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Mate competition in Pakistan: Mate value, mate retention, and competitor derogation

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ABSTRACT

Mate retention and competitor derogation are two key components of human mate competition. In a conservative, religious sample from Pakistan ($N = 255$), the current study investigated evolutionarily informed hypotheses regarding a) sex differences in competitor derogation and mate retention, b) the relationship between mate value and mate retention tactics, and c) the role religiosity plays in predicting the type of mate retention behaviors. The results indicated that across both sexes, higher mate value predicted greater use of mate retention tactics and also predicted overall competitor derogation. Men more than women used tactics of resource display, violence, intra-sexual threats, sexual inducements, derogation of mate, possessive ornamentation, and monopolization. The results also showed that greater religiosity predicted increased use of cost-inflicting mate retention behaviors among men and decreased use among women. To our knowledge, the current study is the first to investigate mating psychology in Pakistan from an evolutionary perspective.

1. Introduction

1.1. Mate value and mate retention tactics

Not all potential mates are equally valued. Although there exist some individual difference in valuation criteria, some potential are consensually seen as more desirable than others (Sugiyama, 2005). Overall desirability as a mate includes a wide variety of attributes (Buss, 1989; Buss, Shackelford, Kirkpatrick, & Larsen, 2001). These include facial attractiveness (Rhodes, 2006), physical attributes (Furnham, Swami, & Shah, 2006), financial prospects (Buss et al., 2001), health (Grammer, Fink, Møller, & Thornhill, 2003), intelligence (Stone, Shackelford, & Buss, 2008), and emotional stability (Buss et al., 1990), to name a few. For the purposes of the current investigation, the aggregate of all of these components of desirability can be thought of as an individual's mate value (Sugiyama, 2005).

Research suggests that individuals are aware of both their and others' mate value (Miner, Starratt, & Shackelford, 2009; Salkicevic, Stanic, & Grabovac, 2014). Furthermore, mating behavior is influenced by both: one's own mate value and one's partner's mate value (Salkicevic et al., 2014). Mate value discrepancies in a relationship have been shown to affect important outcomes such as relationship satisfaction (Conroy-Beam, Goetz, & Buss, 2016; Salkicevic et al., 2014), mating effort (Kirsner, Figueredo, & Jacobs, 2009), forgiveness and jealousy (Sidelinger & Booth-Butterfield, 2007) and likelihood of infidelity (Shackelford & Buss, 1997).

Mate value also appears to affect mate retention behavior (Buss & Shackelford, 1997a; Kirsner et al., 2009; Miner, Starratt, & Shackelford, 2009). Individuals with higher mate value are able to provide more benefits to their partners, such as financial resources, physical protection, and higher quality genes. In comparison, individuals with lower mate value are less able to provide such benefits, and are therefore hypothesized to be more likely to resort to cost-inflicting mate retention tactics. Cost-inflicting tactics work by lowering a partner's self-esteem, (Miner, Starratt, & Shackelford, 2009), or (for example) by monopolizing a partner's time and restricting contact with other potential mates. Indeed, research suggests that the lower mate value individual in a relationship is more likely to initiate cost-inflicting behaviors (such as derogation of mate, vigilance, and jealousy induction), whereas the higher mate value partner is more likely to employ benefit provisioning behaviors (such as resource display and appearance enhancement; Miner, Shackelford, & Starratt, 2009; Miner, Starratt, & Shackelford, 2009; Salkicevic et al., 2014). The present study seeks to investigate this phenomenon in a Muslim Pakistani context for the first time.

Hypothesis 1. *Mate value will predict the specific types of mate retention strategies men and women employ.*

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Specific predictions derived from this hypothesis are:

1a) Men of higher mate value will engage in more benefit-provisioning mate retention behaviors than men of lower mate value.

1b) Men of lower mate value will engage in more cost-inflicting mate retention behaviors than men of higher mate value.

1c) Women of higher mate value will engage in more benefit-provisioning mate retention behaviors than women of lower mate value.

1d) Women of lower mate value will engage in more cost-inflicting mate retention behaviors than women of higher mate value.

1.2. Sex-differentiated mate retention tactics

One of the greatest risks in a mateship is to have a partner who commits an infidelity or defects from the relationship (Edlund, Heider, Scherer, Farc, & Sagarin, 2006; Fisher, Voracek, Rekkas, & Cox, 2008). To guard against such outcomes, humans have evolved specific mechanisms to defend against partner infidelity and defection. These tactics are often referred to as mate retention strategies (Salkicevic et al., 2014).

Since men and women look for different characteristics in a potential mate, mate-retention tactics are also sex-differentiated (de Miguel & Buss, 2011; Kardum, Hudek-Knežević, & Gračanin, 2006; Lopes, Shackelford, Santos, Farias, & Segundo, 2016; Pham, Barbaro, Mogilski, & Shackelford, 2015). In line with women's mate preferences, men more often use the tactics of resource display (Buss, 1988b) and mate derogation (Barbaro, Pham, & Shackelford, 2015). By contrast, in line with men's desires, women more commonly employ mate retention strategies such as appearance enhancement (Buss, 1988b; Buss & Shackelford, 1997a). In sum, the mate preferences of one sex theoretically dictate and empirically predict the mate retention strategies of the opposite sex. The following hypothesis and predictions are based on this logic.

Hypothesis 2. *Men and women will differ in the tactics they use for mate retention*

- Men will use ‘resource display’ more than women as a mate retention strategy
- Women will use ‘appearance enhancement’ more than men as a mate retention strategy

  Additionally, based on previous studies, it has been established that men perform sexual inducements to retain a mate more often as compared to women (Buss, 1988b; de Miguel & Buss, 2011). We want to test the generality this oft-discovered, yet counter-intuitive empirical finding, in this study as well and therefore, hypothesized that:
- Men will use “sexual inducements” more than women as a mate retention strategy

Research shows that men are more likely to use intrasexual threats than are women (Buss, 1988b; Buss & Shackelford, 1997a; Kardum et al., 2006). More broadly, men are more physically aggressive than women (Archer, 2004), and are much more likely to engage in intrasexual violence and homicide (Campbell, 1995). Based on these considerations, we also made the following predictions:

- Men will use ‘intrasexual threats’ more than women as a mate retention strategy
- Men will use ‘violence against rivals’ more than women as a mate retention strategy

1.3. Competitor derogation

Competitor derogation is a common tactic in intrasexual competition (Buss & Dedden, 1990). These are actions initiated with the intent of making a same-sex rival appear less appealing (Buss & Dedden, 1990; Buss & Shackelford, 1997b) and range from insulting the competitor's intelligence to physically confronting him or her. Although both men and women compete intra-sexually, there are sex differences in the ways they derogate their competitors. Men and women tend to derogate their competitors on dimensions valued by the opposite sex; for example, men place a premium on women's physical attractiveness (Sprecher, Sullivan, & Hatfield, 1994) and therefore, women derogate their rivals on the dimension of physical attractiveness (Buss, 1988b; Fisher & Cox, 2009).

Similarly, men tend to derogate their rivals on the dimensions of economic resources and professional achievement, as well as on athletic prowess and physical formidability, because women value these attributes in a potential mate (Buss & Dedden, 1990). Research shows that women find intelligence in men attractive and prefer mating with intelligent men (Buss & Shackelford, 2008). Moreover, because social status is strongly linked to economic resource potential, research also indicates that women prefer men who are high in social status (Li, Balley, Kenrick, & Linsenmeier, 2002). Therefore, men derogate their rivals on precisely these dimensions.

There are also domains of competitor derogation commonly used by both sexes, such as spreading rumors and attacking the social characteristics of one's competitors (Buss & Dedden, 1990). Given the logic that the mate preferences of one sex determine the domains of competition of the other sex (Buss, 1988a), we generated the following hypothesis and predictions:

Hypothesis 3. *Men and women will differ in the ways they derogate their mate competitors*

3a) Men will engage in more derogation of their rivals along the dimensions valued by women: finances, strength, achievement, family and lack of ambition or goal.

3b) Women will engage in more derogation of their rivals along the dimensions valued by men: physical attractiveness and sexual fidelity (vs. promiscuity).

1.4. Religiosity

With a few exceptions, most studies on human mating have taken place in non-Muslim populations (Atari, 2017; Atari, Barbaro, Sela, Shackelford, & Chegeni, 2017; Atari, Barbaro, Shackelford, & Chegeni, 2017; Atari & Jamali, 2016). Pakistan is an overwhelmingly Muslim-majority country (Haub & Kaneda, 2014) with Islam as its official state religion (Rahman, 1973). Religiosity in Pakistan is widespread (Crabtree, 2010) and influences many mating-related behaviors: honor killings (Ruane, 2000), arranged marriages (Zaidi & Shuraydi, 2002), polygamy (Hadi, 2003), and violence towards women (Niaz, 2003). Islamic law influences sexual practices as well – for example, both premarital sex and adultery are punishable under the penal law (Imran, 2013). In Pakistan, religion also influences interaction between the sexes, for instance, with the prevalence of the *purdah*, i.e. headscarf for women, pressures to dress modestly, and the importance of avoiding interaction with genetically unrelated males (Dickemann, 1981; Mirza, 1999).

It seems reasonable to expect that such a high degree of religiosity might impact mating behavior in Pakistan where women are victims of domestic violence at the hands of men (Fikree & Bhatti, 1999). This includes beating and subjecting women to subordinate status, economic dependence, and restrictions on going out alone (Rabbani, Qureshi, & Rizvi, 2008). In Pakistan, women are typically expected to stay in the house and leave the house in accordance with the approval of a male guardian (Ahmed-Ghosh, 2004).

In terms of religiosity and mate retention, an Iranian study indicated an association between religiosity and benefit-provisioning mate retention behaviors in women (Atari, Barbaro, Shackelford, & Chegeni, 2017). Among men, the results were more complex: religiosity negatively predicted physical possession signals and positively predicted

possessive ornamentation, concealment of mate, commitment manipulation, and appearance enhancement. Because Pakistan is also a conservative Islamic state, like Iran, and because religiosity plays an important role in both of these countries, we expected to find the following:

Hypothesis 4. *Religiosity will predict the different types of mate retention strategies men and women employ*

- Religiosity will predict greater use of cost-inflicting mate retention behaviors at least among men

Although mate retention, mate value and competitor derogation have been studied in pairs before, to our knowledge there has been no research simultaneously investigating all three of these constructs together with religiosity. This study therefore aimed to investigate the ways in which religiosity might affect mating psychology, and to what extent well-established evolutionary hypotheses about human mating hold up in an extremely religious Muslim population.

2. Method

2.1. Participants

Originally a sample of 270 participants was collected from three main cities of Pakistan- Lahore, Islamabad and Karachi- to ensure diversity in the data. After excluding the 15 incomplete questionnaires the final sample consisted of 255 heterosexual participants (122 males and 133 females) who were all Muslims. Participants ages ranged from 18 to 66 years ($M = 27.3$; *SD = 5.4) in which w*omen's mean age was 26.8 (*SD = 4.5*) and men's mean age was 27.8 ($SD = 6.1$). In terms of relationship status, 66.4% women and 79.5% men were in a relationship.

2.2. Procedure

Initially, a pilot study was conducted on 25 participants to check the applicability of the scales used in this study. After that, in the final data collection, participants filled out questionnaire comprising of demographics and these four scales in the following order: Self-rating of Religiosity (SRR), Mate Retention Inventory – short form (MRI-SF), Mate Value Scale (MVS) and Competitor Derogation tactics.

2.3. Materials

Self-rating of Religiosity scale (SRR) is a single item scale (Abdel-Khalek, 2007) and it has been validated as a reliable tool for measuring religiosity (Abdel-Khalek & Lester, 2015; Atari, Barbaro, Shackelford, & Chegeni, 2017). Participants were asked "What is your level of religiosity in general?" and they responded on an 11-point scale ranging from 0 (representing no religiosity) to 10 (high level of religiosity).

Mate Retention Inventory – Short form (MRI-SF) measures 19 mate retention strategies with 38 items (Buss, Shackelford, & McKibbin, 2008) and is a reliable tool ($\alpha = 0.90$). Participants indicated their frequency of each mate retention behavior on a 4-point Likert scale with 0 signifying *never* and 3 signifying *often*.

In order to measure Mate value, a self-report *Mate Value Scale* (MVS) was used which consists of 4 items (Edlund & Sagarin, 2014) and is a reliable instrument ($\alpha = 0.86$.). Participants rated their mate value on a 7-point Likert scale ranging from 1 (extremely undesirable) to 7 (extremely desirable).

Competitor Derogation Tactics (Buss & Dedden, 1990) was used which measures how frequently people derogate their rivals on the basis of 28 derogation tactics (see (Buss & Dedden, 1990; Schmitt & Buss, 1996) on a 7-point Likert scale. Based on our pilot study, 2 tactics, "get rival drunk" and "call competitor sexually incompetent" were excluded because drinking and having premarital sex is illegal in Pakistan.

3. Results

3.1. Reliabilities of instruments

Analyses suggest that all the instruments used in this study were reliable. Cronbach's alpha for the Mate Value Scale (MVS) was high for men ($\alpha = 0.85$) women ($\alpha = 0.87$) and overall ($\alpha = 0.86$). MRI-SF also had a high Chronbach's alpha for men ($\alpha = 0.96$), women ($\alpha = 0.95$), and overall ($\alpha = 0.96$). Similarly, the Competitor Derogation scale had a Chronbach's alpha of $\alpha = 0.99$ for both men and women and the exact same value overall ($\alpha = 0.99$).

3.2. Mate value

Consistent with our hypothesis, a regression analysis indicated that mate value predicted the overall frequency of benefit-provisioning behaviors ($\beta = 0.23$, $t(254) = 7.82$, $p < 0.001$) for both sexes. Mate value also explained significant variance in benefit-provisioning scores, $R^2 = 0.05$, $F(1,254) = 14.70$, $p < 0.001$. Men with higher mate value employed more benefit-provisioning behaviors to retain their mates ($\beta = 0.22$, $t(121) = 7.29$, $p < 0.05$). Among men, higher mate value explained significant variance in benefit provisioning $R^2 = 0.048$, $F(1,121) = 6.08$, $p < 0.015$. Among women, higher mate value also predicted greater use of benefit-provisioning behaviors ($\beta = 0.25$, $t(132) = 4.33$ $p < 0.001$) and explained significant variance in benefit-provisioning behaviors $R^2 = 0.064$, $F(1,132) = 8.95$, $p < 0.003$.

Surprisingly, however, men of higher mate value also used more cost-inflicting behaviors ($\beta = 0.51$, $t(121) = -1.17$, $p < 0.001$). Among men, higher mate value explained significant variance in cost-inflicting scores, $R^2 = 0.263$, $F(1,121) = 42.86$, $p < 0.001$. Similarly, women of higher mate value also employed more cost-inflicting behaviors ($\beta = 0.33$, $t(132) = -0.82$, $p < 0.001$), with mate value accounting for variance $R^2 = 0.11$, $F(1,132) = 15.73$, $p < 0.001$ in cost-inflicting scores. Indeed, a linear regression indicated that mate value predicted overall usage of mate retention behaviors, collapsing across the benefit-provisioning and cost-inflicting categories ($\beta = 0.38$, $t(254) = 1.20$, $p < 0.001$), with mate value explaining significant variance in overall mate retention scores $R^2 = 0.144$, $F(1,254) = 42.60$, $p < 0.001$

3.3. Mate retention

We used independent samples *t*-tests to calculate mean differences. Consistent with our hypothesis, men ($M = 4.74$, $SD = 1.52$) used *resource display* $t(254) = 6.47$, $p < 0.001$, $d = 0.81$, more often than women ($M = 3.37$, $SD = 1.84$). Men ($M = 4.29$, $SD = 2.11$) also reported the use of *intra-sexual threats* more than women ($M = 1.27$, $SD = 1.81$), $t(254) = 12.33$, $p < 0.001$, $d = 1.55$. Also in line with our expectations, men reported using *violence against rivals* more often than women, $t(254) = 9.34$, $p < 0.001$, $d = 1.17$ (Male $M = 2.74$, $SD = 2.49$; female $M = 0.49$, $SD = 1.19$).

Consistent with prior studies, more men ($M = 3.61$, $SD = 1.85$) than women ($M = 3.11$, $SD = 1.95$) reported the use of *sexual inducements* $t(254) = 2.11$, $p < 0.05$, $d = 0.26$. Contrary to prediction, women ($M = 3.87$, $SD = 1.83$) did not report using appearance enhancement more than men (($M = 3.93$, $SD = 1.86$), $t(254) = 0.30$).

We also found unpredicted gender differences in certain mate retention strategies. Men ($M = 3.40$, $SD = 2.49$) more than women ($M = 1.30$, $SD = 1.64$) reported the use of *possessive ornamentation*, $t(254) = 8.05$, $p < 0.001$. Similarly, more men ($M = 2.87$, $SD = 2.16$) than women ($M = 2.18$, $SD = 1.95$) reported the use of *monopolization of time* $t(245) = 2.67$, $p < 0.05$, $d = 0.34$ to retain their mates. Finally, men ($M = 2.10$, $SD = 2.21$) more than women ($M = 0.99$, $SD = 1.65$)

Table 1
Sex differences in derogation tactics: Dimensions valued by women.

	Males		Females			
Derogation tactic	M	SD	M	SD	$t(254)$	Cohen's d
Competitor's finances	9.93	7.64	4.91	3.86	6.73***	0.84
Competitor's intelligence	12.09	6.50	6.68	4.62	7.73***	0.97
Competitor's strengths	10.67	7.49	5.51	4.23	6.87***	0.86
Competitor's achievements	10.77	7.20	5.75	4.55	6.73***	0.84
Competitor's lack of ambition/ goals	7.76	4.67	3.83	3.23	7.90***	0.99
Competitor's family	3.39	2.71	1.67	1.60	6.23***	0.78

Note: Males performed all tactics more than women.
*** $p < 0.001$.

engaged in *mate derogation* $t(254) = 4.58$, $p < 0.001$, $d = 0.57$.

3.4. Competitor derogation

Consistent with our hypothesis, males engaged in significantly more competitor derogation than females on the dimensions valued by women: their rival's *finances*, *intelligence*, *strengths*, *achievements*, *goals*, *and family* (see Table 1).

However, contrary to our hypothesis, men *also* engaged in more competitor derogation than women on the dimensions where they were not expected to do so. This included calling the competitor promiscuous, questioning his fidelity, spreading rumors about him, mentioning a previous pregnancy, and derogating his hygiene (see Table 2).

We also found an unpredicted relationship between mate value and competitor derogation. A linear regression indicated that mate value predicted overall competitor derogation, with individuals of higher mate value initiating more competitor derogation. This was true for both males ($\beta = 0.63$, $t(121) = -2.33$, $p < 0.001$) and females ($\beta = 0.38$, $t(132) = 0.54$, $p < 0.001$). Collapsing across sex, mate value explained for significant variance in competitor derogation, $R^2 = 0.23$, $F(1,254) = 75.72$, $p < 0.001$

3.5. Religiosity

Regression indicated that in both sexes, religiosity significantly predicted the type of mate retention tactics employed ($\beta = 0.16$, $t(254) = 7.71$, $p < 0.01$) with religiosity significantly explaining variance in mate retention tactics $R^2 = 0.024$, $F(1,254) = 6.31$, $p < 0.013$. Higher religiosity predicted increased use of cost-inflicting tactics for men ($\beta = 0.43$, $t(121) = 2.51$, $p = 0.001$) and accounted for significant variance in cost-inflicting scores, $R^2 = 0.186$, $F(1,121) = 27.43$, $p < 0.001$. By contrast, higher religiosity predicted *decreased* use of cost inflicting tactics among women ($\beta = -0.17$, $t(132) = 6.75$, $p = 0.05$) and accounted for significant variance in cost-inflicting scores, $R^2 = 0.028$, $F(1,132) = 3.84$, $p < 0.05$. Religiosity did *not* predict benefit-provisioning mate retention behaviors for either men ($\beta = -0.09$, *ns*) or women ($\beta = -0.09$, *ns*).

Table 2
Sex differences in derogation tactics: Dimensions valued by men.

	Males		Females			
Derogation tactic	M	SD	M	SD	$t(254)$	Cohen's d
Call competitor promiscuous	17.96	11.45	9.53	7.63	6.98***	0.88
Derogate appearance	34.41	22.65	19.59	14.69	6.26***	0.79
Question fidelity	7.60	4.62	4.31	3.47	6.49***	0.81
Spread rumors	3.22	2.43	1.62	1.49	6.46***	0.81
Mention previous pregnancy	2.89	2.26	1.51	1.43	5.88***	0.74
Derogate competitor's hygiene	6.66	4.62	3.78	3.30	5.78***	0.73

Note: Males performed all tactics more than women.
*** $p < 0.001$.

4. Discussion

4.1. Mate value and mate retention

The current study examined the associations between mate value, mate retention strategies, competitor derogation tactics, and religiosity in a Muslim-majority sample in Pakistan. The results indicated that mate value predicted the use of mate retention behaviors among both men and women. Across both sexes, higher mate value predicted greater use of both benefit-provisioning and cost-inflicting strategies to retain their mates. To our knowledge, this is the first empirical evidence that higher mate-value individuals engage in more overall mate retention.

We predicted the relationship between mate value and benefit-bestowing behaviors in advance, but were surprised by the findings that higher mate value also predicts greater use of cost-inflicting mate retention behaviors. We think this finding might be explained in two ways. First, in general, people with higher mate value may be able to afford to engage in cost-inflicting behaviors and still be desirable. For example, in Pakistan, mate guarding and violence are common practices. However, practicing such acts does not result in losing value in the eyes of their mates. Second, in Pakistani culture, it's socially acceptable for a man to be suspicious and intrude into his wife's personal space (e.g. checking her cell phone). By contrast, for women, it's often considered socially acceptable to use emotional manipulation with one's mate. These implicit cultural rules, along with the fact that higher mate value individuals can likely afford to engage in more intrusive behaviors, may help explain the relationship between higher mate value and greater use of cost-inflicting behaviors.

4.2. Types of mate retention

In line with our predictions and with previous research (Atari, Barbaro, Shackelford, & Chegeni, 2017; Buss & Shackelford, 1997a; Lopes et al., 2016), men used more *resource display*, *violence* and *intrasexual threats* than women. Unexpectedly, our results also suggest that men used *sexual inducements* and *appearance enhancement* more than women – a finding which can be understood in terms of the culture and religion of Pakistan.

In Pakistan, Islam influences interaction between the sexes by stressing that women should avoid interaction with genetically unrelated males (Mirza, 1999). The headscarf, veil and *burqa* are widespread. More generally, women face immense pressure to dress "modestly" and women who don't observe such modesty norms are often considered socially undesirable. Therefore, women tend not to use much appearance enhancement at all, and certainly not ostentatious forms of it. In line with the restrictions women face in Pakistan, serious doubts are cast on a woman's chastity if she asks for or does anything sexual in nature, including appearance enhancement techniques such as wearing makeup or form-fitting clothing. Using sexual inducements and appearance enhancement are thus overly risky strategies for women in Pakistan. Men do not face these same barriers and are thus free to engage in tactics such as appearance enhancement.

Our results also suggest three additional unpredicted sex differences in mate retention strategies: men engaged in *derogation of mate*, *possessive ornamentation* and *monopolization of time* more than women did.

4.3. Competitor derogation

In line with our predictions and with previous evolutionary theorizing (Buss & Dedden, 1990), we found that Pakistani men derogated their competitors on the dimensions valued by women. These included *rival's financial standing*, *intelligence*, *strength*, *achievements*, *goals*, *and*

family. Unexpectedly, men *also* engaged in more competitor derogation than women on dimensions we did not predict a priori. This included calling the competitor promiscuous, questioning his fidelity, spreading rumors about him, mentioning a previous pregnancy, and derogating his hygiene. As shown by the data, men in Pakistan are more competitive and engage in more intrasexual derogation than do women. This may be explicable in terms of resource gathering. Pakistan is a developing country in which men are the breadwinners and are generally financially responsible for women, who (along with their children) depend on men's income. These conditions likely foster higher levels of intrasexual competitiveness in men. By contrast, women in Pakistan have less power and fewer financial resources. They also have to dress "modestly", and sustain reputational damage for flouting cultural and religious norms. These conditions do not foster high levels of intrasexual competition. This may partly explain the sex difference in intrasexual competition in Pakistan.

We also found an unpredicted positive relationship between mate value and competitor derogation. These findings show that among both sexes, mate value predicted overall competitor derogation, with higher mate value individuals initiating more competitor derogation. This is surprising, in that individuals of higher mate value should not need to engage in competitor derogation as much as individuals of lower mate value. We offer two speculations. First, because the competitors of high mate value individuals are themselves likely to be of high mate value, competitor derogation may acquire extra importance for these individuals. Second, higher mate value individuals are likely better able to sustain the potential reputational costs associated with verbally derogating their competitors. Such a tactic may be more dangerous for less desirable individuals and safer for those of higher mate value. These speculations await both replication and further empirical tests of predictions based on them.

4.4. Religiosity

To our knowledge, previous studies have not explored the relationship between religiosity and mate retention behaviors (for an exception, see (Atari, Barbaro, Shackelford, & Chegeni, 2017)). In the current study, religiosity predicted the *type* of mate retention tactics employed in both sexes. Confirming our hypothesis, greater religiosity predicted increased use of cost-inflicting mate retention behaviors among men. Religiosity did *not* predict benefit-provisioning mate retention behaviors for either sex.

4.5. Limitations and future directions

This study discovered several novel findings and replicates some previous findings in a dramatically different cultural context. Nonetheless, several limitations require highlighting. First, the sample was taken from only three major cities of Pakistan. To increase generalizability, samples from less developed cities should be included in future research. Second, we did not translate the scales into Urdu (the native language of Pakistan). However, people in Pakistan's major cities are fluent in English, mitigating the strength of this limitation. Third, women's self-report may be compromised due to intense socio-religious pressures regarding modesty, sexuality, chastity, and explicit appearance enhancement.

We think the reason men used more sexual inducements and appearance enhancement is that in a religious Islamic culture like Pakistan, women are expected not to do these things, and they sustain reputational damage if they do. This suggests three future directions: first, it would be interesting to investigate if it is also the case in other religious Muslim cultures that men engage in more of these tactics than women. Second, it would be interesting to see if liberal women from higher SES families in Pakistan (which tend to allow their female members more freedom), would respond differently, i.e., whether they engage in more appearance enhancement and sexual inducements than their more conservative and religious counterparts. Third, an important direction for future research would be to examine the reasons women in Muslim cultures, compared with other cultures, sustain more reputational damage for tactics such as appearance enhancement—a direction beyond the scope of the current paper.

Finally, existing research suggests that personality traits predict mate retention behaviors. Specifically, Conscientiousness and Openness to Experience are negatively associated with cost-inflicting mate retention behaviors (e.g., mate concealment, threatening infidelity; (Atari, Barbaro, Sela, et al., 2017; de Miguel & Buss, 2011). It would be worth investigating whether these personality findings replicate in a conservative Islamic culture such as Pakistan.

5. Conclusions

The current study examined the relationship between mate value, mate retention strategies, competitor derogation tactics, and religiosity in a Muslim-majority Pakistani sample. The results indicated that across both sexes, higher mate value predicted greater use of both benefit-provisioning and cost-inflicting strategies to retain their mate. In terms of mate retention strategies, Pakistani men used more resource display, violence, intra-sexual threats, sexual inducements, appearance enhancement, derogation of mate, possessive ornamentation and monopolization of time than women. As predicted based on the causal links between the two components of sexual selection, men derogated their competitors on dimensions valued by women (for example, rival's financial standing, intelligence, and achievements). Men also engaged in more competitor derogation on unexpected dimensions such as calling the competitor promiscuous, questioning his fidelity, and spreading rumors about him.

We also found that among both sexes, mate value predicted overall competitor derogation, with higher mate value individuals initiating more competitor derogation. Higher religiosity predicted increased use of cost-inflicting mate retention behaviors among men and decreased use among women. The current study contributes to the evolutionary psychological literature in non-western cultures and in particular, it adds to the literature on the associations between mate retention strategies, mate value and competitor derogation tactics.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2018.04.007.

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