Original Article

# Confirmatory Factor Analysis of the Coalitional Mate Retention Inventory (CMRI) and Evidence for Two Superordinate Domains

Nicole Barbaro, Yael Sela, Guilherme S. Lopes, and Todd K. Shackelford

Department of Psychology, Oakland University, Rochester, MI, USA

**Abstract:** The Coalitional Mate Retention Inventory (CMRI; Pham, Barbaro, Mogilski, & Shackelford, 2015) assesses the frequency with which individuals solicit allies to assist with mate retention efforts. The current study subjected the CMRI to confirmatory factor analyses (CFAs). A model comparison approach was employed using data from a large community sample of participants currently in a heterosexual romantic relationship ($n$ = 1,003, 54% male). The seven-factor structure of the CMRI demonstrates good model fit and provides significantly better fit than an alternative single-factor structure. The results also demonstrate that the seven tactics of the CMRI are subsumed by two superordinate domains of Benefit-Provisioning and Cost-Inflicting coalitional mate retention. Correlational analyses with the superordinate domains of coalitional mate retention are presented and highlight their predictive utility. We recommend the continued use of the CMRI in psychological research.

**Keywords:** mate retention, coalitional mate retention, confirmatory factor analysis, evolutionary psychology

Men and women may perform various *mate retention* behaviors designed to reduce the risk of partner infidelity and relationship dissolution (Barbaro, Pham, & Shackelford, 2015; Buss, 1988; Buss & Shackelford, 1997). Research on mate retention behaviors has historically focused on *individual mate retention* – behaviors that individuals perform alone (Buss, 1988). Allies, such as friends, also can assist with mate retention efforts (Canary & Stafford, 1992; Pham, Barbaro, & Shackelford, 2015). Recruiting an ally to perform mate retention (e.g., an individual asking their friend to keep an eye on their romantic partner at a social gathering) is referred to as *coalitional mate retention* (Pham, Barbaro, Mogilski, & Shackelford, 2015). Across two studies, Pham, Barbaro, Mogilski, et al. (2015) developed and validated the Coalitional Mate Retention Inventory (CMRI) to assess the frequency with which individuals solicit allies to assist with mate retention. Pham, Barbaro, Mogilski, et al. (2015) used an act nomination procedure (Buss & Craik, 1983) to generate a list of coalitional mate retention behaviors that individuals request that their friends perform. In an independent sample (Pham, Barbaro, Mogilski, et al., 2015, Study 2), participants ($n$ = 387) indicated how frequently they requested that their friend perform each of the coalitional mate retention behaviors identified in the first study. Data-driven (i.e., principal component analyses) and theory-driven (e.g., comparisons with the Mate Retention Inventory (MRI; Buss, 1988) techniques were then used to construct the CMRI (Pham, Barbaro, Mogilski, et al., 2015).

The CMRI includes 44 coalitional mate retention behaviors across seven factors – or "tactics" (see Electronic Supplementary Material, ESM 1, Table 1; Pham, Barbaro, Mogilski, et al., 2015). *Manipulation* includes behaviors in which an ally deceives the partner into demonstrating a propensity to commit infidelity. *Vigilance* includes behaviors in which an ally monitors the partner's behavior. *Monopolizing Time* includes behaviors in which an ally spends time with the partner. *Violence* includes tactic behaviors in which violence is directed against potential mate poachers. *Praise* includes behaviors in which an ally says positive things about the individual to the partner. *Therapy* includes behaviors in which an ally strengthens the romantic partnership by listening to relationship concerns and advising on relationship problems. *Gifts* includes behaviors in which an ally solicits information regarding gifts desired by the partner.

The current study subjects the seven-factor structure of the CMRI to confirmatory factor analyses to validate the seven-factor structure of the CMRI obtained from Pham, Barbaro, Mogilski, et al. (2015). The tactic structure of the



https://doi.org/10.1027/1015-5759/a000439

CMRI (Pham, Barbaro, Mogilski, et al., 2015) is similar to the tactic structure of the MRI (Buss, 1988; Buss, Shackelford, & McKibbin, 2008) – a well-validated instrument that assesses performance frequencies of individual mate retention behaviors (Buss & Shackelford, 1997; Shackelford, Goetz, & Buss 2005). Tactics of individual mate retention can be organized into two superordinate domains of *Benefit-Provisioning* mate retention, characterized by behaviors that reduce the likelihood of partner infidelity by increasing relationship satisfaction (e.g., displaying love and affection toward the partner), and *Cost-Inflicting* mate retention, characterized by behaviors that reduce the likelihood of partner infidelity by inflicting costs on a partner (e.g., by lowering a partner's self-esteem; Miner, Starratt, & Shackelford, 2009). The two superordinate domains of individual mate retention have been replicated in several cultures[1] (Atari, Barbaro, Shackelford, & Chegeni, 2017; Lopes, Shackelford, Santos, Farias, & Segundo, 2016; Miner et al., 2009), and demonstrate unique predictive utility in several research areas (e.g., personality: McKibbin, Miner, Shackelford, Ehrke, & Weekes-Shackelford, 2014; sexual behavior: Sela, Shackelford, Pham, & Euler, 2015; relationship satisfaction: Salkicevic, Stanic, & Grabovac, 2014).

Both coalitional mate retention and individual mate retention strategies are designed to minimize the risk of a romantic partner's infidelity or relationship dissolution (Pham, Barbaro, Mogilski, et al., 2015). Individuals who request more frequent coalitional mate retention also perform more frequent individual mate retention behaviors (Barbaro et al., 2015; Pham, Barbaro, Mogilski, et al., 2015). Given the similarities between individual mate retention and coalitional mate retention, we suspect taxonomical similarities in the measurement of these two strategies. We therefore expect that the seven tactics of coalitional mate retention may be subsumed by two superordinate domains, similar to the superordinate domains of individual mate retention (Buss, 1988; Buss et al., 2008). We hypothesize that the CMRI tactics of Manipulation, Vigilance, Monopolizing Time, and Violence will be subsumed by the superordinate domain of Cost-Inflicting coalitional mate retention. CMRI items within each of these tactics are characterized by particularly deceitful behaviors (e.g., a friend "tricking" the partner into committing infidelity to assess the partner's loyalty). We hypothesize that the CMRI tactics of Praise, Therapy, and Gifts will be subsumed by the superordinate domain of Benefit-Provisioning coalitional mate retention. CMRI items within each of these tactics are characterized by behaviors that attempt to positively impact one's partner (e.g., soliciting a friend for relationship advice or asking a friend to reassure the partner of the individual's romantic feelings; see Table 1, ESM 1).

On the condition that statistical evidence is secured for superordinate domains of coalitional mate retention (via higher-order confirmatory factor analyses), the current study will explore the validity of the CMRI superordinate domains of Benefit-Provisioning and Cost-Inflicting coalitional mate retention by computing bivariate correlations between the CMRI domains and other target variables. Based on previous research with the MRI, it is expected that the coalitional mate retention domains will be negatively associated with age (i.e., self and partner) and relationship length (e.g., Atari, Barbaro, Sela, Shackelford, & Chegeni, 2017; Kaighobadi, Shackelford, & Buss, 2010).

Exploratory correlational analyses between coalitional mate retention domains with relationship satisfaction and relationship commitment will also be computed. Individuals who are more dishonest more frequently request coalitional mate retention (Pham et al., 2017), and also report lower relationship commitment (Farrell et al., 2015). Request frequencies for *both* Benefit-Provisioning and Cost-Inflicting coalitional mate retention, therefore, may be negatively associated with an individual's relationship satisfaction and relationship commitment. The association between dishonesty and request frequencies of coalitional mate retention, however, is particularly robust for the tactics of Manipulation and Violence (Pham et al., 2017). Request frequencies of Cost-Inflicting coalitional mate retention, in particular, may be more strongly (negatively) associated with an individual's relationship satisfaction and relationship commitment, than are request frequencies of Benefit-Provisioning coalitional mate retention. Differences in the magnitudes of the associations with the superordinate domains of coalitional mate retention will therefore also be explored in the current study.

A model comparison approach is used to confirm the factor structure of the CMRI, and to secure evidence for two superordinate domains of coalitional mate retention. Three models are tested and compared. Model A, one-factor lower-order model, is the most numerically parsimonious of the models, such that the covariation among the 44 items of the CMRI is explained by a single latent factor. Model B (Figure 1) depicts a seven-factor lower-order model that is tested to confirm the tactic structure of the CMRI (Pham, Barbaro, Mogilski, et al., 2015). Model C (Figure 2) depicts a two-factor higher-order model that is tested to investigate the structure of the hypothesized

[1] The mate retention tactics that comprise superordinate mate retention domains slightly differ in Brazil (Lopes et al., 2016) and Iran (Atari et al., 2016), as compared to the United States (Miner et al., 2009). The tactics of Emotional Manipulation and Commitment Manipulation (four items) load highest on the Benefit-Provisioning domain in Iran and Brazil, rather than on the Cost-Inflicting domain as in United States samples. The tactic of Derogation of Competitors (two items) loads highest on the Benefit-Provisioning domain in Brazil, rather than on the Cost-Inflicting domain as in the United States and Iran.

 

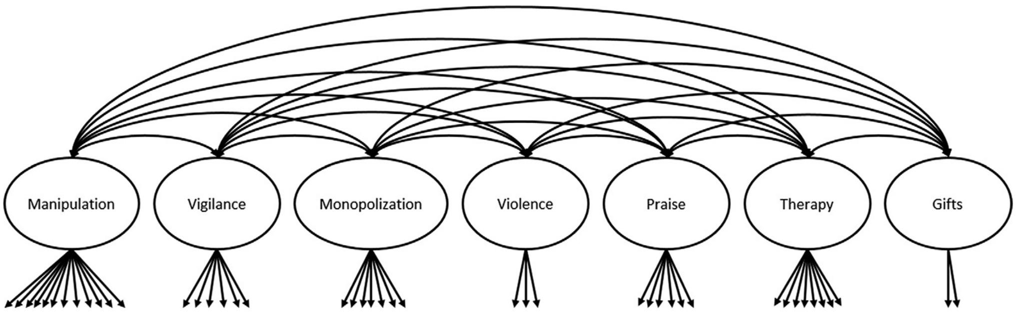


**Figure 1.** Hypothesized seven-factor lower-order model (Model B). Indicator variables and error terms omitted for presentation. See Table 1 (ESM) for complete list of indicator variables on each latent factor.

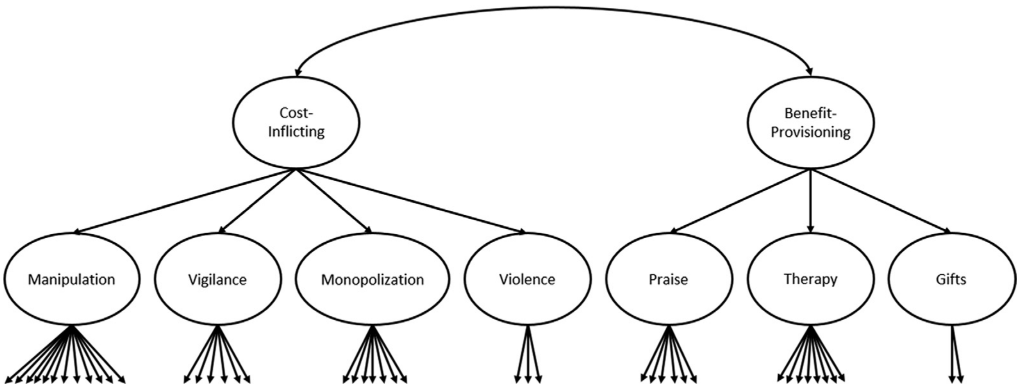


**Figure 2.** Hypothesized two-factor higher-order model (Model C). Indicator variables and error terms omitted for presentation. See Table 1 (ESM) for complete list of indicator variables on each latent factor.

superordinate domains of Benefit-Provisioning and Cost-Inflicting coalitional mate retention. Tests of configural, metric, and scalar invariance are conducted to evaluate structural similarities and differences of the best-fitting model between the four groups present in the sample (men rating men, men rating women, women rating men, and women rating women.) Bivariate correlational analyses with the coalitional mate retention domains are conducted to assess the validity of the two higher-order factors of Model C. Data from a large community sample are used to address the aims of the current research.

# Method

## Participants

Participants[2] ($n$ = 1,003, 54% male) were recruited via Amazon's Mechanical Turk (MTurk). Participants were eligible to participate if they were currently in a committed, heterosexual relationship, at least 18 years of age, and resided in the United States. Participants ranged from 19 to 74 years of age ($M$ = 30.66, $SD$ = 8.45). Participant's romantic partners ranged from 18 to 74 years of age ($M$ = 30.44, $SD$ = 8.44). The mean relationship length was 47.65 months ($SD$ = 68.21). MTurk filters (Peer, Vosgerau, & Acquisti 2013) were implemented such that prospective participants could access and participate in the study if they had (1) successfully completed at least 95% of all their accessed MTurk jobs and (2) successfully completed at least 500 accessed MTurk jobs.

## Procedure

Prospective participants viewed an advertisement for the study on MTurk's job listings. Interested and eligible participants were provided with a link to an information sheet. Those who agreed to participate could access and complete the survey, and those who did not agree to participate were exited from the study. Participants reported demographic

[2] Data used in the current study were part of a larger project to test different hypotheses as reported in Barbaro, Shackelford, and Weekes-Shackelford (2016).



 

information and completed two measures of mate retention behaviors, and a measure of relationship satisfaction and relationship commitment. Participants received $0.50 compensation.

## Measures

Participants completed a measure of relationship satisfaction and relationship commitment (Gagné & Lydon, 2003; Lydon, Menzies-Toman, Burton, & Bell, 2008) by reporting the extent to which each statement described their relationship on a 7-point scale (1 = *not at all*, 7 = *completely*). Composite scores were constructed for *relationship satisfaction* (3 items; $\alpha$ = .86; e.g., "To what extent do you feel that you really enjoy your relationship right now?") and *relationship commitment* (6 items; $\alpha$ = .91; e.g., "To what extent to you feel devoted to your relationship right now?").

Participants completed the Mate Retention Inventory-Short Form (MRI-SF; Buss et al., 2008) to assess performance frequency of individual mate retention behaviors. Participants reported how often they performed each mate retention behavior on a 4-point scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*). Following Miner et al. (2009), we constructed composite (i.e., mean averages) scores for Benefit-Provisioning individual mate retention behaviors (16 items; $\alpha$ = .79), and for Cost-Inflicting individual mate retention behaviors (22 items; $\alpha$ = .96).

Participants completed the 44-item Coalitional Mate Retention Inventory[3] (CMRI; Pham, Barbaro, Mogilski, et al., 2015) twice – once for a male friend and once for a female friend. Participants were instructed to identify one man and one woman, each of whom they considered a good friend, and report on a 4-point scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*) how often they asked their friend to perform each mate retention behavior. Composite scores (i.e., mean averages) were calculated for overall request frequency of coalitional mate retention behaviors from participant's male friend (44 items; $\alpha$ = .98) and female friend (44 items; $\alpha$ = .98).

# Results

## Preliminary Analyses

All correlation and reliability analyses were performed with SPSS 19.0. All confirmatory factor analyses (CFAs) were performed with AMOS 19.0. Maximum Likelihood estimation was used for all CFAs reported throughout. Univariate normality of the 44 CMRI items was investigated in terms of skewness (0.44–1.08, $|M|$ = .81) and kurtosis ($-1.12$ to $-.20$, $|M| = -.66$), and these values were within the ranges recommended for CFA with maximum likelihood (skew < 2 and kurtosis < 7; West, Finch, & Curran, 1995). Marker-variable method was used for primary CFAs. Because participants completed the CMRI twice, however (i.e., once for a male friend and once for a female friend), two sets of the three models were tested and compared (i.e., one set of three models for participants' male friend, and one set of three models for participants' female friend).

Model fit for each model was assessed with multiple fit indices (Jackson, Gillaspy, & Purc-Stephenson, 2009). Chi-square goodness of fit was evaluated (nonsignificant *p*-value at the .05 level indicating acceptable model fit; Barrett, 2007). Because the chi-square statistic is sensitive to sample size ($n > 400$, as in the current study) often yielding significant chi-square values (Bentler & Bonnet, 1980) despite adequate model fit, model fit in the current study also included the relative/normed chi-square ($\chi^2/df$ between 2 and 3; Kline, 2005; Tabachnick & Fidell, 2007; Wheaton, Muthen, Alwin, & Summers, 1977). Root-mean-square error of approximation (RMSEA) of less than .06 (Hu & Bentler, 1999), and a 90% confidence interval with a lower limit close to 0 and an upper limit of less than .08 (MacCallum, Browne, & Sugawara, 1996), indicates good model fit. Tucker-Lewis index (TLI) and Comparative Fit index (CFI) with values of .95 or greater indicate good model fit (Hu & Bentler, 1999). Model comparisons – Model B to Model A, and Model C to Model B – were evaluated by chi-square difference tests (significant *p*-values at the .05 level indicate substantial differences in model fit). Bivariate correlations between indicator variables are available in Table 5 and 6 of ESM 1. AMOS output is available in ESM 2.

## Confirmatory Factor Analyses

A summary of fit statistics for all models is reported in Table 1. CFA results discussed in the text refer to the CMRI for both male and female friend versions, unless otherwise stated. For Model A, the $\chi^2$ value was significant at $p < .001$. The $\chi^2/df$ ratio fell outside the prespecified cutoff range for Model A (for participant's female friend), indicating poor fit of the single-factor lower-order model. Values for the TLI and CFI failed to reach the .95 cutoff.

[3] The CMRI can also be used to assess an ally's "performance" of coalitional mate retention – the frequency with which individuals estimate that their ally performs coalitional mate retention behaviors, but that the individual did not explicitly request from the ally (see Pham, Barbaro, Mogilski, et al., 2015). CFA of the performance version of the CMRI is not reported here (1) to reduce the number of analyses, (2) because the performance version of the CMRI is not as often used in research on coalitional mate retention (but see Pham, Barbaro, Mogilski, et al., 2015 for an example of its use), and (3) because the request, rather than the performance, version of the CMRI affords greater insight into the psychological mechanisms governing the use mate retention strategies.

 

**Table 1.** Summary of confirmatory factor analysis results

| Model | $\chi^2$ | *df* | $\chi^2/df$ | *p* | $\Delta\chi^2$ | $\Delta df$ | *p* | RMSEA | 90% CI | TLI | CFI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | CMR female friend | | | | | | |
| Model A | 4,017.48 | 902 | 4.45 | < .001 | – | – | – | .059 | .057–.061 | .91 | .91 |
| **Model B** | **2,796.55** | **881** | **3.17** | **< .001** | **1,220.93** | **21** | **< .001** | **.047** | **.045–.049** | **.94** | **.95** |
| Model C | 3,029.83 | 894 | 3.39 | < .001 | 233.28 | 13 | < .001 | .049 | .047–.051 | .94 | .94 |
| | | | | | CMR male friend | | | | | | |
| Model A | 3,397.14 | 902 | 3.77 | < .001 | – | – | – | .053 | .051–.054 | .92 | .93 |
| **Model B** | **2,512.69** | **881** | **2.85** | **< .001** | **884.45** | **21** | **< .001** | **.043** | **.041–.045** | **.95** | **.95** |
| Model C | 2,630.67 | 894 | 2.94 | < .001 | 117.98 | 13 | < .001 | .044 | .042–.046 | .95 | .95 |

*Notes.* Model A = one-factor lower-order model; Model B = seven-factor lower-order model; Model C = two-factor higher-order model. $\Delta\chi^2$ refers to model comparisons of Model B to Model A, and Model C to Model B. Best-fitting model in bold.

Model B (Figure 1) showed significant improvement in fit compared to Model A. Significant $\chi^2$ difference tests (*p*s < .001) indicated that the seven-factor model was a better fit than the alternative single-factor model. The $\chi^2$ remained significant at $p < .001$. Model B demonstrated acceptable $\chi^2/df$ ratio statistics, with a ratio of less than 3 for the male friend CMRI, and a ratio just above 3 for the female friend CMRI. Inspection of fit indices for Model B indicated good fit in terms of RMSEA, CFI, and TLI (for the male friend CMRI), with the TLI for the female friend CMRI (.94) just below the cutoff value of .95. Path estimates of Model B (see Tables 2 and 3 in ESM 1) were strong (βs > .63, *p*s < .001) and explained 44–67% of the variance in the indicator variables (see Table 4 in ESM 1). Model B demonstrated substantial covariance estimates among the seven factors (see Table 5 in ESM 1).

Model C (Figure 2) showed significant reduction in fit compared to Model B. $\chi^2$ difference tests (*p*s < .001) indicated that the seven-factor model is a better fit than the two-factor higher-order model. The $\chi^2$ remained significant at $p < .001$. Independent analysis of fit indices for Model C, however, would be deemed acceptable (e.g., Hu & Bentler, 1999; Wheaton et al., 1977). Model C demonstrated acceptable $\chi^2/df$ ratio statistics, with a ratio of less than 3 for the male friend CMRI, and a ratio just above 3 for the female friend CMRI. Inspection of fit indices for Model C indicated good fit in terms of RMSEA, CFI, and TLI (for male friend CMRI), whereas the CFI and TLI for the female friend CMRI (.94) were just below the cutoff value of .95. Path estimates for Model C (see Tables 2 and 3 in ESM 1) were strong (βs > .92, *p*s < .001). Model C reproduced path estimates from the lower-order factors to the indicator variables (βs > .63, *p*s < .001), and explained 43–67% of the variance in the indicator variables (see Table 4 in ESM 1) – indicating the ability of the two higher-order factors to reproduce the estimates between the lower-order factors and the observed variables demonstrated in Model B. The two-factor higher-order model (Model C), therefore, demonstrated overall acceptable model fit.

## Invariance Tests

Invariance tests across groups were performed on the best-fitting model (Model B). Three levels of invariance were tested using multigroup CFA: configural, metric, and scalar invariance (Milsap, 2012). The seven-factor model demonstrates adequate configural and metric invariance based on acceptable $\chi^2/df$ ratio statistics (less than 3), and a non-significant $\chi^2$ difference test between configural and metric models ($p = .29$). Although model fit for the scalar model was significantly worse than that for the metric model, the CFI change was less than .01, suggesting adequate scalar invariance across groups. Overall, Model B demonstrates acceptable invariance across groups (see Table 2).

## Correlational Analyses

Because the two-factor higher-order model (Model C) demonstrated acceptable fit to the data, we examined the associations between request frequencies on the superordinate domains of coalitional mate retention – Benefit-Provisioning and Cost-Inflicting – and demographic variables (i.e., age, partner age, relationship length), relationship commitment, relationship satisfaction, and performance frequencies on the domains of Benefit-Provisioning and Cost-Inflicting *individual* mate retention. Results are displayed in Table 3 (all *p*s < .001).

Request frequencies for both Benefit-Provisioning and Cost-Inflicting coalitional mate retention (male friend and female friend) showed negative correlations with participant age, partner age, and relationship length. Request frequencies for both Benefit-Provisioning and Cost-Inflicting coalitional mate retention were negatively associated with relationship commitment and relationship satisfaction. Request frequencies for Cost-Inflicting coalitional mate retention, however, were more strongly (negatively) associated with both relationship commitment (male friend: $z = -5.01$, $p < .001$; female friend: $z = -4.97$, $p < .001$) and relationship satisfaction (male friend: $z = -4.05$,

 

**Table 2.** Summary of Invariance Tests for Model B (seven-factor lower-order model)

| Model | $\chi^2$ | *df* | $\chi^2/df$ | *p* | $\Delta\chi^2$ | $\Delta df$ | *p* | RMSEA | 90% CI | CFI | ΔCFI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Model B invariance tests | | | | | | |
| Configural | 8,790.89 | 3,524 | 2.49 | < .001 | – | – | – | .027 | .027–.028 | .926 | – |
| Metric | 8,909.51 | 3,635 | 2.45 | < .001 | 118.62 | 111 | .29 | .027 | .026–.028 | .926 | .000 |
| Scalar | 9,105.53 | 3,767 | 2.42 | < .001 | 196.02 | 132 | < .001 | .027 | .026–.027 | .925 | .001 |

*Note.* $\Delta\chi^2$ and ΔCFI refer to model comparisons of metric to configural models, and scalar to metric model.

**Table 3.** Bivariate correlations between CMR domains and other target variables

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Age | – | | | | | | | | | | |
| 2. Partner age | .87 | – | | | | | | | | | |
| 3. Relationship length | .60 | .60 | – | | | | | | | | |
| 4. Commitment | .18 | .19 | .21 | – | | | | | | | |
| 5. Satisfaction | .10 | .11 | .11 | .81 | – | | | | | | |
| 6. MR Cost | −.34 | −.33 | −.36 | −.28 | −.17 | – | | | | | |
| 7. MR Benefit | −.15 | −.17 | −.20 | .19 | .24 | .62 | – | | | | |
| 8. CMR Cost (male) | −.29 | −.29 | −.32 | −.34 | −.23 | .76 | .40 | – | | | |
| 9. CMR Benefit (male) | −.24 | −.25 | −.31 | −.28 | −.18 | .69 | .40 | .92 | – | | |
| 10. CMR Cost (female) | −.27 | −.28 | −.32 | −.32 | −.23 | .75 | .41 | .91 | .87 | – | |
| 11. CMR Benefit (female) | −.23 | −.26 | −.31 | −.26 | −.16 | .68 | .43 | .84 | .85 | .92 | – |
| *M* | 30.66 | 30.44 | 47.65 | 5.98 | 5.87 | 1.20 | 1.77 | 0.81 | 0.90 | 0.81 | 0.90 |
| *SD* | 8.45 | 8.44 | 68.21 | 1.01 | 1.09 | 0.84 | 0.56 | 0.76 | 0.78 | 0.78 | 0.80 |

*Note.* All bivariate correlations significant at $p < .001$. MR = Individual Mate Retention (MRI-SF); CMR = Coalitional Mate Retention (CMRI); Cost = Cost-Inflicting; Benefit = Benefit-Provisioning. "Male" specifies male friend; "Female" specifies female friend.

$p < .001$; female friend: $z = -5.66$, $p < .001$), than were request frequencies for Benefit-Previsioning coalitional mate retention (Fisher's *r*-to-*z* for dependent samples; Steiger, 1980). Finally, request frequencies for both Benefit-Provisioning and Cost-Inflicting coalitional mate retention were positively associated with performance frequencies for both Benefit-Provisioning and Cost-Inflicting individual mate retention. Performance frequencies for Cost-Inflicting *individual* mate retention, however, were more strongly associated with request frequencies for both Benefit-Provisioning (male friend: $z = 13.68$, $p < .001$; female friend: $z = 11.79$, $p < .001$) and Cost-Inflicting (male friend: $z = 18.30$, $p < .001$; female friend: $z = 17.12$, $p < .001$) *coalitional* mate retention, than with performance frequencies for Benefit-Previsioning individual mate retention (using Fisher's *r*-to-*z* for dependent samples; Steiger, 1980).

# Discussion

The current study aimed to confirm the factor structure of the Coalitional Mate Retention Inventory (CMRI; Pham, Barbaro, Mogilski, et al., 2015). Results of confirmatory factor analyses (CFAs) demonstrate good fit of the seven-factor CMRI (Figure 1), and better fit than an alternative single-factor model. The current study also showed acceptable model fit for a two-factor higher-order model of the CMRI (Figure 2). Although the seven-factor lower-order model showed slightly better fit to the data, differences in global fit indices were minimal. Importantly, the two superordinate domains successfully reproduce the path estimates of the seven lower-order factors on their indicator variables.

Correlational analyses further attest to the psychometric soundness and utility of the superordinate domains of coalitional mate retention. Request frequencies of Benefit-Provisioning and Cost-Inflicting coalitional mate retention are positively associated with the analogous superordinate domains of individual mate retention – further evidence that mate retention strategies are employed concurrently (Barbaro et al., 2015). Coalitional mate retention domains were negatively associated with participant age, partner's age, and relationship length – paralleling results documented with the MRI (e.g., Atari et al., 2017).

The correlational analyses also suggest that the domains of coalitional mate retention and of individual mate retention are differently associated with relationship outcomes. Benefit-Provisioning individual mate retention is positively associated, and Cost-Inflicting individual mate retention is negatively associated, with relationship satisfaction and relationship commitment (see also, Salkicevic et al., 2014). Conversely, both Benefit-Provisioning and Cost-Inflicting coalitional mate retention are negatively associated with relationship satisfaction and relationship commitment. These associations are weaker for Benefit-Provisioning coalitional mate retention, relative to the associations with Cost-Inflicting coalitional mate retention – indicating a degree of differential predictive utility of the domains.

Pham et al. (2017) suggested that coalitional mate retention may be more duplicitous than individual mate retention, which may even be the case for "positive" coalitional mate retention behaviors (e.g., tactics of Therapy, Praise, and Gifts). In accord with this suggestion, the associations between domains of coalitional mate retention are more strongly associated with Cost-Inflicting, relative to Benefit-Provisioning, *individual* mate retention. Benefit-Provisioning *coalitional* mate retention behavior may have unintended consequences, however. Benefit-Provisioning behavior may be perceived by a partner as deceitful or untrustworthy because of the indirect method (via a friend) and the disclosure to the friend required for solicitation of coalitional mate retention. Future research could examine coalitional mate for the effectiveness of coalitional behaviors, or how these behaviors are perceived within romantic relationships.

We suggest that the two superordinate domains of Benefit-Provisioning and Cost-Inflicting coalitional mate retention can be profitably employed in future research using the CMRI. The two superordinate domains therefore afford researchers a reduction in the number of variables (two instead of seven) used in hypothesis testing involving the CMRI. Fewer variables afford the benefits of reducing Type 1 error (e.g., coalitional mate retention as a dependent variable), and can potentially reduce issues related to multicollinearity (e.g., domains, rather than tactics, of coalitional mate retention as independent variables) in regression-based analyses.

Future research may find that differential associations with domains of Benefit-Provisioning and Cost-Inflicting coalitional mate retention are more complex than the parallel associations with domains of individual mate retention. A key difference between associations with individual mate retention and associations with coalitional mate retention is that coalitional mate retention involves a third individual, in addition to the romantic dyad. Future research efforts, therefore, should take into account the relationship between the partner and the ally (e.g., friendship quality, kinship relatedness), and the individual characteristics (e.g., personality dimensions) of the partner and the ally, in addition to aspects of the romantic partnership. Nuanced investigations of coalitional mate retention have the potential to elucidate important aspects of romantic relationships within a broader (more evolutionarily relevant) social context.

Because the current study and Pham, Barbaro, Mogilski, et al. (2015) used MTurk samples to validate and confirm the CMRI, future research may benefit from different participant recruitment strategies to confirm that the seven-factor lower-order structure, and the two-factor higher-order structure, replicate across populations and cultures.

## Conclusions

The current study confirmed the tactic structure of the Coalitional Mate Retention Inventory (CMRI; Pham, Barbaro, Mogilski, et al., 2015). The results demonstrate that the seven-factor structure of the CMRI fits the data better than does an alternative single-factor structure, and we also provide initial evidence for two superordinate domains of Benefit-Provisioning and Cost-Inflicting coalitional mate retention. Evidentiary support for conceptual similarities between coalitional mate retention and individual mate retention is provided, and we also document differential associations between domains of coalitional mate retention and domains of individual mate retention with relationship satisfaction and relationship commitment. The results provide psychometric evidence for the tactic structure of the CMRI, and highlight the empirical and theoretical benefits afforded by investigating superordinate domains of coalitional mate retention.

### Acknowledgment

We thank Matthew J. W. McLarnon for helpful assistance with statistical analyses.

### Electronic Supplementary Materials

The electronic supplementary material is available with the online version of the article at https://doi.org/10.1027/1015-5759/a000439

*ESM 1.* Tables, Figures (docx).
Tables and Figures displaying additional results and supplementary information.
*ESM 2.* Data (xls).
CMR-CFA output.

## References

Atari, M., Barbaro, N., Sela, Y., Shackelford, T. K., & Chegeni, R. (2017). The Big Five personality dimensions and mate retention behaviors in Iran. *Personality and Individual Differences, 104*, 286–290. https://doi.org/10.1016/j.paid.2016.08.029

Atari, M., Barbaro, N., Shackelford, T. K., & Chegeni, R. (2017). Psychometric evaluation and cultural correlates of the Mate Retention Inventory-Short Form (MRI-SF) in Iran. *Evolutionary Psychology, 15*, 1. https://doi.org/10.1177/1474704917695267

Barbaro, N., Pham, M. N., & Shackelford, T. K. (2015). Solving the problem of partner infidelity: Individual mate retention, coalitional mate retention, and in-pair copulation frequency. *Personality and Individual Differences, 82*, 67–71. https://doi.org/10.1016/j.paid.2015.02.033

Barbaro, N., Shackelford, T. K., & Weekes-Shackelford, V. A. (2016). Mothers and fathers perform more mate retention behaviors than individuals without children. *Human Nature, 27*, 316–333. https://doi.org/10.1007/s12110-016-9261-z

Barrett, P. (2007). Structural equation modelling: Adjudging model fit. *Personality and Individual Differences, 42*, 815–824. https://doi.org/10.1016/j.paid.2006.09.018

Bentler, P. M., & Bonnet, D. C. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*, 588–606. https://doi.org/10.1037/0033-2909.88.3.588

Buss, D. M. (1988). From vigilance to violence: Tactics of mate retention in American undergraduates. *Ethology and Sociobiology, 9*, 291–317. https://doi.org/10.1016/0162-3095(88)90010-6

Buss, D. M., & Craik, K. H. (1983). The act frequency approach to personality. *Psychological Review, 90*, 105–126. https://doi.org/10.1037/0033-295X.90.2.105

Buss, D. M., & Shackelford, T. K. (1997). From vigilance to violence: Mate retention tactics in married couples. *Journal of Personality and Social Psychology, 72*, 346–361. https://doi.org/10.1037/0022-3514.72.2.346

Buss, D. M., Shackelford, T. K., & McKibbin, W. F. (2008). The Mate Retention Inventory-Short Form (MRI-SF). *Personality and Individual Differences, 44*, 322–334. https://doi.org/10.1016/j.paid.2007.08.013

Canary, D. J., & Stafford, L. (1992). Relational maintenance strategies and equity in marriage. *Communications Monographs, 59*, 243–267. https://doi.org/10.1080/03637759209376268

Farrell, J. E., Hook, J. N., Ramos, M., Davis, D. E., Van Tongeren, D. R., & Ruiz, J. M. (2015). Humility and relationship outcomes in couples: The mediating role of commitment. *Couple and - Family Psychology: Research and Practice, 4*, 14–26. https://doi.org/10.1037/cfp0000033

Gagné, F. M., & Lydon, J. E. (2003). Identification and the commitment shift: Accounting for gender differences in relationship illusions. *Personality and Social Psychology Bulletin, 29*, 907–919. https://doi.org/10.1177/0146167203029007009

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55. https://doi.org/10.1080/10705519909540118

Jackson, D. L., Gillaspy, J. A. Jr., & Purc-Stephenson, R. (2009). Reporting practices in confirmatory factor analysis: An overview and some recommendations. *Psychological Methods, 14*, 6–23. https://doi.org/10.1037/a0014694

Kaighobadi, F., Shackelford, T. K., & Buss, D. M. (2010). Spousal mate retention in the newlywed year and three years later. *Personality and Individual Differences, 48*, 414–418. https://doi.org/10.1016/j.paid.2009.11.008

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York, NY: Guilford Press.

Lopes, G. S., Shackelford, T. K., Santos, W. S., Farias, M. G., & Segundo, D. S. A. (2016). Mate Retention Inventory – Short Form: Adaptation to the Brazilian context. *Personality and Individual Differences, 90*, 36–40. https://doi.org/10.1016/j.paid.2015.10.033

Lydon, J. E., Menzies-Toman, D., Burton, K., & Bell, C. (2008). If-then contingencies and the differential effects of the availability of an attractive alternative on relationship maintenance for men and women. *Journal of Personality and Social Psychology, 95*, 50–65. https://doi.org/10.1037/0022-3514.95.1.50

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*, 130–149. https://doi.org/10.1037/1082-989X.1.2.130

McKibbin, W. F., Miner, E. J., Shackelford, T. K., Ehrke, A. D., & Weekes-Shackelford, V. A. (2014). Men's mate retention varies with men's personality and their partner's personality. *Personality and Individual Differences, 56*, 62–67. https://doi.org/10.1016/j.paid.2013.08.022

Milsap, R. E. (2012). *Statistical approaches to measurement invariance*. New York, NY: Routledge.

Miner, E. J., Starratt, V. G., & Shackelford, T. K. (2009). It's not all about her: Men's mate value and mate retention. *Personality and Individual Differences, 47*, 214–218. https://doi.org/10.1016/j.paid.2009.03.002

Peer, E., Vosgerau, J., & Acquisti, A. (2013). Reputation as a sufficient condition for data quality on Amazon Mechanical Turk. *Behavior Research Methods, 46*, 1–9. https://doi.org/10.3758/s13428-013-0434-y

Pham, M. N., Barbaro, N., Mogilski, J. K., & Shackelford, T. K. (2015). Coalitional mate retention is correlated positively with friendship quality involving women, but negatively with male-male friendship quality. *Personality and Individual Differences, 79*, 87–90. https://doi.org/10.1016/j.paid.2015.01.034

Pham, M. N., Barbaro, N., Noser, A. E., Sela, Y., Shackelford, T. K., Zeigler-Hill, V., . . . Fink, B. (2017). Dishonest individuals request more frequent mate retention from friends. *Personal Relationships, 24*, 102–113. https://doi.org/10.1111/pere.12170

Pham, M. N., Barbaro, N., & Shackelford, T. K. (2015). Development and initial validation of the Coalitional Mate Retention Inventory. *Evolutionary Psychological Science, 1*, 4–12. https://doi.org/10.1007/s40806-014-0001-5

Salkicevic, S., Stanic, A. L., & Grabovac, M. T. (2014). Good mates retain us right: Investigating the relationship between mate retention strategies, mate value, and relationship satisfaction. *Evolutionary Psychology, 12*, 1038–1052. https://doi.org/10.1177/147470491401200512

Sela, Y., Shackelford, T. K., Pham, M. N., & Euler, H. A. (2015). Do women perform fellatio as a mate retention behavior? *Personality and Individual Differences, 73*, 61–66. https://doi.org/10.1016/j.paid.2014.09.020

Shackelford, T. K., Goetz, A. T., & Buss, D. M. (2005). Mate retention in marriage: Further evidence of the reliability of the Mate Retention Inventory. *Personality and Individual Differences, 39*, 415–425. https://doi.org/10.1016/j.paid.2005.01.018

Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin, 87*, 245–251. https://doi.org/10.1037/0033-2909.87.2.245

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). New York, NY: Allyn & Bacon.

West, S. G., Finch, J. F., & Curran, P. J. (1995). Structural equation models with nonnormal variables: Problems and remedies. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues and applications* (pp. 56–75). Newbury Park, CA: Sage.

Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. (1977). Assessing reliability and stability in panel models. *Sociological Methodology, 8*, 84–136. https://doi.org/10.2307/270754

Received September 19, 2016
Revision received April 10, 2017
Accepted April 12, 2017
Published online October 26, 2017
EJPA Section/Category: Personality

**Nicole Barbaro**
Department of Psychology
Oakland University
654 Pioneer Drive
Rochester, MI 48309
USA
nmbarbar@oakland.edu

 