COMMENT

Is a Meta-analysis a Foundation, or Just Another Brick? Comment on Meltzer, McNulty, Jackson, and Karney (2014)

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In a longitudinal data set of married couples, Meltzer, McNulty, Jackson, and Karney (2014) reported that partner physical attractiveness is more strongly associated with relationship satisfaction for men than for women. Although a recent meta-analysis (Eastwick, Luchies, Finkel, & Hunt, 2013) provided no support for this sex difference across 97 samples and ~30,000 participants, Meltzer et al. (2014) responded by outlining 7 criteria required for an appropriate test of the sex difference; these criteria eliminate all but 1 study from the meta-analysis. In this commentary, we raise 3 concerns about Meltzer et al.'s contribution. First, there is weak theoretical and empirical support for the criteria they used to dismiss the relevance of the meta-analysis studies. Second, if one adds Meltzer et al.'s data to the meta-analysis, all the sex differences remain extremely small and nonsignificant, even if one focuses only on studies that best conform to Meltzer et al.'s criteria (i.e., married samples, objective attractiveness measures). Third, a new data set meeting all 7 criteria fails to replicate the Meltzer et al. sex difference; in contrast, one finds that physical attractiveness is, if anything, more strongly associated with the trajectory of relationship satisfaction for women than for men. As noted by Eastwick, Luchies, et al. (in press), in paradigms where participants evaluate partners they have (at a minimum) met face-to-face, the sex difference in the association of physical attractiveness with romantic evaluations is (a) extremely small on average and (b) unlinked to all cross-study characteristics identified to date.

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Keywords:

In their article, Meltzer, McNulty, Jackson, and Karney (2014) argued that a romantic partner's physical attractiveness plays a larger role in predicting men's than women's relationship satisfaction. Although this conclusion contradicts a recent meta-analysis that found no support for this sex difference across a variety of contexts (Eastwick, Luchies, Finkel, & Hunt, in press), Meltzer et al. contended that their data provide the most appropriate test of the sex difference. Before addressing their arguments, we would like to emphasize how pleased we are to see close relationships researchers applying their expertise and impressive research methods to evolutionary psychological topics. Close relationships research can complement evolutionary perspectives and vice versa.

Nevertheless, Meltzer et al. (2014) offered a misleading and incomplete portrait of the literature addressing sex differences in the association of physical attractiveness with romantic evaluations. We argue that (a) the theoretical and empirical justification that Meltzer et al. used to dismiss virtually all relevant studies is weak, (b) the inclusion of the (modestly sized) Meltzer et al. effect does not change the trivial and nonsignificant meta-analytic sex difference, and (c) the Meltzer et al. findings fail to replicate in a new sample meeting all *seven* of their restrictive criteria for a proper test of the sex difference hypothesis. Ultimately, we suggest that the field is best served by focusing on the larger foundation of data built by multiple laboratories rather than any one constituent brick.

Building a Foundation

For nearly 50 years, scholars have examined the association between physical attractiveness and romantic evaluations (Walster,

Aronson, Abrahams, & Rottman, 1966). Inspired by evolutionary perspectives (Buss, 1989), many researchers have sought evidence for a sex difference in this association, with some studies finding such evidence (e.g., Fisman, Iyengar, Kamenica, & Simonson, 2006) and others not (e.g., Eastwick & Finkel, 2008). Other researchers have published articles that presented the association between physical attractiveness and romantic evaluations as an aside but did not call attention to any sex difference (or lack thereof). Still other researchers have collected relevant data on either initial attraction or close relationships contexts but never reported the association separately by sex in a journal article. Given this state of affairs, we concluded that a meta-analysis was required to address whether the association of physical attractiveness with romantic evaluations is sex-differentiated.

We published a review article that included this meta-analysis as well as a broader discussion of when ideal partner preferences do and do not affect the process of forming and maintaining a romantic relationship (Eastwick, Luchies, et al., in press). The physical attractiveness portion of the meta-analysis is most germane to the present discussion: The inclusion criteria required that the researchers had collected (a) men's and women's romantic evaluations (e.g., romantic desire, relationship satisfaction) of an opposite-sex target whom they had met face-to-face at a minimum and (b) a measure of the physical attractiveness of the target. The first criterion led us to studies ranging from confederate designs to speed dating to studies of dating and married couples (but not designs where participants report on hypothetical others, where sex differences are well established; e.g., Townsend, 1993). The second criterion revealed three possible methods of assessing physical attractiveness: the participants' report of the partner's attractiveness (participant-report), the partner's report of his/her own attractiveness (partner-report), and attractiveness coded by a third party (objective attractiveness).

Overall, there was no sex difference in the (positive) association of physical attractiveness with romantic evaluations, and this conclusion did not depend on how physical attractiveness was assessed (participant-report vs. partner-report vs. objective). Furthermore, we tested a series of possible cross-study moderators, including paradigm (initial attraction vs. established couples), population (college students vs. noncollegiate), and participant age. Although several moderators affected the overall size of the association, not one (out of 54 tests) significantly moderated the size of the sex difference. That is, although the size of the sex difference varied across studies, this variance was not linked to any theoretically sensible study features.

Which Bricks Matter?

A priori, these 97 physical attractiveness studies ($N = 29,414$) collectively provided an appropriate test of the sex differences hypothesis and a reasonable opportunity for moderators to reveal where the sex difference might be larger or smaller. Had the studies revealed an overall sex difference of a meaningful size—or had a significant moderator identified a subsample of studies with a sex difference of a meaningful size—we anticipate that few scholars would have objected that the meta-analysis provided a poor test of the hypothesis. To be sure, no single study is perfect; for example, we agree that partner-reported measures of physical attractiveness are potentially problematic for the reasons that Meltzer et al. (2014) describe. But meta-analysis is useful in part because the strengths and weaknesses of individual studies provide an opportunity for moderators to emerge. Therefore, it is unjustifiable to exclude excellent studies like Kurzban and Weeden (2005) for using partner-report measures, as this study contains other admirable features (e.g., a noncollegiate population). If the weak partner-report measures of physical attractiveness in this study suppressed the sex difference, the analyses conducted separately by assessment type (participant-report vs. partner-report vs. objective) would have revealed a shifting of the sex difference. They did not.

Meltzer et al. (2014) addressed the Eastwick, Luchies, et al. (in press) meta-analysis by providing (by our count) seven distinct criteria (see Table 1) for an appropriate test of the sex differences hypothesis. The application of these criteria results in the dismissal of 96 of the 97 meta-analytic studies; only McNulty, Neff, and Karney (2008) remains. Classics like the Boston Couples Study (Hill, Rubin, & Peplau, 1976) and the PAIR project (Marks, Huston, Johnson, & MacDermid, 2001) fail to make the cut, as do other impressive data sets, such as Lucas et al.'s (2004) cross-cultural examination of ~3,000 married couples. The empirical and theoretical justification for these seven criteria is weak: Not one is supported by a significant moderational test (in the meta-analysis or anywhere else to our knowledge), and for several, an equally strong conceptual case can be made for the opposite criterion.

For example, Meltzer et al. (2014) argued that the most appropriate test of the sex difference involves objective measures of physical attractiveness. Objective measures of attractiveness have advantages, but we disagree that other measures necessarily offer weaker tests of sex differences. Objective measures of attractiveness are based on consensus, and people often reach strong consensus about others' attractiveness. But consensus variance in

Table 1

Meltzer et al.'s (2014) Criteria for an Appropriate Test of the Physical Attractiveness Sex Difference

1. Physical attractiveness must be assessed objectively
2. Physical attractiveness ratings must be provided by judges who did not meet the target face-to-face
3. Participants must be in long-term relationships (preferably marriage)
4. Statistical models must include a variety of control variables (about the self and partner)
5. Data must be longitudinal
6. Relationship satisfaction must be the (only) dependent variable
7. Participants must be young

attractiveness judgments is matched (and often exceeded) by relationship variance: unique variability in people's ratings of the same person above and beyond actor and partner variance (Eastwick & Hunt, 2013). People's own judgments of another person's attractiveness incorporate both consensus and uniqueness information and would therefore do the best job of capturing the attractiveness construct as it is filtered through an individual's subjective construal (Ross & Nisbett, 1991). It seems likely that the mental mechanisms that men and women use to weigh the importance of physical attractiveness would use this subjective assessment, not the consensus component alone. In short, the participant-report method has conceptual advantages, and had it revealed evidence of sex differences, there would have been strong justification to declare it the best method. Dismissing subjective judgments out of hand is unwarranted, and the assertion that one type of measure offers the most appropriate test of the sex difference should be viewed as a testable hypothesis (moderation by measure type) rather than a self-evident fact. Once again, in the meta-analysis, measure type did not affect the sex difference.

Another assumption is that the most appropriate test of the sex difference involves married couples. In the Eastwick, Luchies, et al. (in press) article, we laid out a rationale that the predictive validity of ideal partner preferences could be stronger in established relationship contexts relative to attraction (e.g., speed dating) contexts. So we certainly agree that relationship stage could have moderated the size of the sex difference; yet it did not, nor did relationship length moderate the size of the sex difference among the studies examining established relationships. Nevertheless, Meltzer et al. (2014) declared that the sex difference should be most likely to occur in long-term relationships, which they confine to married relationships. We find this narrow interpretation of "long-term" to be puzzling if ideal partner preferences are supposed to serve the evolved function of guiding the selection of a reproductive partner. If only married—not dating—couples offer a relevant test, one would have to argue that people should not consider a partner in relation to their ideals until they have already made the most substantial mating commitment that humans make. In dating relationships, couples must navigate many choice points that afford them the chance to think carefully and decide whether they want to continue investing in the relationship (Gagné & Lydon, 2004). Meltzer and colleagues' exclusions imply that people should use their ideals only after, but not before, they have made these heavy investments, a pattern that is hard to reconcile with the functional evolutionary logic. Such an odd pattern could reflect reality, but it should be viewed as a testable hypothesis—with studies including both dating and married relationships and testing for moderation—rather than a self-evident fact.

A third assumption is that the most appropriate test of the sex difference involves a variety of statistical controls. In their one analysis testing the sex difference, Meltzer et al. (2014) controlled for the intercept and slope effects of several self- and partner-variables, ultimately generating a model with 32 total predictors—16 for men and 16 for women. Models with large numbers of correlated predictors can produce unstable estimates and interpretive problems (Blalock, 1963; Gordon, 1968), and scholars have recently argued for the importance of presenting findings both with and without covariates (Simmons, Nelson, & Simonsohn, 2011). Furthermore, the theory behind the decision to include these covariates is weak. The authors made the argument that

attractiveness should reveal sex-differentiated effects on satisfaction because attractiveness had differential effects on reproductive success for men and women in humans' evolutionary past. However, the authors did not argue that the confounds they sought to eliminate are unique to the present day; if the confounds also existed in humans' evolutionary past—which seems likely—then controlling for them requires considerable theoretical elaboration. Natural selection operates on whole organisms, not a single trait controlling for other correlated traits. As an illustration, researchers who exerted selection pressures for tameness in foxes also inadvertently selected for other traits, such as fur pigmentation, that share underlying hormonal mechanisms with tameness (Trut, Plyusnina, & Oskina, 2004). This issue is known as *constraint* in evolutionary biology (Gould, 1980); Meltzer et al. implied that sexual selection could have shaped the appeal of the portion of attractiveness that does not overlap with other constructs, but the proper manner of demonstrating that selection has overcome such constraints is a source of considerable debate (Finlay, Darlington, & Nicastro, 2001). In the current case, it is unclear how or why natural selection would operate on the narrow construct that is the subcomponent of physical attractiveness that is not correlated with partner attractiveness, income, age, and extraversion.

Our assessments of Meltzer et al.'s (2014) remaining criteria are ambivalent. In the meta-analysis, we deliberately used an inclusive definition of the dependent variable that included not only relationship satisfaction but also commitment, passion, intimacy, and other commonly used evaluative constructs that are highly correlated with satisfaction. We chose this route to guard against cherry-picking (see also Eastwick & Finkel, 2008), but we understand other scholars' decisions to select a priori a single dependent variable (e.g., satisfaction) as the best measure. In addition, we appreciate the merits of longitudinal data, although in the current case, it is odd and perhaps misleading to suggest that longitudinal data offer the best test of the sex difference, as the authors found the sex difference only on the intercept (i.e., initial levels of satisfaction) and not on the slope (i.e., trajectories of satisfaction). Also, although the theoretical rationale underlying the prediction that the sex differences should be stronger in younger populations is reasonable, again, the meta-analysis did not reveal any evidence that the sex difference varied with participant age. In general, Meltzer et al. had weak theoretical and empirical justification to suggest that their study provides the only appropriate test of the sex difference hypothesis.

Adding One Brick Does Not Shift the Foundation

If the dismissal of large numbers of studies in the meta-analysis is not justified a priori, then it is appropriate to consider whether the inclusion of the Meltzer et al. (2014) data would have altered the conclusions of the meta-analysis. In this section of our commentary, we demonstrate that, even as we narrow in on the subset of studies that most closely resemble Meltzer and colleagues' data, it is not possible to find a meaningful sex difference.

As Meltzer et al. (2014) noted, five studies in the meta-analysis used married individuals and objective measures of attractiveness, and they observed that "the weighted-average correlation between partner attractiveness and own satisfaction in those studies appears stronger among men than among women" (p. xx). This statement is correct, although the effect size is trivial and nowhere close to

EASTWICK, NEFF, FINKEL, LUCHIES, AND HUNT

statistically significant: The meta-analyzed effect size in these five studies is $r = .15$ for men and $r = .09$ for women ($Q = 0.20$, $p = .655$). As noted in Meltzer et al.'s footnote 1, two of these five studies actually come from the Meltzer et al. samples (McNulty et al., 2008; Neff & Karney, 2005). In the meta-analysis, the sex differences from these two studies were larger than is typical for the meta-analysis (especially McNulty et al., 2008) but not particularly out of range.

Had Meltzer and colleagues (2014) concluded data collection before we had completed the meta-analysis, we would have jettisoned the McNulty et al. (2008) and Neff and Karney (2005) data points and simply included the male and female effect sizes presented in this article ($r = .10$ for men, $r = -.05$ for women) with an N of 458 men and 458 women. If we recalculate the meta-analytic sex difference among the studies using married individuals and objective measures (now $k = 4$; 1,360 participants), the effect size is $r = .09$ for men and $r = .09$ for women ($Q = 0.00$, $p = .993$). So if anything, the inclusion of the new samples and/or the authors' data analytic strategy actually reduced the already small meta-analytic sex difference.

Moreover, we also have new data on the association of objective physical attractiveness with romantic evaluations in established relationships in two data sets. The first is the Northwestern Couples Study (a mixture of dating and married couples; DeWall et al., 2011, Study 6), and the second is the large sample of the Austin Marriage Project (all married couples; Buck & Neff, 2012). The objective physical attractiveness ratings from these couples were recently collected for a new project (Eastwick, Morgan, et al., 2013). These two data sets contribute $N = 188$ and $N = 168$ (total: 356) couples, respectively, to the objective attractiveness analyses within the meta-analysis.

To calculate the associations for the Northwestern Couples Study and the Austin Marriage Project, we used the guidelines described in the meta-analysis (Eastwick, Luchies, et al., in press). In the Northwestern Couples Study, the associations were $r = .12$ for men and $r = .05$ for women, and in the Austin Marriage Project, the associations were $r = .08$ for men and $r = .12$ for women. We added these data points along with the Meltzer et al. (2014) data to the meta-analysis and recalculated the associations. Results including these three new data points are presented in **T2,** Table 2. The first three rows present the results of analyses that **AQ:4** were also described in Eastwick, Luchies, et al. (in press). The first row presents the associations between attractiveness and romantic

evaluations calculated (a) across all studies in the meta-analysis (i.e., studies where participants had met face-to-face the person about whom they are reporting the romantic evaluation dependent variable) and (b) by averaging across the three possible ways of assessing physical attractiveness (i.e., participant-report, partner-report, and objective). These associations are identical to those reported in Eastwick, Luchies, et al. and did not differ for men and women. The second row presents the associations between the same averaged measure of physical attractiveness and romantic evaluations for only paradigms that examined *established relationships*, and the third row presents the associations between *objective attractiveness* and romantic evaluations across initial attraction and established relationships paradigms. The difference between these associations and those presented in the Eastwick, Luchies, et al. meta-analysis is $r = .01$ or smaller, and the associations reveal no evidence of sex differences.

The bottom four rows of Table 2 present very specific subanalyses using objective attractiveness alone as the independent variable; these analyses were not described in the Eastwick, Luchies, et al. (in press) meta-analysis for the sake of brevity. The association between objective attractiveness and romantic evaluations were calculated (a) for all participants who were reporting on relationship partners (i.e., dating, a mixture of dating/married, and married samples), (b) for participants from paradigms examining dating partners or a mixture of dating/married partners (including all couples from the Northwestern Couples Study), and (c) for participants from paradigms examining only married participants (including the Austin Marriage Project and Meltzer et al., 2014). Finally, in the bottom row of Table 2, we added the associations from only the married subsample of the Northwestern Couples Study to analysis (c). No sex difference emerged in any analysis, and the sex difference effect sizes were consistently half of the size of Cohen's (1988) small effect or smaller. There appears to be no obvious way of combing through the full corpus of meta-analytic data to procure a significant sex difference.

Failure to Replicate

In short, the prior foundation of data does not support Meltzer et al.'s (2014) contention that there is a sex difference in the association of physical attractiveness with romantic evaluations, even with objective measures and in the married samples they deem most relevant to the test of the hypothesis. In this final section of

Table 2
Updated Eastwick et al. (in Press) Meta-Analysis

	Independent variable	k	N	Men		Women		Q_{Sex}	p
				r	95% CI	r	95% CI		
Sample									
All paradigms	All three	97	29,780	.43	[.37, .48]	.40	[.35, .45]	0.48	.488
Established relationships	All three	49	20,126	.37	[.28, .45]	.31	[.22, .40]	0.83	.361
All paradigms	Objective	33	7,531	.31	[.23, .39]	.25	[.17, .33]	0.94	.334
Established relationships	Objective	11	2,976	.08	[.01, .15]	.03	[−.02, .09]	1.12	.290
Dating samples	Objective	6	1,280	.09	[−.00, .17]	.03	[−.05, .11]	0.95	.330
Married samples	Objective	5	1,696	.08	[−.04, .21]	.09	[−.05, .22]	0.00	.955
Married samples + NU married subsample	Objective	6	1,924	.13	[−.00, .25]	.12	[−.01, .24]	0.00	.954

Note. CI = confidence interval; NU = Northwestern University.

our commentary, we stipulate for the moment that the most appropriate test of the sex difference involves all seven criteria that Meltzer and colleagues outlined. A seven-way interaction cannot easily be tested, so the next best possibility would be a replication demonstrating similar effect sizes in independent samples that satisfied the seven criteria. The married participants in the Northwestern Couples Study and all the participants in the Austin Marriage Project happen to fit all seven. In the field of close relationships research, where longitudinal studies require many years and considerable grant funding, this is about as close to a direct replication as possible.

The methods of these studies are detailed in other reports (Buck & Neff, 2012; DeWall et al., 2011); we outline here the major methodological details that correspond to Meltzer et al.'s (2014) seven criteria. Judges who had never met the couples rated the attractiveness of both members of the couple by viewing video clips of discussion tasks from an initial intake session (7–8 coders; $\alpha = .87$). The average age of the couples was young: 33.5 for husbands and 31.6 for wives. The covariates income, age, and extraversion were collected at study intake. In the Northwestern Couples Study, the relationship satisfaction dependent variable was the Rusbult, Martz, and Agnew (1998) satisfaction scale ($\alpha = .96$), and in the Austin Marriage Project, satisfaction was assessed using the Funk and Rogge (2007) couple satisfaction index ($\alpha = .97$). Both studies were longitudinal; couples in the Northwestern Couples Study provided data at study intake and then six additional times every 4 months, and couples in the Austin Marriage Project provided data at study intake and then two additional times every 6 months (total observations = 2,488). Time was coded in months (intake = 0), and all other variables were standardized ($M = 0$, $SD = 1$) within study. Replicating Meltzer et al.'s procedure, the two studies were combined into a single data set, and we used growth curve modeling procedures that estimate husbands' and wives' parameters simultaneously (Raudenbush, Brennan, & Barnett, 1995).

Results of this replication attempt are presented in Table 3. Unlike the results documented by Meltzer et al. (2014), the intercept effects were nearly identical for men and women, $F(1, 1910) = 0.00$, $p = .987$. The slope effects did reveal a marginally significant sex difference, $F(1, 1910) = 3.11$, $p = .078$; however, the slope effect was positive for women but (nonsignificantly) negative for men. That is, the effect of attractiveness on the intercept of satisfaction was the same for men and women, and the partner's attractiveness had a marginally more *positive* effect on women's than on men's satisfaction reports over time. Eliminating all the income, age, and extraversion controls (Simmons et al., 2011) revealed nearly identical conclusions: No sex difference emerged on the intercept, $F(1, 1936) = 0.06$, $p = .808$, and a sex difference favoring women emerged on the slope, $F(1, 1936) = 5.62$, $p = .018$. Partner income, age, and extraversion did not moderate either the intercept or slope sex difference test.

If anything, the conclusions of the current replication are the opposite of those claimed by Meltzer et al. (2014). Yet we would hesitate to conclude from this one analysis that objective attractiveness has more positive effects on women's satisfaction over time than men's. As a consequence of conducting the meta-analysis, we have seen a sea of data where the size of this sex difference shifts in small but unpredictable ways. A moderator may emerge to explain these shifts, but it has not emerged yet.

Table 3
Independent Replication of Meltzer et al. (2014)

Variable	Husbands β	Husbands SE	Wives β	Wives SE
Initial satisfaction				
Husbands' age	−.114	.113	−.053	.114
Wives' age	.064	.117	.141	.118
Husbands' income	−.075	.050	−.017	.051
Wives' income	−.026	.069	−.111	.070
Husbands' extraversion	.094†	.056	−.053	.057
Wives' extraversion	.037	.055	.066	.056
Husbands' physical attractiveness	−.014	.075	**.067**	.075
Wives' physical attractiveness	**.069**	.068	.059	.069
Changes in satisfaction				
Husbands' age	−.008	.007	−.015*	.007
Wives' age	.014*	.007	.020**	.007
Husbands' income	.003	.002	.001	.002
Wives' income	−.008*	.004	−.008*	.004
Husbands' extraversion	−.002	.003	−.001	.003
Wives' extraversion	−.003	.003	−.001	.003
Husbands' physical attractiveness	.007*	.003	**.007***	.004
Wives' physical attractiveness	**−.002**	.003	−.003	.003

Note. $N = 280$ couples; 2,488 observations. Predicted associations between partner's physical attractiveness and participant's romantic evaluations are bolded. Estimates for initial satisfaction can be interpreted like partial correlations (all predictors are standardized); estimates for changes in satisfaction can be interpreted as changes in correlations with each month.
† $p \le .10$. * $p \le .05$. ** $p \le .01$.

Until then, the Meltzer et al. findings should be interpreted cautiously and within the context of the full suite of relevant data gathered by multiple labs over the last 50 years.

Conclusion

As a final note, Meltzer and colleagues' (2014) characterization of our own theoretical perspective is lacking. The Eastwick, Luchies, et al. (in press) review is not primarily an article about sex differences but rather a broad view on how ideal partner preferences generally function. It represented our attempt to integrate several disparate literatures and theoretical perspectives. Surely our synthesis is imperfect, and it will require updates over time. But Meltzer et al. implied that our entire theory is that people don't know what they want in a partner, thereby neglecting our much broader framework for explaining the interpersonal effects of ideal partner preferences (e.g., Eastwick, Eagly, Finkel, & Johnson, 2011; Eastwick, Finkel, & Eagly, 2011; Eastwick, Luchies, et al., in press; Eastwick & Neff, 2012).

In their meta-analysis volume, Cooper, Hedges, and Valentine (2009) likened meta-analysts to bricklayers, who take bricks of difference shapes and sizes and attempt to construct an edifice that coheres. We felt that this literature needed a foundation, as it was getting too easy to cherry-pick the bricks that supported one perspective or another—the classic problem with narrative reviews. We harbor no illusions that our particular perspective will stand forever, and someone will surely generate a better foundation that accounts for all the available data in due time. Our field will continue to be generative if we consider how all our findings fit together and simultaneously recognize that any one data set is, all in all, just another brick.

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