



## A meta-analysis of sex differences in romantic attraction: Do rating contexts moderate tactic effectiveness judgments?

David P. Schmitt\*

Bradley University, USA

Although a number of studies have explored perceived sex differences in romantic attraction effectiveness, no research has systematically examined whether different rating contexts might moderate effectiveness judgments. In a meta-analytic review of romantic attraction research, four potential moderating variables were examined: temporal context (unspecified, long-term, short-term), manipulation form (self-promotion, competitor derogation), attraction type (general, retention, poaching), and sex of rater (mixed, same, opposite). Although perceived sex differences in physical appearance and resource-related tactics remained stable across most moderating variables, sex differences did vary across some rating contexts. For example, perceptions of sex differences in the effectiveness of appearance-related attraction tactics were much stronger in the context of self-promotion ( $d = -.77$ ) compared with the competitor derogation context ( $d = -.17$ ). Resource-related tactics of attraction displayed the opposite pattern, with significantly larger perceived sex differences in the context of competitor derogation ( $d = .93$ ) than in self-promotion ( $d = .68$ ). Discussion focused on the implications of sex difference variability and stability across rating contexts for evolutionary theories of romantic attraction.

Few topics in evolutionary social psychology have received as much empirical attention as human mate choice and romantic attraction (Simpson & Kenrick, 1997). Much of the evolutionary psychology research on mate choice has focused on sex differences—on differences between men's and women's fundamental romantic desires and basic reproductive strategies (Bjorklund & Shackelford, 1999; Cashdan, 1998; Hinde, 1984; Kenrick, Sadalla, Groth, & Trost, 1990). It has been suggested, for example, that men tend to place great emphasis on physical appearance when choosing a mating partner (Johnston & Franklin, 1993; Singh & Young, 1995; Symons, 1979). Women, in contrast, are hypothesized to place more emphasis on resource-related attributes (Ellis, 1992; Sadalla, Kenrick, & Vershure, 1987).

Empirically, sex differences in desires for physical beauty and resources have been found in many small studies (Buss & Schmitt, 1993; Jensen-Campbell, Graziano, & West, 1995; Regan, 1998; Sprecher, McKinney, & Orbuch, 1987) and have been documented in large representative samples of the USA (e.g. Sprecher,

\*Requests for reprints should be addressed to David P. Schmitt, 105 Comstock Hall, Bradley University, Peoria, IL 61625, USA (e-mail: [dps@bradley.edu](mailto:dps@bradley.edu))

Sullivan, & Hatfield, 1994). More impressive, however, is the fact that sex differences in preferences for physical beauty and resources have been detected across several human cultures (Buss, 1989; Knodel, Low, Saengtienchai, & Lucas, 1997; Walter, 1997), providing some support for their universality in male and female natures (Bock & Cardew, 1997; Brown, 1991). The existence of these sex differences has also been confirmed using many different research methodologies (Bailey, Gaulin, Agyei, & Gladue, 1994; Ellis & Symons, 1990; Hassebrauck, 1998; Malamuth, 1996; Speed & Gangestad, 1997; Townsend, 1993; Weiderman & Dubois, 1998), suggesting they are not artefacts or biases limited to self-report forms of assessment.

In addition to directly showing that men and women possess somewhat different mate preference psychologies, sex differences in romantic desires have been confirmed by looking into the indirect effects of these desires. For example, Kenrick and his colleagues (Kenrick, Neuberg, Zierk, & Krones, 1994) demonstrated using the 'contrast effect' that exposure to physically attractive individuals tends to lessen a man's commitment to his current relationship partner. However, such exposure had no effect on women's commitment to their current partners. Conversely, when women were exposed to targets who had high status and resource-related attributes, this lessened women's (but not men's) commitment to their current romantic partners. Kenrick and others have argued that this is indirect evidence that men and women possess evolved mate preferences that unconsciously affect their relationship satisfaction and commitment.

Another indirect effect of sex-differentiated mating desires can be found in the context of romantic attraction. According to sexual selection theory (Darwin, 1871), the evolved mate preferences of one sex should have a substantive impact on the effectiveness of attraction tactics used by the opposite sex. If men possess an evolved preference for physical attractiveness, the argument goes, women should be more effective than men at using mate attraction tactics that manipulate physical attractiveness. Conversely, if women prefer resources more than men do, men should be seen as more effective than women at using resource-related tactics of attraction. Empirical evaluations of this aspect of sexual selection in humans have largely been supportive. For example, Buss (1988a), Tooke and Camire (1991) and Walters and Crawford (1994) all found that women were judged more effective than men when using appearance-related tactics of attraction, whereas men were judged more effective than women when using resource-related tactics of romantic attraction.

Perceived sex differences in physical appearance and resource-related tactic effectiveness have also been documented within more specialized rating contexts of romantic attraction. Buss (1988b), for example, found sex differences in effectiveness ratings of appearance and resource-related tactics when used by men and women to attract and retain a long-term marital partner. Schmitt and Buss (1996) documented sex differences in perceived tactic effectiveness across self-promotion and competitor derogation forms of attraction. Schmitt and Buss (2001) found sex differences in perceived appearance and resource-related mate attraction within the specialized context of obtaining a partner who is already in a relationship, what they called the context of 'human mate poaching'.

Even though several studies have examined the judged effectiveness of mate attraction tactics, no study has investigated the ways that perceived sex differences in attraction effectiveness might vary across this diverse array of specialized rating contexts. As a result, it is unclear whether sex differences in appearance and

resource-related tactic effectiveness judgments are consistent in form and magnitude across different rating contexts, or whether certain critical features of context play a moderating role in perceptions of sex-differentiated romantic attraction.

For example, perceived sex differences could meaningfully vary across temporal contexts, with some tactics showing greater sex differences in short-term than in long-term contexts, much as do mate preferences (Kenrick *et al.*, 1990; Regan, 1998). Tactics of attraction using physical appearances have also been shown to interact with temporal context in a few studies (e.g. Schmitt & Buss, 1996). However, the use of a meta-analysis to more rigorously examine the moderating role of temporal context on physical appearance tactics would be an important empirical advancement, and could have implications for ruling out certain evolutionary hypotheses of sexual strategy variation. Gangestad and Simpson (2000), for instance, have argued that women who pursue short-term sexual strategies do so, at times, to gain access to physically attractive men. Men are thought to pursue physically attractive partners in both short-term and long-term contexts. If this theory holds, we should find that sex differences in using physical appearance-related tactics reliably lessen in the context of short-term mating. If a meta-analysis revealed that sex differences across a wide range of specified contexts do not shift, the Gangestad and Simpson hypothesis would be partially disconfirmed.

Another important question that could be addressed by meta-analysis is whether perceived sex differences in attraction effectiveness vary in strength depending on whether ratings are obtained from members of the same sex, the opposite sex, or both sexes combined. Systematic variation in tactic effectiveness across sex-of-rater contexts could inform theory of mind research (see Archer and Haigh (1999) for an example on aggression). In the domain of sexuality, the beliefs men and women have about one another are often at odds with how they view themselves (Haselton & Buss, 2000). In the case of resource tactics, if men judged other men to be effective at resource-related tactics, but women do not, resource-related romantic attraction might be ruled out as a consequence of *intersexual* selection. Investigators might then turn their efforts to understanding potential *intrasexual* competition motives for resource display and devotion.

Other perceived sex differences in romantic attraction may depend on whether the tactics are employed in the context of self-promotion or as part of competitor derogation. For instance, some previous investigations have found that personal appearance tactics are judged more effective in self-promotion than competitor derogation (Schmitt & Buss, 2001); other studies failed to uncover this pattern of results (Schmitt & Buss, 1996). If a meta-analysis suggested that certain tactics tend to display greater perceived sex differences in self-promotion contexts, this could generate new hypotheses about why these tactics are seen as effective: Is possessing a desirable trait more important than just being better than a competitor? What is it about this trait that causes this pattern? Does this pattern depend on other contexts of attraction?

Many of these caveats to sex differences in human mate attraction have been alluded to in previous individual studies (e.g. Schmitt & Buss, 1996). However, no study has meticulously examined the nature of sex differences across many different rating contexts, nor has research documented that the statistical findings of previous smaller studies show similar patterns and magnitudes when viewed across multiple studies. Across all potential moderators, systematic variation in the form and strength of perceived sex differences in mate attraction across rating contexts could reveal

important avenues for future research and theory in romantic attraction. It could stimulate new research questions—why do sex differences exist in self-promotion tactic effectiveness but disappear in competitor derogation contexts? It could have implications for future theorizing in the domain of human courtship—short-term attraction contexts may be different from long-term attraction contexts in ways not discovered by individual empirical studies. Systematic variation in tactic effectiveness across sex-of-rater contexts could inform why men and women judge each other's attractive effectiveness differently. Finally, as noted above, systematic variation across temporal context might inform new findings on sexual strategy pluralism (Gangestad & Simpson, 2000).

At the same time, any stability of these mate preferences across rating contexts would be informative, and might provide additional evidence that the source of mating desires for physical attractiveness and resources resides in highly specialized and sex-differentiated human mating psychologies (Buss, 1995). At a minimum, meta-analytically examining sex differences across rating contexts is an important step forward in our understanding human mate attraction. In this article, a meta-analytic approach was used to evaluate the stability of sex differences in attraction of effectiveness judgments, and to determine the potential moderating roles of temporal context (unspecified, long-term (i.e. potential marriage partner), short-term (i.e. a brief affair, a one-night stand)), manipulation form (self-promotion (displaying a desired attribute), competitor derogation (suggesting a rival does not possess a desired attribute)), attraction type (general, retention (keeping a romantic partner), poaching (attracting someone who is already in a relationship)), and sex of rater (mixed (men and women rating men and women), same (men rating men, women rating women), opposite (men rating women, women rating men)).

## Method

Meta-analysis is a statistical technique that allows researchers to combine research findings across multiple studies (Cooper & Hedges, 1994; Glass, McGaw, & Smith, 1981; Hunter & Schmidt, 1990; Rosenthal, 1991). Because meta-analyses involve large numbers of participants from multiple studies, the focus in meta-analytic research is normally not on the statistical significance of sex differences. Even relatively trivial differences between men and women will register as significant if the sample size is much larger than 1000. Instead, meta-analyses focus on the magnitude or strength of sex differences. The strength of the difference between men and women is independent of sample size and is formally expressed as an effect size (e.g.  $d$ ). An effect size ( $d$ ) is calculated by subtracting the male mean from the female mean, and dividing by their pooled standard deviation (Hedges & Olkin, 1985; Rosenthal, 1991). Thus, if  $(d) = .50$  on a dimension of sexual permissiveness, the average man is half a standard deviation higher than the average woman on that dimension. Traditionally, effect sizes are considered small if less than .20, moderate at .50 and large at .80 (Cohen, 1969). This technique has become common in sex difference research (Hyde & Linn, 1986), in part because it can provide answers to two important types of research questions.

First, many researchers want to know if certain sex differences are stable. A sex difference is considered stable or 'robust' when it registers across all studies in a similar way. If a meta-analysis finds that a sex difference ( $d$ ) is not robust, it can diminish confidence in the reality of the sex difference and call into question any hypotheses that predicted the difference. However, if a sex difference is shown to be

meta-analytically robust, it generates the expectation that the same sex difference will be encountered in future research. For example, if sex differences in the perceived effectiveness of appearance-related tactics of attraction are robust, they should show up in a similar way with similar ( $d$ ) values across all studies that looked at appearance-related effectiveness judgments—across mate attraction, retention and poaching studies; across raters of the same, opposite and mixed sex. If sex differences in appearance-related tactic effectiveness judgments are not robust across studies, evolutionary researchers cannot use them as strong evidence in support of their theoretical perspective, and the hypotheses that generated the predictions, such as sexual strategies theory (Buss & Schmitt, 1993), might be called into question.

Second, meta-analysis allows researchers to identify key variables that might have a moderating influence on other statistical relationships (e.g. Sheeran & Orbell, 1998). By combining studies using slightly different research designs, for example, the effect of research design on sex differences can be quantified more clearly. Previous meta-analyses of sex differences in personality (Feingold, 1994) and sexuality (Oliver & Hyde, 1993) have found some moderators of sex differences such as date of publication and the type of measure that is used. In the case of mate attraction, meta-analysis could provide a quantitative tool for determining whether perceived sex differences vary in magnitude depending on which sex is a rater. In addition, findings that are too subtle to be statistically significant in single studies with small sample sizes may reveal themselves as practically significant effect sizes in meta-analytic investigations.

### **Accumulation of research on tactics of romantic attraction**

A search of PsychInfo using the keywords 'interpersonal attraction', 'romantic attraction', 'human sex differences' and 'gender differences' from the years 1871–2001 resulted in an initial pool of 55,916 studies. In addition, a fugitive search was made for unpublished data on romantic tactic effectiveness, and attempts were made to locate relevant dissertations. All studies that reported *perceived* sex differences in appearance or resource-related attraction effectiveness were included in the meta-analysis. Not included in the meta-analysis were studies on sex differences in human mate *preferences* (Buss, 1989; Buss, Shackelford, Kirkpatrick, & Larsen, in press), sex differences in the *actual* effectiveness of experimental exposure to adaptive attributes (Townsend & Levy, 1990), and studies that document *indirect* effects of mate preferences on phenomena other than romantic attraction effectiveness judgments (Kenrick *et al.*, 1994). Although sex differences in such studies are important, the current investigation focused on moderators of *perceived effectiveness* on human mate attraction. This resulted in a total of 39 empirical findings based on responses from over 2500 participants.

## **Results and discussion**

Tables 1 and 2 provide all key information from physical appearance and resource-related tactic effectiveness judgments. The first row in Tables 1A and 1B contains the pertinent data from Buss (1988a), a study that looked at sex differences in the physical appearance tactic 'alter appearance'. This study did not specify whether the attraction took place in the context of long-term or short-term mating, so the temporal context of the result was classified as 'unspecified'. The tactic was used to increase the mate value of the tactic's user, so the manipulation form was classified as 'self-promotion'. The

**Table 1.** Appearance-related attraction tactics: the impact of temporal context, manipulation form, attraction type and sex of rater on sex differences in perceived effectiveness

Table 1A Appearance-related tactic	Moderator variables				Publication date
	Temporal context	Manipulation form	Attraction type	Sex of rater	
Alter appearance	Unspec.	Self-prom.	General	Mixed <sup>a</sup>	(1)
Enhance appearance	Unspec.	Self-prom.	General	Same <sup>b</sup>	(2)
Improve appearance	Unspec.	Self-prom.	General	Mixed <sup>a</sup>	(3)
Competitor's appearance	Unspec.	Derog.	General	Mixed <sup>c</sup>	(4)
Enhance physical attractiveness	LT	Self-prom.	General	Mixed <sup>d</sup>	(5)
Rival's physical attractiveness	LT	Derog.	General	Mixed <sup>e</sup>	(5)
Appearance enhancement	LT	Self-prom.	Retention	Mixed <sup>a</sup>	(6)
Enhance physical appearance	LT	Self-prom.	Poaching	Same <sup>a</sup>	(7)
Enhance physical appearance	LT	Self-prom.	Poaching	Opposite <sup>a</sup>	(7)
Rival's physical appearance	LT	Derog.	Poaching	Same <sup>e</sup>	(7)
Rival's physical appearance	LT	Derog.	Poaching	Opposite <sup>e</sup>	(7)
Enhance physical appearance	LT	Self-prom.	Poaching	Opposite <sup>a</sup>	(8)
Enhance physical attractiveness	ST	Self-prom.	General	Mixed <sup>d</sup>	(5)
Rival's physical attractiveness	ST	Derog.	General	Mixed <sup>e</sup>	(5)
Enhance physical attractiveness	ST	Self-prom.	General	Mixed <sup>a</sup>	(9)
Enhance physical appearance	ST	Self-prom.	Poaching	Same <sup>a</sup>	(7)
Enhance physical appearance	ST	Self-prom.	Poaching	Opposite <sup>a</sup>	(7)
Rival's physical appearance	ST	Derog.	Poaching	Same <sup>e</sup>	(7)
Rival's physical appearance	ST	Derog.	Poaching	Opposite <sup>e</sup>	(7)
Enhance physical appearance	ST	Self-prom.	Poaching	Opposite <sup>a</sup>	(8)

Note. Unspec.=unspecified; LT=long-term; ST=short-term; Self-prom.=self-promotion; Derog.=derogation.

<sup>a</sup>Ratings made on a 7-point scale ranging from 1 (not very likely to be effective) to 7 (very likely to be effective);

<sup>b</sup>ratings made on a 5-point scale ranging from 1 (very ineffective) to 5 (very effective); <sup>c</sup>ratings made on a 7-point scale ranging from 1 (not very effective) to 7 (very effective); <sup>d</sup>ratings made on a 7-point scale ranging from 1 (not at all effective) to 7 (extremely effective); <sup>e</sup>ratings made on a 6-point scale ranging from -3 (not very likely to be effective) to +3 (very likely to be effective).

The references under column 6 are: (1) Buss (1988a); (2) Tooke and Camire (1991); (3) Walters and Crawford (1994); (4) Buss and Dedden (1990); (5) Schmitt and Buss (1996); (6) Buss (1988b); (7) Schmitt and Buss (2001); (8) Schmitt (2001); (9) Greer and Buss (1994).

attraction type was 'general' in that it did not involve mate retention or mate poaching, and the sex of rater of tactic effectiveness included a 'mixed' group of men and women. All studies were classified along these four moderating context variables by two independent coders; no disagreements were observed between coders.

In the Buss (1988a) study, men ( $M=3.26$ ) were rated as being less effective than women ( $M=4.37$ ) when using the tactic of 'alter appearance'. This difference was statistically significant ( $t(54)=-5.19, p<.001$ ), and the magnitude of the difference was rather large ( $d=-1.39$ ). This one study, however, is of relatively limited value. The sample size was small ( $N=56$ ), and it asked about attraction tactics in a generalized way (i.e. no reference to the type of relationship sought, whether the target was already in a relationship and so forth).

The value of meta-analysis derives from pooling many studies together and looking for robust and moderating patterns of sex differences. The statistical program

Table 1B	Sex of actor						Significance and effect size	
	Men			Women			<i>t</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>		
Alter appearance	3.26	.71	28	4.37	.88	28	-5.19***	-1.39
Enhance appearance	2.32	.56	44	2.67	.61	72	-3.16	-.59
Improve appearance	n/a	n/a	53	n/a	n/a	53	-2.80	-.55
Competitor's appearance	3.19	.96	60	3.12	1.03	60	.39	.07
Enhance physical attractiveness	3.85	.98	53	4.61	.98	55	-4.03***	-.78
Rival's physical attractiveness	-.07	1.06	44	.30	1.19	42	-1.52	-.33
Appearance enhancement	4.44	.95	23	4.90	1.14	23	-1.49	-.43
Enhance physical appearance	3.55	.98	74	4.42	1.37	114	-5.07***	-.71
Enhance physical appearance	3.43	1.22	114	4.35	1.25	74	-4.98***	-.75
Rival's physical appearance	2.37	1.31	76	2.92	1.78	98	-2.35*	-.37
Rival's physical appearance	2.64	1.56	97	2.64	1.58	74	-.74	-.11
Enhance physical appearance	2.59	1.35	60	2.87	1.53	23	-.77	-.20
Enhance physical attractiveness	4.38	.94	53	5.13	.87	55	-4.30***	-.84
Rival's physical attractiveness	.50	1.09	44	1.02	1.31	42	-2.00*	-.43
Enhance physical attractiveness	3.04	.89	50	4.16	1.16	50	-5.42***	-1.09
Enhance physical appearance	4.03	1.18	76	5.36	1.30	99	-7.07***	-1.06
Enhance physical appearance	3.98	1.33	99	5.07	1.23	76	-5.61***	-.85
Rival's physical appearance	2.31	1.19	74	2.32	1.19	114	-.06	-.01
Rival's physical appearance	2.13	1.19	114	2.31	1.20	74	-1.01	-.15
Enhance physical appearance	2.34	1.25	64	3.11	1.76	22	-2.89*	-.55

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Note. n/a=not available from the published article of Walters and Crawford (1994). Cohen (1969) defined effect sizes (*d*) as small at .20, moderate at .50 and large at .80.

Comprehensive Meta-Analysis (Version 1.0.9, BioStat Inc., Engelwood, NJ) was used to analyse stability and potential moderating factors of sex differences reported in Table 3. As can be seen at the top of Table 3, after combining all 20 empirical findings that inform us about perceived sex differences in physical appearance tactic effectiveness, strong and consistent sex differences were found. Overall, based on a combined sample of over 2500 participants, women were judged moderately more effective than men when using appearance-related tactics ( $d = -.52$ ). The 95% confidence interval was from  $-.60$  to  $-.44$ , a range of error that suggests that this perceived sex difference is reliably moderate in magnitude. However, several moderating factors, including the four rating contexts addressed in this analysis, could attenuate or accentuate this perceived sex difference in interesting ways.

### **Do temporal contexts moderate sex differences in attraction effectiveness judgments?**

The first potential moderator of perceived sex differences in appearance-related attraction was 'temporal context'. As seen in Table 3, four studies, with a total sample size of 398 participants, did not specify the temporal context of appearance-related attraction as either long-term marital attraction or short-term sexual attraction. These

**Table 2.** Resource-related attraction tactics: the impact of temporal context, manipulation form, attraction type and sex of rater on sex differences in perceived effectiveness

Table 2A Resource-related tactic	Moderator variables				
	Temporal context	Manipulation form	Attraction type	Sex of rater	Publication date
Display resources	Unspec.	Self-prom.	General	Mixed <sup>a</sup>	(1)
Dominance/resources	Unspec.	Self-prom.	General	Same <sup>b</sup>	(2)
Demonstrate resources	Unspec.	Self-prom.	General	Mixed <sup>a</sup>	(3)
Competitor's financial resources	Unspec.	Derog.	General	Mixed <sup>c</sup>	(4)
Display resources	LT	Self-prom.	General	Mixed <sup>d</sup>	(5)
Show resource potential	LT	Self-prom.	General	Mixed <sup>d</sup>	(5)
Rival's current finances	LT	Derog.	General	Mixed <sup>e</sup>	(5)
Rival's resource potential	LT	Derog.	General	Mixed <sup>e</sup>	(5)
Resource display	LT	Self-prom.	Retention	Mixed <sup>a</sup>	(6)
Demonstrate resources	LT	Self-prom.	Poaching	Same <sup>a</sup>	(7)
Demonstrate resources	LT	Self-prom.	Poaching	Opposite <sup>a</sup>	(7)
Demonstrate resources	LT	Self-prom.	Poaching	Opposite <sup>a</sup>	(8)
Display resources	ST	Self-prom.	General	Mixed <sup>d</sup>	(5)
Give resources immediately	ST	Self-prom.	General	Mixed <sup>d</sup>	(5)
Rival's current finances	ST	Derog.	General	Mixed <sup>e</sup>	(5)
Give gifts	ST	Self-prom.	General	Mixed <sup>a</sup>	(9)
Demonstrate resources	ST	Self-prom.	Poaching	Same <sup>a</sup>	(7)
Demonstrate resources	ST	Self-prom.	Poaching	Opposite <sup>e</sup>	(7)
Demonstrate resources	ST	Self-prom.	Poaching	Opposite <sup>a</sup>	(8)

Note. Unspec.=unspecified; LT=long-term; ST=short-term; Self-prom.=self-promotion; Derog.=derogation.

<sup>a</sup>Ratings made on a 7-point scale ranging from 1 (not very likely to be effective) to 7 (very likely to be effective);

<sup>b</sup>ratings made on a 5-point scale ranging from 1 (very ineffective) to 5 (very effective); <sup>c</sup>ratings made on a 7-point scale ranging from 1 (not very effective) to 7 (very effective); <sup>d</sup>ratings made on a 7-point scale ranging from 1 (not at all effective) to 7 (extremely effective); <sup>e</sup>ratings made on a 6-point scale ranging from -3 (not very likely to be effective) to +3 (very likely to be effective).

The references under column 6 are: (1) Buss (1988a); (2) Tooke and Camire (1991); (3) Walters and Crawford (1994); (4) Buss and Dedden (1990); (5) Schmitt and Buss (1996); (6) Buss (1988b); (7) Schmitt and Buss (2001); (8) Schmitt (2001); (9) Greer and Buss (1994).

findings were treated as an 'unspecified' attraction context. In the unspecified context, the average sex difference in physical appearance effectiveness suggested that women were perceived as more effective than men ( $d = -.46$ ), a moderate magnitude of effect (Cohen, 1969). In the eight studies that explicitly specified attraction taking place in the long-term context, the average effect size was very similar to the unspecified context ( $d = -.48$ ), suggesting that when the context is unspecified, participants may be assuming that the attraction takes place in the temporal context of long-term mating. Finally, in the eight studies involving short-term attraction, the average difference between men and women was also moderate ( $d = -.57$ ). The moderating variable of temporal context seemed to have little effect on sex differences in appearance-related attraction effectiveness, as confirmed by a test for between-class heterogeneity ( $Q_b = 1.34$ , n.s.). Women were judged more effective in every temporal context, and the size of the sex difference was consistent and moderate in size across all contexts ( $d \approx -.50$ ).



Table 2B	Sex of actor						Significance and effect size	
	Men			Women			t	d
Resource-related tactic	M	SD	N	M	SD	N		
Display resources	4.12	.82	28	3.56	.94	28	2.38**	.63
Dominance/resources	2.59	.45	44	2.26	.66	72	3.20**	.59
Demonstrate resources	n/a	n/a	53	n/a	n/a	53	4.40***	.87
Competitor's financial resources	2.88	.88	60	2.07	.88	60	5.04***	.92
Display resources	2.94	1.31	53	2.53	1.13	55	1.74*	.34
Show resource potential	4.74	1.33	53	3.43	1.45	55	4.90***	.95
Rival's current finances	.14	1.05	44	-.94	1.14	42	4.56***	.99
Rival's resource potential	1.53	1.04	44	.75	1.09	42	3.39**	.74
Resource display	4.50	.95	23	3.76	1.21	23	2.31*	.69
Demonstrate resources	4.29	1.21	74	3.62	1.19	114	3.73***	.56
Demonstrate resources	4.63	1.31	114	3.56	.96	74	6.45***	.91
Demonstrate resources	3.33	1.55	60	2.55	1.19	23	2.45**	.53
Display resources	4.17	1.59	53	3.51	1.48	55	2.23*	.43
Give resources immediately	4.87	1.37	53	4.02	1.11	55	3.54***	.69
Rival's current finances	-.06	1.12	44	-1.20	1.02	42	4.94***	1.07
Give gifts	3.82	1.16	50	3.33	1.12	50	2.15*	.43
Demonstrate resources	4.48	1.11	76	3.45	1.32	99	5.60***	.86
Demonstrate resources	4.80	1.32	99	3.68	1.05	76	6.25***	.97
Demonstrate resources	2.93	1.36	64	2.48	1.17	22	1.49	.34

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Note. n/a=not available from the published article of Walters and Crawford (1994). Cohen (1969) defined effect sizes ( $d$ ) as small at .20, moderate at .50 and large at .80.

As seen down the right-hand side of Table 3, the overall sex difference in resource-related tactic effectiveness, based on judgments over 2100 participants, was large ( $d = .73$ ). According to the pattern of effect sizes across 19 empirical findings, the 95% confidence interval ranged from .64 to .82. Thus, this difference is likely to be moderate to large across future investigations. As with physical appearance, the effect of temporal context on resource-related tactics was negligible ( $Q_b = 2.00$ , n.s.). The average sex difference was large in the unspecified context ( $d = .77$ ), in the long-term context ( $d = .71$ ) and in the short-term context ( $d = .72$ ). Thus, the moderator variable of temporal context seemed to have little effect on people's perceptions of sex differences in resource-related attraction effectiveness.

### **Do manipulation forms moderate sex differences in attraction effectiveness judgments?**

The second potential moderator variable of sex differences in perceived tactic effectiveness was 'manipulation form'. The two main contexts of manipulation form evaluated here were *self-promotion* (self-enhancement of one's own adaptive attributes in the eyes of a potential mate) and *competitor derogation* (damaging the perceived value of a mating competitor or romantic rival). Women were perceived as

**Table 3.** Moderating impact of rating contexts on sex differences in perceived mate attraction effectiveness

Moderator variable	Sex differences							
	Appearance-related tactics				Resource-related tactics			
	<i>k</i>	<i>N</i>	<i>d</i>	95% CI	<i>k</i>	<i>N</i>	<i>d</i>	95% CI
Overall	20	2,548	-.52	-.60 to -.44	19	2,129	.73	.64 to .82
Temporal context								
Unspecified	4	398	-.46	-.67 to -.26	4	398	.77	.56 to .98
Long-term	8	1,044	-.48	-.61 to -.35	8	893	.71	.57 to .85
Short-term	8	1,106	-.57	-.70 to -.45	7	838	.72	.58 to .86
Manipulation form								
Self-promotion	13	1,535	-.77	-.88 to -.66	15	1,751	.68	.58 to .78
Competitor derogation	7	1,013	-.17	-.29 to -.04	4	378	.93	.71 to 1.14
Attraction type								
General	9	886	-.60	-.73 to -.46	12	1,188	.71	.59 to .83
Retention	1	46	-.43	.17 to -1.03	1	46	.69	.08 to 1.30
Poaching	10	1,616	-.47	-.58 to -.37	6	895	.75	.61 to .90
Sex of rater								
Mixed sex	9	816	-.59	-.73 to -.45	12	1,118	.72	.60 to .84
Same sex	5	841	-.53	-.67 to -.38	3	479	.68	.49 to .86
Opposite sex	6	891	-.44	-.58 to -.30	4	532	.79	.61 to .98

much more effective than men at using physical appearance tactics in the context of self-promotion ( $d = -.77$ ). This was a robust finding, and the 95% confidence interval suggests that this difference will usually be large in studies examining this form of romantic self-promotion. However, the perceived sex difference in appearance tactic effectiveness shifted from large to small in the context of competitor derogation ( $d = -.17$ ). Women were still perceived as more effective than men when using appearance derogation, but the magnitude of this difference was significantly less than in perceived self-promotion ( $Q_b = 51.51, p < .001$ ).

There are two basic possibilities for explaining this shift across manipulation form. First, it may be that women's judged effectiveness when using appearance-related tactics dramatically decreases in the context of competitor derogation, so much so that they become perceived only about as effective as men who derogate their competitor's appearance. Second, men's judged effectiveness when using appearance tactics may become especially high in the context of competitor derogation, so much so that they are perceived nearly as effective as women. Examining the means presented in Table 1, it seems that the former explanation is driving the reduced sex differences in competitor derogation effectiveness judgments. Both men and women are perceived as less effective in the context of competitor derogation, compared with self-promotion, when using appearance-related tactics. However, the perceived effectiveness decrease for women appears greater than the shift for men. Thus, the present meta-analysis suggests that manipulation form may be a significant moderator of sex difference

effectiveness judgments, and women's usage of physical appearance tactics seems especially effective in the context of competitor derogation.

The potential moderator of manipulation form also had a significant impact on resource-related tactic effectiveness judgments. Men were perceived as more effective than women at using resource tactics in the context of self-promotion ( $d = .68$ ). This was a robust finding, and meta-analytic procedures suggest that this difference will usually be moderate to large in the context of self-promotion. However, this sex difference becomes larger in the context of competitor derogation ( $d = .93$ ). Men were perceived as much more effective than women when using resource derogation, and the magnitude of this difference was significantly larger than perceived self-promotion sex differences ( $Q_b = 4.14, p < .05$ ).

Again, there are two general possibilities that could explain this pattern of results. First, it may be that men's judged effectiveness when using resource-related tactics dramatically increases in the context of competitor derogation, so much so that they become 'hyper-effective' compared to women. Second, women's effectiveness when using resource tactics may become perceived as especially ineffective in the context of competitor derogation, so much so that the sex difference in that rating context shifts from moderate to large. Examining the means presented in Table 2, it appeared that both factors were at work. When using resource-related tactics, men were judged more effective and women less effective in the context of competitor derogation. Thus, the present meta-analysis revealed a potentially important moderator of sex difference effectiveness judgments, and identified a possible reason why sex differences may shift across rating contexts. Namely, perceived sex differences in resource tactics effectiveness increased in the context of competitor derogation because men were seen to fare better, whereas women fare worse, at derogating a competitor's resource capabilities.

### **Do attraction types moderate sex differences in attraction effectiveness judgments?**

The third potential moderator variable of sex differences in perceived effectiveness of attraction tactics was 'attraction type'. As can be seen down the left-hand side of Table 3, nine empirical findings, with a total sample size of 886 participants, contrasted men's and women's perceived effectiveness in using appearance tactics in the context of general mating, displaying a moderate effect size ( $d = -.60$ ). One study examined the effectiveness of appearance tactics in the context of mate retention, and also found a moderate sex difference in favour of women ( $d = -.43$ ). Ten findings examined sex differences in appearance tactics within the context of mate poaching. Across these studies, the average perceived sex difference was once again moderate in size ( $d = -.47$ ). Thus, the rating context of 'type' seemed to have little moderating effect on judgments of sex differences in appearance-related effectiveness ( $Q_b = 2.02, n.s.$ ). Women were judged more effective in every attraction type, and the size of the sex difference was consistently moderate in magnitude ( $d \approx -.50$ ).

As shown down the right-hand side of Table 3, 12 empirical findings, with a total sample size of 1188 participants, contrasted men's and women's judged effectiveness in using resource-related tactics of attraction in the context of general mating. In these studies, the average perceived sex difference in resource tactic effectiveness was moderate to large ( $d = .71$ ). One study examined the effectiveness of resource tactics in the context of mate retention and also found a moderate to large sex difference

in favour of men ( $d=.69$ ). Six findings examined sex differences in resource tactics within the context of mate poaching; again, the average sex difference was large ( $d=.75$ ). Thus, the potential moderating variable of attraction type seemed to have little effect on sex differences in resource-related attraction effectiveness ( $Q_b=.27$ , n.s.), with men judged more effective in every attraction type, and the size of the sex difference was consistently moderate to large in magnitude ( $d\approx.70$ ).

### **Does the sex of the rater moderate sex differences in attraction effectiveness judgments?**

A fourth potential moderator variable of sex differences in appearance-related attraction was 'sex of rater'. In most cases, ratings made by men and women were collapsed to provide judgements of how effective male and female actors would be at using different tactics of attraction. As can be seen down the left-hand side of Table 3, nine empirical findings, with a total sample size of 816 participants, examined sex differences in physical appearance tactics based on these 'mixed-sex' ratings. That is, both men and women rated male effectiveness, and both men and women judged female effectiveness at using appearance tactics. Across these studies, the perceived sex difference was moderate in magnitude ( $d=-.59$ ). In a few instances, the ratings of tactic effectiveness were based on judgments from raters that were the same sex as the actor. For example, Tooke and Camire (1991) examined effectiveness sex differences based on men's judgments of male effectiveness and women's judgments of female effectiveness. In five of these 'same-sex' studies, the perceived sex differences in effectiveness were also moderate ( $d=-.53$ ). Finally, some researchers examined the effectiveness of attraction tactics based on the ratings from the opposite sex of the tactic user. For example, Schmitt and Buss (2001) examined male actor effectiveness as judged by women, compared with female actor effectiveness as judged by men. Six studies looked at only men's perceptions of female appearance tactic effectiveness compared with women's judgements of male appearance tactic effectiveness. When these 'opposite-sex' ratings were used, the sex difference in appearance attraction effectiveness was moderate ( $d=-.44$ ). The rating contexts of sex of rater, therefore, seemed to have little moderating effect on perceived sex differences in appearance-related attraction effectiveness ( $Q_b=2.11$ , n.s.). Women were judged more effective in every possible sex by rater context, and the size of the sex difference was consistently moderate in magnitude ( $d\approx.50$ ).

As can be seen down the right-hand side of Table 3, 12 empirical findings, with a total sample size of 1118 participants, examined six differences in resource-related tactics based on mixed-sex ratings. Across these studies, the average perceived sex difference was moderate to large in magnitude ( $d=.72$ ). Three studies looked at only men's ratings of male effectiveness and women's ratings of female effectiveness. In these studies, the perceived sex differences in effectiveness were also moderate to large ( $d=.68$ ). Finally, four studies looked at only men's perceptions of female resource tactic effectiveness compared with women's judgements of male resource tactic effectiveness. When opposite-sex ratings were used, the sex difference in resource attraction effectiveness was large ( $d=.79$ ). The moderating variable of sex of rater, therefore, seemed to have little effect on sex differences in resource-related attraction effectiveness ( $Q_b=.79$ , n.s.). Men were judged more effective within every possible sex by rater context, and the size of the sex difference was consistently moderate to large in magnitude ( $d\approx.70$ ).

## Conclusion

In a meta-analytic review of mate attraction research, the potential moderating impacts of temporal context, manipulation form, attraction type and sex of rater on judgments of tactic effectiveness were examined. Perceived sex differences in physical appearance and resource-related tactics remained relatively stable across most rating contexts. However, differences did vary across some rating contexts. Most notably, perceived sex differences in appearance-related tactics were stronger in the context of self-promotion compared with competitor derogation. Resource-related tactics of attraction displayed the opposite pattern, with larger sex differences in competitor derogation effectiveness judgments than in self-promotion. It appeared that the shift in perceived physical appearance effectiveness was driven by the fact that women were judged especially ineffective in the context of competitor derogation, compared to self-promotion, when using this tactic. In contrast, the shift in judged sex differences in resource tactic effectiveness resulted from men faring better, and women doing worse, in the context of derogating a competitor's resource capabilities.

Even though sex differences in romantic attraction effectiveness judgments were largely consistent across rating contexts, potentially useful information was gleaned from each analysis of potential moderating variables. For example, effect sizes in the temporal context category of long-term mating were similar to those of the unspecified context, implying that when the context is unspecified, the participants may be assuming that the attraction takes place in the long-term mating context. This information would be useful for those looking to compare past research designs that have employed these different methods (but note that these differences failed to reach statistical significance). In addition, because the meta-analysis revealed that sex differences in appearance tactics do not significantly lessen in the short-term temporal context (in fact, the direction of the change was for sex differences to increase in short-term mating), the Gangestad and Simpson (2000) conjecture that women who pursue short-term sexual strategies do so to gain access to physically attractive men was partially disproved.

The meta-analytic finding that sex of rater did not moderate sex differences may be useful information for future investigators when deciding on sex-of-rater research designs. For example, based on the current findings, future investigators need not be overly concerned with ensuring a relatively complex design of having men and women rate both men's and women's tactical efficacy. Moreover, because the current meta-analysis found no significant differences between same-sex and opposite-sex ratings of effectiveness, it appears that these tactics play a substantive role in intersexual selection (Darwin, 1871).

The finding that attraction type did not moderate sex differences hints that the influence of the hypothesized adaptations driving mate choice may extend beyond romantic attraction, to domains such as mate retention and marital harmony (Buss, 1995; Shackelford & Buss, 1997). Importantly, the magnitude of these effects was stable, such that the mate preferences of one sex seemed to impact in a reliable way on the romantic tactics of the opposite sex. Whether in general attraction, poaching attraction or mate retention, women were judged more effective when using appearance-related tactics, and men were viewed as more effective when using resource-related tactics.

Finally, as noted above, the findings of significant variation in manipulation form suggest that sex differences in tactical efficacy judgments depend on the strategic

form of mate attraction. Overall, it seemed that the perceived effectiveness of sex-linked tactics accentuated in the manipulation form of competitor derogation. Men were seen as more effective at using resource-related tactics, but men were seen as especially effective (and women less effective) when derogating competitors' resources. One speculation for why this trend exists is that men can more easily derogate a competitor's resource abilities compared with manipulating other perceived features of male competitors, or perhaps that doing so is easier than promoting one's own resource-related attributes (i.e. physical resources, status, social dominance, intelligence, etc.; see Ellis, 1992). Another speculation is that women may be especially ineffective at derogating another woman's resource-related attributes because some men may see women without such attributes as more attractive or at least easier to attract (see Buss & Schmitt, 1993). Given the limitations of the current analysis, however, these explanations are purely speculative.

One of the benefits of the current meta-analysis may be that future researchers can use these findings to guide their study of romantic attraction processes, especially those looking at shifts across manipulation forms. Any future studies that do examine sex differences in romantic attraction effectiveness judgments may be easily added to the list of studies presented in Tables 1 and 2, and additional meta-analyses could then be conducted. Indeed, other potential moderator variables may exist in the present set of studies or, with the placement of additional studies alongside those in Tables 1 and 2, the influence of new rating contexts could be explored. Thus, the present research may be taken as a first step toward the ongoing meta-analytic investigation of sex differences in judgments of romantic attraction effectiveness.

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