Evolutionary Behavioral Sciences

Why Is Age So Important in Human Mating? Evolved Age Preferences and Their Influences on Multiple Mating Behaviors

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Evolutionary theorizing suggests that chronological age, because it is so strongly linked with key reproductive qualities like fertility, should be an exceptionally consequential variable in mate selection. We review voluminous evidence for mate preferences for age and the substantial and varied behavioral sequelae of those preferences. These include (a) in actual marriage decisions, men choose younger wives, and women choose older husbands, on average in all of the dozens of cultures studied; (b) in personal advertisements, men and women seek partners consistent with their expressed age preferences; (c) chronological age determines number of "hits" received in online dating services; (d) the age of potential bride influences the amount of money spent on premarriage customs; (e) men's mate retention effort, including commitment manipulation, resource provisioning, and intrasexual threats, is significantly predicted by the wife's age; and (f) chronological age is an important sex-linked cause of divorce. The far-reaching ramifications of age also extend to (g) tactics of intrasexual competition, (h) predictors of mate value discrepancies, (i) victims of sex crimes, and (j) prostitution patterns. Finally, chronological age predicts (k) probability of remarriage, and (l) the age gap between grooms and brides upon remarriage. We synthesize evidence from diverse methods, across different cultures, and over time spans of centuries. Massive converging evidence provides a powerful, yet complex, understanding of the evolutionary importance of age in multiple mating outcomes over the human life span.

Public Significance Statement
We review the voluminous evidence that people express ideal preferences for the age of their potential mate and act on these preferences in mate selection. This review speaks to an ongoing debate in the human mating literature concerning the importance of ideal preferences for real mating behavior. Further, it serves to highlight the many domains of life into which mating spreads its influence.

Keywords: age, mate preferences, mate selection, mating behavior, evolutionary psychology

Age is a peculiar, yet singularly important, attribute of humans. Everyone has an age, so all

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people can be arrayed on this variable. It carries special social significance in many contexts—the benevolent or condescending treatment of youth; the social hierarchies constructed on "respecting elders;" the social segregation by age in most or all cultures; the social invisibility of the young or old depending on culture and context; and its frequent occurrence in everyday discourse, ranging from exhorting people to "act their age" to derogatory comments about people being either immature or "over the hill." No one, it seems, is indifferent to age.

From an evolutionary perspective, age takes on special conceptual significance because so many elements that contribute to mate value

covary with age. Among them are pubescence, fertility, senescence of reproductive organs, physical size, emotional maturity, social status, and abilities to acquire reproductively relevant resources—life history variables of profound importance. These age-graded elements are core to association value, such as kin value and co-alitional value. Perhaps most important, they are core to mate value and make age central to human mating (Symons, 1979; Williams, 1975).

Empirical evidence across research labs, methods, cultures, and time establish age as a key variable in mate preferences and mate selections. That people readily and reliably track and store their age makes age an empirically tractable variable. Age has all of the features of a model variable for studying mate preferences and mate choice more broadly. Yet age has received relatively little attention from mating researchers compared to variables like physical attractiveness, for which there are hundreds of empirical studies.

Cross-cultural research demonstrates that humans appear to have universal mate preferences, including those for the age of potential mates (e.g., Bech-Sorensen & Pollet, 2016; Buss, 1989; Kenrick & Keefe, 1992). These preferences were originally hypothesized to function in guiding people to adaptive mate choices—a fundamental domain of life for sexually reproducing organisms. However, they also should have implications for a wide array of downstream behavioral outcomes, such as tactics of attraction, selection of mates as a function of mate value, determinants of mate retention, likelihood of experiencing sexual harassment, probability of divorce, and a host of other important life outcomes.

As a secondary issue, the study of age mate preferences and their consequences have a critical bearing on a recent debate that has emerged in the scientific literature. Some have challenged the view that mate preferences are consequential in driving mating decisions. They have advanced the view that mate choice is more or less random with respect to preferences (e.g., Eastwick, Luchies, Finkel, & Hunt, 2014; for counter arguments and evidence, see Li & Meltzer, 2015; Li et al., 2013). If this view were correct, it would undermine the scientific importance of mate preferences and would lead logically to three surprising conclusions: (a) that consensually expressed mate preferences,

documented worldwide across cultures and over time, are meaningless psychological quirks; (b) that people who adopt tactics of mate attraction, tactics of derogation of competitors, and tactics of mate retention that correspond to the perceived mate preferences of the opposite sex are deluded because those tactics lack efficacy in attracting mates or besting mating rivals; and (c) that humans are the sole known sexually reproducing species, alone among the millions of sexually reproducing species on Earth, that lack functional preferences for potential mating partners.

Here we provide an in-depth examination of the role of mate preferences in driving human behavior by focusing on ideal mate preferences for age. Several foundational articles have established that age preferences act to guide human mate choice (e.g., Buss, 1989; Kenrick & Keefe, 1992). In the more than a quarter century since these articles, numerous empirical findings have been published, so it is timely to do a stock-taking and more extensive conceptual integration. We expand on these classic articles in two critical ways. First, we review the voluminous but previously unexamined evidence, accumulated prior to and since the publication of these original articles, from across cultures and across centuries, that bears on the hypothesis that humans select mates based on ideal preferences for age.

Second, we expand on prior discussions of age preferences by reviewing bodies of literature that connect age preferences to a wide array of real-world outcomes. These include self-reported ideal preferences, personal advertisements, and marriage data but also the effects of age preferences on gift giving, prostitution, relationship dissolution, mate guarding, criminal behavior, remarriage patterns, and deception (see Figure 1). This synthetic review underscores the broad importance of mating and mate preferences to human behavior.

To frame this treatment, we first discuss the hypothesized functions of preferences broadly, and then specifically within the mating domain. We then move into theoretical background concerning the importance of age before reviewing empirical evidence establishing that males and females have distinct preferences for ages in particular mates. Finally, we examine this key question: Do age mate preferences drive actual mating behavior in its many domains?
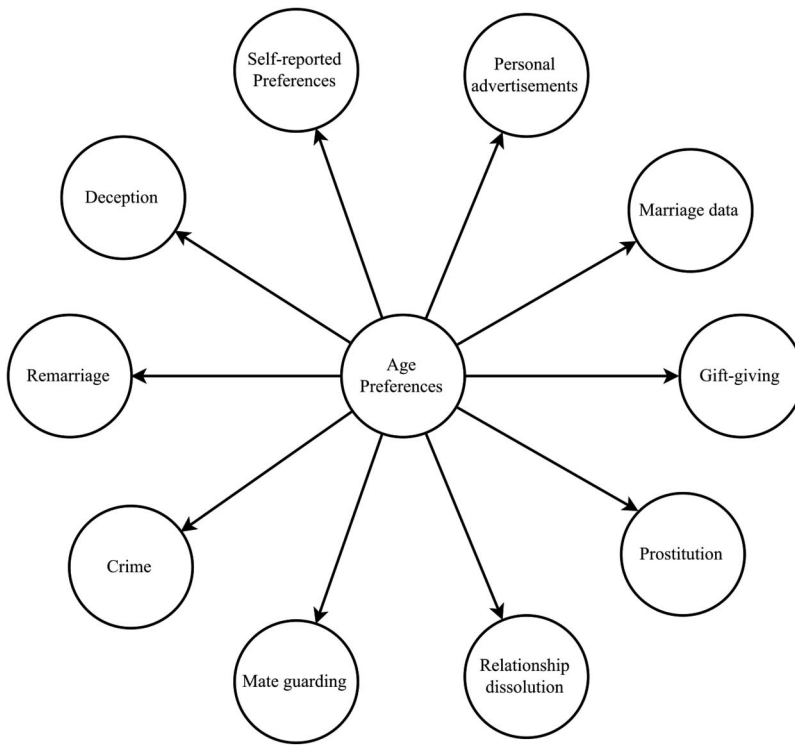
Figure 1. The broad impacts of age mate preferences.

Why Have Preferences?

Preferences are effective tools for solving decision making problems. Across domains, organisms face problems wherein they must select among alternatives. Consider food choice. All organisms must extract nutrients and calories from their environments. But not all items that could be eaten contribute to this end, and some actively work against it. Evolved food selection preferences are effective adaptations that probabilistically guide organisms to ingest nutritious and energy-provisioning foods and to avoid ingesting substances teaming with toxins or harmful microorganisms (Rozin, 1976). All known species show marked food preferences that map onto the nutrients available in their environments. For instance, humans have strong preferences for fats and sugars (important energy sources) as well as nutrient-dense savory and salty foods; bitter and sour flavors are aversive because they are associated with dangerous and toxic foods (Krebs, 2009; Rozin, 1976). Of course, these preferences are not insensitive to

environmental input. People can learn to enjoy bitter or spicy flavors depending on what is available in their local environment—mate preference mechanisms also have important environmental inputs, albeit different ones from those of food choices.

Preference mechanisms need several features to serve as effective decision-making adaptations. Preferences first must map onto the benefit structure present in the real-world alternatives. Habitat preferences provide a good example. Potential habitats vary on a variety of dimensions relevant to fitness. Habitats must be of a suitable temperature for the organism in question. Habitats should be relatively devoid of predators and rich in prey. They should offer *prospect* (resources) as well as *refuge* (places to see without being seen Orians & Heerwagen, 1992). An effective decision-making psychology would generate preferences that attract organisms to habitats that contain fitness-promoting elements (temperate, safe, with prospect and refuge), repel them from fitness-

costly habitats (extreme, predator-packed climates with few resources and little shelter), and allow them to disregard fitness irrelevant information (e.g., local cloud shape). Additionally, the strength of preferences for a dimension should be correlated with the fitness impact of the dimension: Those dimensions that affect fitness the most should be those that most affect habitat selection.

There are strong conceptual reasons to expect mating to be a domain governed by mate preferences. First, through the lens of selection, choosing a mate is one of the most important decisions a sexually reproducing organism can make. Reproduction cannot occur without this vital decision. Potential mates vary on dozens of dimensions, such as health, size, shape, personality, social status, kin ties, and coalitional alliances. They also vary on cost-inflicting attributes such as mutation load, parasite load, and aggressive temperament. Poor mate choice could jeopardize an individual's entire reproductive career; good mate choice could greatly enhance it. Choosing a benefit-bestowing mate and avoiding a cost-inflicting mate, in short, has enormous fitness consequences, so selection should strongly favor mate preference adaptations. A large research area confirms this expectation for nonhuman organisms (e.g., Thornhill & Alcock, 1983) and for humans (Buss, 2015). The extent to which preferences guide actual mating behavior, the circumstances in which it does so, and which individuals are best and least able to translate their desires into successful mate selections has been less well studied.

Why Age Is Vitally Important in Human Mating

Mate preferences for age provide a good window into understanding the potentially far-reaching consequences of mate preferences for two key reasons. The first is theoretical. Age is monumentally important to mate selection because it is central to mate value—the net fitness benefits a mate affords. The second is empirical. Age is an eminently tractable variable and reliably recorded. People tend to keep close track of age in their personal lives. Importantly, the larger society also seems to believe age is important, because age is widely recorded in public documents such as births certificates, marriage licenses, and death certificates. Marriages,

births, divorces, and deaths happen to be among the highest fitness-impact events in an individual's life. We suggest these facts, taken together, make age a uniquely powerful window into the complex dynamics and nuances of mate preferences, mate selection psychology, and its sequelae.

Age Is an Important Cue to Mate Value

The importance of age stems from a simple, fundamental fact: Time and energy are finite resources. Organisms must allocate some of their limited time and energy to the evolutionary bottom line: reproduction. However, before an organism can reproduce, it must first complete several other tasks. A successful organism must stay alive against bodily wear and tear and pathogenic infection. A surviving organism then must find a suitable mate with whom to reproduce. These tasks require constructing psychological and physiological systems that perceive, act, learn, digest, and move. Building and operating these systems requires organisms to forage for energy and nutrients from the environment. Finally, successfully reproducing in highly altricial species such as our own requires providing some time and energy to allow one's offspring to survive and reproduce. The better an organism accomplishes these nonreproductive processes, the more effectively that organism can *ultimately* reproduce. Organisms therefore face a fundamental tradeoff: An organism can invest time and energy in immediate reproduction or they can delay reproduction and invest energy in other processes, with the potential for more or higher quality reproduction in the future.

An inevitable consequence of these "life history" tradeoffs is a particular maturation schedule. Slowly developing species like our own have to spend a substantial period of time investing energy in development and maintenance rather than reproduction and our lifespans are consequently characterized by periods of extended juvenility. During these juvenile periods, our bodies—and brains, for humans—grow rapidly. The demands of this rapid development preclude investing in reproduction, and juveniles consequently remain infertile and sexually uninterested. For humans, this is a critical time of learning. People dedicate enormous time and energy to learning a language, learning social

divisions and hierarchies, and, crucially, learning the knowledge and skills necessary to navigate their social and physical environments. These young humans have little time, energy, or ability to dedicate toward foraging for themselves and are consequently extremely dependent on investment from others.

This extended developmental period is ended by a relatively abrupt entrance into reproductive investment. For humans, this is marked by puberty, at which a host of reproductive characteristics emerge—menstrual cycling, breast development, and increased fat deposition on hips and buttocks in females; height increase, testosterone production increase, upper body strength, and deepening of vocal pitch in males. Somatic investment and development continue after puberty and the end of the juvenile period, but both slow dramatically relative to their previous rates. Both males and females develop an increased desire for mating and with that comes competition for access to mates. Importantly for mating, juvenile humans emerge as fertile around this period and, in traditional hunter-gatherer cultures, begin for the first time to be net calorie producers rather than net caloric drains (Kaplan, Hill, Lancaster, & Hurtado, 2000).

Beyond the age-graded schedule of reproductive maturation and entry into reproductive competition, age is rendered an important variable by senescence. Most organisms experience a decline in the functioning of their bodily systems and humans are no exception. The most widely accepted theory for the evolution of this senescence is the Medawar-Williams theory of senescence (Medawar, 1957; Williams, 1957). Even without declining bodily systems, most individuals would not survive to old age due to predators, infection, starvation, accidents, or conspecific aggression. In effect, this means that natural selection does not apply as forcefully in old age as it does in youth. A gene that increases the chance of death at old age—for instance, by causing the gradual breakdown of an important organ system—would affect a relatively small proportion of the population and therefore would not be selected against as harshly as a gene that increased the chance of death at an earlier age. As a consequence, natural selection can favor the evolution of genes that cause senescence as long as they counteract this cost with increased reproduction early in life.

This natural senescence creates trends of extreme importance to mate selection. Both sexes experience a gradual decline in health late in life—a decline critical to mate value. Males and females also have somewhat different senescence curves on components that contribute to mate value. Males experience a decline in their resource productivity as their increased skill and knowledge gradually fails to compensate for decreasing health and physical prowess. Female fertility also begins a decline after its peak before totally ceasing at menopause. The reasons for the decline in female fertility remain an evolutionary mystery. Abrupt female reproductive senescence is made more mysterious by two facts: (a) that male fertility decreases slowly across the life span; and (b) that senescence curves for all other bodily functions, such as heart, lungs, and kidneys, show only a gradual decline over the life span (Hill & Hurtado, 1991).

Maturation, senescence, and mate value. The results of these broader trends of aging and senescence furnish specific implications for mate value. For women, age strongly predicts fecundity and reproductive value. Figure 2 plots birthrate—a crude proxy of fecundity—and reproductive value as a function of women's age. Fecundity refers to the probability of conception per sex act. More fecund women are more able to produce offspring, and are thus higher value as potential mates from an evolutionary perspective. More specifically, although important to both, fecundity should be a larger component of female short-term mate value rather than long-term mate value (Buss & Schmitt, 1993). When males seek short-term mates with minimal investment, the capacity to conceive immediately is maximally important.

The precise age trends in female fecundity are difficult to determine because fecundity is difficult to measure directly. Actual birth rates by age, or fertility, provide an indirect measure of fecundity and for women in the U.S. peak in the midtwenties (Martin, Hamilton, Osterman, Curtin, & Mathews, 2012), with some variation across time. However, fertility rates are confounded with behavior: Fecundity can be high when fertility is low simply if people have less sex or use more effective contraception methods (see Ellison, 2003). Ovarian hormone concentrations provide an indirect measure of ovarian functioning, which is linked to fecundity (Lip-
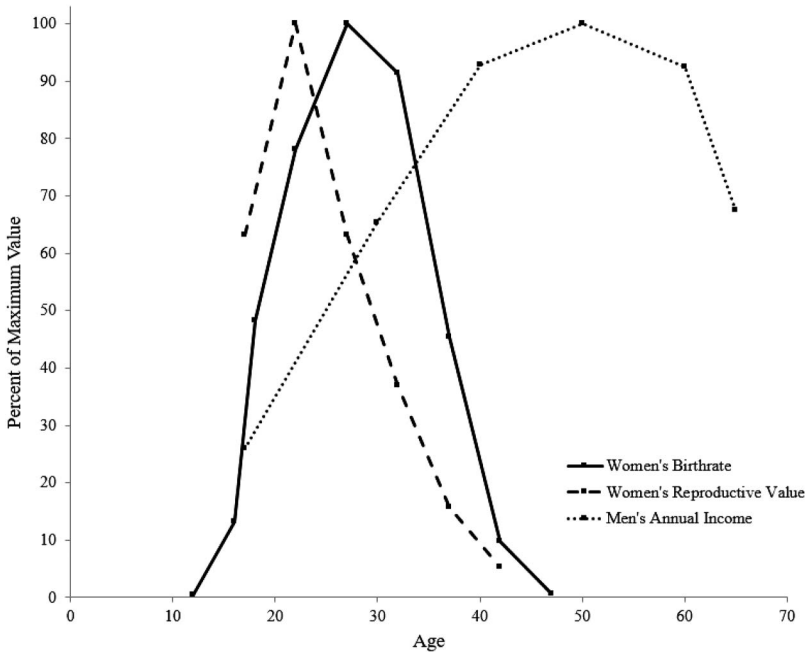
Figure 2. Women's estimated reproductive value (Martinez, Daniels, & Chandra, 2012), women's birthrate (Martin, Hamilton, Osterman, Curtin, & Mathews, 2012), and men's income (U.S. Census Bureau, 2014) as a function of age. All data based on U.S. populations.

son & Ellison, 1996) and peaks in the early thirties (Ellison, 1994). Nonetheless, hormone levels are only probabilistic indicators of fecundity and are most often measured cross-sectionally rather than longitudinally.

The general trend of fecundity across the life span is extremely clear even if the precise age when fecundity peaks is less clear. Fecundity is low in prepubescence and rises to an early life peak—approximately in the midtwenties, with some cultural and individual variation (Ellison, 2003). From this peak, fecundity remains high through the late twenties or early thirties, and then drops continuously to cessation at menopause. This age-graded curve makes female short-term mate value strongly age-linked: Females in their mid-to-late-twenties, near their fecundity peak, are highest in short-term mate value (Buss & Schmitt, 1993).

Reproductive value, on the other hand, refers to *future* reproductive capacity: the average number of offspring a person can be expected to produce in the future given their age. Counter-intuitively, reproductive value is somewhat low very early in life: High early life mortality

means that many young people, on average, cannot be expected to live to reproductive age. Reproductive value will typically peak in the late teens and early twenties, after the onset of puberty and when mortality declines (Buss, 1989; e.g., Office of Population Censuses and Surveys [OPCS], 1996; Pawlowski & Dunbar, 1999a). Reproductive value declines continuously thereafter until menopause. Theoretically, the capacity to produce many children over a long span is critical to males interested in long-term, committed mating. Female long-term mate value is highest in the late teens and early twenties and declines gradually thereafter.

Male mate value is also age-linked due to the age-linked profile of economic resource productivity (see Figure 2). Because of the substantial resource demands of pregnancy and lactation, women historically have faced the adaptive problem of identifying and attracting mates who are willing and able to provide resources. Across hunter–gatherer societies, the number of calories males produce from hunting and gathering rises until a peak in the midthirties (Kaplan et al., 2000). Productivity remains high

through the forties before gradually declining until males are unable to forage. This trend remains even in modern societies, with male income rising throughout the life span to a slightly later peak in the late forties and early fifties (U.S. Census Bureau, 2014). Income does drop off after this late-life peak. Further, older men have shorter expected future lifespans, and therefore are less likely to provide for and support offspring over the long-term, potentially making very old men less valuable as long-term mates. However, these trends are complicated in modern societies by the fact that money can be saved and inherited, unlike foraged foods in ancestral conditions. Given the importance of resources and earning potential in female long-term mate preferences, the age-linked trends in resource productivity render male long-term mate value age-linked. Male long-term mate value, to the degree that it is linked with economic resource productivity, is low early in life, and shows an age distribution corresponding to cues to decline in resource productivity.

Male fecundity declines across the life span, but does so slowly relative to the female decline. Nonetheless, male reproductive physiology introduces age as a factor to male short-term mate value. Sperm quality declines with age. The sperm of older males has more deleterious mutations that are associated with an increased risk of disorders in children of older men (e.g., Bordson & Leonardo, 1991; Kong et al., 2012). Women mating with older men therefore risk bearing unhealthy offspring that carry higher mutation loads. This risk is costly in long-term mating contexts, it is costlier to women in short-term mating contexts, in which they might get pregnant by men with subpar sperm, but from whom they will not receive long-term investment. We therefore offer a novel prediction about age and mate value: Male short-term mate value should decline with age, according to the relative risk of deleterious mutations, even as long-term mate value rises with age as a function of greater on-average resource-provisioning ability.

Mate preferences for age. That mate value is reliably age-linked for both sexes, and undoubtedly has been throughout human history, furnishes predictions about evolved mate preference psychology. In order to be functional, mate preferences must guide individuals toward mating with high mate value partners—those that offer large benefits and few costs. The age-linked nature of mate value predicts that sexual and romantic attraction will be age-linked as well. Because female fecundity and reproductive value both peak and then decline relatively early in life, males should be maximally attracted to younger females. Conceptually, these trends are predicted to differ for short-term and long-term attraction. For long-term mates, the age trends of reproductive value predict that males will be maximally attracted to females nearer their peak reproductive value, closer to their early twenties. Females below this age are predicted to be less attractive. Attraction is predicted to drop off gradually with age after the peak in reproductive value. Fecundity, in contrast, is predicted to be the principal driver of short-term mate value, so males are predicted to be maximally sexually attracted to females in their midtwenties—that is, to women near their peak in fecundity (Ellison, 1994).

Male attractiveness is predicted to follow a different age gradation, linked to resources and cues to resource acquisition as well as sperm quality. Male long-term attractiveness should follow age trends in resource productivity, showing a gradual rise toward the peak in resource productivity and a gradual drop-off thereafter. For short-term mating, however, older males should be found less attractive than younger males due to the increased risk of deleterious mutations.

Although the age-trends of resources and reproductive physiology are clear, several factors add complexity and nuance to human mate preference psychology. The first is that male long-term attractiveness will be more culturally linked than female attractiveness. Resource productivity is affected by factors like income equality, resource fungibility, and resource inheritance that vary widely across cultures, both traditional and modern. Resource productivity in the form of hunting ability in hunter–gatherer cultures will differ from earning potential in agrarian cultures, herding cultures, and those with cash economies. Reproductive value and fecundity, on the other hand, are considerably more constrained. Stated differently, there is greater variability among males in their resource trajectories with age than there is among females in their fecundity trajectories with age (Buss, 2016). Precisely when male attractiveness peaks will thus depend on the specifics of any culture's environment as well as individuating qualities of different males of the same

age (e.g., in status and other correlates of resource potential). In contrast, female attractiveness peaks should be more invariant.

A separate constraint concerns the perception of age. The earliest formal number systems begin to appear approximately around 3,000 BCE. Human age preference psychology surely predates this invention and is unlikely to have changed substantially in the geologically brief period following. As a result, mate preference psychology is unlikely to be designed to take information on actual age as input relative to information on *perceived* age. Chronological age should matter in mate choice only indirectly, through its ability to affect perceived age. As a corollary, we should expect perceptions of age to trump information on chronological age in mate selection.

Perceptions of age can come from the observation of cues like facial maturity, skin quality and smoothness, stature—social or physical—or even social information. This means that females who are able to *appear* youthful, as many do in modern environments sheltered historically prevalent environmental insults, may appear younger than their chronological age and hence remain sexually or romantically attractive even as their fecundity and reproductive value decline. In the same way, young males can increase their attractiveness by increasing their apparent maturity—physical or behavioral—even if their resource productivity is lacking, and older males also sheltered from elements that typically give the appearance of older age, may appear younger than their chronological age. And of course the rise of cosmetic surgery in modern environments allows individuals to alter cues that historically would have been highly age-linked.

Constraints on mate preferences and mate choice. Preferences are constrained in predictable ways. What people desire represents ideals; however, people cannot always get what they want (Buss & Schmitt, 1993; Li, Bailey, Kenrick, & Linsenmeier, 2002). Many factors will prevent ideal preferences from being translated into actual mate choice behavior. Actual choice behavior is a downstream outcome that theoretically should be influenced by ideal preferences, personal mate value, influences and manipulations by other interested parties, and the realistic constraints of mating markets. Mutual mate choice imposes one principle constraint. Because each person must be chosen by a desired other, one's own age will permit or limit translating preferences into mate

selection. All males may prefer younger brides, all else equal, but if females prefer older husbands in return, older males and younger females should attract closer matches to their preferences than younger males or older females. Males, on average and with greater variance, will show an increasing ability to satisfy their preferences as they age, up to a point, whereas females will decreasingly be able satisfy their preferences. Other aspects of mate value will have similar effects. Higher mate value people have more power on the mating market and can therefore more successfully attract partners they desire. For example, resource possession is an important part of male long-term mate value; wealthier males will be more able to leverage their relative preference for youth into actually attaining youthful partners.

These conceptually plausible constraints influence not just actual mate selection but also the very mate preferences people hold. By virtue of their power on the mating market, higher mate value people can afford to raise their standards and thus can have more stringent ideal preferences for potential mates. Women who are kinder, more intelligent, more physically attractive, or more youthful are higher in mate value and consequently can demand higher mate value men who embody their age preferences—a hypothesis that has been confirmed empirically (e.g., Buss & Shackelford, 2008). Both preferences and actual partners will be subject to market constraints, each better representing the ideal among higher mate value people.

Finally, a key caveat centers on men's short-term mate selection—men, but not women, dramatically lower their minimum preferences for short-term mates (Buss & Schmitt, 1993; Kenrick, Sadalla, Groth, & Trost, 1990). Men invest very little in their short-term mates: potentially as little as the time it takes to secure a partner and consummate sex. These low costs typically make mating with even a low-quality short-term mate worthwhile in the currency of fitness, although there are sometimes other costs such as reputational damage and retribution from the woman's mates or kin (Buss, 2015). Consequently, and consistent with parental investment theory (Trivers, 1972), men tend to be less selective in short-term mating contexts. Relative to long-term mates, men show low minimum standards for a variety of qualities in short-term mates (Kenrick, Sadalla, Groth, & Trost, 1990). Thus, while highly fecund women should be preferred by men as

short-term mates, men should nonetheless be willing to short-term mate opportunistically, when the costs and risks are low, with women who do not match their ideal preferences.

Age Is Highly Empirically Tractable

Humans select among potential mates based on a wide array of dimensions, each of which could in principal serve as a case study in human mate selection. Age is among the most important of these dimensions in large part because humans are acutely aware of their own ages and the ages of those around them. In fact, age appears to be a fundamental dimension along which we automatically categorize other humans (Brewer & Lui, 1989; Kurzban, Tooby, & Cosmides, 2001). In modern societies, birthdays mark increases in age. Moreover, age is a standard item in documents both private—such as social networking sites, personal ads, and online dating—and public, such as marriage and divorce records. The result is that everyone is aware of their own age and able to determine or discover the ages of others, aside from the occasional deception. Even in traditional societies that lack large formal number systems, people are aware of rough relative ages. This knowledge manifests in behaviors ranging from marriage decisions where people become eligible for marriage only at certain ages (e.g., among the !Kung San, girls can marry as young as 10 but men are typically not eligible until their thirties; Shostak, 1981) to status hierarchy negotiations (e.g., older men command more status than younger men among the Tiwi; Hart, Pilling, & Goodale, 1960).

The widespread tracking, documenting, and discussion of age makes age relatively unique and particularly important among mate preference variables. Many other variables, such as kindness, are also strongly preferred in mates. Yet countries around the world presently and historically record spouses' age at marriage for all legal marriages. These records provide large-scale, naturalistic assays of mate preference-motivated behavior. We are aware of no such records that also document how kind married spouses were to one another. Thus, in addition to self-reports and laboratory studies available for the study of preferences, studying age gives psychologists access to massive samples of behavioral data in the form of demographic data,

census reports, personal ads postings, and Internet dating responses. This large reservoir of available data makes hypotheses about the relation of age to mating among the most empirically tractable hypotheses in all mating research.

Summary

The fundamental life history tradeoffs organisms face in allocating their time and energy to fitness-promoting goals causes organisms to follow species-typical maturation schedules. For humans, this life historical fact causes some of the most important features of mate value to be age linked in sex-differentiated ways. Female reproductive value and fecundity both rise to early peaks and then drop off gradually across the life span, with fecundity peaking slightly later than reproductive value. For males, resource productivity rises steadily before hitting a stable peak in midlife; this peak drops off relatively late in life. While male fecundity remains relatively stable throughout life, sperm quality declines with old age. As mate preferences are hypothesized to function to guide selection of high-value mates, the age-linked nature of mate value provides several predictions about the nature of mate preferences for age. In particular, women's long-term attractiveness should peak early in life and decline thereafter. Men's long-term attractiveness will show a later age peak, a more gradual decline with age, and greater variance. These sex difference should be smaller for short-term attractiveness, with both sexes peaking earlier in life and declining with age. However, female short-term attractiveness should decline more rapidly than does male short-term attractiveness. In the following section, we examine evidence bearing on these predictions and evidence bearing on whether these preferences are translated into behavior, constrained by factors like own-age and mate value.

Age in Mate Preferences and Mate Selection

Age is a relatively neglected variable in mate preference research despite the direct conceptual links between age and central components of mate value and substantial evidence, from numerous sources, that age preferences translate into real-world behavior. Only a handful of psychological studies explore age as a mate preference variable directly (e.g., Buss, 1989; Buunk, Dijkstra, Ken-

rick, & Warntjes, 2001; Kenrick & Keefe, 1992) relative to the large literature on variables such as physical attractiveness (e.g., see Sugiyama, 2005, 2015, for reviews). Much evidence bearing on age predictions comes from data sources less traditionally used by psychologists, including demographic records, economic behavior, and historical data. To our knowledge, no previous article has attempted to broadly synthesize these diverse literatures.

Male Age Preferences and Age-Related Mating Behavior

Two distinct questions can be asked about the relations between age and mating in males: (a) Do men have ideal preferences for younger partners? (b) Do men actually act on these ideal preferences? We first review the evidence concerning men's ideal preferences for partner age. We next turn to reviewing a broad array of data sources bearing on whether men's ideal preferences affect their behavior in the mating domain and beyond.

Self-reported ideal age mate preferences. Several mate preferences studies establish the importance of youth in male mate preferences. One of the largest of these studies remains Buss (1989)—an examination of ideal long-term mate preferences in more than 10,000 participants across 37 cultures spread across five continents and six islands. This study examined the ideal age difference between self and a potential spouse. It found that men in all 37 cultures preferred partners who were younger themselves, with the average age preference being a wife 2.66 years younger than oneself—an effect size of $d = 1.94$ relative to women's preference. This preference ranged from a minimum of 1.22 years younger in Canada to a maximum of 7.35 years younger in Zambia. In a more recent replication, Grøntvedt and Kennair (2013) show in a sample from Norway, one of the most sexually egalitarian countries in the world, that men still prefer long-term and short-term mates younger than themselves. And a study of 44,253 online daters confirms that men prefer women younger than they are by about 3 years (Bingol & Basar, in press).

One alternative explanation for this finding is that men prefer younger partners, not because of age's link to fecundity and reproductive value, but because men desire a partner younger per

se, independent of their partner's actual age. Buunk et al. (2001) challenge this alternative explanation in a survey of a Dutch community sample. They found, like Buss (1989), that men consistently prefer long-term mates who are at most several years younger than themselves. That is, except for men in their twenties. These younger men were willing to accept partners who were up to 5 years *older* than themselves, with a maximal age in the mid-to-late twenties. This age preference corresponds exactly to the age window in which female fecundity is at peak and when reproductive value is still relatively high. This reversal in preferences is crucial evidence that male preference psychology is attuned to the effects of age on mate value— and not just relative partner age—because it shows that men do not merely prefer younger mates, but rather specifically prefer younger mates because they are probabilistically highest in reproductive value and fecundity. Even stronger evidence in favor of this conclusion comes from teenage boys, who are most attracted to women who are slightly older than themselves and thus near their reproductive value peaks (Kenrick, Keefe, Gabrielidis, & Cornelius, 1996). This attraction is not reciprocated by teenage girls and the age preference reverses as soon as men are themselves older than the age at which female reproductive value peaks.

Men's age preferences are stable across cultures but also across time within cultures. One study compared mate preferences within mainland China across two large samples separated by a quarter of a century (Chang, Wang, Shackelford, & Buss, 2011). Men in the 1983 sample expressed a preference for partners younger than themselves by 2.15 years; men in the 2008 sample desired partners 3.41 years younger. In both samples, men desired much younger partners compared with women: The effect size of this sex difference was $d = 2.61$ in 1983 and $d = 3.67$ in 2008. Consistency over time also emerged in two samples of mate preferences from India, taken in 1984 and 2009 (Kamble, Shackelford, Pham, & Buss, 2014). Indian men in 1984 desired partners 4.50 years younger than themselves whereas Indian men in 2009 desired partners 3.92 years younger. The effect sizes for sex differences in Indian age preferences were $d = 4.28$ and $d = 4.34$ for the two time periods, respectively. Similar cross-time stability of age preferences emerged in Brazil

(Souza, Conroy-Beam, & Buss, 2016). In 1984, Brazilian men preferred mates 3.22 years younger and Brazilian women 4.01 years older; 30 years later, in 2014, the preferences were 2.38 and 3.59, respectively, with *d* values of 2.30 and 1.07.

Personal mating ads by those seeking actual mates. Findings from these studies present evidence that men's ideal mates are youthful—at approximately the age where reproductive value peaks—but they are based entirely on self-report. Higher stakes data sources, in which actual mating outcomes are sought, offer an important complement to self-report data. Personal advertisements provide one such data source.

One study examined all personal advertisements published in a Brazilian newspaper over a 2-year period (de Sousa Campos, Otta, & de Oliveira Siqueira, 2002). Men of all age groups expressed preferences for partners who were at least several years younger than themselves—except, again, men in their twenties, who preferred mates who were at most slightly older than themselves. These Brazilian results closely replicate those of Kenrick and Keefe (1992), who analyzed 218 personal ads from an Arizona newspaper. They found that men desired potential mates who were younger than themselves and that this preference only strengthened with men's own age: by age 50, men were interested in partners who were 5 years their junior at the oldest. These men preferred mates 15 years younger than themselves at the youngest. Once again, however, only for young men in their twenties and early thirties was the maximum preferred age slightly older than their own age. Nearly identical results emerged in personal ads from Germany, the Netherlands, and India (Kenrick & Keefe, 1992).

Greenlees and McGrew (1994) found that men were more likely than women to state a desire for younger partners in a sample of 1,000 personal ads published in a British magazine but did not report the precise age difference preferred. A sample of 7,415 personal advertisements in a Spanish newspaper found the same: Men expressed preference for partners 5.7 years younger than themselves on average and this desire was stronger as men aged (Gil-Burmann, Pelaez, & Sanchez, 2002).

Finally, Pawlowski and Dunbar (1999a) took analysis of personal statements a step further by computing "market values" of each age group by dividing the number of ads requesting a given age group by the number of opposite sex advertisements offering that age group. Reflecting men's preferences, women's demand/supply ratio tracked reproductive value perfectly: women in their early twenties had the highest market value to men, which declined thereafter until approximately 40 years of age.

Age preference evidence from traditional cultures. Personal advertisements provide important converging evidence for a male preference for relative youth, but are limited in that advertisements are restricted exclusively to modern societies. It is possible that preference trends observed in advertisements alone may be artifacts of our modern, industrial societies rather an ancient, evolved preference for youth. For this reason, ethnographic evidence of preferences in traditional societies is invaluable. However, these studies are rare and infrequently assay preferences directly—instead, studies of traditional societies often focus on actual marriage behavior and thus will be covered in detail in the following section. Nonetheless, when Hadza hunter–gatherers of Tanzania were asked to list the traits they thought were important in a potential mate and men, but not women, expressed a preference for youth (Marlowe, 2004). Furthermore, men expressed a strong preference for fertility in a potential mate. When asked how they could determine the fertility of a potential mate, the Hadza adults replied that one could tell by looking at a person—presumably because the Hadza were using cues to age, among other cues, to determine the fertility and thereby desirability of potential mates.

Short-term versus long-term age mate preferences. Men's age preferences are predicted to differ slightly for potential short-term mates. Reproductive value is of more importance to long-term mating than it is to short-term mating whereas immediate fecundity is more important to short-term mating. Because reproductive value peaks slightly before fecundity, men should tend to prefer younger partners for long-term mates than they do for short-term mates. Buunk et al. (2001) provides mixed support for this prediction in a sample of 70 Dutch men. Men's minimum preferred age for a casual affair partner corresponds strongly to the peak of women's fecundity, with ages ranging from approximately 18 to 30 as men themselves age. Contrary to predictions, the minimum age for marriage partners is consistently higher than the

minimum age for casual affair partners. However, the maximum age for a potential marriage partner is consistently lower than that of a casual affair partner until men themselves are in their 50s. Unfortunately, Buunk et al. (2001) do not report data on *ideal* age for marriage or casual affair partners—the most direct test of this prediction.

A much larger study of 12,656 Finns found that across men's age, the ideal age for a sexual partner ranged from 20 up to a maximum of approximately 35 years of age for older men (Antfolk et al., 2015). This corresponds precisely to the window in which female fecundity is maximal but extends later than peak female reproductive value. While consistent with the predicted strategy-differentiated mate preferences, Antfolk et al. (2015) do not report data on desired age in long-term partners. Grøntvedt and Kennair (2013) found that men indeed desired short-term mates younger than themselves, but did not compare ideal short- and long-term mates. Thus, the extant research provides mixed support for this prediction and requires future studies that directly compare men's ideal age for short-term and long-term partners.

In sum, there is substantial evidence that men prefer to mate with young women, and that these preferences correspond to trends in female fecundity and reproductive value. These preferences emerge in self-report surveys across cultures as well as personal advertisements from Arizona to India. Marlowe (2004) shows that these trends are not merely western or modern artifacts but extend even to traditional societies. Finally, there is mixed evidence that preferences for age are differentiated as a function of mating strategy, with short-term mate preferences more closely tracking fecundity curves than reproductive value curves.

Do men act on their preferences for younger women?   A crucial goal of this article is to determine whether preferences guide actual behavior. The apparent importance of age as well as the ease with which it can be tracked and recorded mean there exist multiple data sources that can be exploited to test the hypothesis that men's preferences are translated into actual mating behavior. These data sources include population demographic data, public marriage records, crime reports, and indices of courtship behavior.

Marriage data.   An important advantage of studying the relations between age and mating behavior is that age is readily recorded in public documents across cultures and across time. A key source of data bearing on whether preferences for age manifest into actual mating behavior is therefore demographic data, particularly marriage documents. Across cultures, marriages are announced or recorded in public documents and the age of husbands and wives are commonly included in these reports. Moreover, the recordings of ages of brides and grooms are likely highly accurate, because they can and often are independently confirmed by other publicly recorded documents such as certificates of birth. If men do actually act on their desire for younger partners, these reports should show that husbands in fact tend to be older than their wives.

Otta et al. (1999) showed that men are indeed older than their wives in Brazil, where by legal mandate marriages had to be publicly announced in newspapers. They analyzed a sample of 3,000 newspaper announcements and found that men on average married partners younger than themselves—as young as 15 years younger for men over 50. The only exception occurred for men under 20 years of age, who married slightly older wives, corresponding closely to the preference reversal observed in young men. This age difference also appears in American marriage data (Guttentag & Secord, 1983). American men marry women who are, on average, 3 years younger at their first marriage, 5 years younger at second marriage; and 8 years younger at third marriage. A separate study in Albany found an age gap of 3 years between husbands and their first wives (Buckle, Gallup, & Rodd, 1996).

Kenrick and Keefe (1992) assembled contemporary marriage statistics from a single month in Seattle, WA and 2 months in Phoenix, AZ as well as a sample of marriages from Phoenix, AZ in 1923. In all three samples, men married women younger than themselves and this age gap increased with men's age, just as the desired gap increases with age. In the contemporary samples, the only age groups that married women older than themselves were again the teenaged men, corresponding to the findings for expressed preferences of this age group. Even prior to marriage, men in sexually egalitarian Norway select partners younger themselves on average and this age gap grows with men's own age (Grøntvedt and Kennair, 2013).

What about evidence from older samples? Schoen, Urton, Woodrow, and Baj (1985) examined American marriage data from cohorts born between 1888 and 1980. Across cohorts, men's average age at first marriage was 2.65 years older than women's and was still 1.9 years older in the cohorts with the smallest age gap. Across cohorts, the magnitude of this age difference was $d = 2.36$. Extending back further in time, Low (1991) analyzed marriage data from seven Swedish parishes between the years of 1824 and 1840. Low does not report age differences between spouses directly, but does find that men tended to marry first at a later age (27.5 years of age) than women (25.0 years of age). Men are older than their wives across a wide array of cultures as well. Husbands were older than their wives in one sample of marriage data from across 28 countries, ranging from Bangladesh, to Peru, to Yemen (Casterline, Williams, & McDonald, 1986). The median difference ranged from 2.5 years in the Philippines to 9.8 years in Mauritania.

Finally, Buss (1989) collected marriage statistics from 27 countries around the world. Men married women 2.99 years younger than them on average, ranging from a minimum average of 2.17 years younger than themselves in Ireland to a maximum average of 4.92 years younger in Greece. This actual age difference corresponded tightly to men's average preference for a partner 2.66 years younger than themselves. Indeed, actual age difference across countries correlated $r = .68$ with preferred age difference—a key finding that reveals a link between mate preferences and actual mating decisions.

Dating services: Personal advertisements, online dating, and speed dating. Personal advertisements provide not only an index of men's preferences but can also be used as evidence of their behavior. Many personal advertisement services not only post ads but also track the responses advertisements receive. If men actually act on their preferences for younger partners, women who advertise a younger age should receive more responses from men. de Sousa Campos et al. (2002) analyzed response rates in their sample of Brazilian personal ads. They found that women in the 20–29 age bracket received the most responses from men seeking mates: Nearly twice as many as women in the 30–39 bracket and five times as many responses as women in the 50+ age bracket. In Baize and Schroeder's (1995) random sample of 240 personal ads, response rate from men was negatively correlated with age, meaning that older women received fewer "hits" than younger women. Pawlowski and Koziel (2002) analyzed ads from 617 Polish women; they found sex and age offered interacted to predict hit rate, with age being a strong negative predictor of women's hit rate but not men's.

Although personal ads now typically take the form of online dating profiles, the impact of age preferences remains the same. Hitsch, Hortaçsu, and Ariely (2010) analyzed the browsing behavior of 22,000 users of an online dating site and attempted to predict a user's likelihood of sending an e-mail to a potential mate based on the potential mate's age. They found that men preferred women either their age or 5–9 years younger than themselves. Men additionally had a strong bias against women older than themselves. However, the authors did not find that older men had stronger preferences for youth.

Age preferences also appear to manifest in mate selections at speed dating events (Kurzban & Weeden, 2005). The number of "yeses" women receive in these events is negatively correlated with their age. The greater desirability of younger women at these events is made more impressive by the fact that speed dating events suffer a crucial statistical limitation: People preferentially attend speed dating events attended by potential mates that fulfill their age preferences (Kurzban & Weeden, 2007). Because men choose to attend speed dating events attended by younger women, there is limited variance in age within speed dating events for preferences to manifest. Nonetheless, even in this restricted age sample, men preferentially select younger partners.

Economic behavior. In few domains do stated mate preferences manifest into actual behavior more clearly than in economic conduct. Exchange of resources in pursuit of desires is a universal feature of both traditional and modern economies; economic behavior therefore makes an easily tracked and highly quantitative index of the translation of psychological preferences into manifest behavior. Do men's pattern of economic resource spending reflect their expressed preferences for mates in line with the predictions outlined?

A particularly informative economic assay of men's mating behavior is the money spent on premarriage customs. Many societies have traditions that require or make strongly normative that men spend large sums of money or resources in order to gain the permission to marry their desired bride. In modern, Western societies this ancient custom manifests in engagement ring purchasing. Men are expected to buy their brides-to-be expensive rings—worth at least 2 months' salary, according to some traditions and diamond companies—in order to even propose to their mates. One sample of 1,000 newlywed couples found that ring price was strongly negatively correlated with the age of the future bride; men purchased more expensive engagement rings for younger fiancées than for older fiancées (Cronk & Dunham, 2007).

This trend is not unique to Western cultures: The Kipsigis, a traditional society in Kenya, have a premarriage expenditure custom known as "bridewealth." Before marriage, Kipsigi men pay the families of their brides an unreciprocated bridewealth consisting of livestock and cash. By converting these bridewealths into their cash value, Borgerhoff Mulder and Turke (1988) found that brides who were older at the time of their marriage commanded lower bridewealth payments than did younger brides.

An unprecedented data set bearing on this issue came from a study of marriages in South Korea (Sohn, 2017). A subset of these marriages occurs through an unusual phenomenon—some men purchase brides from developing countries. Although the sample of South Korean men who married Korean women ($N = 1,088,457$) showed the usual age gap of several years, Korean men who purchase foreign brides ($N = 45,528$) married dramatically younger fertile women, regardless of men's ages, reaching two decades younger for the older cohorts of men. In a market where men can act on their preferences for young brides, they apparently act on those preferences.

Another data source comes from "sugar daddying," a trend wherein typically wealthy men pay large amounts of money for the company of women often with explicit sexual arrangements. Popular services like SeekingArrangement.com cater to this community by pairing "sugar babies" with sugar daddies in their area. According to SeekingArrangement, the average sugar daddy user is 39-years-old and spends an average of $4,357 per month on one or more sugar babies (Wade, 2013). If the sugar daddy/sugar baby terminology alone does not sufficiently reveal the age gap typical of sugar relationships, reportedly 44% of SeekingArrangement's sugar babies were female college students in 2012 (Waldron, 2013). SeekingArrangement actively recruits college student sugar babies through free premium memberships (Seeking Arrangement, 2015).

A qualitatively different form of economic evidence comes from prostitution. Whereas premarriage rituals and sugar babying simply track economic exchanges within ongoing relationships, prostitution provides a direct economic assay of mating behavior in that money is exchanged for sexual access. Arunachalam and Shah (2008) report earnings data from a sample of over 4,000 sex workers in Mexico and Ecuador. Although not discussed by the authors, their data show that the earnings of female sex workers precisely track the age trend of fecundity: Earnings are low until they peak in the early-to-midtwenties and gradually decline thereafter. That this trend is linked to fertility is further highlighted by the fact that this age-linked earning trend does not occur for female nonsex workers, whose income peaks in the late 40s (Arunachalam & Shah, 2008). Similar links between age and other cues to women's fertility have been found in a study of Polish prostitutes (Prokop, Dylewski, Wonza, & Tryjanowski, in press). A study of U.S. female "escorts," a common euphemism for sexual services, found that younger escorts charged higher fees than older escorts (Griffith, Capiola, Balotti, Hart, & Turner, 2016). The costs of sex are apparently higher for young escorts.

A separate sample of 248 Gambian sex workers provides convergent evidence (Pickering, Todd, Dunn, Pepin, & Wilkins, 1992). Gambian sex workers under the age of 25 charge the most per contract, slightly above women between 25 and 34 and over 60% more than women above 34. Interestingly, the number of contracts per day does not differ between the three age groups. This shows that younger women are not overvaluing themselves, because men are willing to pay their higher premiums. The equivalence of contact number across age also reveals key features of male short-term mating psychology: Men are willing to short-term mate with women regardless of their age, but value access to younger women enough to incur additional costs.

Finally, a recent study of 8,560 sex workers from 15 different cities in Indonesia revealed an age distribution of earnings that closely mimicked the human fertility curve (Sohn, 2016). Prices charged were highest for the age range of 16–24, but then dropped, hitting a low at age 40 (the oldest age in the sample considered). The highest charging sex workers were able to charge fully twice as much as those at the older end of the distribution. In sharp contrast, the wages earned by nonsex workers increased with age, peaking at precisely the age at which sex worker wages were lowest.

Relationship maintenance, marital dissolution, and mate retention effort. Diamonds and bridewealth may be forever, but the relationships they initiate often are not. Studying these dissolutions, and the maintenance behaviors that function to prevent them, can provide additional evidence bearing on the degree to which men's preferences for youth are translated into real-world behavior. Although we should not expect dissolution and maintenance to be a direct function of partner mate value (see Conroy-Beam, Goetz, & Buss, 2015), even indirect effects should be sufficient to make men try harder to retain relationships with younger partners. Betzig (1989) collected causes of marital dissolution reported by ethnographers or informants in ethnographic reports from 186 traditional societies around the world. Partner age was a moderately common cause of divorce: "Old age" was listed as a cause of divorce in eight separate cultures, slightly less than "bad temper" (10 cultures) and more than "jealousy" (six cultures). Importantly, however, across all ethnographic reports, old age of a spouse was a cause of divorce only for men.

The infrequency of old age as a cause of divorce may be in part because of the severity of divorce; the effects of age might be clearer on behaviors that are more common and less extreme. Indeed, men married to younger partners were more likely to engage in more frequent mating retention behaviors like "emotional manipulation, commitment manipulation, possessive ornamentation, intrasexual threats, and violence against rivals" (Buss & Shackelford, 1997, p. 353) in attempt to maintain their relationships with their partners. Men married to older partners devote less intense effort to mate retention, even controlling for length of relationship.

Crime data—sexual harassment and assault. Crime statistics provide a final source of evidence. One informative domain of criminal behavior is predictors of sexual harassment in the workplace. Given the high costs to the victims of workplace sexual harassment, broadly defined as unwanted sexual advances, as well as the potential retaliatory costs, harassment can serve as an extreme assay of men's mate preferences and their translation into behavior. Sexual harassment is disproportionately directed at younger women and drops off dramatically after 45 years of age (Studd & Gattiker, 1991). Particularly informative data come from Terpstra and Cook (1985), who found that women aged 20–29 filed 46% of reported sexual harassment complaints despite making up only 30% of the total female workforce. Conversely, women above 40 filed 12% of sexual harassment cases while making up 38% of the workforce.

An even more extreme criminal index comes from sexual assault statistics. Regardless of whether or not men have adaptations specifically designed to produce sexual assault (the evidence is not even close to sufficient to warrant the conclusion that they do; see Buss, 2015), the age distribution of victims of forced sex provides an informative, if unfortunate, data source. Ample evidence establishes that rape victims are disproportionately young (e.g., see Malamuth, Huppin, & Paul, 2005 for a review). Indeed, the age distribution of victims mirrors almost exactly fecundity curves for females (Thornhill & Thornhill, 1983). However, this age distribution could occur if younger women were more vulnerable to crime in general, rather than men specifically targeting desirable younger women for sexual assault.

A better assay of whether young women are targeted for sexual assault is the incidence of opportunistic sexual assault during robberies. These crimes naturally control for any age-linkages of victimization in general because the comparison group remains crime victims: If younger women were merely more likely to be victimized in general, the probability of sexual assault during robberies would be constant across age. However, if offenders acted on expressed preferences for young women, young women should be especially at risk of sexual assault in addition to broader victimization. The likelihood of an offender opportunistically assaulting a robbery victim does indeed track fe-

male fecundity: the risk of sexual assault during a robbery peaks in the early-to-midtwenties and drops to near zero for victims past their 40s (Felson & Cundiff, 2012). Thus, even in these extreme and abhorrent sexual assault crimes, men reveal a preference for youthful women.

Summary. In sum, in addition to powerful evidence that men *desire* mates who are youthful—younger than themselves and nearer their peak in fecundity and reproductive value—a wide array of very different data sources suggest that desires translate into actual mating behavior: (a) Men across cultures and across time marry women younger than themselves. (b) They preferentially seek younger women as indicated by responding more frequently to their personal mate-seeking advertisements. (c) Men spend more money on engagement rings for younger women. (d) In cultures with bride-price, such as Kenya, men pay larger sums to acquire younger wives. (e) Men seeking prostitutes are willing to pay more money to have sex with younger than older sex workers. (f) Men devote more effort to mate retention when married to younger compared with older wives. Sex crimes provide two additional data sources. (g) Younger women are disproportionately victims of sexual harassment in the workplace. And (h) robbers are more likely to opportunistically sexually assault younger women who happen to be present during the robbery (see Table 1). Together these eight very different data sources provide compelling evidence that men's age preferences for mates actually drive men's behavior.

Female Age Preferences and Age-Related Mating Behavior

We have reviewed evidence that men have preferences for youthful women and that they act on these preferences. Human mate choice, however, is usually mutual—each person must select and be selected by a mate. Thus, it is important to test the hypothesis that women also have theoretically expected age preferences. It is also important to examine whether women's age mate preferences translate into actual mating decisions. The evidence for these trends is less abundant in women than in men, but it is sufficient to draw firm conclusions.

Do women prefer to mate with older men? Data on stated mate preferences strongly sup-

ports the prediction that women desire somewhat older mates. Across all 37 cultures sampled in Buss (1989)'s cross-cultural survey, women's ideal long-term mate was on average 3.42 years older. In this study, the age preference ranged from a low of 1.82 years older in Canada to 5.1 years older in Iran. Dutch women similarly state a maximum age preference between 5 and 10 years older than themselves (Buunk et al., 2001). That Kenrick et al. (1996) found teenage boys prefer older mates was strong evidence that male preferences are linked to fecundity and reproductive value. However, the same study shows that these boys' preferences are not reciprocated: Women in their teenage years prefer somewhat older mates and this preference continues relatively unchanged throughout the life span (Kenrick et al., 1996). Norwegian women also express a preference for somewhat older long-term and short-term mates (Grøntvedt and Kennair, 2013).

Women's long-term age preferences show just as much within-culture stability as men's. In their samples of Chinese mate preferences, collected 25 years apart, Chang et al. (2011) found that women expressed a preference for partners 3.45 years older than themselves in 1983 and a preference for partners 4.15 years older in 2008. Indian women showed similar age preferences (Kamble et al., 2014). In 1984, Indian women expressed a preference for partners 4.19 years older than themselves; Indian women in 2009 preferred partners 3.33 years older than themselves. Brazilian women preferred to mate with men 4.01 years older in 1984 and 3.59 years older three decades later in 2014 (Souza et al., 2016). Combined, these cross-time studies spanning a quarter of a century and more support a high level of consistency in women's preferences for somewhat older long-term mates.

Women's short-term preferences conform to prediction as well. Because sperm quality, in the form of a larger number of mutations linked with offspring abnormalities, declines with age, the genetic benefits of short-term mating decline as a function of increasing male age. Women were therefore predicted to prefer slightly younger partners for short-term mating than they do for long-term mating. Antfolk et al. (2015) found that women of all ages were sexually interested in partners slightly older than themselves, approximately 7 years older at age

Table 1
Summary of Evidence That Men Act on Age Preferences

Evidence domain	Method	Finding	Citations
Mate preferences	Questionnaire	Men across cultures report a desire for younger long-term partners.	Buss, 1989; Buunk, Dijkstra, Kenrick, & Warntjes, 2001; Kenrick, Keefe, Gabrielidis, & Cornelius, 1996; Grøntvedt & Kennair, 2013
		Men prefer younger long-term partners across generations within cultures.	Chang, Wang, Shackelford, & Buss, 2011; Kamble, Shackelford, Pham, & Buss, 2014
		Teenage men prefer long-term partners slightly older than themselves.	Buunk et al., 2001; Kenrick, Keefe, Gabrielidis, & Cornelius, 1996
		Men prefer younger short-term mates than long-term mates.	Mixed: Buunk et al., 2001; Antfolk et al., 2015
	Dating services	Men advertise a desire for younger long-term partners.	de Sousa Campos, Otta, & de Oliveira Siqueira, 2002; Kenrick & Keefe, 1992; Greenlees & McGrew, 1994; Gil-Burmann, Peláez, & Sanchez, 2002; Pawlowski & Dunbar, 1999a; Phua, Sosa, & Aloisi, 2017).
		Teenage males advertise a desire for slightly older partners.	de Sousa Campos, Otta, & di Oliveira Siqueira, 2002; Kenrick & Keefe, 1992
	Traditional cultures	Men, but not women express a preference for youth in potential mates.	Marlowe, 2004
Mating behavior	Marriage data	Men's long-term and marriage partners are younger than themselves.	Otta, da Silva Queiroz, de Sousa Campos, Weronika Dowbor da Silva, & Silveira, 1999; Guttentag & Secord, 1983; Buckle, Gallup, & Rodd, 1996; Kenrick & Keefe, 1992; Grøntvedt & Kennair, 2013
		Men have married younger partners across time.	Schoen, Urton, Woodrow, & Baj, 1985; Low, 1991
		Men marry younger partners across cultures.	Casterline, Williams, & McDonald, 1986; Buss, 1989
	Dating services	Younger women receive more responses from men.	de Sousa Campos, Otta, & di Oliveira Siqueira, 2002; Baize & Schroeder, 1995; Pawlowski & Koziel, 2002
		Men preferentially contact younger women on online dating sites	Hitsch, Hortaçsu, & Ariely, 2010
		Men preferentially attend speed dating events with younger women. Men additionally select younger partners within these events.	Kurzban & Weeden, 2005; Kurzban & Weeden, 2007
	Economic behavior	Men spend more resources on pre-engagement traditions (e.g. engagement rings, bridewealths) for younger wives.	Cronk & Dunham, 2007; Borgerhoff Mulder & Turke, 1988
		Men pay more for sex with younger prostitutes.	Arunachalam & Shah, 2008; Pickering, Todd, Dunn, Pepin, & Wilkins, 1992; Griffith, Capiola, Balotti, Hart, & Turner, 2016
		Men pay for relationships with predominantly younger "sugar babies."	Wade, 2013; Waldron, 2013

(*table continues*)

Table 1 (*continued*)

Evidence domain	Method	Finding	Citations
	Relationship maintenance	Men, but not women, list "old age" as a cause of divorce across traditional cultures.	Betzig, 1989
		Men engage in more mate retention behaviors for younger partners.	Buss & Shackelford, 1997
	Crime data	Men are more likely to sexually harass younger women.	Studd & Gattiker, 1991; Terpstra & Cook, 1985
		Younger women are more often sexually assaulted, even controlling for victimization in general.	Malamuth, Huppin, & Paul, 2005; Felson & Cundiff, 2012

20, but that the desired age gap declined as women approached 40. Buunk et al. (2001) provides even clearer evidence in favor of this prediction: With the exception of the maximum desires of females in their twenties, in both minimum and maximum age desired, women preferred their casual affair and sexual fantasy partners be *younger* than their marriage partners, as predicted.

Studies of personal advertisements for mates provides strong convergent evidence that women prefer to mate with somewhat older men. Women who commission Brazilian personal ads request partners at a minimum their age or slightly older and at most more than 10 years older than themselves (de Sousa Campos et al., 2002). Kenrick and Keefe (1992) found that women were willing to accept a partner slightly younger than themselves at the youngest, but across all age groups preferred a partner 10 years older than themselves at the oldest. Precisely the same trend was found in German and Dutch personal advertisements. This trend was even more extreme in Indian advertisements, where the youngest acceptable age difference was zero across the life span. In contrast to men, who more often seek younger partners, Greenlees and McGrew (1994) found that women were more likely to ask for older partners. Spanish women of all age groups express in their personal advertisements a preference for older men with an average preferred age difference of 4 years (Gil-Burmann et al., 2002). In Polish personal advertisements, women of all ages express a preference for partners older than themselves—though the magnitude of the age difference shrinks as women themselves age

(Pawlowski, 2000). This is the reverse of men's preferences in the same sample: Men prefer younger partners at all ages, with the gap preferred growing wider as men age. Finally, Pawlowski and Dunbar (1999a)'s market value index, derived by dividing the proportion of advertisements asking for mates of a given age by the number of advertisements offering that age, showed that men in their late thirties were of the highest market value. In sum, across cultures, methods, time periods, and age, women express a clear preference for long-term partners older than themselves and near their peaks in resource productivity.

Do women act on their preferences for somewhat older men? Several sources of evidence can be used to examine this question.

Marriage data. In addition to showing that men tend to marry partners younger than themselves, Otta et al. (1999) found that women tended to marry husbands slightly older than themselves. This trend started with a 5-year age gap for women below 20, but gradually dwindled to an age gap of zero when women were above 50. By necessity, that American husbands are 3 years older than their wives also indicates that wives are succeeding in acquiring the older men they desire (Guttentag & Secord, 1983). This same rationale applies to 20th century American marriages (Schoen et al., 1985) and 19th century Swedish marriages (Low, 1991): Women are on average approximately 2 to 3 years younger than their husbands at their first marriage. Grøntvedt and Kennair (2013) found that women's long-term partners, who may or may not be married, were indeed older than the women themselves for all age groups.
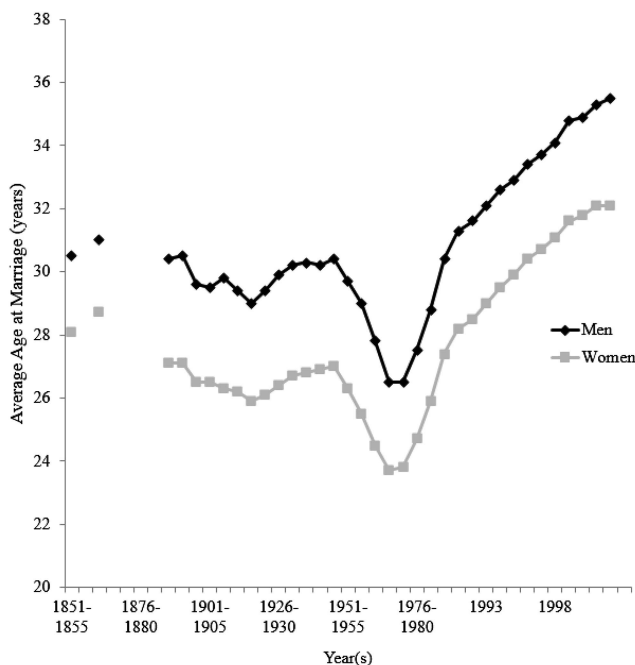
Figure 3. Average age at marriage in Norway from 1851–2002 from Norwegian census data (Statistics Norway, 2015). Men are consistently older than their partners across all time periods. Note that data from before 1991 is binned into groups of five years and that the age axis begins at 20 years of age.

This accords with Norwegian census data (see Figure 3). From 1851 to 2002, Norwegian marriage data shows a consistent age gap between spouses whereby women marry men 2.74 years their senior on average (Statistics Norway, 2015). This gap between spouses persists across time despite changes in marriage age overall as well as quite radical social and political changes within Norway over this period. These include two world wars, an energy-driven economic boom, and women's suffrage as part of a period of increasing political progressiveness and gender egalitarianism.

Kenrick and Keefe's (1992) marriage statistics showed, for both the 1923 sample and the two more contemporary samples, that women on average married men older than themselves. As with their stated preferences, at no age did women on average marry partners younger than themselves. Women in New York marry men 2.7 years older than themselves on average (Buckle et al., 1996). Across the 28 countries sampled in Casterline et al. (1986), the median age difference between spouses was 5.44 years,

with husbands older than wives. The 2.99 year average age difference between spouses found in Buss (1989) corresponds well to women's preference that their partners be 3.42 years older than themselves. In fact, the average difference preferred by men and women was the wife 3.04 years younger than her husband, suggesting actual marriage age may represent a compromise between men and women's desires.

Spousal age differences conform to predictions across time within cultures as well. In 1982, women in China were 2.8 years younger than their husbands; Chinese husbands were still 2.15 years older than wives in 2008 (Chang et al., 2011). Indian women in 1982 were 4.70 years younger on average than their husbands; in 2011, this age difference was 3.80 years (Kamble et al., 2014).

Sex differences in marriage age are present across cultures, but variability in marriage age across cultures reveals important features of age preference psychology. Recall that the trend in men's mate value across age is expected to vary across cultures more than the same trend for

women. This is because the desirability of men's age is linked to age trends in resources productivity, which can vary widely across cultures; the desirability of women's age is linked to more cross-culturally stable age trends in fecundity and reproductive value. Consistent with this prediction, variability in husband marriage age across cultures dwarfs variability in wife marriage age: Across countries, the average variance in husband's age at marriage is 47.54 whereas the average variance in wife's age is just 16.13 (Casterline et al., 1986). Moreover, age differences within cultures are overwhelmingly determined by variability in husband's age. This shows that men consistently prefer to marry younger women, nearer their peak in reproductive value, across cultures. However, women's age preference psychology appears to be more sensitive to cultural context.

Unfortunately, Casterline, Williams, and McDonald (1986) did not compare men's marriage age with the age at which men's income peaks. This leaves open a potential alternative explanation for these findings: Cultures with larger age gaps may be cultures in which people simply marry later. We know that the age gap preferred by men increases as men themselves age (e.g., Kenrick & Keefe, 1992). Cultures in which people marry later on average may simply show a larger age gap between spouses because older men are acting on their more extreme mate preferences, and not necessarily because male income peaks later in these cultures. A critical test that could distinguish these alternative hypotheses thus remains for future research: If variability in men's marriage age is driven by cross-cultural variability in men's income trajectory, cross-cultural variation in husband age should be predictable by cultural variation in age at peak income.

Dating services. Women as well as men behaviorally reveal their mate preferences through their responses to personal advertisements. While the response rate experienced by women declines dramatically with age in Brazilian personal advertisements, the response rate experienced by men begins low in the 20–29 bracket and increases dramatically, ultimately peaking for men older than 50 (de Sousa Campos et al., 2002). In fact, the personal ads of men over 50 receive over four times as many responses as ads from women of the same age and as ads from men below 30. Unfortunately, de

Sousa Campos et al. (2002) do not report the age of responders, but do report that over 75% of female advertisers fell between the ages of 30 to 49—younger than the 50+ year old men who received the most responses and older than the relatively ignored men in their thirties. Two separate studies provide convergent findings. Age was positively correlated with the response rate to men's personal advertisement in one sample of personal advertisements (Baize & Schroeder, 1995). In a sample of Polish personal ads, age was the second strongest predictor of the response rate experienced by men (Pawlowski & Koziel's, 2002). Education was the only stronger predictor—another indicator of resource earning potential.

Women using online dating services also act in accordance with consensual preferences (Hitsch et al., 2010). Women's initial contact behaviors show a preference for men who are their age or slightly older. Women also show some aversion to younger men. Finally, in speed dating, women are curiously less likely to "yes" to older potential mates (Kurzban & Weeden, 2005). However, this apparent reversal is complicated by the fact that women preferentially attend speed dating events attended by older men (Kurzban & Weeden, 2007). In speed dating, women thus appear to seek out pools of older potential mates, but select younger partners within those pools of older men.

Summary. In sum, data concerning women's mate preferences and their translation into behavior are less available for, and overlap heavily with, data available for men. Nonetheless, the available data strongly support the same conclusion: women have preferences for age in potential mates and they act on them. Table 2 reviews these data sources. Women across cultures self-report a desire for long-term partners older than themselves and in no culture, modern or traditional, do women express a desire for youthful long-term partners. Age preferences are common even in nontraditional mating markets, like mail-order marriages. These preferences emerge in women's personal advertisements across cultures where women both request older partners and preferentially respond to ads of older men. Finally, women's preferences for age manifest in marriage records across generations, wherein women consistently marry partners older than themselves. These multiple streams of evidence converge on one

Table 2
Summary of Evidence That Women Act on Age Preferences

Evidence domain	Method	Finding	Citation
Mate preferences	Questionnaire	Women report a desire for somewhat older long-term partners.	Buss, 1989; Buunk et al., 2001; Kenrick, Keefe, Gabrielidis, & Cornelius, 1996; Grøntvedt & Kennair, 2013
		Women prefer somewhat older long-term partners across generations within cultures.	Chang et al., 2011; Kamble et al., 2014
		Women prefer younger short-term mates than long-term mates.	Mixed: Buunk et al., 2001; Antfolk et al., 2015
	Personal advertisements	Women advertise a desire for somewhat older long-term partners.	de Sousa Campos, Otta, & di Oliveira Siqueira, 2002; Kenrick & Keefe, 1992; Greenlees & McGrew, 1994; Gil-Burmann, Palaez, & Sanchez, 2002; Pawlowski & Dunbar, 1999a
Mating behavior	Marriage data	Women's long-term and marriage partners are somewhat older than themselves.	Otta et al., 1999; Guttentag & Secord, 1983; Grøntvedt & Kennair, 2013; Buckle, Gallup, & Rodd, 1996
		Women have married somewhat older partners across time.	Schoen et al., 1985; Low, 1991; Statistics Norway, 2015; Kenrick & Keefe, 1992
		Women marry older partners across cultures.	Casterline et al., 1986; Buss, 1989
	Dating services	Older male advertisers receive more responses from women.	de Sousa Campos, Otta, & di Oliveira Siqueira, 2002; Baize & Schroeder, 1995; Pawlowski & Koziel, 2002
		Women using online dating sites prefer same-age or slightly older men	Hitsch et al., 2010
		Women preferentially attend speed dating events with older potential mates	Kurzban & Weeden, 2007

strong conclusion: Mate preferences for age drive human mating behavior.

Competition for Mates: Who Is Able to Implement Age Preferences in Actual Mating Outcomes?

The findings discussed so far have concerned one process of sexual selection: intersexual selection, or preferential mate choice. Successful mating also requires another hurdle—competing with those who share similar desires. A key component of this causal process involves embodying, or seeming to embody, the desires of potential mates more completely than competitors. Mate competition imposes a key constraint on a direct or one-to-one translation of desires into actual mating outcomes. Some individuals lack the qualities necessary to be competitive on the mating market; those low in mate value encounter formidable difficulties in fulfilling

their preferences in actual mate selection. For instance, if adolescent males are less desirable to the targets of their desires—highly fertile women a few years older than they are—these men will encounter tremendous difficulty attracting those partners. Thus, if mate preferences for age do manifest in actual mating behavior, in addition to the on-average tendency for people to pursue and wed partners who match their preferences, we should be able to observe principled individual differences. Men and women high in mate value should be more successful in translating their age preferences into age selections.

Remarriage. Remarriage data provides an excellent source of evidence for testing the hypothesis that competitiveness on the mating market, particularly in terms of mate value, acts as a critical moderator of the ability to translate mate preference into mate selection outcomes.

Partners who divorce are necessarily older at the time of their divorce than they were at their marriage. Consider a woman, age 26 who marries a man age 28—the current average age of first marriage in the U.S.—who are perfectly matched on mate value at the time of marriage, but who divorce a decade later. Considering just the average age curves for fecundity and resources, the now 36-year-old woman will have dropped in mate value while the now 38-year-old man will have increased in mate value. This makes divorced men higher in mate value, on average, when they reenter the marriage market, and divorced women lower in mate value. If men and women act on their preferences for age, this dynamic should make ex-husbands fare better on the mating market than their ex-wives: Men should have an easier time remarrying than do women and should more successfully attract partners who better match their age preferences.

Kuzel and Krishnan (1973) analyzed census data on Canadian remarriages from 1961–1966. They found that whether divorced or widowed, men of all ages were more likely to remarry by age 80 than were women. For widowed remarriers, the gap in remarriage probability widened particularly around age 40, as fecundity and reproductive value begin to decline for women faster than men: Widowed men in their thirties have a .98 probability of remarrying relative to women's probability of .71. This relative probability, whereby men are 38% more likely to remarry than women, spikes to a relative probability of 97% as men and women enter their 40s. Men were not only more likely to remarry than women, but also remarried faster. Men remarried 7.66 years faster across age groups for divorced people and 8.21 years faster for widowed people.

American data from across the 20th century shows similar trends (Schoen et al., 1985). Across all cohorts in this study, divorced men were on average 7% more likely to ever remarry than divorced women. Particularly striking, widowed men were 167% more likely to remarry than widowed women, although this effect is undoubtedly partly due to the sex ratio imbalance among much older samples. This trend occurs across cultures as well (Chamie & Nsuly, 1981). Although remarriage behavior varies across cultures in response to many factors—laws, religion, tradition—in each of 47 cultures, from every inhabited continent,

widowed and divorced men remarry at a higher rate than women, ranging from an approximate low of 12% relative probability for divorced men in New Zealand to a high of 889% in Egypt.

Where data are available, these sex differences are amplified with age despite an overall decline in remarriage rate with age. For instance, for 25- to 29 year-old widows and widowers in Egypt, men remarry more than women by a factor of 2.72; for widows and widowers between ages 50–54, men remarry at a higher rate by a factor of 49.5. Even in the group with the smallest change across age, divorced Swedes, men's remarrying rate changes from being greater by a factor of 1.03 between ages 25–29 to being greater by a factor of 1.67 between ages 50–54. The CDC's Monthly Vital Statistics Report (1995) corroborates this sex difference in U.S. remarriage rates from 1980 and 1990, the last years for which statistics are available. As Figure 4 shows, men and women start with relatively similar remarriage rate early in life, but men's remarriage relative to women's climbs with age as men increasingly remarry more than do women.

Remarriage probabilities clearly indicate that divorced or widowed men are more likely to remarry than their female counterparts—a trend that becomes increasingly pronounced with increasing age. This trend is precisely predicted because men's now-increased age increases their mate value whereas women's increased age decreases their mate value. However, other factors could drive this sex difference in remarriage as well: For instance, women may have a more difficult time remarrying if they are more often the primary caregivers after divorce. The presence of stepchildren is a strong predictor of marital and family conflict (Daly & Wilson, 1996) and likely makes the initiation of new marriages more challenging. Additionally, the same trends could occur if men were merely relaxing their standards for remarriage. Within-sex remarriage comparisons are therefore a crucial supplementary data source: Men should be more likely to remarry than women and remarrying men should acquire partners who fulfill their preferences more than do their younger competitors. Women, on the other hand, should have more difficulty fulfilling their mate preferences: those women who do remarry should tend to acquire partners further from their preferences than do younger women.
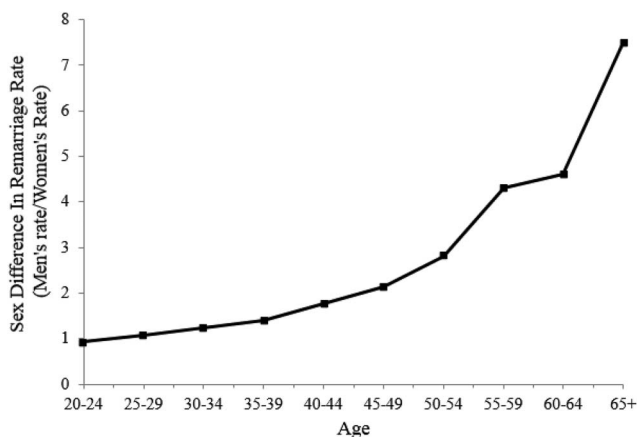
Figure 4. Sex difference in remarriage rate (men's rate/women's rate) as a function of age. Based on U.S. demographic data for 1989 and 1990. Men become increasingly more likely to remarry than women with increasing age.

Consistent with these predictions, for American men the average age gap within first marriage is just 3 years; this gap increases to 5 years within second marriages and 8 years within third marriages (Guttentag & Secord, 1983). A separate study found that men averaged remarriage partners 6 years younger than themselves whereas their first wives were just 1.5 years younger on average (Buckle et al., 1996). If older men are marrying increasingly younger women as they divorce and remarry, this implies that older women are not securing the men they desire. Interestingly, the same study found that women did not change their age gap upon remarriage and were therefore acquiring partners of slightly higher mate value than their first partners, though not to the same extent as were their exhusbands (Buckle et al., 1996). Fieder and Huber (2007) analyzed marriage data from over 10,000 Swedish men and women and found that men's first partners were 1.74 years their junior relative to an age gap of 6.10 years for second partners. Women's age gap, in contrast, decreased, with women selecting mates 3.18 years their senior for first partners but settling for an age gap of just 0.90 years for second partners. This trend is not novel: 19th century Swedish men married women 0.45 years older than themselves for a first marriage but then acquired partners 10.6 years younger than themselves for second marriages (Low, 1991).

Men, on average, fare better on the remarriage market than do women—a trend that increases with increasing age. Men are more likely to remarry than women after divorce or widowing and this difference persists across countries and across time. Men are also more likely than their exwives to acquire partners who better match their mate preferences both absolutely and relative to their first partners. These sex differences occur because remarrying men are able to leverage their increased age, presumably tracking their on-average increased resource holding potential, into higher mate value and better mate choices. Women's increased age lowers their overall mate value as a function of decreased fecundity and reproductive value, forcing them to compromise. Coupled with findings indicating that men and women each prefer and pursue partners younger and older than themselves, respectively, remarriage data provides evidence that age preferences are robustly manifested in mating behavior—a translation of preferences into actual matings that is moderated by mate value.

Mate value. Personal age affects the extent to which men and women are able to satisfy their preferences for age because age is an important component of mate value. But age, of course, is not the only component of mate value. If high mate value people are better able to translate their preferences for age into actual mate selections, determinants of mate value in general should predict partner age alongside personal age. Status and resources are relatively important components of male mate value (Buss, 1989; Kenrick et al., 1990; Symons,

1979), so men possessing these qualities should be more able than men lacking these qualities to implement their mate preferences in actual mating outcomes. Among 19th century Swedish men, age of wife was a near direct function of the man's resources, with the youngest wives on average (24.5 years) going to upper-class men who had the most land or largest businesses and progressively older wives going to men of lower classes: 25.0 years, 25.7 years, 26.9 years, and 25.5 years, respectively, for descending resource classes (Low, 1991).

These mate value effects can be so strong that traditional societies like the Tiwi of Australia can at first appear to flout the broader trends of age preferences. Among the Tiwi, young men marry the oldest women, in contrast to their predicted preference for youthful brides. However, this occurs only because the older, highest status men marry the youngest women before younger men get the chance. For Tiwi men under 30, marrying older women is a political strategy: By marrying these women, young men get the political clout and connections they need for the opportunity to marry younger women later in life (Hart, Pilling, & Goodale, 1960; Kenrick, Nieuweboer, & Buunk, 2010).

Another interesting source of evidence comes from studies of kings and other men of exceptionally high status or power. Theoretically, we expect these men to be in the best position to translate their mate preferences into actual mate selections. In the 1700s and 1800s, wealthier men from the Kummerhorn population of Germany married younger brides than did men lacking wealth (Voland & Engel, 1990). Historical studies of kings and despots found that they routinely stocked their harems with young, attractive, nubile women (Betzig, 1992). The Moroccan emperor Moulay Ismail, for example, reportedly sired some 888 children with roughly 500 women. When a woman in his harem reached the age of 30, she was moved out of the emperor's harem and into a lower-level leader's harem, and then replaced with a younger woman. Roman, Babylonian, Egyptian, Incan, Indian, and Chinese emperors all apparently shared the preferences of Emperor Ismail and enjoined their trustees to scour their lands for as many pretty young woman as could be found (Betzig, 1992).

A subtler prediction concerns the relationship between age and mate preferences. People who embody the age preferences of the opposite sex have more bargaining power on the mating market and therefore are able to get away with setting higher standards. Theory therefore predicts that these individuals—younger women and older men—would have more stringent mate preferences in general. Munro, Flood, McKellar, and Reudink (2014) analyzed preferences sought as a function of age in a sample of 1,275 female personal advertisements from cities across Canada. They found that younger women placed more emphasis on the resources of potential mates in their ads. In a separate study, women of the highest market value, those closest to peak fecundity and reproductive value, demand the largest number of traits in their personal advertisements (Pawlowski & Dunbar, 1999a). High market value men also demanded more traits in their advertisements with the exception of a single outlier.

Deception about age in the mating market. If age is an important factor in actual mate selection, we should expect to observe some degree of deception about age in mate competition. Those able to obscure true age would have been able to deceive their way into better mateships, either by concealing an undesirable age or by faking a more desirable age. Make-up products like concealer, explicitly designed and advertised to mask age, hint at the existence of age-deceptive adaptations. Personal advertisement data provides some empirical support. Women are more likely than men to withhold their age in their personal ads (Greenlees & McGrew, 1994). Given that the average age of the advertisers who did report an age was 35, approximately the age at which women's age-linked mate value begins to decline, this implies that women are masking their true age to avoid the accompanying decline in response rates. Pawlowski and Dunbar (1999b) found that women, but not men, who did not state their age in their personal advertisements were more demanding in their mate preferences. They also used linear regression of age sought as a function of stated age to estimate the age of the withholding women. This regression yielded a predicted age of 41 years old, the age at which women's response rates are declining. Women omitting age information therefore seem to be concealing their older age in attempt to attract partners, or to widen the potential pool of potential mates who might otherwise not respond.

Summary. Separately from the mate preferences and mate selection behavior of each sex, convergent evidence across very different data sources all point to the conclusion that men's and women's mate competition in actual mating markets is directly affected by age (see Table 3). Men are more successful on the marriage market as they age, on average, and are more likely to acquire partners that satisfy their mate preferences; women remarry less as they age and increasingly settle for partners younger than their ideal. Higher mate value men, as indicated by status and resources, are better able translate their preferences for youthful women into mate selection behavior. Younger women, on the other hand, demand higher mate value partners. Moreover, older women are more likely than younger women to conceal their age. Mate preferences for age, in short, appear to drive not only men's and women's mate choice behavior, but also drive tactics of mate competition, mate attraction, and deception of the opposite sex.

Conclusions

Cogent theoretical rationales and abundant empirical evidence converge on the conclusion that age is an exceptionally important variable in human mating. Age lies at the heart of two sets of variables crucial to mate value—fecundity and reproductive value in women, and status and resource earning potential in men. There are powerful theoretical reasons for predicting that both age-linked variables will be, and have been, central to human reproduction over human evolutionary history, and hence central to evolved mating psychology.

The first—reproductive capacity—accrues its theoretical importance from the straightforward fact that all living humans are descendants of a long and literally unbroken line of ancestors, each of whom chose mates with qualities correlated with reproductive capacity. If our ancestors failed to do so, they would have failed to reproduce and failed to leave descendants. Consequently, in addition to managing to survive to reproductive age, choosing a mate capable of reproduction historically has been possibly the most important decision an individual could make. As descendants of this unbroken chain of ancestors, modern humans carry with them the mating psychology that led to their ancestor's reproductive success. Because age is the most important available predictor of reproductive capacity for women, it follows that age and cues to age should figure prominently in men's mate preference psychology.

Age is also a key predictor of men's status and resources, albeit a predictor with greater variance than the corresponding age-reproductive capacity link for women. In no culture do adolescent men experience, on average, the highest status or secure the most resources. Studies of the links between age and hunting abilities in hunter-gatherer societies and between age and resource-acquisition in more modern societies, all point to the conclusion that age is a strong correlate of male resource acquisition. An important conceptual caveat is that

Table 3
Summary of Evidence of Intrasexual Competition Over Age Preferences

Evidence domain	Finding	Citation
Remarriage	Men are more likely to remarry than women.	Kuzel & Krishnan, 1973; Schoen et al., 1985; Chamie & Nsuly, 1981
	The sex difference in remarriage rates increases with age.	Kuzel & Krishnan, 1973; Chamie & Nsuly, 1981; CDC Monthly Vital Statistics Report, 1995
	Men, but not women, increasingly satisfy their age preferences with remarriage.	Guttentag & Secord, 1983; Buckle, Gallup, & Rodd, 1996; Fieder & Huber, 2007; Low, 1991
Mate value	High status men marry younger mates than low-status men.	Low, 1991; Hart, Pilling, & Goodale, 1960; Kenrick, Nieuweboer, & Buunk, 2010; Voland & Engel, 1990; Betzig, 1989
	Younger women and older men have more demanding mate preferences.	Munro, Flood, McKellar, & Reudink, 2014; Pawlowski & Dunbar, 1999a
	Older women are more likely to conceal their age.	Greenlees & McGrew, 1994; Pawlowski & Dunbar, 1999b

with increasing age, men experience considerable variance in resource acquisition. Unlike female reproductive capacity, which shows a tighter linkage with age, age is a good but nonetheless weaker predictor of male resource acquisition. This leads to the more refined predictions that among same-age men, those who have access to more abundant resources should be better able to fulfill their desires for younger women—a specific prediction supported by empirical evidence spanning cultures and centuries. Over evolutionary history, women who chose mates who were both able and willing to channel resources to themselves and their offspring would have out-reproduced women to were indifferent to these key qualities.

In addition to these clear conceptual expectations, age is also one of the most empirically tractable dimensions of mate choice. It is universally tracked and recorded, often in public documentation, which itself reveals its importance in human affairs. Being a single and objective numerical value, the recording and measurement of age is exceptionally reliable. Because mate preferences for age and its correlates could not have evolved if they did not influence actual mating behavior, it is critical to determine whether, and under which conditions, these mate preferences govern a suite of mating-related outcomes. These include perceptions of attractiveness, actual short-term mate seeking, differential responsiveness to mating opportunities, choices of marriage partners, and patterns of remarriage following divorce. They should also include tests of the hypothesis that those high in mate value are most able to translate their mate preferences into actual mating outcomes. Finally, they should include important classes of mating behavior derived from the second major component of sexual selection, patterns of mate competition. Exploring these large and numerous bodies of findings answers several key questions about age and its relationship to human mating.

Does Age Manifest in Human Expressed Preferences?

Yes. Based on the empirical literature reviewed in this article, using multiple studies, multiple methods, multiple cultures, and multiple time periods, expressed age preferences in a mate by men confirm the central hypothesis—they closely track reproductive capacity in females. Also based on the voluminous literature reviewed, age preferences in a mate expressed by women, to a clear but somewhat lesser degree, confirm the prediction that they track this key correlate of status and resources.

Do Sex Differences in Age Preferences Show Large and Replicable Effect Sizes?

Yes. The sex differences in age preferences are among the largest and most robust findings in cross-cultural studies of mate preferences. While the typical effect size in psychology hovers around a d of 0.20–0.30 (Funder & Ozer, 1983), sex differences in age mate preferences are often in the neighborhood of $d = 2.00$, dramatically greater than typical psychological effects. This effect size, secured through multiple methods, large samples, and multiple cultures, places sex differences in age mate preferences as among the largest psychological sex differences ever demonstrated in the history of psychology. And in an era in which many psychological findings have proven unreplicable, what some call a replication crisis in psychology, these age mate preferences are among the most replicable psychological findings ever documented.

Do Age Mate Preferences Influence Actual Mating Behavior?

Yes. Mate preferences could not evolve unless they influenced actual mating behavior, from mates sought, mates courted, mates selected, mates retained, and even mates divorced. For cogent conceptual reasons, mate preferences cannot be translated invariantly into actual mating behavior. Most centrally, a person's mate value limits the pool of potentially accessible mates. And unlike food selection, mate selection typically requires reciprocity—a chosen mate must choose in return. Given these clearly specified constraints of mating market dynamics, the findings from marriage data, remarriage data, personal ad response rates, financial decisions, relationship maintenance, preference standards, mail-order bride preferences, deception, sexual harassment, and sexual assault rates support a singular conclusion: When it comes to age, mate preferences exert a powerful influence on actual mating behavior.

Broader Implications of Age in Human Mating

These conclusions have important implications for several disciplines, ranging from evolutionary biology to psychology to economics.

Implications for sexual selection theory applied to humans. Consider first the implications for evolutionary biology. Sexual selection theory, composed of the component processes of preferential mate selection and intrasexual competition, has long been the central theoretical framework for understanding mating in sexually reproducing species (Andersson, 1994). Evolved mate preferences that influence actual mating behavior have been documented in thousands of sexually reproducing species, from common fruit flies to Mormon crickets to mammals and primates (e.g., Alcock, 2013; Arnqvist & Rowe, 2005; Thornhill & Alcock, 1983). The current article documents decisively that sexual selection theory provides a fundamental framework for understanding human mating psychology (Buss, 1995). This conclusion contravenes views that humans have somehow been exempt from the processes of sexual selection. It places our species squarely within the broader context of all sexually reproducing species.

Implications for debates about whether mate preferences influence actual mating behavior. The current conclusions also have important implications for several debates within psychology. One debate concerns whether mate preferences influence actual mating behavior, or whether they are inconsequential beyond people's beliefs of what they desire. The current findings strongly support the first position—that age mate preferences profoundly influence actual mating behavior. This mating behavior ranges widely from actual responses in online dating sites to brideprice paid, engagement rings purchased, actual age differences between brides and grooms, causes of divorces, and remarriage probabilities after divorce. We suggest that few if any other psychological proclivities have real-world behavioral consequences as broadly and powerfully empirically documented as age mate preferences.

Implications for mating and human affairs. The current findings also demonstrate the profound importance of human mating to psychology and human affairs. Our ideal mate preferences do not merely dictate who we want, but extend to and pervade our lives. Age mate preferences affect who we marry and with whom we spend our lives and raise our children. Competition for and pursuit of mates guides how we spend our money, funding billion-dollar industries in areas like dating services and cosmetics. Disturbingly, our mating ideals even appear capable of compelling some to commit life-altering crimes that impair women's safety and well-being. The choice of a mate is one of the most critical decisions a sexually reproducing organism can make. Mate preferences are consequently much more than idle fantasies; preferences are potent motivations that shape our world.

In sum, the findings reviewed here weigh heavily on theories of human mating and furnish researchers several important opportunities and insights. The role of age in human mating, in short, has profound implications for multiple disciplines—placing humans within the biological context of other sexually reproducing species; shedding light on important debates within the field of psychology; and revealing the many ways in which mating influences human behavior across domains. Our review of the literature on age preferences provides a cogent conceptual framework for further understanding the impacts of age preferences on human mating behavior and a solid, extensive body of supporting empirical findings, hallmark characteristics of mature and growing science. Finally, and crucially, in providing a window into mate preferences more broadly, the body of work surrounding age preferences firmly supports one conclusion: Mate preferences, particularly those for age, are deeply important for understanding human life.

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