

35 Mating Intelligence

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Mating Intelligence Defined

In the broadest terms, we see *mating intelligence* as the cognitive abilities that bear on mating-relevant outcomes – in short: the mind’s reproductive system (Geher, Miller, & Murphy, 2008). *Mating intelligence* differs from the broader field of *mating psychology* per se as mating intelligence focuses on relatively high-level cognitive processes – intelligence that underlies the domain of human mating – while mating psychology writ large has focused on relatively basic, unconscious, low-level psychological processes – such as the effects of ovulation on attraction (Miller, Tybur, & Jordan, 2007) or the nature of the human voice as a courtship device (e.g., Locke, 2017; Pipitone & Gallup, 2008). A mountain of research on human mating makes it abundantly clear that many basic psychological processes comprise evolved mating adaptations in our species.

Mating intelligence is different in that it focuses on the richer, more abstract, and more intellectual nature of human psychology in the domain of mating. Clearly, there are low-level, physiological, and emotional aspects of human mating that seem like important products of our evolutionary heritage. Mating intelligence suggests that there are also high-level, cognitive aspects of human psychology that also primarily reflect mating-relevant adaptations resulting from our evolutionary heritage.

Summary of Geher, Camargo, and O’Rourke’s (2008) Model

In summarizing the first fifteen chapters of the book *Mating Intelligence*, Geher, Camargo, and O’Rourke (2008) provide a framework for conceptualizing this new construct. First, these authors draw important distinctions between the *fitness indicator* component of mating intelligence and the *cognitive mating mechanisms* component.

Rooted in Miller’s (2000a) conception of high-order human intelligence as having evolved for courtship purposes, the fitness indicator component of mating intelligence corresponds to areas of intelligence that are uniquely human (including, for instance, artistic and linguistic elements), that vary dramatically from person to

person, that are partly heritable, and that are attractive in the mating domain. Such forms of intelligence may include, for instance, art (Nettle & Clegg, 2006), creative writing (Nettle, 2009), humor (see Kaufman et al., 2010; Kaufman et al., 2008), and vocabulary (see Rosenberg & Tunney, 2008). Importantly, while these hypothesized mental fitness indicators have been shown to act as courtship signals, they do not necessarily directly bear on mating issues. Thus, the fitness indicator component of mating intelligence is thought to comprise higher-order intellectual processes (e.g., the ability to write and recite a high-quality poem) but the links between these processes and mating outcomes are conceptualized as indirect. So, while poetic ability, for instance, may have evolved partly because success in this area was related to success in attracting high-quality mates, the thoughts that underlie poetry need not be directly mating-relevant or, indeed, publicly advertised as part of courtship (Nettle, 2009; although they may be – see Gottschall & Wilson, 2005).

On the other hand, *cognitive mating mechanisms* are proposed to be relatively high-level cognitive abilities that bear directly on mating-relevant issues. In successful mating, one must effectively engage in a host of such processes – such as accurate cross-sex mind reading (to know whether a potential mate is interested, to know what a current mate wants, etc.), strategic flexibility in mating strategies (knowing when it is optimal to pursue long-term versus short-term strategies), being able to read cues that reliably indicate that a mate has cheated in a relationship, being able to out-compete intrasexual rivals while keeping an eye toward presenting oneself as kind and other-oriented, and so on. In short, there are many cognitive processes that are directly relevant to the domain of mating. We conceptualize these processes as the cognitive mating mechanisms of mating intelligence.

Two important superordinate variables underlie the nature of mating intelligence in the model proposed by Geher, Camargo, and O'Rourke (2008). The first is biological sex. In many regards, human mating processes have been shown to be sex-differentiated. While dramatic intrasex variability tends to exist for mating-relevant variables, consistent sex differences on such variables are reliably found – often across disparate cultures – suggesting that males are more likely than females to pursue short-term mating strategies across the gamut of mating-relevant behavioral traits (see Buss, 2003). As such, male mating intelligence is predicted to be more honed toward optimizing short-term mating opportunities while female mating intelligence is predicted to be more honed toward optimizing long-term opportunities. This prediction follows from asymmetries in parental investment across the sexes that benefit males, the lower investing sex, in short-term strategies and that benefit females, the higher investing sex, in long-term strategies (see Buss, 2003).

Consistent with Buss's (2003) predictions, using the newly developed Mating Success Scale (MSS), Camargo and colleagues (2013) found that their MSS short-term subscale positively correlated with the number of short-term partners for males and their MSS long-term subscale positively correlated with the number of long-term partners for females. These findings provide empirical support for sex differences in optimizing short- and long-term mating opportunities when it comes to mating success.

Life-history strategy is a similarly important superordinate variable (see Figueredo et al., 2008). This idea, adapted from evolutionary ecology, suggests that organisms unconsciously strategize to find an optimal balance between somatic effort (facilitating their own survival) and reproductive effort (facilitating the replication of their genes into future generations via reproduction). This concept was initially designed by biologists to characterize different kinds of species – those that are *k-selected* – defined as “expecting” a long life within a stable environment (e.g., elephants) versus those that are *r-selected* – defined as “expecting” an unpredictable life, within an unstable environment (e.g., rabbits; see MacArthur & Wilson, 1967). While humans are *k-selected* as a species, there are clearly differences among human environments in terms of predictability of resources and long-term stability. With this idea in mind, Figueredo and colleagues (2008) and others (see Giosan, 2006) propose that people differ in terms of the degree to which they follow a prototypical *k-selected* strategy. As such, these scholars conceptualize a *k-differential* continuum as typifying humans, with some people being relatively *high-k* (these would be individuals who are raised in relatively resource-rich and stable backgrounds) and others being relatively *low-k* (individuals raised in harsh and relatively resource-poor and unstable backgrounds and/or high in mortality).

A great deal of recent research has shown that the differential-*k* continuum is strongly predictive of general behavioral strategies – with *high-k* individuals being more likely to delay gratification and take long-term approaches to solving problems (mating and otherwise) and *low-k* individuals being more likely to seek instant gratification and to take short-term approaches to solving problems (see Kruger, Reischl, & Zimmerman, 2008). Such a strategies approach allows for plasticity and malleability of human adaptations and is in concordance with evolutionary principles in behavioral ecology, in which adaptations vary by specific environmental demands, as these constraints influence the expression of adaptations (Wilson, 2007). Consequently, this plasticity of adaptations also allows for considerable individual differences, the focus of the mating intelligence construct.

Geher, Camargo, and O’Rourke (2008) propose that the differential-*k* continuum is a major variable that underlies mating intelligence. To the extent that the elements of mating intelligence are adaptations, designed to facilitate long-term reproductive success, it makes sense that the nature of mating intelligence would change as a function of an individual’s placement on the differential-*k* continuum. High-*k* individuals are expected to be most likely to pursue long-term mating strategies and to ultimately engage in high levels of parental effort while low-*k* individuals are expected to be most likely to pursue short-term mating opportunities. As such, high-*k* individuals are predicted to have cognitive sets that facilitate long-term mating, often at a cost to success in the area of short-term mating, while low-*k* individuals are predicted to be characterized by cognitive sets that, on the other hand, facilitate success in short-term mating. Thus, the nature of mating intelligence likely takes on different forms in light of the *k-differential* continuum. Someone high in general intelligence who comes from an unstable childhood background and develops a low-*k* life-history strategy may well make mating decisions in adulthood that

seem highly unintelligent (consider Bill Clinton's scandal with Monica Lewinsky, as an example).

Finally, Geher, Camargo, and O'Rourke (2008) propose that the different elements of mating intelligence – including the fitness indicators and cognitive mating mechanisms – ultimately should predict Darwin's bottom line of reproductive success. In fact, from an evolutionary perspective, all adaptations are adaptations because they gave our ancestors reproductive advantages. Biologists who study nonhumans are able to see whether certain traits are more likely to lead to higher numbers of viable offspring compared with other traits. However, the study of humans from an evolutionary perspective runs into an idiosyncratic quagmire regarding this issue: birth control. The presence of birth control in most Westernized societies makes it nearly impossible to study contemporary human behavior optimally from an evolutionary perspective, as hypothesized human evolutionary adaptations cannot typically be examined vis-à-vis reproductive success. A researcher who, for instance, hypothesizes that relatively deep voices in males evolved because women are attracted to such voices and ultimately are more willing to become pregnant and bear children of men with deep voices runs into a problem – such women may well be taking oral contraceptives – so this researcher will have a difficult time counting viable offspring as a way of testing their adaptationist hypothesis.

This problem, which ends up as a major concern for all evolutionary approaches to humans, needs to be addressed. Geher, Camargo, and O'Rourke (2008) and others (e.g., Pérusse, 1993) propose that we need to measure indicators of mating success as a proxy for reproductive success to be better able to test evolutionary hypotheses. If mating intelligence does comprise an important set of adaptations, then measures of mating intelligence should predict reproductive success. In this sense, we refer to *reproductive* success purely in the Darwinian sense, corresponding to the number of viable offspring produced in one's lifetime (and other markers of inclusive fitness).

Since we cannot typically measure reproductive success effectively in large samples of modern humans, predictions regarding mating intelligence should seek to predict mating success that may be addressed in terms of behavioral outcomes as well as potential reproductive fitness outcomes such as sperm quality (see Arden et al., 2009). Interestingly, Arden and colleagues (2009) and others have found that sperm quality actually tracks markers of physical attractiveness and health.

Mating success is defined largely as including outcomes that would have likely led to reproductive success under precontraceptive conditions. For males, such outcomes would include, for a straightforward example, having had sexual intercourse with multiple women (of high mate value, including having strong physical health, etc.) and, in particular, attracting women who are physically attractive. Of course, males also are often motivated to pursue long-term strategies (see Simpson & Gangestad, 2000) and, as such, a measure of mating success for males should also include such outcomes as being courted by kind, intelligent, and socially connected females for long-term relationships. For females, outcomes associated with mating success would include, for instance, having a history of dating relatively successful men (i.e., men who are high in objective measures of mate value) and having had

multiple men allocate resources toward them (for a thorough treatment of operationalizing mating success in modern humans, see Camargo et al., 2013). Importantly, mating success, in this context, refers to outcomes that would have led to increased fitness relative to same-sex competitors under ancestral conditions – we are not referring to more intuitive conceptions, such as relationship happiness in long-term mateships. The working assumption here, which is consistent with the general approach of evolutionary psychology (see Geher, 2014), is that our minds are the products of ancestral conditions and, as such, we are focusing on factors that would have increased reproductive success of our ancestors as opposed to modern proximate outcomes associated with relationships.

In sum, this model of mating intelligence suggests that it (1) is broken into fitness indicators and cognitive mating mechanisms, (2) is moderated importantly by the superordinate variables of biological sex and the differential-k continuum, and (3) ultimately predicts mating success.

What Is New Here?

What is new here? Any time someone proposes a novel psychological construct, educated psychological researchers automatically raise a skeptical eye – rightfully so. The modern behavioral sciences are rooted in methods for objectively collecting and analyzing observable data. Psychology is an empirical science – and psychologists demand empirical evidence for any and all claims. While this skeptical approach may make psychological research difficult to conduct and to publish, it is, generally, a good thing. The scientifically rigorous approach that underlies modern research psychology makes it so that the material taught to students in psychology classes in modern universities is based largely on data.

When Geher and Miller (2008) launched the construct of mating intelligence in their book by the same name, they knew full well that this construct would be under a good bit of scrutiny. In fact, several of the chapters in that edited volume on mating intelligence included comments that were critical of the concept writ large. Never one to mince words, Satoshi Kanazawa (2008) wrote: “Intelligence, in its original definition, referred to purely cognitive abilities . . . I personally would have preferred to keep it that way” (p. 283). Similar concerns are expressed in chapters by Figueredo and colleagues (2008) as well as in David Buss’s (2008) foreword to the book.

While the basic idea of mating intelligence has generally been well received in both academic (see Springer, 2009) and popular circles (see Perina, 2007), we think it is important to address criticisms of this construct up front. As is true of any newly introduced psychological construct, the main criticism launched at mating intelligence has been essentially this: What is new here?

The Heuristic Value of Mating Intelligence (What Is New Here)

Sometimes, progressive scientific ideas form from stepping back and looking at things from a new angle (see Dawkins, 2005). We believe that the unification

of the fields of mating and intelligence, implied in the mating intelligence construct, provides such a new angle on many areas of the behavioral sciences. In a thorough consideration of the areas potentially illuminated by this construct, Miller (2008) argues that mating intelligence has the potential to improve our understanding of such disparate facets of human functioning as medicine, psychiatry, economics, marketing, political science, sociology, education, and law. Here, we discuss specific areas of psychological research that may benefit – or that have already benefited – from the mating intelligence construct.

The study of individual differences from an evolutionary perspective has been, to this point, largely incomplete. With a major focus on human universals, evolutionary psychology has often either dismissed or ignored individual differences in important behavioral traits. While there are some important exceptions to this generalization, such as Nettle and Clegg's (2008) work on understanding superordinate personality trait dimensions (such as introversion/extraversion) in terms of balancing selection forces and Simpson and Gangestad's (1991) groundbreaking work on individual differences in sociosexuality (i.e., promiscuity; see also Penke, Denissen, & Miller, 2007), by and large, mating research conducted from an evolutionary perspective focuses on human universals such as sex-specific tactics to derogate competitors for mates (e.g., Buss & Schmitt, 1996), universals in the nature of human jealousy (Buss et al., 1992), universals in features of attractive faces and bodies (Hughes & Gallup, 2003), and universals in qualities desired in long-term versus short-term mates (Gangestad & Simpson, 2000).

While the universalist approach that characterizes most evolutionary psychology research clearly has shed light on many important aspects of the human condition, it fails to do justice to the myriad traits in our species that demonstrate reliable individual differences. Our conception of mating intelligence as including both mental fitness indicators and cognitive mating mechanisms opens the door for two important areas of individual-differences research. The study of mental fitness indicators addresses many cognitively laden traits (see Klasios, 2013) that seem to act as courtship mechanisms. Such traits include verbal fluency (Rosenberg & Tunney, 2008), humor (Greengross & Miller, 2008, 2011; Kaufman et al., 2008; Tornquist & Chiappe, 2015), conspicuous altruism (in a general sense – not just toward a specific mate; see Arnocky et al., 2017; Miller, 2007), and creative writing (Kaufman & Kaufman, 2009; Lange & Euler, 2014).

The study of cognitive mating mechanisms has the potential to provide insights into many areas of mating psychology that have been primarily studied from a universalist perspective. For instance, while mating psychologists have previously documented sex-specific features of deception in the mating domain (e.g., Haselton et al., 2005), a mating intelligence approach to this issue may address individual differences in mate-deception efficacy (e.g., O'Brien et al., 2010). Similarly, while prior researchers have addressed universals in responses to infidelity, it may be that there are individual differences in such processes as (1) the ability to accurately detect infidelity, (2) the ability to engage in infidelity with a high-quality mate, (3) the ability to deceive a partner about one's history of infidelity, and so forth. The study of individual differences in mating-relevant trait dimensions should be a major product of the mating intelligence construct.

In formulating our model of mating intelligence (Geher, Camargo, & O'Rourke, 2008), the importance of mating success became clear. Intelligence research of all kinds focuses on predicting success in some area. Research on cognitive, or general intelligence, has focused on predicting success in various academic arenas (see Sternberg, 1996); research on social intelligence has sought to pinpoint the predictors of success in such areas as marriage and career (Cantor & Kihlstrom, 1987); research on emotional intelligence has examined the predictors of success in such areas as intimate relationships (Casey et al., 2008), health (Matthews, Zeidner, & Roberts, 2002), education (Brackett et al., 2007), and, most recently, creativity (Geher, Betancourt, & Jewell, 2017). Given the evolutionary roots that underlie mating intelligence, it quickly becomes clear that the main kind of success that should result from mating intelligence would be *reproductive success*, which is essentially Darwin's bottom line – ultimately bearing on the number of viable descendants that reach future generations (taking physical quality of descendants into account [conceptually] as well, to the extent that quality facilitates gene proliferation overall across generations). Whether a trait is adaptive in the Darwinian sense corresponds, ultimately, to whether certain levels of that trait led to increases in reproductive success in our ancestors. As such, the main outcome that should be predicted by any adaptation is reproductive success – often framed in terms of the number of viable offspring produced. To further elucidate the primacy of Darwin's bottom line, individuals higher in mating intelligence show particular preferences for sex acts that would facilitate reproduction, that is, vaginal intercourse (Peterson, Geher, & Kaufman, 2011).

An important hurdle to the study of mating intelligence, then, becomes apparent. Given the widespread use of birth control in so many modern societies, reproductive success, operationalized in terms of number of offspring, has little construct validity. A tall, muscular, symmetrical, dominant, and intelligent male in a modern society may well attract many high-quality (attractive, healthy, and free from debilitating mental illness) sexual partners but his consistent use of birth control may reduce his reproductive success to zero. As such, the widespread use of birth control renders reproductive success nearly impossible to operationalize in modern human populations. For this reason, we propose that reproductive success needs to be approximated with measures of mating success – defined (based on our prior work in this area) as including outcomes that would have corresponded to reproductive success under precontraceptive conditions (see Geher, Camargo, & O'Rourke, 2008). While previous scholars have considered the importance of operationalizing mating success (e.g., Pérusse, 1993), the mating intelligence framework makes the need for valid measures of mating success extremely clear.

Camargo and colleagues (2013) sought to create a valid and reliable MSS to serve as a proxy for reproductive success for research within the mating domain. Importantly, this scale focused on the quality of sexual relationships rather than simply the number of previous sexual partners. Accurately measuring the mating success of males compared to females may therefore be a relatively simpler feat, with the metric of the number of sex partners alone sufficiently serving to capture the construct. One of the important outcomes of the mating intelligence construct should pertain to thorough psychometric work on mating success.

Intelligence and Mental Fitness Indicators

Human courtship has a distinct flavor compared to the courtship behavior of other species. We sing tunes designed to coordinate with lyrics, write poems, and paint wonderfully complex and aesthetic pictures to attract mates. We go on dates, exchange witty banter, and engage in long conversations about preferences and values. Why do we bother?

When we seek a mate, we surely look for someone whom we can connect with on a personal level, who shares our hopes, desires, goals, and fears. As such, mate selection in humans consistently focuses on qualities that are optimal for short-term as well as long-term partners. But, at another level, our genes pull us toward individuals high in fitness (heritable genetic quality). Most animals in the animal kingdom advertise fitness by displaying elaborate structures that do not appear to serve a survival function. The peacock's tail, the elk's antlers, and the nightingale's voice are all examples of adaptations that signal fitness.

Humans are unique, however, in the amount of fitness information that is contained in the brain. And, because the brain is the source of human intelligence, intelligence is fair game for sexual selection. According to the principle of sexual selection, reproduction is just as much a struggle as survival. Thus, while adaptations for survival surely come to typify organisms via evolutionary processes, adaptations that are primarily about successful reproduction share the front seat. Sexually selected traits (as opposed to traits operating under the forces of natural selection) display high variance because there is competition for individuals to mate with those who exhibit traits that are metabolically expensive, hard to maintain, not easily counterfeited, and highly sensitive to genetic mutations. Such traits that display these properties are the most reliable indicators of genetic fitness. According to Zahavi's (1997) handicap principle, even though fitness indicators may impair the odds of survival (creating a handicap), they can offer reproductive benefits that outweigh the survival costs. The peacock's tail may make it difficult for the peacock to walk, and may make the peacock more visible to predators, but it attracts mates. Likewise with the human brain – while there may be metabolic costs associated with having such a heavy brain, the costs may be outweighed by reproductive benefits (as well as, perhaps, benefits in other domains). Those animals who can display such structures that go beyond survival are advertising that they not only have the resources to survive but they also have resources left over to invest in excess. An analogy can be found in Veblen's (1899) idea of conspicuous consumption. According to Veblen, a wasteful display of wealth is a reliable indicator of wealth since the poor cannot afford such waste. From Zahavi's perspective, such characteristics represent *costly signals*, which evolve as hard-to-fake, honest advertisements of heritable qualities. Importantly, while modern technologies have changed the playing field a bit in terms of how people present themselves to one another, many basic behavioral attributes, such as verbal fluidity, artistic talent, and so on, still fit within this costly signaling framework.

In recent years, Geoffrey Miller has applied Zahavi's handicap principle to the evolution of human intelligence, arguing that sexual selection played a much

greater role than natural selection in shaping the most distinctively human aspects of our minds, including storytelling, art, music, sports, dance, humor, kindness, and leadership (Miller, 1998, 2000a, 2000b, 2000c, 2001; Kaufman et al., 2008). Miller argues that these behaviors are the result of complex psychological adaptations whose primary functions were to attract mates, yielding reproductive rather than survival benefits. Germs of this idea can be traced back to Darwin: “It appears probable that the progenitors of man, either the males or females or both sexes, before acquiring the power of expressing mutual love in articulate language, endeavored to charm each other with musical notes and rhythm” (Darwin, 1871, p. 880).

In his model of the mind as a courtship device, Miller (2000) makes several assumptions regarding the nature of human intelligence. In this model, he assumes that the general factor of human intelligence (i.e., g) is synonymous with human intelligence writ large. Miller also argues that behaviors that show a strong influence of general intelligence (i.e., are highly g -loaded) should be sexually attractive since they are indicators of a superordinate *fitness factor* (f factor). Indeed, evidence has been accumulating that suggests the existence of an f factor. Various threads of research show a correlation between g and many biological traits such as height, health, longevity, bodily symmetry, and even sperm quality (Arden et al., 2009; Banks, Batchelor, & McDaniel, 2010; Bates, 2007; Calvin et al., 2010; Furlow et al., 1997; Jensen, 1998; Prokosch, Yeo, & Miller, 2005; Silventoinen et al., 2006; Sundet et al., 2005); g may therefore be an indicator of deleterious mutation load, which would affect many interacting genes and thereby have an effect on the entire biological system.

There is also accumulating evidence that intelligence and creativity (which Miller argues are an important facet of intelligence) are sexually attractive traits. Buss (1989) investigated mate preferences across thirty-seven cultures and found that intelligence was the second-most-desired trait in a sexual partner, right below kindness. Experimental research shows that intelligent and creative individuals are considered more attractive and have a higher number of sexual partners (Buss, 1989; Griskevicius, Cialdini, & Kenrick, 2006; Haselton & Miller, 2006; Nettle & Clegg, 2006; Prokosch et al., 2009).

Various scholars have elaborated and clarified Miller’s theory. Feist (2001) notes that Miller focuses on sexual selection and artistic creativity to the exclusion of the evolution of scientific creativity and technology, which Feist argues is more likely to have been shaped by natural selection pressures. Further, Feist (2001) argues that natural selection has driven mainly the more applied or technological aspects of creativity that have clear survival benefits, such as advances in science and engineering, whereas sexual selection may have driven more ornamental or aesthetic aspects of creativity, including art, music, dance, and humor – forms of creativity that have come along more recently on the evolutionary scene.

Therefore, not all creative displays may be considered equally as sexually attractive. “Nerdier” displays of creativity, such as in math, engineering, and the sciences, may be considered less attractive, on average, than more “artistic” displays of creativity such as in poetry, music, and art. Recent research does suggest that,

collapsing over individual differences, more artistic forms of creativity are considered more sexually attractive than are more scientific forms of creativity (Kaufman et al., 2009). This trend, of course, may well depend on the target audience (as female scientists might find scientific creativity to be relatively attractive).

In any case, individual differences were found in that those who reported higher levels of creative achievement in scientific forms of creativity did tend to find scientific forms of creativity sexually attractive (as well as some artistic forms of creativity), whereas those who reported higher levels of creative achievement in artistic forms of creativity did tend to find artistic forms of creativity sexually attractive but did not report finding scientific forms of creativity sexually attractive. Future research should clarify these issues, testing Feist's hypothesis at both the group and the individual level of analysis.

In a related line of thought, Feist argues that Miller's account of sexual selection does not fully connect with the creativity literature. In this body of literature, creativity is defined as both novel and adaptive behavior (Sternberg, 1998), not as novel creative displays that attract the attention of potential mates. Feist also notes that there is evidence that creative people tend to be less likely to marry and, when they do, they have relatively *few* children (Harrison, Moore, & Rucker, 1985), a factor that surely also impacts on reproductive success. Also, it should be noted that time spent on creative projects may be time taken away from mating and child-rearing (Gabora & Kaufman, 2010). And it is also possible that creative individuals may have trouble in relationships, on average, as well, due to their unique constellation of personality traits, including being less conventional and conscientious and more driven, ambitious, dominant, hostile, and impulsive than less creative individuals (see Feist, 1998). However, additional research has suggested that, since negative dispositional qualities (e.g., anxiety, neuroticism, schizotypy) associated with mental illness sometimes go hand in hand with creativity, these attributes may actually be beneficial in regard to short-term mating in males (Beaussart, Kaufman, & Kaufman, 2012).

In a related line of research, Mithen (2006) presents evidence that the musicality of our ancestors and relatives may in fact have had considerable *survival value* as a means of communicating emotions, intentions, and information as well as facilitating cooperation. Thus, sexual selection may not be the primary selective pressure for musicality. He also notes that, while it may appear at first blush that creative men have more short-term sexual partners because of their creativity, their attractiveness may be more the combination of good looks, style, and an antiestablishment persona. Mithen also points out that the finding (Miller, 1999) that males produce at least ten times more music than females and are the most productive around the age of thirty (in which men are in their peak mating effort and activity) could more parsimoniously be explained by the particular structure and attitudes of twentieth-century Western society. Perhaps the most reasonable conclusion is that sexual selection helped ramp up the evolution of intelligence and creativity, exaggerating certain forms, or making them not only functional but also ornamental. In this way, they went beyond the realm of practicality to the realm of aesthetic functionality. However, more recent research provides support for Miller's general hypothesis

that artistic ability is at least partially sexually selected. Crocchiola (2014) found both male and female artists, compared to nonartist controls, have higher prenatal testosterone levels, as indicated by having a relatively low ratio between the second to fourth digit finger length.

From a different angle, Kanazawa (2008) argues that individuals with greater general intelligence do not have greater mating intelligence, except in areas where the mechanisms underlying mating intelligence operate on evolutionarily novel stimuli. Kanazawa (2004, 2010) proposed that general intelligence evolved as a domain-specific psychological mechanism to solve evolutionarily novel problems (for a different perspective on the evolution of general intelligence, see Borsboom & Dolan, 2006; Chiappe & MacDonald, 2005; Geary, 2004, 2009; Girotto & Tentori, 2008; Kaufman et al., 2011). With this theory as a foundation, Kanazawa (2008) argues that general intelligence is independent of other adaptations, including mating intelligence. Kanazawa presents evidence that those higher in verbal intelligence are relatively ineffective at evolutionarily familiar tasks such as finding mates, having children, and getting and staying married (for further evidence on the negative association between IQ and marriage, see Taylor et al., 2005). Kanazawa presents evidence that those with higher verbal intelligence are better, however, at voluntarily controlling fertility, a finding Kanazawa interprets as reflecting the better ability of those with higher verbal intelligence in dealing with evolutionarily novel means of contraception in the current environment. Accordingly, Kanazawa and others see this tendency for individuals high in general intelligence to take steps to inhibit reproduction as consistent with the dysgenic hypothesis, that low intelligence drives out high intelligence.

Perhaps it is important to distinguish between the sexual attractiveness of intelligence and the use of human intelligence to navigate the mating domain. An interesting irony may be that, while intelligence might be a sexually attractive trait, those with high intelligence may have no advantage in actually navigating the mating domain (unless the domain consists of evolutionary novelty). It is to the cognitive mechanisms underlying mating intelligence that we now turn.

Mating-Relevant Cognitive Mechanisms

As stated in prior work, we believe that the cognitive mating mechanisms of mating intelligence include both species-typical and individual-differences features (Miller, 2008). Species-typical (i.e., universalist) mating mechanisms include the many mating qualities that have been studied by prior researchers that may be thought of as characterizing a human universal mating intelligence. Such qualities include, as examples, the tendencies to (1) advertise qualities that are attractive to potential mates (Buss & Schmitt, 1996), (2) engage in adaptive mating-relevant self-deception (O'Sullivan, 2008; Lynn, Pipitone, & Keenan, 2014), (3) demonstrate meta-strategic flexibility, by changing one's mating strategy as a function of current ecological conditions (such as the prevailing sex ratios; see Schmitt 2005), and (4) hold biased mating-relevant beliefs that may be evolutionarily adaptive (Haselton &

Buss, 2000; Cyrus, Schwarz, & Hassebrauck, 2011). To a large extent, the edifice of mating psychology comprises the species-typical portion of mating intelligence's cognitive mating mechanisms.

As a recent example of a mating-relevant psychological process framed as a cognitive mating mechanism, consider Geher's (2009) work on cross-sex mind reading. Rooted in methods borrowed from the field of emotional intelligence research (Geher, 2004), this work explored, in a large sample of heterosexual adults, the ability to accurately guess the mating desires of the opposite sex. Being able to read the thoughts of the opposite sex (literally, not in an extrasensory manner!) comprises an important set of cognitive skills that are crucial for mating success. Thus, this ability is a crucial cognitive mating mechanism that underlies mating intelligence. In this research, participants were presented with real personal ads written by members of their own sex – and they were asked to judge which ad (in clusters of three) was rated as most attractive for either a long-term or short-term mating partner by members of the opposite sex. In a separate part of the study, members of the opposite sex rated these same ads, so the actual answers could be determined. Ads were all content-coded for the presence of sexual content in a blind process by two independent judges.

Across both short- and long-term items, women showed a strong tendency to overestimate the degree to which males were attracted to ads of women who included sexual content. These findings are consistent with an *adaptive bias* account of cross-sex mind reading, suggesting that women may be particularly prone to think that men are only interested in sex; such a judgment may encourage women to be especially skeptical of men's intentions. Such commitment skepticism may be part of a broad long-term female mating strategy designed to reduce the likelihood of a female's being impregnated by a nonfaithful male and, thus, bearing the evolutionary tax of raising an offspring alone.

In terms of accuracy in cross-sex mind reading, the findings were revealing. Each sex turned out to be relatively expert at guessing the mating-relevant thoughts of the opposite sex when the judgments corresponded to the dominant strategy of the opposite sex. Thus, females outperformed males in guessing short-term desires, while males outperformed females in guessing long-term desires. Accordingly, it seems that cross-sex mind reading seems particularly honed when it comes to knowing what the opposite sex wants in the areas that are prioritized by the opposite sex. The Analogical Peacock Hypothesis, proposed by McKeown (2013), further suggests that mind-reading abilities (in addition to creative displays) are the product of sexual selection pressures that are advantageous in social communication and, in turn, can increase reproductive success. This hypothesis basically says that conspicuous social-analytic abilities may be the products of sexual selection.

While Geher (2009) explicates the utility of the mating intelligence construct to generate new research and new findings, this study was limited when it came to understanding cross-sex mind reading in terms of individual differences. An attempt to measure cross-sex mind reading in terms of individual differences did not yield internally reliable scales. While this fact was somewhat disappointing, it is worth noting that this same issue typified the earliest attempts to create ability-based

measures of emotional intelligence (Mayer & Geher, 1996). Attempts to operationalize emotional intelligence in terms of individual differences have increased markedly in their success across time (Geher, 2004). We expect that attempts to measure the mating mechanisms of mating intelligence as individual-differences variables will also succeed in time.

In fact, another thread of recent work has demonstrated that mating intelligence may prove to be a valid individual-differences construct. Geher and Kaufman (2007) created a self-report measure of mating intelligence published in *Psychology Today* (Perina, 2007). While this scale was not initially designed with scholarly goals in mind, several recent studies that have included this measure have demonstrated its internal reliability as well as its predictive utility (O'Brien et al., 2010). Male and female versions of this scale, created primarily for use with heterosexual populations, tap several major dimensions that underlie mating intelligence, including (1) accuracy in cross-sex mind reading, (2) effective deception in the mating domain (a characteristic that likely pertains to effective self-presentation in both short-term and long-term mating strategies), (3) adaptive self-deception in the mating domain, (4) adaptive mating-relevant bias (with the male subscale corresponding to overestimating the degree to which women find males sexually attractive and the female subscale corresponding to being hyper-skeptical of males' intentions), and (5) effective behavioral courtship display. Thus, this scale is designed to tap both mental fitness indicators and mating mechanisms in terms of individual differences.

It is important to note that this measure uses self-report methods and that, without question, work on this scale represents the nascent stage of psychometric efforts on this construct that are needed. Previous research on aspects of human intelligence using self-report methods has generally cast a critical eye on such approaches (Geher & Renstrom, 2004). Ultimately, ability-based measures would likely have more face validity as well as, perhaps, more predictive validity. Still, both the male and the female versions of this measure (based on total scale scores) demonstrated high internal-consistency reliability. Further, in two studies on young heterosexual adults, this scale demonstrated a strong ability to predict important variables related to reproductive success. In the first study, males' scores were positively predictive of having had more sexual partners in the past year as well as more lifetime partners, whereas females' scores showed a more nuanced pattern, with high mating intelligence for females corresponding to having had sexual relations relatively early in life but not having a relatively high number of sexual partners in the last year (a pattern that may be adaptive for females). Thus, for males, high mating intelligence seems to correspond to more sexual partners overall whereas, for females, high mating intelligence corresponds to having more sexual experience but *not* a more promiscuous current strategy (O'Brien et al., 2010).

A second study explored mating intelligence in the context of hookups, generally defined as short-term sexual relationships with no explicit long-term relationship attached (Garcia & Reiber, 2008; for review, see Garcia et al., 2012). In addition to measuring mating intelligence, this study asked participants if they had ever engaged in Type-I hookups (with strangers), Type-II hookups (with acquaintances), and Type-III hookups (with individuals they defined as *friends*). Again, the mating

intelligence scale demonstrated sensitivity to important sex-differentiated features of relationships. For males, higher mating intelligence corresponded to having engaged in each kind of hookup, whereas, for females, high mating intelligence corresponded to having engaged in hookups with acquaintances (Type-II) but not either of the other kinds. These findings make sense from an evolutionary perspective, as it may be particularly costly for a female to engage in sex with a stranger, about whom she has little information. Such relationships, started with minimal baseline information, could put a female at high risk for such adverse outcomes as violence, desertion, or disease. On the other hand, prior research has demonstrated that it is not adaptive for females to have sexual relations with close opposite-sex friends; and, in fact, females typically do not report having opposite-sex friends for sexual reasons (Bleske-Recheck & Buss, 2001). Relations with individuals defined as acquaintances may well strike a balance.

The findings from the aforementioned studies (Geher, 2009; O'Brien et al., 2010) are presented to give a face to the field of mating intelligence. Some of these findings bear primarily on species-typical mating mechanisms whereas others focus on individual differences in the different elements of mating intelligence. While this work provides an important first step in carving out the nature of mating intelligence and its contribution to the field of psychology, more research is surely needed to help the mating intelligence construct realize its potential.

The Future of Mating Intelligence

By proposing the mating intelligence construct, we hope to stimulate research on the connection between human sexuality and human intelligence. A large part of the relatively nascent field of evolutionary psychology includes the study of human mating (see Buss, 2005). However, evolutionary psychology has traditionally focused on human universals instead of individual differences. Recent work has even suggested there may be individual variation in mating intelligence over the course of the ovulatory cycle in naturally cycling females, with mating intelligence scores increasing with probability of conception (Peterson, Carmen, & Geher, 2013). The field has also traditionally focused on lower-level cognitive processes instead of higher-level cognitive functions. We hope the mating intelligence construct will provide a missing piece of the human cognitive puzzle for the fields of both human intelligence and evolutionary psychology and will stimulate cross-talk between the two fields of inquiry.

The integrative model of mating intelligence outlined here and first proposed by Geher, Camargo, and O'Rourke (2008) includes two main components. The first class of cognitive processes relates to mating-relevant cognitive domains that are thought to primarily serve courtship display functions. While evolutionary psychology has tended to focus mainly on behavioral displays of physical qualities such as strength, virility, and athleticism, the mating intelligence construct focuses on psychological qualities (*mental fitness indicators*) such as confidence, kindness, creativity, intelligence, resourcefulness, status, humor, and mental health.

According to Miller's (2000) fitness indicator model, humans are particularly attuned to behavioral qualities of potential mates that reveal *good genes* in the evolutionary sense in that they reveal a relatively low mutation load (in other words, a relatively low number of genetic mutations) as well as genes that are generally associated with health, survival, and successful reproductive abilities (see Keller & Miller, 2006). Therefore, much of human mate choice can be explained as an adaptive (unconscious) fear of heritable mutations – as *mutation phobia*. According to this idea of mutation phobia, people are repulsed by features of potential mates that have a strong latent correlation with high mutation load. Importantly, this model is largely based on the idea that various physical and behavioral attributes have significant heritability coefficients (see Miller, 2000).

In the biological literature, body asymmetry or dullness of plumage are often given as examples (see Hasson, 2006). Although physical traits such as bodily asymmetry are thought to be indicators of developmental instability (DI), which negatively relates to fitness, a recent study failed to identify significant relationships between various indicators of DI and mating success (Kordsmeyer & Penke, 2017). However, these null findings may be the result of an inadequate assessment of mating success. Additional work would perhaps benefit from the implementation of the newly developed MSS (Camargo et al., 2013) to capture both quantitative and qualitative aspects of mating success and is necessary to fully claim that low-DI individuals (with low mutation loads) are actually more attractive, as indicated by their mating success. Clearly, future research on this topic is needed.

It is not clear, however, whether such mate choice operates in a continuous or categorical manner. It is entirely possible that our mate preferences have been shaped more to avoid mating with high mutation load individuals who have obvious physical or psychological problems than to make very fine discriminations among individuals who seem more or less average in terms of mutation load. The idea here is that, although not all physical and psychological problems are rooted in high mutation load, across evolutionary time, there was enough of a correlation between these variables that we were selected to prioritize these attributes in the mate selection process.

Zebrowitz and Rhodes (2004) offer evidence that, at least in some cases, mate choice operates in a categorical manner. They found that people could accurately predict overall health and intelligence for targets with relatively unattractive faces but not for targets with relatively attractive faces. Facial attractiveness was predictive of health and intelligence for targets and intelligence only at the low-fitness extremes.

Such a curvilinear relationship between indicator quality and sexual attractiveness (concave-downward, with rapidly diminishing returns above the mean of indicator quality) may be seen in the domain of mating intelligence. For example, someone with an IQ of 90 may be much more attractive than someone with an IQ of 70 but a potential mate with an IQ of 150 may only be a little more attractive than one whose IQ is 130. Importantly, IQ scores vary considerably across such groupings as education levels. As such, these points regarding IQ likely need to be considered in such a broader context.

Research should attempt to investigate the (probably nonlinear) functions that relate mutation load to mental fitness indicators and that relate indicator quality to attractiveness in mating. Such research should sample populations from all strata of society. Indeed, if it turns out that fitness indicators correlate differently at low-quality and high-quality extremes, and assortative mating on IQ is a predominant occurrence, then bright, healthy, college sophomores may not be the best and/or only population we should be studying for mating intelligence research on the display, judgment, and sexual attractiveness of fitness indicators!

Another issue in the understanding of mental fitness indicators has to do with the relation of each fitness indicator to general intelligence. In conceiving of *g*-loaded mental traits as having arisen from sexual selection processes, Miller (2000a) posits that *g* is essentially an index of neurodevelopmental stability and brain efficiency that taps any overall fitness factor (roughly, the first principal component of genetic quality across all fitness-related traits). Further, Miller proposes that the existence of this superordinate fitness factor should be manifest as a positive manifold (all-positive correlations) among fitness indicators in general. Future research should attempt to test Miller's (2000c) predictions and shed light on the nature of the courtship display components of mating intelligence. One such method would be to simply assess the *g*-loadings of a variety of mental fitness indicators and compare the relationship of the *g*-loadings to ratings of sexual attractiveness of each fitness indicator. According to Miller, there should be a positive relationship.

Future research should also try to elucidate the particular characteristics of various mental displays that are sexually attractive. Various forms of creativity (e.g., artistic) may be considered more attractive than other forms of creativity (e.g., scientific), not only due to indications of *g* (indeed, scientific forms of creativity are probably more *g*-loaded than artistic forms of creativity) but also due to fitness indications of kindness, emotional expressivity, and so on. Importantly, these different attributes are not all strongly intercorrelated with one another and many exceptions to the general trends that are postulated in Miller's (2000) model exist.

Future research should also assess the importance of individual differences in preferences for various mental fitness indicators. Preliminary research in this regard is underway (Kaufman et al., 2009) and suggests that, at the group level, artistic forms of creativity are considered more sexually attractive than scientific forms of creativity, with substantial individual differences in preferences for forms of creative display that can at least partly be predicted by an individual's personality, intelligence, and creativity.

The second class of cognitive processes acts as mating mechanisms. Such potentially fruitful domains of mating intelligence that can be classified under the mating mechanisms component of mating intelligence include *mate choice mechanisms* for evaluation and choosing among potential sexual partners (e.g., Penke et al., 2008); *self-evaluation mechanisms* for assessing one's own mate value (O'Brien et al., 2010); *mechanisms for making context-sensitive decisions about mating strategies* (Schmitt, 2005) such as whether to pursue short-term or long-term relationships; *cross-sex mind reading mechanisms* (Geher, 2009) for understanding and influencing the behavior of potential mates, and of their friends, families, and children; and

same-sex mind reading mechanisms for understanding and influencing the behavior of potential sexual rivals, and of their friends, families, and allies (Fisher, 2004). Future research should also attempt to investigate relations between mental fitness indicators and mating mechanisms. For instance, are those with a higher IQ better able to detect interest in a potential mate? Are those who are higher in fitness displays such as humor production better at assessing their own mate value? Such an investigation of how various fitness indicators relate to one another and with other mating mechanisms will help clarify the structure of mating intelligence.

One step toward this clarification would be to develop a performance measure of mating intelligence. The mating mechanisms in our model may be interrelated much like the abilities that underlie emotional intelligence (see Chapter 29 in this volume). The ability-based model of emotional intelligence presented by the authors of that chapter suggests that there are four basic facets of emotional intelligence, which are somewhat interrelated and mildly *g*-loaded. These facets include the ability to identify emotions, assimilate emotion into thought, understand emotions, and manage emotions (in one's self and others). This framework might be useful for producing a test of mating intelligence as well as understanding the structure of mating intelligence. Just as emotional intelligence may have basic interrelated components that underlie it, mating intelligence may also have basic elements (such as the ability to accurately assess one's own mate value) that may be interrelated and found to comprise a distinct set of mating-relevant cognitive abilities. Kirsner, Figueredo, and Jacobs (2003) created the Mate Value Inventory (MVI), a comprehensive multivariate scale, which assessed qualities desired in social and sexual mates (e.g., intelligence, jealousy, physical fitness, desire to have children, and ambition). Recent research has assessed the relationship between mating intelligence and mate value specifically finding that mating intelligence appears to be a valid predictor of one's self-perceived mate value (Dillon et al., 2016). Moreover, Wagstaff, Sulikowski, and Burke (2015) attempt to further build the bridge between mating intelligence and mate value by showing how making mating-relevant decisions is correlated with one's own perceived mate value.

An important distinction between emotional intelligence and mating intelligence here pertains to content – with emotional intelligence dealing with emotion-relevant stimuli and processes and mating intelligence focusing on content tied to the mating domain. Recent research has shown that individuals engage in assortative mating on emotional intelligence (Śmieja & Stolarski, 2018). Essentially, people tend to mate with others who have a level of emotional intelligence comparable to their own (Dillon et al., 2016). Similar findings may be found regarding assortative mating patterns and mating intelligence specifically, once a more robust mating intelligence measure is established. An important area for future work would be to examine the empirical relationships between measures of emotional intelligence and measures of mating intelligence in detail.

In addition to such basic psychometric qualities as internal reliability of measuring instruments, this work will need to assess (1) whether different elements of mating intelligence are mildly interrelated, (2) whether they are somewhat related to *g*, (3) whether they are not redundant with well-established personality traits such as the Big Five, and (4) whether the abilities that comprise mating intelligence are, indeed, predictive of mating success (such as the abilities to attract, choose, court, and retain

high-quality sexual partners and to deter sexual rivals and infidelities). Such psychometric work will be crucial in determining whether mating intelligence is a useful individual-differences construct within psychology writ large. Further, given that emotional intelligence is predictive of success in intimate relationships, research on the interface between emotional intelligence and mating intelligence could be both theoretically and practically valuable. Finally, future research needs to focus on measuring mating intelligence in an ability-based manner. Work on the parallel construct of emotional intelligence has clearly demonstrated that indices of this construct as an ability are not fully correlated with indices of this construct measured via self-report measures (see Geher, 2004). Ability-based measures of mating intelligence might use work in emotional intelligence as a guide, examining such abilities as, for instance, the ability to know what is attractive to a large group of potential mates, the ability to effectively deceive others regarding mating-relevant stimuli, and so on. Future research along these lines should be very fruitful in carving out the nature of this construct.

In terms of the practical value of mating intelligence, there are important potential applications of the mating intelligence framework to society. Awareness of mating intelligence in the larger society should increase our appreciation of psychological and mental qualities in a potential mate in addition to purely physical qualities. Further, sex education in schools can be improved by being informed by the mating intelligence framework. In particular, by embracing the fact that much of the human mind is really about mating, sex education classes could teach students the importance of mental indicators and the various skills necessary to successfully navigate the mating domain. Informed by the complexities of human mating research, such education could address the fact that there are multiple routes to success in mating – with males and females both armed with a variety of long- and short-term strategies that are highly context-sensitive. The mating intelligence idea underscores this complexity but also places these ideas within a coherent framework informed by evolutionary theory. In addition, Geher and Kaufman's (2013) book *Mating Intelligence Unleashed: The Role of the Mind in Sex, Dating, and Love* provides us with practical guidance regarding mating intelligence research for our daily lives by providing insight into questions in the field of mating by using research in areas such as personality, social psychology, developmental psychology, neuroscience, and creativity.

It is our hope that the mating intelligence construct, by providing an evolutionarily informed understanding of human intelligence that takes into account the important domain of human mating, can allow us to move toward a more complete understanding of human intelligence.

Acknowledgments

We greatly appreciate the diligent work of senior editor Robert Sternberg during the editorial process and we thank Justin Garcia for offering his thoughtful guidance and insights regarding biological aspects of this work. We also thank Megan Geher for her excellent editorial help.

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