Article

Mate Preferences in Three Muslim-Majority Countries: Sex Differences and Personality Correlates

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Abstract

Cross-cultural research on long-term mate preferences in Muslim-majority countries is scarce. The research described here aims to examine the KASER (kindness/dependability, attractiveness/sexuality, status/resources, education/intelligence, and religiosity/chastity) model of mate preferences in Iran, Pakistan, and Turkey ($N = 1{,}089$). We examined structural validity, measurement invariance between men and women, sex differences, cultural differences, and Big Five personality correlates of these dimensions of mate preferences. Findings supported preregistered hypotheses regarding sex differences in mate preferences. Multilevel models suggested that the magnitude of sex differences was invariant across cultures. Personality correlates of mate preferences varied across cultures, but agreeableness consistently predicted the preference for kind and dependable partners across cultures. In sum, sex differences in mate preferences within and across three Muslim-majority countries described here replicate previous findings, but evidence for personality correlates of mate preferences is mixed, variable across cultures, and in need of further examination in non-Western samples.

Keywords

mate preferences, sex differences, Big Five, personality, cross-cultural psychology

Selecting a long-term romantic partner is a key life decision and influences most aspects of our lives. Mate choice is associated with physical well-being, mental health, economic decision-making, workplace behavior, social interactions (see Diener & Seligman, 2002; Hill & Buss, 2006), and brain structure (Kawamichi et al., 2016). Previous research has identified some well-established sex differences in men's and women's mate preferences (Buss, 1989; Buss & Schmitt, 1993; Schmitt, 2005). The processes underlying human mate choice and people's preferences in choosing a long-term romantic partner are complex (Conroy-Beam & Buss, 2016). Although most of the literature on human mating psychology relies heavily on Western, Educated, Industrialized, Rich, and Democratic societies (WEIRD; Henrich, Heine, & Norenzayan, 2010), psychologists have recently begun to explore mating psychology in Middle Eastern Muslim-majority countries (e.g., Chaudhary, Al-Shawaf, & Buss, 2018; Chegeni, Pirkalani, & Dehshiri, 2018). Using a recently developed multidimensional model of long-term mate preferences in Iran (Atari, 2017), we present, and make publicly available, data from three Muslim-majority countries (Pakistan, Iran, and Turkey), examine preregistered hypotheses about sex differences in mate preferences in these cultures, and investigate Big Five predictors of mate preferences in each culture.

Sex Differences in Mate Preferences

There are some universal preferences in mate selection. For example, people tend to prefer kind, healthy, and empathetic partners and dislike cruel partners or those suffering from a terminal illness (e.g., Boysen, 2017). Several reasons might underlie these preferences. For example, kind and empathetic partners are more likely to cooperate in the maintenance of a long-term relationship (Buss & Barnes, 1986), increase relationship satisfaction (Valentine, Li, Meltzer, & Tsai, 2019), and are more likely to be caring parents in the future (Buckels et al., 2015). There is a substantial body of evidence from different researchers, cultures, and methods showing that men and women differ in their long-term mate preferences (see Bech-Sørensen & Pollet, 2016; Buss, 1989; Eastwick & Finkel,

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2008). Compared with women, men tend to be more attracted to indicators of fertility and reproductive value, including physical attractiveness and youth (Meltzer, McNulty, Jackson, & Karney, 2014; Sugiyama, 2005). Compared with men, women report stronger preferences for signs of the ability to acquire resources, social status, and dominance (Li, Bailey, Kenrick, & Linsenmeier, 2002). Across cultures, women rate indicators of access to resources (e.g., wealth, achievement) and willingness to invest (e.g., love, commitment) as particularly desirable in a long-term romantic partner (Buss 1989; Shackelford, Schmitt, & Buss, 2005). These findings are universal, but the magnitude of the sex difference varies from culture to culture (see Buss, 1989). A recent analysis showed that sex differences in preferences for "good earning capacity" may be slightly smaller in countries with greater gender equality such as Sweden or Norway (e.g., Zhang, Lee, DeBruine, & Jones, 2019).

Sex differences in mate preferences have been found to be relatively invariant over time in different cultures. Kamble, Shackelford, Pham, and Buss (2014) used two research instruments to examine sex differences in mate preferences in India, and compared the findings with Indian mate preferences reported in Buss (1989). Mate preferences for "mutual attraction" and "love" remained important for Indian men and women, being invariant over a quarter of a century, despite India's history of arranged marriage. Sex differences in mate preferences for physical attractiveness and resources (e.g., good financial prospects, social status) remained relatively invariant over time: Women placed greater emphasis on financial prospects than did men, and men placed greater emphasis on physical attractiveness. Souza, Conroy-Beam, and Buss (2016) compared a large sample of modern Brazilians with a Brazilian sample studied in Buss (1989). Mate preferences for "mutual attraction," "kindness," and "intelligence" remained important for both sexes, and sex differences in these preferences remained relatively invariant over time. Sex differences in preferences for cues to fertility (e.g., youth, physical attractiveness) and resources (earning capacity, financial prospects, social status) also remained relatively invariant over time and replicated previous findings. These findings point to the stability of sex differences in mate preferences. However, much less is known about these sex differences in mate preferences in Muslim-majority countries.

Building upon findings of Atari and Jamali (2016) in Iran, Atari (2017) developed a five-factor model of mate preferences using a factor analytic approach. This model consists of five dimensions in choosing a long-term mate: kindness/dependability, attractiveness/sexuality, status/resources, education/intelligence, and religiosity/chastity (KASER; Atari, 2017). In terms of sex differences, women tended to place more value on kindness/dependability (Cohen's $d = 0.48$), status/resources (Cohen's $d = 1.30$), and education/intelligence (Cohen's $d = 0.66$) than did men. On the other hand, men placed more emphasis on attractiveness/sexuality (Cohen's $d = -0.47$) than did women in long-term mating. No significant sex difference emerged for religiosity/chastity (Cohen's $d = -0.13$). This multidimensional model of long-term mate preferences has been used in Iran (e.g., Atari, Chegeni, & Fathi, 2017), but no other Middle Eastern countries.

Personality and Mate Preferences

Empirical studies have found that personality predicts mate preferences. Recently, Gebauer, Leary, and Neberich (2012) examined the relationship between Big Two personality traits (agency/competence and communion/warmth; Abele, Cuddy, Judd, & Yzerbyt, 2008) and Big Three mate preferences (attractiveness, status, and warmth; Fletcher, Simpson, Thomas, & Giles, 1999). These authors provided supporting evidence for the similarity-attracts hypothesis in a cross-cultural sample; however, they also found that culture may moderate these relationships. For example, agentic individuals (more than communal individuals) preferred attractiveness in mate selection, but this association was not significant in attractiveness-valuing countries (e.g., Austria, Italy). One broader implication might be that characteristics that are already preferred in a society are less heavily influenced by an individual's personality traits. In other words, when a mate preference is normative in a culture, personality traits are not powerful predictors of that preference in that culture. Gebauer and colleagues' (2012) findings showed that robust differences exist between cultures in the strength of *similarity hypothesis* effects (i.e., individuals ending up with mates who are similar to themselves; see Buss, 1984) at least in the domain of Big Two personality traits. More specifically, the "similarity-attracts" hypothesis, in the domain of physical attractiveness, holds in countries where attractiveness preferences are not normative in selecting a long-term mate (e.g., France, Poland). The similarity hypothesis, also known as assortative mating, refers to individuals' propensity to mate with partners with similar traits more frequently than would be expected under a random mating pattern.

Most cross-cultural studies in the literature have relied on WEIRD countries. To our knowledge, no cross-cultural study has investigated personality and mate preferences in religious Muslim-majority countries. The few studies in non-WEIRD, Muslim-majority countries focused exclusively on limited samples (e.g., Atari & Chegeni, 2017; Chaudhary et al., 2018) and do not reveal anything about the relationship between basic personality traits (i.e., the Big Five) and long-term mate preferences in such cultural settings. Therefore, it is important to further examine the links between different personality traits and mate preferences in different cultures, particularly non-WEIRD ones (Štěrbová et al., 2017).

The Current Research

In order to fill this gap and extend recent cross-cultural work on mate preferences, we designed the current research to investigate (1) sex differences in long-term mate preferences using a multidimensional model developed in non-Western cultures, (2) measurement invariance (MI; i.e., a statistical test to examine whether a given measure is interpreted in a conceptually

Table 1. Summary of All Preregistered Hypotheses.

No.	Hypothesis	Result
1	Men will score higher than women on the preference for attractiveness/sexuality	Supported in Iran and Turkey
2	Women will score higher than men on the preference for status/resources	Supported in all three countries
3	Women will score higher than men on the preference for kindness/dependability	Supported in all three countries
4	Women will score higher than men on the preference for education/intelligence	Supported in Iran and Turkey
5	Openness to experience will be negatively associated with the preference for religiosity/chastity	Supported in Iran and Turkey
6A	Agreeableness will be positively associated with the preference for kindness/dependability	Supported in all three countries
6B	Agreeableness will be positively associated with the preference for religiosity/chastity	Not supported
7A	Conscientiousness will be positively associated with the preference for kindness/dependability	Supported in Iran
7B	Conscientiousness will be positively associated with the preference for religiosity/chastity	Supported in Iran

similar manner by respondents representing different groups or cultural backgrounds) of long-term mate preferences using a novel measure of mate preferences in three languages (Turkish, Farsi, and Urdu), and (3) links between the Big Five model of personality and the KASER model of mate preferences in Turkey, Iran, and Pakistan. According to the aforementioned literature on mate preferences in different cultures (see Atari, 2017; Buss, 1989; Zhang et al., 2019), we preregistered our hypotheses, which were as follows:

Hypothesis 1 (H1): Men would score higher than women on the preference for attractiveness/sexuality factor.
Hypothesis 2 (H2): Women would score higher than men on the preference for status/resources factor.
Hypothesis 3 (H3): Women would score higher than men on the preference for kindness/dependability factor.
Hypothesis 4 (H4): Women would score higher than men on the preference for education/intelligence factor.

Based on assortative mating literature and previous findings (see Atari & Chegeni, 2017; Buss, 1984; Lewis, Al-Shawaf, & Yilmaz, 2015; Štěrbová et al., 2017), we hypothesized that openness to experience would be negatively associated with the preference for religiosity/chastity (Hypothesis 5 [H5]). We predicted that agreeableness would be positively associated with kindness/dependability (Hypothesis 6a [H6a]) and religiosity/chastity (Hypothesis 6b [H6b]); conscientiousness would be positively associated with kindness/dependability (Hypothesis 7a [H7a]) and religiosity/chastity (Hypothesis 7b [H7b]). All preregistered hypotheses are summarized in Table 1.

Method

Participants

We recruited 1,089 heterosexual participants from Pakistan ($n = 325$; 166 women), Iran ($n = 251$; 138 women), and Turkey ($n = 513$; 306 women). The data in Pakistan were collected from three universities, the data in Iran were collected from public places (including universities), and in Turkey, we used an online setting to collect data from university students. The mean self-reported ages were 22.78 (range = 15–37, $Md = 22$, $SD = 3.01$), 24.51 (range = 17–46, $Md = 24$, $SD = 5.56$), and 25.12 (range = 15–76, $Md = 22$, $SD = 8.01$) years in Pakistan, Iran, and Turkey, respectively. All participants identified themselves as Pakistani, Iranian, and Turkish nationals and spoke Urdu, Farsi, and Turkish as their first language. After agreeing to participate in this study, each participant completed a set of self-report measures.

Measures

Mate preferences. We used the Iranian Mate Preferences Scale-20 (Atari, 2017), which is a short operationalization of the KASER model of long-term mate preferences. This measure was originally validated in Farsi, so we created the Urdu and Turkish versions using a standard back-translation technique (Brislin, 1970) before data collection. Specifically, translators fluent in Urdu and Turkish (and English) translated the items into the local language from the original version, then two independent translators unaffiliated with this study translated the items back into English. Small differences that emerged during the translation process were resolved between the translators, the scale developer, and the authors, resulting in Urdu (Urdu Mate Preferences Scale) and Turkish (Turkish Mate Preferences Scale) versions of the scale. This measure has 20 sex-neutral items categorized under five factors. Each item is a characteristic that individuals rate when choosing a long-term romantic partner on a 4-point scale ranging from 1 (*unimportant*) to 4 (*very important*). Kindness/dependability (K), attractiveness/sexuality (A), status/resources (S), education/intelligence (E), and religiosity/chastity (R) are measured by 7, 3, 3, 3, and 4 items, respectively. Internal consistency coefficients for all factors are summarized in Table 2.

The Big Five. We used a short measure of the Big Five dimensions of personality. All participants completed the Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003). Each personality dimension is measured using 2 items, one of which needs reverse scoring. All items are rated along a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The Farsi, Urdu, and Turkish translations of the TIPI have been used in recent studies with desirable results (Afhami, Mohammadi-Zarghan, & Atari, 2017; Atak, 2013; Khan, Ahmed, & Abid, 2016). Although the number of items in the TIPI (2 items per trait, see Cortina, 1993) make the coefficient

Table 2. Descriptive Statistics and Internal Reliability Coefficients of the Study Variables.

	Iran			Pakistan			Turkey		
Variable	*M*	*SD*	α	*M*	*SD*	α	*M*	*SD*	α
Kindness/dependability	3.80	0.30	.79	3.24	0.48	.72	3.37	0.41	.69
Attractiveness/sexuality	3.10	0.68	.77	3.02	0.58	.51	2.58	0.63	.76
Status/resources	2.86	0.81	.77	2.92	0.76	.79	2.00	0.73	.84
Education/intelligence	3.11	0.71	.71	3.08	0.69	.70	2.90	0.73	.66
Religiosity/chastity	2.75	0.79	.71	3.25	0.53	.55	1.74	0.76	.77
Extroversion	8.75	3.15	.53	8.56	2.38	−.02[a]	8.43	2.78	.10
Agreeableness	9.22	2.24	.20	8.78	2.00	−.33[a]	8.61	2.43	.10
Conscientiousness	10.57	2.74	.50	9.14	2.29	.09	9.29	2.68	.14
Emotional stability	7.81	3.04	.36	8.22	2.17	−.21[a]	7.97	2.49	−.06[a]
Openness to experience	10.88	2.46	.35	8.86	2.03	−.28[a]	8.94	2.91	.01

Note. TIPI = Ten-Item Personality Inventory.
[a]These subscales showed negative interitem correlations in TIPI's 2-item subscales.

α an inadequate method for evaluation of TIPI's reliability, we report all α coefficients in Table 2.

Data Analysis

Data from three countries were screened for skewness and kurtosis (Kline, 2010). Demographic variables were examined using standard descriptive statistics within each sample, including means (*M*), standard deviations (*SD*), and internal consistencies (Cronbach's α) using *psych 1.8* (Revelle, 2017) in *R* programming language (Version 3.4.2; R Core Team, 2017). The main analysis was conducted in three steps. First, single-group confirmatory factor analyses (CFAs) examined each instrument's proposed factor structure. Model modifications were used with caution and applied only if a reasonable theoretical explanation existed (i.e., we only covaried error terms of items corresponding to the same latent factor). To evaluate the goodness of fit for the models, we used the fit indices and liberal cutoff values (see Hu & Bentler, 1999). Since the χ^2 is sensitive to sample size, we used χ^2/df and root mean square of approximation (RMSEA; Steiger, 1990) for model evaluation: χ^2/df smaller than 4 and RMSEA values smaller than .08 indicate a reasonable fit and RMSEA values smaller than .05 a good fit (see MacCallum, Browne, & Sugawara, 1996). A 90% confidence interval (CI) was also reported. For the comparative fit index (CFI; Bentler, 1990) and Tucker–Lewis index (TLI), values greater than .9 indicate a good fit, but values between .80 and .90 have been reported as satisfactory in the literature, especially for complex models using short measures (e.g., Atari, 2017). For the standardized root-mean-square residual (SRMR), values smaller than .09 indicated a good fit. Maximum likelihood estimation was used for model testing for all models.

MI testing included a series of model comparisons. At each comparison step, equality constraints were added consecutively to the models. Each model served as a basis for comparison to the preceding model. In the baseline model (*configural invariance*), no equality constraints were applied. This facilitated an evaluation of factor structures across samples. For testing *weak invariance*, factor loadings were constrained to be equal across different groups. If weak invariance was established, intercepts were also constrained to be equal across the groups (*strong invariance*). Imposing constraints on structural models always leads to decreases in model fit. To determine whether the decrease in fit is substantial, initial studies used χ^2 difference tests (Byrne, Shavelson, & Muthén, 1989), but χ^2 differences are also sensitive to sample size (Oishi, 2007). Thus, Cheung and Rensvold (2002) recommended a ΔCFI smaller or equal than .01 to indicate good MI. In addition to the χ^2 difference test, we examined ΔCFI and ΔRMSEA. We also report Bayesian information criterion (BIC) for all models, where smaller values indicate a superior solution to the trade-off between complexity and fit. If MI was evidenced, latent means were compared using independent-samples Welch-corrected *t* tests. Effect sizes were reported using the *effsize 0.7* (Torchiano, 2016). All CFIs and MIs were conducted with the R programming language and *lavaan 0.6* package (Rosseel, 2012).

Multilevel models (MLMs) were run using *lme4 1.1* package (Bates, Mächler, Bolker, & Walker, 2015). In the MLMs, we examined the sex effect nested in cultures, allowing sex differences in mate preferences to vary in the three cultures. Before allowing the sex effect to vary across countries, we calculated intraclass coefficients based on cultural differences. We calculated conditional R^2 to take both the effects of sex and country into account. Finally, we used linear regression models to examine the role of personality dimensions on mate preferences in different cultures. With regard to *p* values, we preregistered $p < .05$ as suggestive evidence and $p < .005$ as strong evidence for our statistical inferences (see Benjamin et al., 2018). Preregistration, data, and materials for this study are publicly available on Open Science Framework (https://osf.io/dws2a).

Results

CFAs

We began our analyses with three CFAs replicating the model proposed by Atari (2017). The five-factor model fit to the data

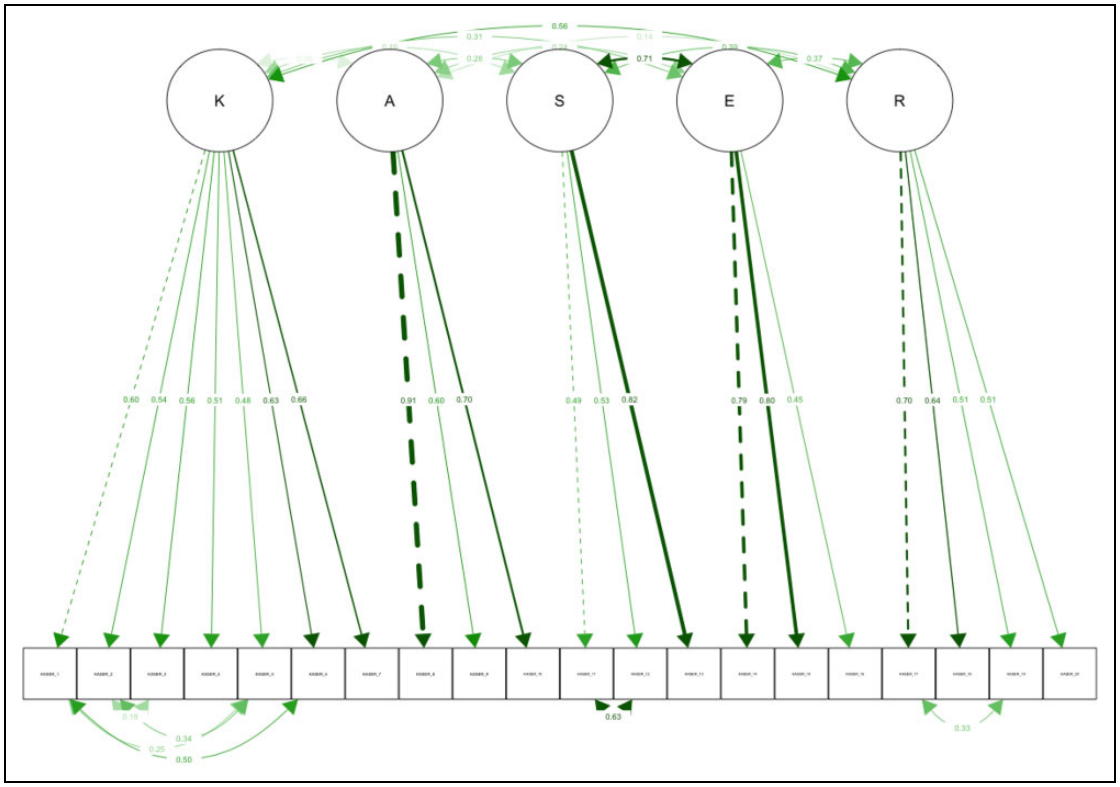

Figure 1. Modified measurement model in Iran.

from Iran was close to those reported by the parent study. We used "modification indices" to improve model fit by covarying error terms of items under a same dimension. The modified Iranian model (Figure 1) had adequate fit to the data ($\chi^2/df = 2.06$; CFI = .90; TLI = .88; RMSEA = .065; RMSEA 90% CI [.055, .075]; SRMR = .068). We applied the same procedure to Pakistani data where the modified model (Figure 2) showed good fit ($\chi^2/df = 2.21$; CFI = .88; TLI = .85; RMSEA = .061; RMSEA 90% CI [.052, .070]; SRMR = .067). The modified model for Turkish data (Figure 3) also showed acceptable fit to the data ($\chi^2/df = 3.56$; CFI = .89; TLI = .86; RMSEA = .072; RMSEA 90% CI [.065, .078]; SRMR = .086).

MI and Sex Differences

Although widely neglected in sex differences research, it is important to assess MI for men and women prior to examination of sex differences (Wang, Chen, Dai, & Richardson, 2018). Drawing on original unmodified models (see Table 3), we established strong MI across sexes in Pakistan, Iran, and Turkey (see Table 4). As can be seen, BIC is lowest in the strong MI model in all three countries. In addition, model differences in CFI and RMSEA are mostly below recommended thresholds. Strong invariance (also known as scalar invariance) implies that not only the item loadings but also the item intercepts are similar across the groups. This form of MI implies that there are no systematic response biases and is required in order to meaningfully compare the means of latent variables across different groups (Chen, 2008). Therefore, we can meaningfully compare sex differences in the average scores of the dimensions of the measurement model.

Next, we examined and visualized sex differences in dimensions of mate preferences in three cultures (see Figure 4 for violin plots, which are similar to box plots with the addition of a rotated kernel density plot on each side, appropriate for examining sex differences). The results are summarized in Table 5. As can be seen in Table 5, H1 was supported in Iran and Turkey (i.e., men scored higher on desire for A). H2 was supported in all samples (i.e., women scored higher on S). H3 was supported in all samples (i.e., women scored higher on K). H4 was supported in Iran and Turkey (i.e., women scored higher on E). Finally, although we did not have preregistered hypotheses about sex differences in preferences for religiosity/chastity, Pakistani women showed stronger preference for religious/chaste romantic partners than did Pakistani men (Cohen's $d = -0.50$).

Multilevel Modeling

We ran five series of MLMs to examine how the effect of sex on mate preferences in nested in cultures. Our random-intercept MLMs are summarized in Table 6. In the K factor, the intraclass coefficient was .25, indicating that 25% of K variations was explained at country level. The mean sex effect across cultures was −.14 scores ($SE = .02$, $t = -4.67$, $p < .01$), favoring women (conditional $R^2 = .27$). Varying the sex

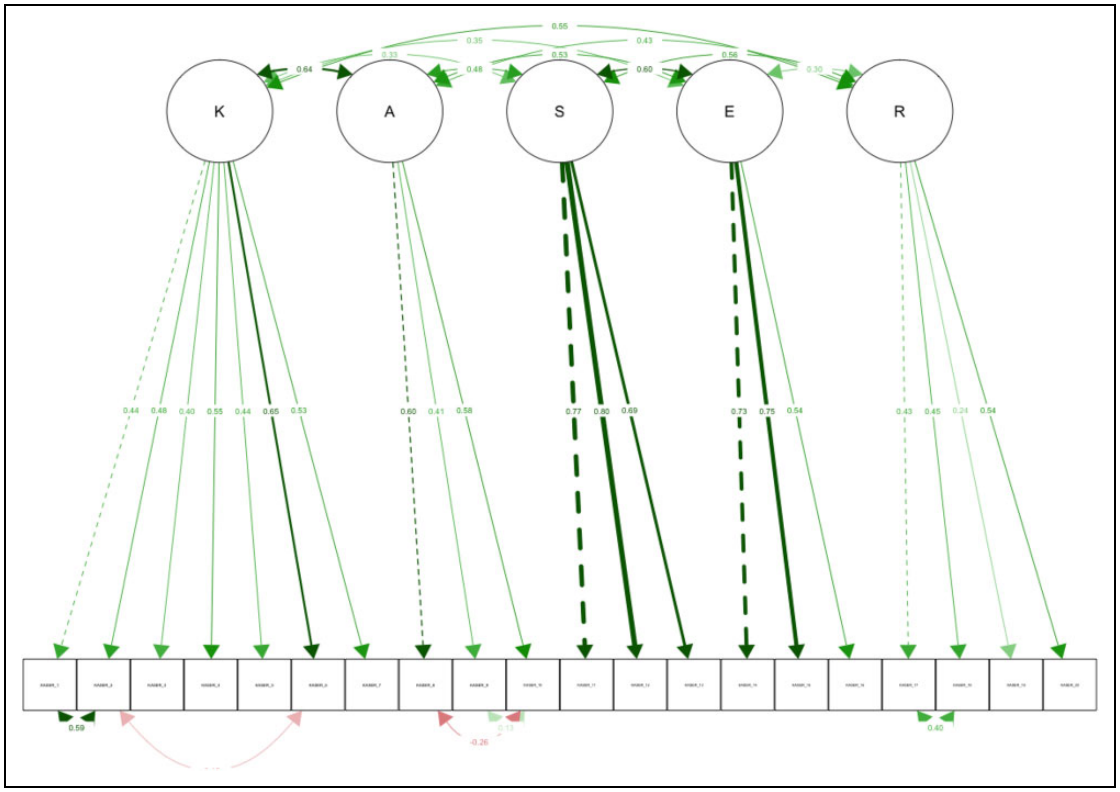

Figure 2. Modified measurement model in Pakistan.

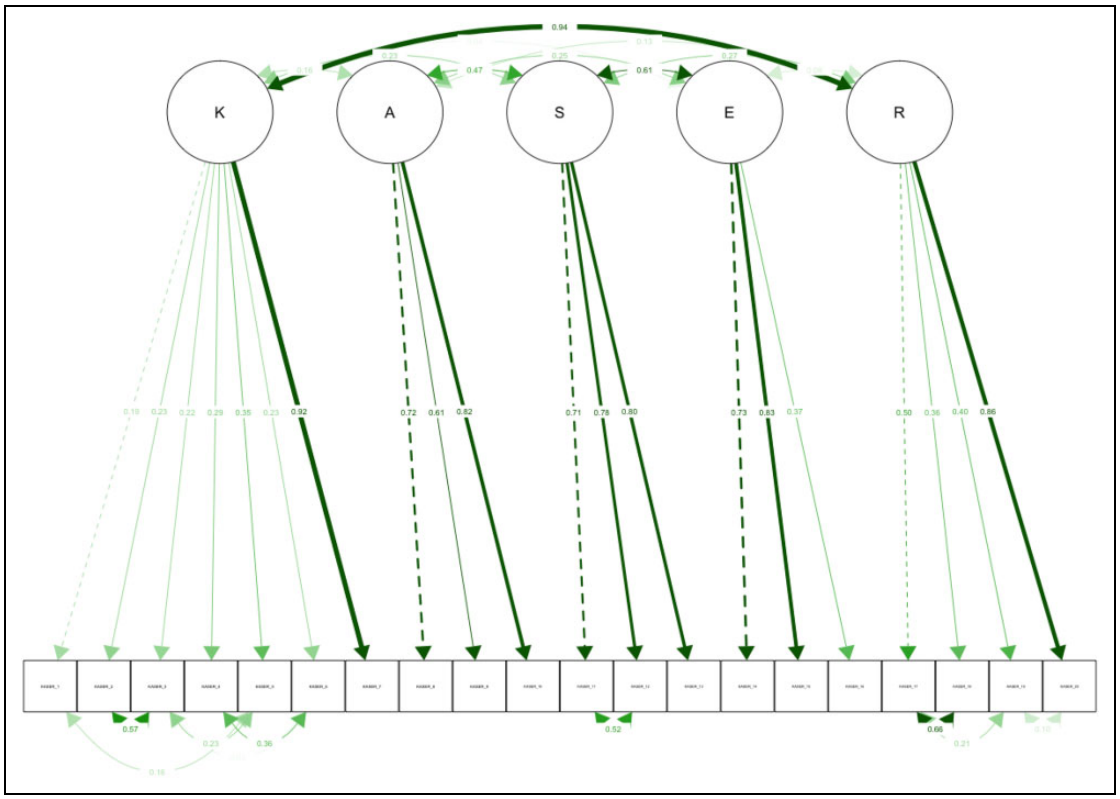

Figure 3. Modified measurement model in Turkey.

Table 3. Results of Confirmatory Factor Analyses in Three Cultures.

Country	Model	χ^2/df	CFI	TLI	RMSEA 90% CI	SRMR
Iran	Unmodified	2.96	.81	.77	.088 [.079, .098]	.082
	Modified	2.06	.90	.88	.065 [.055, .075]	.068
Pakistan	Unmodified	3.05	.79	.75	.079 [.071, .088]	.091
	Modified	2.21	.88	.85	.061 [.052, .070]	.067
Turkey	Unmodified	5.63	.79	.75	.097 [.091, .103]	.091
	Modified	3.56	.89	.86	.072 [.065, .078]	.086

Note. CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square of approximation; SRMR = standardized root-mean-square residual; CI = confidence interval; *df* = degrees of freedom.

effect among cultures did not significantly improve the model ($\chi^2 = 0.80$, $df = 2$, $p = .67$). Therefore, sex differences in K were not significantly variable across cultures. In the A factor, the intraclass coefficient was .12, indicating that 12% of A variations was explained at country level. The mean sex effect across cultures was .17 scores ($SE = .04$, $t = 4.44$, $p < .01$), favoring men (conditional $R^2 = .13$). Varying the sex effect among cultures did not significantly improve the model ($\chi^2 = 0.42$, $df = 2$, $p = .81$). Therefore, sex differences in A were not significantly variable across cultures. In the S factor, the intraclass coefficient was .23, indicating that 23% of S variations was explained at country level. The mean sex effect across cultures was −.52 scores ($SE = .04$, $t = -11.99$, $p < .01$), favoring women (conditional $R^2 = .34$). Varying the sex effect among cultures did not significantly improve the model ($\chi^2 = 1.95$, $df = 2$, $p = .38$). Therefore, sex differences in S were not significantly variable across cultures. In the E factor, the intraclass coefficient was .01, indicating that 1% of E variations was explained at country level. The mean sex effect across cultures was −.20 scores ($SE = .04$, $t = -2.73$, $p < .01$), favoring women (conditional $R^2 = .04$). Varying the sex effect among cultures did not significantly improve the model ($\chi^2 = 5.71$, $df = 2$, $p = .06$). Therefore, sex differences in E were not significantly variable across cultures. In the R factor, the intraclass coefficient was .44, indicating that 44% of R variations was explained at country level. The mean sex effect across cultures was −.10 scores ($SE = .04$, $t = -2.22$, $p = .03$), favoring women (conditional $R^2 = .45$). Varying the sex effect among cultures did not significantly improve the model ($\chi^2 = 2.24$, $df = 2$, $p = .33$). Therefore, sex differences in R were not significantly variable across cultures. In sum, sex differences in all KASER traits were relatively invariant across cultures.

Personality and Mate Preferences

We ran five distinct sets of regressions in three countries with five dimensions of mate preferences as dependent variables and the Big Five personality dimensions as independent variables. Model estimates of these regression models are summarized in Tables 7–9. H5 was supported in two cultures: In Iran and Turkey, individuals who scored higher on openness to experience preferred less religious partners. H6a was supported in all three countries, but H6b was not supported (i.e., more agreeable individuals prefer more kind/dependable partners in all cultures, but we found no evidence between agreeableness and preference for religiosity/chastity). Conscientiousness was positively associated with kindness/dependability and religiosity/chastity in Iran, but not Pakistan or Turkey. Therefore, H7a and H7b were not supported in Pakistan and Turkey.

Discussion

As we predicted in our preregistration, sex differences in dimensions of mate preferences largely replicated previous findings. Specifically, our MLMs revealed that women—more than men—valued kindness, dependability, good parenting characteristics, status, resources, education, and intelligence in a potential romantic partner. Men, on the other hand, consistently scored higher on the preference for attractiveness. We found strong support for these preregistered hypotheses (H1–H4). This study therefore provides support for well-established evolutionary hypotheses about sex differences in mate preferences and is one of the first studies to do so in

Table 4. Sex Measurement Invariance Models in Three Cultures.

Country	Model	χ^2	$\Delta\chi^2$	*df*	Δdf	CFI	ΔCFI	RMSEA	ΔRMSEA	*p*	BIC
Iran	Configural	633.73	—	320	—	.81	—	.088	—	—	9,895
	Weak MI	685.43	51.70	335	15	.79	.022	.091	.003	<.001	9,863
	Strong MI	762.01	76.58	350	15	.76	.037	.097	.006	<.001	9,857
	Strict MI	868.68	106.67	355	5	.70	.060	.107	.011	<.001	9,937
Pakistan	Configural	667.03	—	320	—	.78	—	.082	—	—	15,088
	Weak MI	693.24	26.21	335	15	.77	.007	.081	.001	.04	15,027
	Strong MI	724.36	31.13	350	15	.76	.010	.081	.000	.01	14,972
	Strict MI	774.20	49.84	355	5	.73	.029	.085	.004	<.001	14,993
Turkey	Configural	1,071.8	—	320	—	.78	—	.097	—	—	21,082
	Weak MI	1,096.7	24.96	335	15	.78	.003	.096	.002	.05	21,014
	Strong MI	1,131.0	34.29	350	15	.77	.006	.095	.001	.003	20,955
	Strict MI	1,266.1	135.09	355	5	.73	.038	.102	.007	<.001	21,059

Note. MI = measurement invariance; *df* = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square of approximation; BIC = Bayesian information criterion.

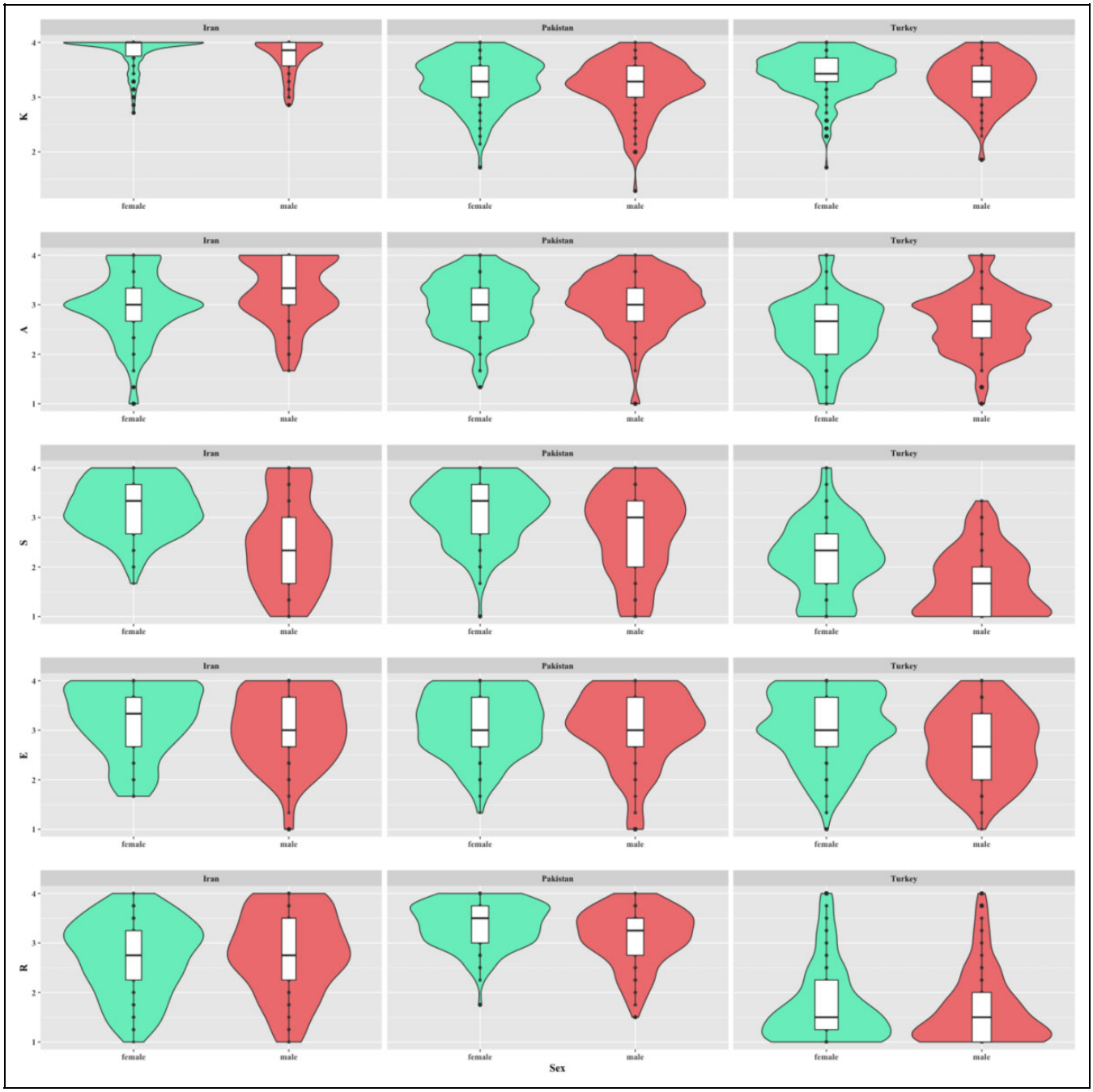

Figure 4. Violin plots of sex differences in mate preferences.

Middle Eastern, Muslim-majority countries (for exceptions, see Atari, 2017; Buss, 1989).

We also found some culture-specific effects. We found, on an exploratory basis, that women in Pakistan put more emphasis on religiosity and chastity than do men, which might be attributable to cultural norms in Pakistan. Yet this effect should be treated with uncertainty until further replicated in future research.

We found that the magnitude of sex differences in mate preferences, indexed by nonsignificant changes in model fit in MLMs, was relatively invariant across cultures. Cultures varied in their average level of mate preferences. For example, Figure 4 clearly shows how these three cultures have very different average-level preferences for religiosity and chastity. However, once we included sex in our multilevel models, cross-cultural variation was attenuated.

Moderate and mixed associations were detected between individuals' scores on the Big Five personality dimensions and their mate preferences on the KASER Scale. We found that openness to experience predicts preferences for less religious

Table 5. Sex Differences in Mate Preferences Across Three Cultures.

	Iran			Pakistan			Turkey		
Factor	Women's *M* (*SD*)	Men's *M* (*SD*)	Sex *d*	Women's *M* (*SD*)	Men's *M* (*SD*)	Sex *d*	Women's *M* (*SD*)	Men's *M* (*SD*)	Sex *d*
K	3.83 (.28)	3.75 (.32)	−.27*	3.30 (.45)	3.18 (.50)	−.24*	3.45 (.38)	3.27 (.43)	−.46**
A	2.96 (.67)	3.26 (.65)	.46**	2.99 (.57)	3.05 (.58)	.10	2.51 (.63)	2.68 (.61)	.28**
S	3.19 (.54)	2.45 (.89)	−.99**	3.12 (.61)	2.70 (.85)	−.56**	2.20 (.72)	1.71 (.64)	−.70**
E	3.20 (.69)	3.01 (.72)	−.26*	3.11 (.63)	3.04 (.75)	−.10	3.04 (.71)	2.70 (.73)	−.48**
R	2.72 (.76)	2.79 (.82)	.09	3.37 (.45)	3.12 (.57)	−.50**	1.77 (.78)	1.69 (.74)	−.09

Note. K = kindness/dependability; A = attractiveness/sexuality; S = status/resources; E = education/intelligence; R = religiosity/chastity.
*$p < .05$ (suggestive evidence). **$p < .005$ (strong evidence).

Table 6. Multilevel Models Predicting Mate Preferences With Random-Intercept Effects of Sex.

Variable	ICC	Sex (*B*)	Sex (*SE*)	*t* Value
K	.25	−.14	.02	−5.58***
A	.11	.17	.04	4.44***
S	.27	−.52	.04	−11.99***
E	.02	−.22	.04	−5.15***
R	.45	−.010	.04	−2.22*

Note. ICC = intraclass correlation; K = kindness/dependability; A = attractiveness/sexuality; S = status/resources; E = education/intelligence; R = religiosity/chastity.
*$p < .05$. ***$p < .001$.

partners in Iran and Turkey, but not in Pakistan. Open individuals tend to report slightly lower levels of religiosity in Iran and Turkey, but not in Pakistan (e.g., Gebauer et al., 2014). It may therefore be the case that more open individuals in Iran and Turkey are less religious and prefer mates with similar levels of religiosity. However, our personality measure did not perform well in Pakistan, with unexpected negative interitem correlations, suggesting that TIPI's subscales may not be reliably measuring the Big Five personality dimensions in Pakistan.

Consistent with our expectation, agreeableness predicted preference for kindness and dependable character in all cultures, but (contrary to our prediction) we found no evidence that agreeableness predicts individuals' preferences for religious or chaste partners. Agreeable individuals are less likely to commit infidelity (Bourdage, Lee, Ashton, & Perry, 2007) and are generally "kind," "sympathetic," and "considerate" (Costa & McCrae, 1992). It stands to reason, therefore, that while characteristics associated with agreeableness are generally preferred by *all* individuals (Strouts, Brase, & Dillon, 2017), those who score higher on agreeableness place an even greater importance on these characteristics.

In the context of romantic relationships, people who score high on conscientiousness are more likely to remain exclusive (Bourdage et al., 2007) and participate in more religious traditions (Afhami et al., 2017). Individuals who score higher on conscientiousness tend to prefer romantic partners who have similar characteristics (Botwin, Buss, & Shackelford, 1997). We predicted that more conscientious individuals would prefer more dependable and religious mates. These effects were found in Iran, but not in Pakistan or Turkey. The role of conscientiousness in mate selection preferences in different cultures should therefore be treated with caution.

Together, our results are consistent with the notion that people's preferences are guided by their basic personality dimensions, at least to some extent (see Youyou, Schwartz, Stillwell, & Kosinski, 2017). Rather than personality-personality analysis (e.g., *conscientious individuals prefer conscientious partners*; see Štěrbová et al., 2017), we examined the associations between personality dimensions and an established model of long-term mate preferences (e.g., *conscientious individuals prefer kind, understanding, religious, and chaste partners*). There is convincing evidence that other personality traits, not examined here (e.g., narcissism; Atari & Chegeni, 2017), predict a preference for attractiveness/sexuality. This calls for further research on the relationships between different personality models (e.g., HEXACO; Lee & Ashton, 2004) and the KASER model of long-term mate preferences in different cultures.

The present research had several strengths, including its cross-cultural samples from understudied Muslim-majority nations and its use of a novel, dimensional model of mate preferences. However, the present study also had some limitations. One such limitation is that most participants in the present study were from urban areas in Iran, Pakistan, and Turkey, leaving out rural areas and subcultures within these countries. Future research would do well to include more rural areas of non-WEIRD cultures. Second, we used a short measure of the Big Five (Gosling et al., 2003), which showed unexpectedly poor interitem correlations, especially in Pakistan (see Table 2). Future research may benefit from using longer measures of the Big Five (e.g., Big Five Inventory-2 [BFI-2]; Soto & John, 2017). In addition to trait-level analysis of the relationship between the Big Five and mate preferences, we suggest facet-level analyses that are feasible using recently developed measures of the Big Five (e.g., BFI-2). We strongly recommend replicating these results in independent samples since multiple Urdu measures failed to meet conventional (or liberal) thresholds for internal consistency. It would also be instructive to examine the associations between people's ratings of their own characteristics on the KASER model and their mate preferences using this model (see Conroy-Beam & Buss, 2016). Finally, this study used cross-sectional data and correlational

Table 7. Regression Estimates of Personality Dimensions Predicting Mate Preferences in Iran.

	Iran																			
	K				A				S				E				R			
Variable	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI
Extroversion	.008	1.36	.176	[−.004, .019]	.011	0.82	.413	[−.016, .038]	.018	1.14	.255	[−.013, .050]	−.006	−0.43	.667	[−.034, .022]	.020	1.29	.198	[−.010, .049]
Agreeableness	.040	4.86	.000	[.024, .056]	−.019	−1.01	.313	[−.057, .018]	.039	1.72	.086	[−.006, .084]	.002	0.11	.915	[−.038, .042]	.040	1.90	.059	[.002, .082]
Conscientiousness	.017	2.53	.012	[.004, .030]	−.002	−0.15	.881	[−.034, .029]	.017	0.93	.355	[−.020, .054]	−.019	−1.16	.248	[−.052, .014]	.040	2.29	.023	[.006, .075]
Emotional stability	−.009	−1.44	.152	[−.021, .003]	−.012	−0.82	.411	[−.040, .016]	−.044	−2.61	.010	[−.077, −.011]	−.021	−1.41	.161	[−.051, .008]	−.010	−0.63	.529	[−.041, .021]
Openness to experience	−.006	−0.87	.388	[−.021, .008]	.002	0.09	.929	[−.033, .036]	.013	0.62	.537	[−.028, .054]	−.006	−0.33	.740	[−.042, .030]	−.090	−4.63	.000	[−.128, −.051]
Model R^2			.12				.10				.04				.02				.12	

Note. K = kindness/dependability; A = attractiveness/sexuality; S = status/resources; E = education/intelligence; R = religiosity/chastity; CI = confidence interval.

Table 8. Regression Estimates of Personality Dimensions Predicting Mate Preferences in Pakistan.

	Pakistan																			
	K				A				S				E				R			
Variable	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI
Extroversion	.036	3.15	.002	[.013, .058]	.023	1.61	.108	[−.005, .050]	.028	1.52	.131	[−.008, .064]	.008	0.47	.642	[−.025, .040]	.010	0.79	.429	[−.015, .035]
Agreeableness	.038	2.92	.004	[.012, .064]	.009	0.54	.587	[−.023, .041]	−.005	−0.24	.813	[−.047, .037]	−.024	−1.24	.218	[−.062, .014]	.003	0.18	.854	[−.027, .032]
Conscientiousness	.010	0.79	.429	[−.014, .034]	−.006	−0.41	.685	[−.036, .024]	−.043	−2.16	.031	[−.082, −.004]	−.035	−1.96	.051	[−.070, .000]	−.007	−0.54	.591	[−.035, .020]
Emotional stability	.014	1.11	.269	[−.011, .038]	.012	0.75	.451	[−.019, .042]	−.008	−0.42	.678	[−.048, .031]	.035	1.91	.057	[−.001, .071]	.019	1.35	.177	[−.009, .047]
Openness to experience	.003	0.24	.808	[−.023, .029]	−.010	−0.63	.530	[−.043, .022]	−.039	−1.78	.076	[−.082, .004]	−.041	−2.12	.035	[−.080, −.003]	−.030	−1.97	.050	[−.060, .000]
Model R^2			.07				.01				.04				.04				.02	

Note. K = kindness/dependability; A = attractiveness/sexuality; S = status/resources; E = education/intelligence; R = religiosity/chastity; CI = confidence interval.

Table 9. Regression Estimates of Personality Dimensions Predicting Mate Preferences in Turkey.

	Turkey																			
	K				A				S				E				R			
Variable	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI	*B*	*t*	*p*	95% CI
Extroversion	.013	2.02	.044	[.000, .026]	.008	0.77	.442	[−.012, .028]	.024	2.05	.040	[.001, .047]	.019	1.60	.111	[−.004, .042]	.003	0.25	.805	[−.021, .027]
Agreeableness	.023	3.19	.002	[.009, .038]	.005	0.45	.650	[−.018, .028]	.019	1.43	.154	[−.007, .045]	−.001	−0.11	.914	[−.028, .025]	.016	1.16	.249	[−.011, .044]
Conscientiousness	.011	1.55	.121	[−.003, .024]	−.001	−0.13	.901	[−.022, .020]	.014	1.14	.254	[−.010, .038]	−.006	−0.49	.624	[−.031, .018]	.010	0.77	.443	[−.015, .035]
Emotional stability	.008	1.12	.263	[−.006, .022]	.019	1.69	.092	[−.003, .042]	−.035	−2.68	.008	[−.061, −.009]	−.018	−1.36	.176	[−.044, .008]	−.001	−0.06	.953	[−.028, .026]
Openness to experience	−.015	−2.41	.016	[−.027, −.003]	−.012	−1.25	.212	[−.031, .007]	−.031	−2.81	.005	[−.053, −.009]	−.009	−0.78	.433	[−.031, .013]	−.027	−2.33	.020	[−.050, −.004]
Model R^2			.05				.01				.04				.01				.01	

Note. K = Kindness/dependability; A = Attractiveness/sexuality; S = Status/resources; E = Education/intelligence; R = Religiosity/chastity; CI = confidence interval.

analyses. It is therefore important not to draw any firm causal conclusions from the present findings that personality traits predict mate preferences.

Conclusion

The current research is the first systematic preregistered examination of mate preferences in understudied Muslim-majority countries in the Middle East. We provide evidence that the KASER model of mate preferences (Atari, 2017) has adequate measurement qualities in Farsi, Urdu, and Turkish and that its scores can be meaningfully compared between men and women (indexed by strong MI). Consistent with our hypotheses and with previous evolutionary psychological research, robust sex differences in mate preferences emerged in these cultures, such that women showed a stronger preference for kindness/dependability, status/resources, and education/intelligence, whereas men showed a stronger preference for attractiveness/sexuality. Examination of personality correlates of mate preferences showed that the Big Five dimension of agreeableness consistently predicts preferences for kind and dependable romantic partners, and openness to experience predicts preference for less religious partners in Iran and Turkey. We hope that these findings motivate researchers to continue studying mate preferences and personality and to do so especially in understudied Muslim-majority countries.

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