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Incorporating geographic distance into mate preference research: Necessities and luxuries, 2.0

PETER K. JONASON, MONIQUE NOLLAND, AND MICHAEL D. TYLER
Western Sydney University, Australia

Abstract
This study ($N = 370$) examined mate preferences in men and women using the budget allocation paradigm across traits typically studied and the value placed on geographic proximity or propinquity. Importantly, traditionally studied preferences (i.e., physical attractiveness and social status) were seen as priorities, whereas the novel trait of distance was a luxury, suggesting that people were willing to travel to find a partner who satisfies their more important mate preferences. Men valued a short-term mate who was close to them more than women did. Prior work on mate preferences was replicated in their context-specific nature as per evolutionary models of mate choice.

In the last 10 years, the manner by which people find their romantic and sexual partners has changed with the meteoric rise of applications like Tinder, Bumble, and Happn and online dating services like Match.com or eHarmony, with nearly 15% of Americans claiming to have used such a service, as suggested by Pew Research.[1] No more are people limited to choose from those who they have actually met (Bossard, 1932) and/or exist within their tribe, nor do they have to wait until their tribe encounters another friendly group (Ember, 1978). In ancestral environments, traveling great distances to find a mate would have been problematic as doing so would lead to becoming detached from one's social and familial network, losing any status individuals may have earned within their group, and heavy physical risk, especially for males. For example, exogamy (i.e., leaving one troop for another) in chimpanzees (*Pan troglodytes*) is more common for females than males, as males who attempt to change groups are often viciously attacked and killed and have no political alliances to rise in social status to gain access to mates in the new group (de Waal, 2007). Even in the time of modern civilization, it was not until the train or the car that people could travel great distances with relative ease (but at considerable cost) to find romantic partners if they could somehow know someone who was available and interested in a relationship through, for instance, personal or lonely hearts ads (Cameron, Oskamp, & Sparks, 1977; Harrison & Saeed, 1977). But when the ubiquity of automobiles and online dating came together, they may have changed mate searching substantially.

Today, with great ease, individuals can search, at varying distances from their present location (e.g., their couch), for romantic and sexual partners. This means that a new trait people might need to seriously consider, when assessing the viability of a potential partner, is how far away they are. Although it is

Peter K. Jonason, School of Social Sciences and Psychology, University of Western Sydney, New South Wales, Australia; Monique Nolland, School of Social Sciences and Psychology, University of Western Sydney, Sydney, New South Wales, Australia; Michael D. Tyler, School of Social Sciences and Psychology, University of Western Sydney, New South Wales, Australia.

Data collected for this study can be found in another form in an honors thesis of the second author as a student at the University of Western Sydney.

Correspondence should be addressed to Peter K. Jonason, School of Social Sciences and Psychology, Western Sydney University, Milperra, NSW 2214, Australia, e-mail: p.jonason@westernsydney.edu.au.

1. http://www.pewresearch.org/fact-tank/2016/02/29/5-facts-about-online-dating/

reasonable to assume that people would prefer to date a proximate partner over a distal one given the challenges posed by maintaining a long-distance relationship (Carpenter & Knox, 1996; Feeney, 1999; Sahlstein, 2004) and that distance may be somewhat of a "dealbreaker" in people's mating decisions (Jonason, Garcia, Webster, Li, & Fisher, 2015), people may differ in how much this trait matters to them. In this study, we replicate and extend work on sex differences and similarities in mate preferences (Bech-Sørensen & Pollet, 2016; Buss, 1989; Li, Bailey, Kenrick, & Linsenmeier, 2002; Li & Kenrick, 2006; Li, Valentine, & Patel, 2011; Li et al., 2013) and extend that to include geographic proximity.

Distance is not a uniquely human problem when it comes to mate choice. The distance between sexual partners plays a role in the reproductive fitness of fur seals (*Callorhinus ursinus*; Hoffman, Forcada, Trathan, & Amos, 2007; for a critique, see Kotiaho, Lebas, Puurtinen, & Tomkins, 2008), colonial lesser kestrels (*Falco naumanni*; Calabuig, Ortego, Cordero, & Aparicio, 2008), and Chacma baboons (*Papio ursinus*; Clarke, Henzi, Barrett, & Rendall, 2008). For example, in baboons, the distance a male has to search for sexual partners is a function of his mate value (e.g., rank), and female fur seals will travel down the beach—a calorically expensive task for a pinniped—in search of higher quality (i.e., unrelated and heterozygotic) mates. In people, distance has rarely been considered in relation to mate choice from a psychological perspective, but given this nonhuman work, the centrality of distance created by dating applications/online dating services, and the potential reproductive fitness outcomes (e.g., improved access, greater risk of pathogens), might play a role in human mate choice. The work that has been conducted when considering distance or propinquity in people tends to be over 60 years old, sociological in nature, and focused exclusively on marriage or long-term relationships (Abrams, 1943; Bell, 1957; Bossard, 1932; Clark, 1952; Ellsworth, 1948). Such research revealed the role of population density, social integration, and cultural differences in how people manage distance in marital choice. In contrast, psychological research has focused on how people may deal with the distance in preexisting relationships (Feeney, 1999) where distance is seen as an obstacle to overcome to maintain a stable and happy relationship. Instead, we are interested in the manner by which geographic location fits within mate choice decisions in men and women with regard to their romantic and sexual partners.

Evolutionarily, the most important traits in mates for the sexes appear to be social status for women and physical attractiveness for men (see Li & Meltzer, 2015). Social status conveys important information about mate quality, internal traits, and ability to provide resources for one's mate and offspring (Jonason, Li, & Madson, 2012). Although modern, Western women may be well positioned to rear offspring alone given social welfare systems, a markedly peaceful environment, and government-mandated alimony and child support payments, ancestral environments were not characterized by these three modern advances, nor are more primitive societies that continue to exist today (e.g., Hadza, Yanamamo). Over generations, women who made choices in mates who could provide for them and their offspring will have reared more offspring, making the genes responsible for that choice more common in the female population (Buss, 1985, 1995). In contrast, men's preference for a physically attractive partner is not a function of men being more superficial (Zentner & Eagly, 2015) but, instead, reflects recurrently beneficial choices in mates that led to more offspring. Physical attractiveness and youth signal better health (e.g., symmetry and pathogen resistance) and fecundity, and men who had such a preference would have made more viable offspring, leading to directional selection for this preference in men (Buss, 1989; Gutierres, Kenrick, & Partch, 1999). Evolutionary psychologists propose that modern psychologies—including mating decision—are based on ancient programming in our genes that influence how our brains are wired, which were created by recurrent selection pressures (Buss & Schmitt, 1993; Li, 2007).

Given the importance of traits like social status and physical attractiveness in mate

choice, we expect geographic proximity (a) to be a "luxury" item in assembling one's ideal partner and (b) to be valued less than men's and women's ancestral priorities of physical attractiveness and social status, respectively (Buss, 1985; Feingold, 1992; Howard, Blumstein, & Schwartz, 1987; Kenrick, Groth, Trost, & Sadalla, 1993). If accurate, this would suggest that people would like to have a partner near them but are willing to travel if they need to in order to maintain their preferences in physically attractive and socially successful partners. In order to best understand the role of proximity in mate choice, we compare its relative importance to traits traditionally studied in mate choice research (e.g., social status, physical attractiveness).

Despite their theoretical disagreement about the origins of sex differences (Li & Meltzer, 2015; Zentner & Eagly, 2015), both evolutionary (Buss & Schmitt, 1993; Symons, 1979) and sociocultural (Eagly, 1987; Eagly & Wood, 1999) models of mate choice predict sex differences in mate preferences (Cameron et al., 1977; Harrison & Saeed, 1977). Men are expected to value physical attractiveness more than women do, regardless of temporal duration of the relationship (Li & Kenrick, 2006; Li et al., 2002). In contrast, women are expected to value social status more than men do, especially in the long-term context (Buss & Schmitt, 1993; Jonason, Li, et al., 2012), and to value physical attractiveness more in their short-term than their long-term partners (Gangestad & Simpson, 2000).

As this is the first study on the role of proximity in mate choice as opposed to its function in existing relationships (Carpenter & Knox, 1996; Feeney, 1999; Sahlstein, 2004), we conjecture here about potential sex differences. On the whole, we expect the sexes to be similar in how much they desire a partner who is geographically close so as to avoid the financial, reproductive, and psychological costs incurred by traveling. However, there might be one context-specific sex difference. Men may be averse to investing in relationships that are likely to have limited reproductive returns (Buss & Schmitt, 1993). Long-term relationships are where men (and women) invest more (relative to short-term relationships) in their relationships, whereas short-term relationships are more about sexual gratification (Jonason, 2013). If distance is a cost imposed on individuals, men may be heavily concerned with finding a short-term partner who is nearby. Additionally, for women, bad choices in mating may be sufficiently and consistently higher than in men (Jonason et al., 2015; Trivers, 1972). Traveling costs are fixed and likely lower than the costs of making a bad mate choice, a choice that could result in unwanted pregnancy, single parenthood, sexual or physical abuse, or sexually transmitted infections. Women may see a favorable trade-off in the traveling costs as opposed to making a bad short-term mating choice. This might translate into a sex difference in allocations to have a geographically proximal short-term, but not a long-term, mate.

Thus far, we may have overemphasized sex differences as opposed to within-sex differences. Therefore, we also make predictions about how people differ in what they prioritize in their mates and how men and women might differ in their allocation patterns in long-term and short-term mates. What people want in their long-term mates when constrained should reveal a heavy preference for physically attractive partners in both long-term and short-term mates, but men and women should sacrifice how much they want an attractive mate in the long term so that they can get other important qualities like social status and liveliness. That is, we expect both sexes to be willing to trade their desires for a highly attractive partner when transitioning away from casual sex relationships, which are mostly about sexual gratification and potential good genes (Gangestad & Simpson, 2000; Jonason, 2013). As suggested by prior research, creativity may be particularly undervalued in both sexes for short-term partners, when constrained relative to when unconstrained, as it is seen as a luxury trait (Li et al., 2002); liveliness, which is a trait that may also be a luxury (Li et al., 2002), may be particularly valued in long-term mates when constrained, but when unconstrained, it may be valued in short-term mates as it may signal greater potential for enjoyment and even sexual gratification.

The dating world has gone through apparently serious changes in the last decade with the advent of GPS-based technologies and online dating to assist in finding partners for both casual and serious relationships. These technologies have made salient a potentially new and important trait in mate selection—the distance someone is away from the one doing the choosing. In this study, we conduct the first study (we know of) that examines how much people care about the geographic proximity of their potential partners (not their current partners; Feeney, 1999), describes sex differences in these individual differences, examines relationship context specificity, and situates those preferences relative to other well-studied traits. Secondarily, we replicate context-specific sex differences in the value individuals place on having physically attractive and socially successful partners in the hopes of adding to the ongoing conversation about the presence of sex differences in mate preferences.

Method

Participants

Participants ($N = 370$) were undergraduates (who received credit for participation) from Australia ($n = 96$) and Americans recruited (who received US$1 for participating) through Mechanical Turk ($n = 274$).[2] There were 212 (57%) men and 158 women (43%). The average participant was between 18 and 63 years of age ($M = 29.75$, $SD = 10.36$), heterosexual (93%), and of European descent (67%).[3] Participants labeled themselves as single (45%) or in a relationship (54%) about equally (<1% did not specify).[4]

Procedure and materials

We assessed mate preferences in both serious (i.e., long-term) and casual sex (i.e., short-term) relationships using the budget allocation method (Li et al., 2002), which has been used in research on relationship choice, personality, and organizational psychology (e.g., Jonason, Luévano, & Adams, 2012; Jonason, Valentine, Li, & Harbeson, 2011; Wee, Jonason, & Li, 2014). Participants spent their allocated budget of 10 (low budget) and 30 (high budget) mate dollars to purchase decile levels of five author-defined characteristics with no a priori values assigned to them (see Table 1). Four out of five of the traits have been used in previous research (Li & Kenrick, 2006; Li et al., 2002), but in order to keep with the five-trait design, we had to drop one trait. We opted to drop the "kindness" trait as previously used so as to have an equal mix of necessities or "must haves" (i.e., physical attractiveness, social status) and luxuries or "would be nice to haves" (e.g., creativity, liveliness) to best situate proximity. A linear schedule was used such that each mate dollar purchased 10 percentile points on any trait. We counterbalanced the orders of the budgets and relationship types, and the order the characteristics were randomized but were all presented simultaneously. However, where participants did not make allocations that summed to the total budget, they were instructed to change their responses to sum to the allotted budget. After completing the budget task, participants completed demographic questions. Upon completion, participants were debriefed and thanked.

Results

We began with an omnibus analysis of variance (ANOVA) for the 2 (participant's sex) × 2 × 2 × 5 (Participant's Sex × Mating Context; within-subjects × Budget; within-subjects × Traits; within-subjects) design. The four-way interaction was significant, $F(4, 1{,}364) = 3.62$, $p < .01$, $\eta_p^2 = .01$. To probe the nature of this interaction, we examined necessities and luxuries (i.e., the low and high budget conditions) separately in each mating context.[5]

2. Results did not differ by sample type and are, thus, collapsed across this distinction.
3. Given the imbalanced sample sizes here, no analyses were conducted based on this distinction.
4. There were no significant differences in overall expenditures to each trait between those who were single and those involved in a relationship.
5. Where homogeneity of variance was violated (using Levene's test), we report t values with degrees of freedom that have been adjusted using the Welch–Satterthwaite method.

Table 1. *The definitions provided to participants for each characteristic (modified from Li, Bailey, Kenrick, & Linsenmeier, 2002; Li & Kenrick, 2006)*

Characteristic	Definition
Social level	A person's social situation or social class—what kind of job they have or intend to have (if at all), their education, living arrangement, car, the type of clothes they (can afford to) wear, etc. • 50th percentile (average) = average community college or college student, works part-time job with flex hours, has a used car, lives in apartment with a roommate • 0th percentile = person with the lowest social level seen on the busy street—no job and no intention of holding one, no education, no car, etc.
Creativity	A person's level of artistic ability and originality—how artistically talented they are and the extent to which they stray off the beaten path. • 50th percentile (average) = may occasionally demonstrate originality, perhaps able to write a poem or play a song • 0th percentile = lowest creativity of anyone seen on the busy street—no creativity or artistic talent at all
Geographic proximity	How far away a person lives to you, as indicated by time taken to travel. • 50th percentile (average) = 2 hr • 0th percentile = 3 or more hr
Liveliness	How lively a person's mannerisms or behavior is, and how outgoing they are. • 50th percentile (average) = moderately lively, energetic at times, somewhat extroverted • 0th percentile = least lively person seen on the busy street
Physical attractiveness	A person's physical appearance (i.e., body & face). Does not include how they dress. • 50th percentile (average) = pleasant looking, may have a nice feature or two, reasonable face, but they are not striking • 0th percentile = least physically attractive person seen on the busy street

Mate preferences

A $2 \times 2 \times 5$ (Participant's Sex × Mating Context; within-subjects × Trait; within-subjects) mixed-model ANOVA was run to examine allocations in the low budget condition only. A significant three-way interaction of Sex × Mating Context × Trait, $F(4, 1{,}364) = 4.11$, $p < .01$, $\eta_p^2 = .01$, was found (see Figure 1).[6] There were significant interactions of participants' sex and short-term, $F(4, 1{,}364) = 3.35$, $p < .01$, $\eta_p^2 = .01$, and long-term, $F(4, 1{,}364) = 14.47$, $p < .001$, $\eta_p^2 = .04$, trait allocations. For short-term mates, men and women both spent the highest proportion of their low budget on physical attractiveness. We examined sex differences in the mating contexts (Bonferroni-corrected alpha). Women spent significantly more than men did on the social level for short-term mates, $t(341) = 2.68$, $p < .01$, Cohen's $d = 0.29$, an effect that was replicated and was stronger in the long-term mating context, $t(341) = 5.72$, $p < .001$, $d = 0.62$. In the long-term mating

6. For economy of reporting, we only report the significant differences.

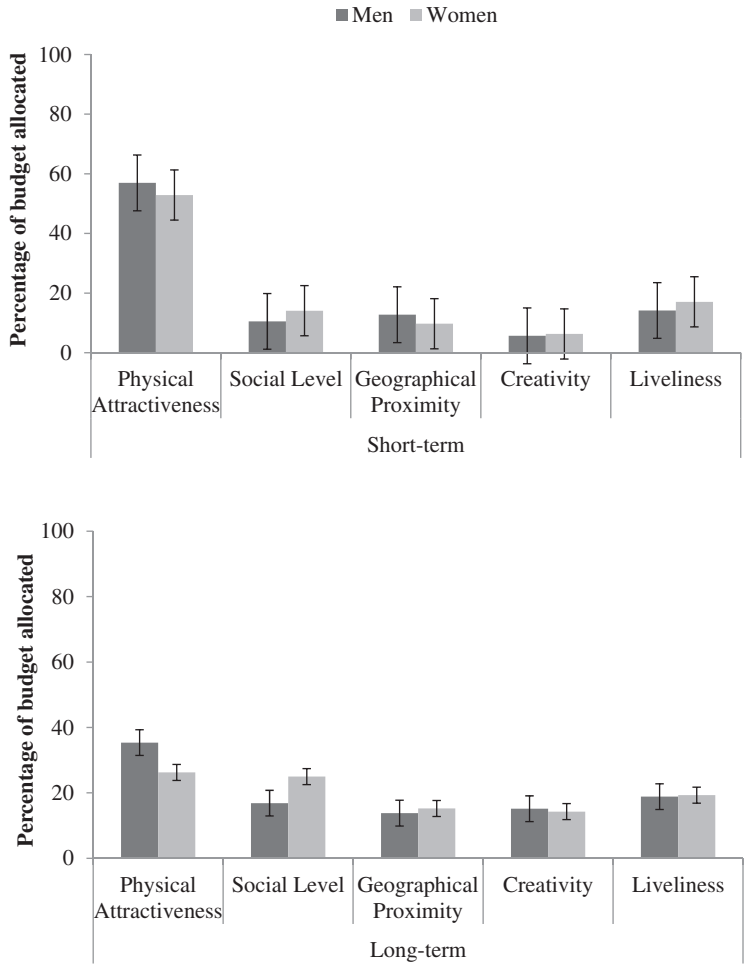

Figure 1. Sex differences and similarities in mate preferences in the low budget (i.e., necessities) condition with 95% confidence intervals.

context only, men spent more of their budget on finding a physically attractive partner than women did, $t(323.56) = 5.65$, $p < .001$, $d = 0.63$. There were within-subject effects for the allocations in each trait within the long-term, $F(4, 1{,}364) = 66.73$, $p < .001$, $\eta_p^2 = .16$, and short-term, $F(4, 1{,}364) = 444.50$, $p < .001$, $\eta_p^2 = .57$, mating contexts, such that in the low budget condition (Table 2, top panel), in the long-term context, all comparisons were significant except geographic proximity to social level, and in the short-term context, all comparisons were significant.

A second $2 \times 2 \times 5$ mixed-model ANOVA was run with the same factors to examine allocations in the high budget condition. A significant three-way interaction of Sex × Mating Context × Trait, $F(4, 1{,}364) = 6.71$, $p < .001$, $\eta_p^2 = .01$, was significant (see Figure 2). There were significant interactions between participants' sex and short-term, $F(4, 1{,}364) = 9.37$, $p < .001$, $\eta_p^2 = .03$, and long-term, $F(4, 1{,}364) = 8.26$, $p < .001$, $\eta_p^2 = .03$, trait allocations. Men and women spent the highest proportion of their high budgets on physical attractiveness for short-term mates. We examined the simple effect of sex as above. Women spent more of their budget than men did on social level in the short-term, $t(341) = 5.08$, $p < .001$, $d = 0.56$, and long-term, $t(341) = 3.33$, $p < .001$, $d = 0.37$, contexts. Men spent more of their budget

Table 2. *Percent allocations in traits across mating contexts and budgets*

	Mean percent			
	STM	LTM	*t*	*d*
Low budget				
Physical attractiveness	55.25	31.55	18.48***	1.16
Social level	11.98	20.23	−9.68***	−0.64
Geographic proximity	11.49	14.40	−3.16**	−0.21
Creativity	5.92	14.78	−11.79***	−0.81
Liveliness	15.36	19.04	−4.50**	−0.30
High budget				
Physical attractiveness	28.97	23.44	16.98***	1.05
Social level	17.94	19.06	−2.42*	−0.15
Geographic proximity	17.81	20.23	−3.70**	−0.25
Creativity	13.76	17.61	−7.88***	−0.48
Liveliness	21.39	19.60	3.78***	0.27

Note. STM = short-term mating; LTM = long-term mating; *d* = Cohen's *d* effect size.
*$p < .05$. **$p < .01$. ***$p < .001$.

than women did on physical attractiveness in the short-term, $t(272.49) = 4.28$, $p < .001$, $d = 0.52$, and long-term, $t(341) = 6.49$, $p < .001$, $d = 0.72$, contexts. And men spent more of their budget than women did in finding a short-term mate who was geographically near, $t(341) = 2.80$, $p < .01$, $d = 0.31$, consistent with our conjecture that men would be unwilling to invest time and effort traveling for a short-term partner. There were within-subject effects for the allocations in each trait within the long-term, $F(4, 1{,}364) = 23.52$, $p < .001$, $\eta_p^2 = .07$, and short-term, $F(4, 1{,}364) = 132.67$, $p < .001$, $\eta_p^2 = .28$, mating contexts, such that in the high budget condition (Table 2, bottom panel), in the long-term mating context, all comparisons were significant except for geographic proximity to liveliness and social level to geographic proximity, creativity, and liveliness, and in the short-term contexts, all comparisons were significant except social level to geographic proximity.

In Table 2, we compared the percentage allocated to each trait across the mating duration within each budget. A greater percent was allocated to social level, geographic proximity, and creativity in the long-term compared to the short-term contexts, which appears to be a function of portions of the budget being reappropriated from physical attractiveness preferences. Interestingly, in the low budget condition, participants allocated a smaller percentage to liveliness in a short-term mate than a long-term mate when constrained, but this pattern reversed in the unconstrained budget. This may reveal the luxury nature of this trait. When we examined within-sex differences, we found that when constrained, women allocated a greater percentage of their budget for long-term mates—than short-term mates—to social level, $t(142) = -7.45$, $p < .001$, $d = -0.81$; geographic proximity, $t(142) = -4.21$, $p < .001$, $d = -0.41$; and creativity, $t(142) = -6.68$, $p < .001$, $d = -0.74$, and a larger portion of their short-term—than long-term—budget to physical attractiveness, $t(142) = 12.56$, $p < .001$, $d = 1.31$, and when unconstrained, they allocated more to long-term partners being creative, $t(142) = -4.31$, $p < .001$, $d = -0.40$, and close by, $t(142) = -5.20$, $p < .001$, $d = -0.55$, and more to short-term mates who were lively, $t(142) = 2.55$, $p < .05$, $d = 0.28$, and attractive, $t(142) = 11.52$, $p < .001$, $d = 1.27$. When men were constrained, they allocated more to a long-term mate who had social level, $t(199) = -6.35$, $p < .001$, $d = -0.53$, creativity, $t(199) = -9.83$, $p < .001$, $d = -0.86$, and liveliness, $t(199) = -4.52$, $p < .001$, $d = -0.39$, and more to short-term partners who were physically attractive, $t(199) = 13.66$, $p < .001$,

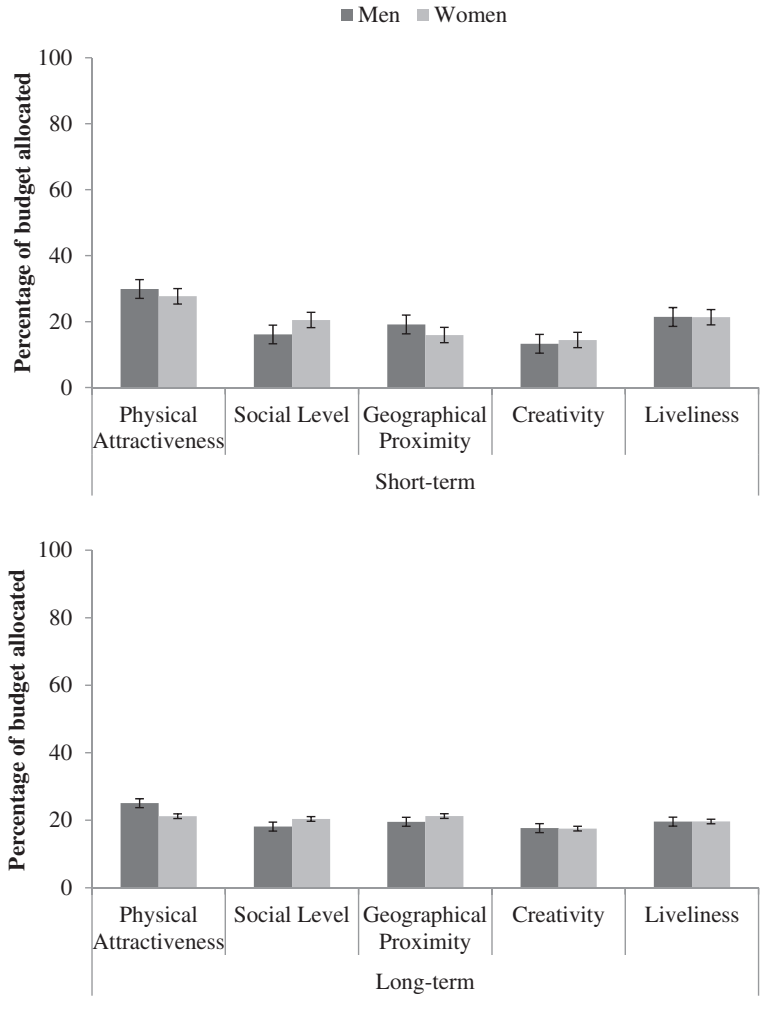

Figure 2. Sex differences and similarities in mate preferences in the high budget (i.e., luxuries) condition with 95% confidence intervals.

$d = 1.08$, and when unconstrained, they allocated more to long-term mates who had social status, $t(199) = -3.11$, $p < .01$, $d = -0.26$, and creativity, $t(199) = -6.64$, $p < .01$, $d = -0.54$, and more to short-term mates who were lively, $t(199) = 2.81$, $p < .01$, $d = 0.81$, and attractive, $t(199) = 12.73$, $p < .01$, $d = 0.97$.

Necessities and luxuries

As additional income becomes available, people spend an increasingly smaller percentage of their extra income on necessities. In contrast, people spend an increasingly greater percentage of extra income on luxuries. Table 3 shows the low-budget (first 10 mate dollars) and high-incremental-budget (last 20 mate dollars) allocations (in percentages) made across the 10 characteristics for each mating duration. We performed simple tests of the effect of budget on each of the 10 characteristics for each sex by mating duration (Bonferroni-corrected $\alpha = .05/10 = .005$). Those with a significant negative (positive) change can be considered necessities (luxuries).

The following characteristics would be classified as necessities in the long-term context: for women, physical attractiveness, $t(142) = 5.08$, $p < .001$, $d = 0.58$, and social level, $t(142) = -4.82$, $p < .001$, $d = 0.34$; for

Table 3. *Low- and high-income consumption in mean percent allocated to each characteristic*

	Low budget		High incremental budget		Δ%	
	Women	Men	Women	Men	Women	Men
Short-term mates						
Physical attractiveness	52.87	56.95	27.68	29.90	−25.19**	−27.05**
Social level	14.06	10.50	20.49	16.13	6.43**	5.63**
Geographic proximity	9.72	12.75	15.95	19.14	6.23**	6.39**
Creativity	6.29	5.65	14.45	13.27	8.15**	7.62**
Liveliness	17.06	14.15	21.35	21.42	4.29*	7.27**
Long-term mates						
Physical attractiveness	26.22	35.35	21.19	25.05	−5.04**	−10.30**
Social level	24.97	16.85	20.38	18.11	−4.58**	1.27
Geographic proximity	15.24	13.80	21.22	19.53	5.98**	5.73**
Creativity	14.27	15.15	17.52	17.67	3.25**	2.52*
Liveliness	19.30	18.85	19.64	19.58	0.34	0.73

*$p < .01$. **$p < .001$.

men, physical attractiveness, $t(199) = -11.08$, $p < .001$, $d = 0.71$. Luxuries in long-term relationships would be classified as follows: for women, geographic proximity, $t(142) = 5.62$, $p < .001$, $d = 0.48$, and creativity, $t(142) = 3.79$, $p < .001$, $d = 0.29$; for men, geographic proximity, $t(199) = 7.07$, $p < .001$, $d = 0.50$, and creativity, $t(199) = 3.29$, $p < .01$, $d = 0.23$.

In the short-term mating context, physical attractiveness would be classified as a necessity: for women, $t(142) = -13.30$, $p < .001$, $d = 1.06$, and men, $t(199) = -17.49$, $p < .001$, $d = 1.29$. Luxuries would be classified as follows: for women, social level, $t(142) = 5.65$, $p < .001$, $d = 0.63$; geographic proximity, $t(142) = 6.73$, $p < .001$, $d = 0.54$; creativity, $t(142) = 10.94$, $p < .001$, $d = 0.95$; and liveliness, $t(142) = 3.55$, $p < .01$, $d = 0.13$; for men, social level, $t(199) = 6.61$, $p < .001$, $d = 0.54$; geographic proximity, $t(199) = 5.86$, $p < .001$, $d = 0.49$; creativity, $t(199) = 10.69$, $p < .001$, $d = 0.85$; and liveliness, $t(199) = 8.13$, $p < .001$, $d = 0.69$.

Discussion

What do people want in their romantic and sexual partners? Do men and women want different things? Do those preferences differ as a function of the level of investment both sexes put into a relationship? And how, if at all, might what we know be extended by including less well-studied, but potentially salient, traits like geographic proximity? In this study, we examined individual differences in how much men and women care about the geographic proximity of their sexual and romantic partners and replicated work on other mate preferences using the budget allocation method (Jonason et al., 2011; Li et al., 2002) instead of standard, Likert-style responses (Bech-Sørensen & Pollet, 2016).

Consistent with our predictions, both sexes saw proximity as a luxury, but it was men who particularly valued a short-term partner who was close to them. Traveling to find mates may allow other people to prioritize "more important" traits like attractiveness and social status. However, given the asymmetries in costs for engaging in short-term relationships in men and women (Buss & Schmitt, 1993; Trivers, 1972), women may continue to be willing to sacrifice distance to get what they want, whereas men may be willing to lower their standards. In addition, distance may be unappealing to men when they are seeking a short-term partner as men may be unwilling to invest the time/money required to traverse the distance to just have sex (Buss & Schmitt,

1993). Nevertheless, geographic distance may play a secondary role in mate choice, and it may not be a major dealbreaker (Jonason et al., 2015). Instead, distance may only be cause for a coupling not taking place if a number of other features, like the availability and quality of alternatives, are taken into account.

Beyond these unique findings in relation to geographic proximity, we have replicated prior effects. For example, creativity was a luxury (Li & Kenrick, 2006; Li et al., 2002), which may suggest that traits like intelligence and wit may be nice to have but are considered secondary to more evolutionarily important traits, like social status and physical attractiveness. We also replicated sex differences in mate preferences (Eagly, 1987; Gutierres et al., 1999; Howard et al., 1987; Kenrick et al., 1993) in an (combined) MTurk and college student sample using the budget technique to understand mate preferences (Li & Kenrick, 2006; Li et al., 2002). Briefly, men and women spent the highest proportion, whether in constrained or unconstrained conditions, on physical attractiveness for short-term mates, consistent with prior work suggesting both sexes prioritize physical attractiveness in their partners but most strongly in the short-term partners (Li & Kenrick, 2006). Such results are consistent with predictions from strategic pluralism (Gangestad & Simpson, 2000); physical attractiveness in both sexes is an honest indicator of genetic fitness and immunocompetence (Symons, 1979). As short-term relationships are characterized by little investment, finding a partner who has good genes may act as a necessary "insurance policy" for the deleterious life events that children might experience at greater rates with only one parent (e.g., disease, accidents, reproductive competition). Unsurprisingly, men also treated physical attractiveness in their long-term partners as more of a necessity than women did (Buss, 1989; Cameron et al., 1977). In this case, it is likely that men maintain high priorities in their long-term and short-term partners in relation to physical attractiveness given its role in fertility and fecundity (Gangestad & Simpson, 2000; Symons, 1979). In contrast, it is women who may shift (i.e., spend their budget elsewhere) their priorities of physical attractiveness when transitioning from short-term to long-term relationships. Nevertheless, both sexes reduced the value they placed on the physical attractiveness of their long-term partners so that they could emphasize other traits that are more likely to ensure good relationship functioning and longevity (e.g., social level).

Women spent significantly more than men did on social level for short-term mates, an effect that was stronger in the long-term mating context when constrained (i.e., low budget) but stronger for short-term partners when unconstrained (i.e., high budget), suggesting that social level is a necessity in long-term partners and a luxury in short-term partners (Li et al., 2002; Li et al., 2013). Such effects are consistent with the sexual strategies theory (Buss & Schmitt, 1993) and parental investment theory (Trivers, 1972) in relation to the asymmetrical obligations offspring impose on the sexes. By treating social status as a necessity, especially in long-term mates, ancestral women may have gained access to the necessary investment they needed to rear offspring, and the preferences of modern women result from that ancestral selection pressure (Jonason, Li, et al., 2012).

Limitations and conclusions

The primary goal of this study was to replicate and extend the utility of the necessities and luxuries paradigm in understanding mate preferences. Nevertheless, the study is characterized by a number of limitations. First, although our sample was older in age than typical college student samples, our sample could be described as W.E.I.R.D. (i.e., Western, educated, industrialized, rich, and democratic; Henrich, Heine, & Norenzayan, 2010). Although we have no particularly strong reason to mistrust online samples (Buhrmester, Kwang, & Gosling, 2011), cross-cultural work might be warranted as Americans and Australians have more ready access to cars and other public transportation than in developing nations, which might attenuate the role of distance in decision making.

Second, we focused on only five traits in mate selection. There are likely a large number of potential factors that influence

mate choice (e.g., Buss, 1985, 1989). The budget allocation technique operates as a middle ground between typically dichotomous, forced-choice paradigms and Likert-style questions. By its nature, however, it cannot examine a full range of traits that influence mate choice. Instead, we focused on traits that are under dispute in the research (Li & Meltzer, 2015; Zentner & Eagly, 2015) and added geographic proximity.

Third, although comparing short-term and long-term relationships is useful for highlighting sex-based differences in mate preferences (Buss & Schmitt, 1993), a comprehensive account of what people want in their romantic/sexual partners must include a wider range of relationships (e.g., same-sex and polyamorous; see Jonason & Balzarini, 2016; Jonason, Valentine, & Li, 2012). For example, the decision making around polyamorous mate choice might be one where different individuals satisfy different trait-specific needs when a person has limited jealousy, a fairly unrestricted sociosexuality, and cannot find a single person who embodies all of their mate preferences.

Fourth, although participant's sex is a powerful individual difference in mate preferences, there may be others of relevance worth investigating, like sociosexuality (Simpson & Gangestad, 1991), mate value (Regan, 1998), and the dark triad traits (Jonason et al., 2011). These factors might act as mediators of sex differences in mate preferences. Recall that mate value was important in dispersion in Chacma baboons, and thus, mate value seems like a likely candidate; however, couple that with the availability of attractive partners, and there is likely an interesting dynamical system at play between the person and their situation that accounts for not just the distance willing to travel but also in mate preferences in general.

Fifth, we have examined mate preferences and not actual mate choice, which some have argued is problematic (Eastwick & Finkel, 2008; but see Li & Meltzer, 2015). Although there is at least some evidence suggesting that mate preferences and mate choice are in alignment when properly studied (Li et al., 2013), the budget allocation task may be somewhat abstract and artificial as people are unlikely to intuitively think about mate selection in this way. This may qualify our results to be somewhat limited to saying something without strong ecological validity, but nonetheless adding to the larger budget allocation literature.

Sixth, the budget allocation method may amplify differences because of its within-subjects nature.[7] While a possibility, we feel the best way to learn about the nature of people's preferences and priorities is to put people in a proverbial corner to learn what really matters to them as opposed to just what they would like to have. To date, the budget allocation method represents the only method that allows for a multitrait assessment of mate preferences in this way. Nevertheless, the best way to show that the effects we detected are not methodological artifacts would be a follow-up using normative style methods.

Seventh, it was particularly challenging to fit geographic proximity into the budget allocation framework. There are a number of problems created by forcing geographic proximity into the budget allocation framework. One concern is that it is more likely that people intuitively think of proximity in actual distances or time instead of the decile fashion we have used for it is the time and/or distance that are actually the obstacles to be overcome. Another problem is that by choosing 3 hr as the peak distance, we may have artificially created the effect that distance was a luxury, when if we had set it higher, 15 hr for instance, it might have revealed itself as a necessity. This is one of the limitations of the budget allocation technique itself; the variance of budgets allocated to each trait can become more restricted as one allocates more of their budgets elsewhere. Nevertheless, future research should adopt alternative methods (i.e., Likert scales, distance estimates) for understanding the role of distance in romantic and sexual mate choice. All in all, as we have provided the first attempt to understand the role of distance in mate choice outside of sociology, including casual sex and romantic relationship, we would argue

7. Similar criticisms have been leveled against forced-choice methods.

that our results provide, at the very least, a new avenue of research into decision making at the onset of relationships.

In conclusion, we have updated and replicated research on context-specific sex differences in mate preferences using the budget allocation method (see Li & Meltzer, 2015). It appears that the traits people "must have" reflect traditional priorities, whereas the trait of geographic proximity may be a luxury. Men placed heavy emphasis on finding a partner—regardless of context—who was physically attractive and preferred to have a short-term partner who was nearby. Women desired short-term partners who were attractive but maintained interest in partners with social status regardless of mating context. We encourage future work that examines traditional and, potentially, new traits that characterize potential partners to better understand the mate preferences as they operate in today's modern dating context.

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