Mating intelligence: Frequently asked questions
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What is mating intelligence (MI)?

MI is the whole set of human psychological adaptations for sexual reproduction – for making babies, but not for raising them (which would be Parenting Intelligence, presumably). MI includes mental capacities for courtship and display; for sexual competition and rivalry; for relationship-formation, commitment, coordination, and termination; for flirtation, foreplay, and copulation; for mate-search, mate-choice, mate-guarding, and mate-switching; and for many other behavioral capacities that bring mainly reproductive payoffs (Miller, 2000a). Each of these capacities cuts across traditional psychological distinctions between perception, cognition, emotion, motivation, learning, memory, planning, intelligence, and personality.

What forms does MI take?

There is a major distinction within MI theory between 'mental fitness indicators' and 'mating mechanisms.' Mental fitness indicators are psychological adaptations that have evolved through mate choice to advertise one's phenotypic and genetic quality to potential mates. They should typically show large individual differences, high heritabilities, substantial correlations with other indices of fitness (e.g., general intelligence, body symmetry, physical health, mental health, longevity, fertility), and a high degree of sexual attractiveness, especially in serious, long-term relationships (Miller, 2000a,b; Miller & Todd, 1998). Examples of mental fitness indicators would include the perceptual, cognitive, emotional, and behavioral capacities for:

- Language: sustaining interesting conversations and telling memorable stories during courtship (Dunbar, Marriot, & Duncan, 1997; Miller, 2000a; Shaner, Miller, & Mintz, 2004);
- Humor: producing amusing verbal and non-verbal behaviors (Bressler & Balshine, 2006; Bressler, Martin, & Balshine, 2006; Gervais & Wilson, 2005; Weisfeld, 2006);
- Art: producing creative, skilled works of ornamental or representational art (Haselton & Miller, 2006; Miller, 2001; Nettle & Clegg, 2006);
- Music: e.g., entraining and producing complex rhythms when drumming or dancing (Bachner-Melman et al., 2005; Brown et al., 2005; Miller, 2000c; Sluming & Manning, 2000);
- Morality: displaying attractive moral virtues such as kindness, honesty, heroism, humility, or gift-giving; (Farthing, 2005; Kelly & Dunbar, 2001; Miller, in press; Sozou & Seymour, 2005);
- Ideology: creating novel world-views; debating arcane details of religious and political ideologies with sexual rivals (Kanazawa, 2000; Miller, 1996; Tybur, Miller, & Gangestad, in press);
- Drug use: taking psychoactive drugs that boost subjective mate value (Newlin, 2002) and mental fitness indicator functioning (Sullivan & Hagen, 2002), but that would provoke mental illness if one were genetically vulnerable (Diamond, 1992; see Arseneault et al., 2004; Svenningsson et al., 2003);

- Foreplay: orchestrating manual, oral, and genital contact that is sexually arousing to a lover (Haavio-Mannila & Kontula, 1997; S. Miller & Byers, 2004; Puts & Dawood, 2006).

The study of mental fitness indicators is most closely allied with current psychological research on individual differences: intelligence, personality, behavior genetics, clinical psychology, creativity, and ideological attitudes. Its theoretical foundation is a branch of evolutionary biology called costly signaling theory (Bird & Smith, 2005; Cronk, 2005; Miller, 2000a).

On the other hand, most other aspects of MI should take the form of reliable 'mating mechanisms' – psychological adaptations that evolved through broader forms of sexual selection to understand, judge, and influence potential sexual partners and rivals. They should typically show smaller individual differences, lower heritabilities, lower correlations with indexes of fitness, and a lower degree of direct sexual attractiveness. When they do show individual differences, these may often reflect different mating strategies rather than differences in general phenotypic quality (e.g., Figueredo et al., 2006; Gangestad & Simpson, 2000; Nettle, 2005; Shackelford, Schmitt, & Buss, 2005). Examples of such mating mechanisms would include the perceptual, cognitive, emotional, and behavioral capacities for:

- Mate search: finding potential mates, and accurately assessing their age, sex, relationship status, and parental status (Todd & Miller, 1999);
- Mate choice: judging the physical and psychological attractiveness of potential mates (Miller, 2000a);
- Self-assessment: learning one's own mate value (see Ben Hamida, Mineka, & Bailey, 1998; Kirkpatrick & Ellis, 2001);
- Mating acculturation: learning the ecological, cultural, social, and demographic constraints governing the local mating market;
- Learning about sex differences in typical behavior patterns and preferences, both cross-cultural universals (e.g., Archer, 2004; Schmitt, 2003, 2005) and culture-specific adaptations to local ecologies and ideologies (e.g., Gangestad & Buss, 1993; Marlowe, 2003; Moore et al., 2006),
- Mind-reading: understanding the beliefs and desires of potential mates, current mates, sexual rivals, and their interested friends and family members (e.g., Haselton & Buss, 2000; Thomas & Fletcher, 2003);
- Strategic mating: adopting appropriate mating strategies given one's mate value, the local mating market, and specific potential mates; adaptively switching mating strategies when circumstances change (e.g., when mates, rivals, children, or friends get pregnant, change social status, get sick, die); derogating and deterring sexual rivals and stalkers (see Gangestad & Simpson, 2000);
- Mating emotions: developing infatuations, falling in love, forming romantic attachments, and feeling jealousy;
- Short-term mating: managing short-term affairs, infidelities, jealousies, and break-ups.

Mating mechanisms tend to be human universals – reliably developing legacies of prehistoric mating patterns. The study of mating mechanisms is most closely allied with current psychological research in evolutionary psychology, human sexuality, intimate relationships, Theory of Mind, social cognition, social neuroscience, person perception, emotions, decision making, and self-esteem.

<u>Is MI a way to describe of human universals or individual differences</u>?

Both – as outlined above. MI has two aspects that make it a bit confusing at first. There is a universal aspect: MI as a set of species-typical adaptations – the human sexuality part of human nature that we have in common – which we call 'mating mechanisms.' Then there is an individual-differences aspect: MI as a set of individual differences – the differences in attractiveness, personality, intelligence, sexual strategies, and mate preferences that we find so salient and gossip-worthy in others, and such a source of high or low self-esteem in ourselves. MI's universality means that all normal adult humans have some basic capacities for flirting, conversing, being funny, telling stories, choosing mates, and falling in love. MI's variability means that some people are much better at these things than others. Thus, MI includes both human universals (as studied by evolutionary psychology) and individual differences (as studied by psychometrics, behavior genetics, personality psychology, and clinical psychology).

Does MI explain everything distinctive about humans?

No, it mainly concerns mental capacities that are displayed in courtship, used in mate choice, used in cross-sex mind-reading, and that guide context-sensitive sexual strategies. It is less relevant to research on human capacities that have more obvious survival and social payoffs, such as finding food, navigating through space, avoiding predators and pathogens, caring for offspring, helping kin, making friends, coordinating group behavior, and sustaining social norms (see Buss, 2005). There are probably hundreds of human psychological adaptations that evolved without much influence from mate choice. MI is just a subset of the human mind's capacities (albeit an evolutionarily central and emotionally momentous subset).

Is MI distinctively human?

No, almost all multi-cellular, sexually-reproducing species would be expected to have evolved complex psychological adaptations for courtship, mate choice, sexual rivalry, and so forth (Kokko et al., 2002). However, certain advanced capacities for understanding the beliefs and desires of the opposite sex would presumably require Theory of Mind, and may be more limited across species. Also, certain advanced courtship tactics (e.g., sarcasm, lingerie – see Jorgensen, 1996; Storr, 2002) may be limited to humans. In fact, it makes sense that evolutionary forces would have shaped species such that the nature of fitness-indicators and mating mechanisms tend to be relatively species-specific (Verzijden, Lachlan, & Servedio, 2005; Via, 2001).

Which people embody MI in the form of mental fitness indicators?

Most mythological figures and popular culture celebrities who are known for more than just their looks exemplify some form of mating intelligence – specifically in the form of mental fitness indicators – which is why we're interested in them (see Brune, 2001; McCutcheon, Lange, & Houran, 2002).

Mythological figures exemplifying various forms of MI mental fitness indicators include the Greek gods Aphrodite, Apollo, Athena, and Dionysus, the Hindu gods Krishna, Lakshmi, and Sarasvati, and the *Arabian Nights* narrator Scheherezade. Even in monotheistic religions, superhuman levels of MI (e.g., empathy, creativity, general knowledge) are often ascribed to the deity, although such charismatic traits would seem more useful in a polytheistic mixed-sex pantheon.

Western historical exemplars of MI mental fitness indicators of MI would include Abelard and Heloise, Shakespeare, Casanova, Mozart, Jane Austen, Pablo Picasso, Jimi Hendrix, and Germaine Greer (see Miller, 2000a). With regard to contemporary celebrities, different people will think of different professional exemplars for each domain of courtship. My personal MI icons happen to include artists Cindy Sherman and Andy Goldsworthy, musicians Tori Amos and Andre Benjamin, comedians Sarah Silverman and Eddie Izzard, novelists Mary Gaitskill and Chuck Palahniuk, and actors Tilda Swinton and Denzel Washington. Since celebrity is

transient and faddish, each of these names will sound poignantly out-dated within a few years. Also, the winner-take-all nature of celebrity and the economic division of labor lead to the fact that that most celebrities are known for only one form of MI, giving the false impression that there are ferocious trade-offs between different forms of MI. I suspect that Tori Amos could learn to do film-acting better than most humans could, and that Denzel Washington could learn to sing and play piano better than most humans could, but they have little to gain and much to lose by trying to do so publicly (see Amos & Powers, 2005).

People who do not embody the mental-fitness aspects of MI typically do not usually become famous, except through physical appearance, sports ability, family background, crime, or blind luck. Super-models, football stars, British royalty, serial killers, and lottery winners may achieve notoriety, but do not often embody MI's signature fitness-display features, and therefore are not usually respected for their deeper personal qualities.

Which people embody MI in the form of mating mechanisms?

Although reliable mating mechanisms (such as the ability to accurately judge prevailing sex ratios in a local mating market) show smaller individual differences than mental fitness indicators, some people still show exemplary efficiency, accuracy, and strategic intelligence in their mate choice, cross-sex mind-reading, and relationship-management skills. I know a few friends, family members, therapists, and colleagues who excel at these things, but you haven't heard of them, so you'll need to think of your own list. Most such people are respected and envied within their small social circle, but never achieve public notoriety, because they are mostly average in their physical and mental fitness indicators.

Also, some people are much better able to articulate how these reliable mating mechanisms work, through their novels, plays, or films. To gain insight into these aspects of MI, it helps a lot to read pre-modern playwrights and novelists who thought about courtship and character, love and money, passion and convention, before literature became all alienated and self-referential – novelists such as Jane Austen, Gustave Flaubert, George Eliot, Anthony Trollope, Charles Dickins, Henry James, and Edith Wharton. A few more contemporary writers also have good MI insights – John Updike, Martin Amis, Salman Rushdie, Anne Tyler, Ian McEwan, and Margaret Atwood. Whenever one of my bright young Ph.D. students gets overly conceited and thinks they understand everything about human mating, I recommend stepping back from the science, reading a good novel, and remembering how large a gap remains between the behavioral phenomena portrayed in literary fiction, and psychology's ability to explain those phenomena.

How does MI relate to other social adaptations?

In our highly social species, we often do collective mate-attraction (e.g., through coordinated music) and collective mate choice (e.g., through collaborative gossip). Thus, MI can also include the signaling systems for exchanging and understanding mating-relevant information. For example, MI would include the capacities for seeking advice from friends about how to stay faithful and committed to one's relationship, or how to extricate oneself from the relationship, depending on its prospective costs and benefits. Thus, MI includes not just courtship adaptations and mate-choice adaptations for forming one's own sexual relationships, but social-insight and social-persuasion adaptations for following and influencing the courtship behaviors and mate choices of others.

How does general intelligence relate to MI in the form of mental fitness indicators?

General intelligence (a.k.a. IQ, general cognitive ability, the *g* factor) is the best-established, most predictive, most heritable mental trait ever found in psychology (Jensen, 1998; Plomin et al., 2003). Whether measured with a formal IQ test or assessed through informal conversation, intelligence predicts objective performance and learning ability across all

important life-domains that show reliable individual differences (Deary, 2000; Gottfredson, 1997, 2003; Lubinski, 2000). Thus, it is very likely to predict individual differences in the mental fitness indicator components of MI as well.

Evolutionary psychology often misunderstands general intelligence as if it were a rather implausible psychological adaptation in its own right. It is misconstrued as a specific mental organ, module, brain area, or faculty – yet one that is fairly general-purpose (Kanazawa, 2004). However, it is not viewed that way by most intelligence researchers. Instead, they view general intelligence as an individual-differences construct – like the constructs 'health,' 'beauty,' or 'status.' Health is not a bodily organ; it is a latent variable that emerges when one factor-analyzes the functional efficiencies of many different organs. Because good genes, diet, and exercise tend to produce good hearts, lungs, and antibodies, the vital efficiencies of circulatory, pulmonary, and immune systems tend to positively correlate, yielding a general 'health' factor. Likewise, beauty is not a single sexual ornament like a peacock's tail; it is a latent variable that emerges when one factor-analyzes the attractiveness of many different sexual ornaments throughout the face and body (Thornhill & Grammer, 1999). Similarly, general intelligence is not a mental organ, but a latent variable that emerges when one factor-analyzes the functional efficiencies of many different, mostly domain-specific mental organs (Carroll, 1993).

General intelligence seems to be a pretty good index of genetic quality, phenotypic condition, and mate value, since it is positively correlated with:

- Genetic outbreeding (which would mask harmful mutations) (Mingroni, 2004);
- Physical health and longevity (Anstey et al., 2004; Gottfredson, 2004; Rushton, 2004; Whalley & Deary, 2001);
- Body symmetry (Bates, 2004; Prokosch et al., 2004)
- Physical attractiveness (Kanazawa & Kovar, 2004; Zebrowitz et al., 2002);
- Mental health (Cannon et al., 2002; Walker et al., 2002);
- Brain size (McDaniel, 2005; Miller & Penke, submitted; Posthuma et al., 2002; Thoma et al., 2005);
- Creativity (Kuncel, Hezlett, & Ones, 2004; Rindennann & Neubauer, 2004);
- Leadership ability (Judge, Colbert, & Ilies, 2004);
- Emotional intelligence (Ciarrochi, Chan, & Caputi, 2000; Mayer, Caruso, & Salovey, 1999; Schulte, Ree, & Carretta, 2004; Van Rooy & Viswesvaran, 2004);

Thus, many mental fitness indicators are likely to function as good-genes indicators by virtue of working as indicators of general intelligence (Miller, 2000b). That is, a simple model would be:

good genes → big, bright brains → general intelligence → specific mental fitness indicators

A more complex model would reflect the positive effects of both general intelligence and certain personality traits (e.g., agreeableness, extroversion, and openness to experience) on social and emotional intelligence, and their effects on courtship abilities.

<u>How does general intelligence relate to MI in the form of mating mechanisms?</u>

If general intelligence indexes the neurodevelopmental stability of brain growth and brain functioning in general, it may also be modestly predictive of individual differences in the functional efficiency of mating mechanisms. That is, brighter people may be better not just at courtship displays, but also at mating mechanisms such as mate choice, cross-sex mind-reading, relationship management, learning their own mate value, detecting infidelities, and so forth. This has a couple of implications for MI research. First, we should be routinely measuring the intelligence of all of our participants in research on mate choice, cross-sex social attribution,

etc., to see how *g*-loaded each of these abilities really is. We don't necessarily need to give the full 36-item Raven's Advanced Progressive Matrices test; it may be sufficient to ask students to self-report SAT scores, ACT scores, and college grades. Second, if these capacities do have substantial *g*-loadings, we should realize that mating research conducted on bright college sophomores is not likely to generalize very well to other humans. Likewise, marital therapies developed for professional couples may not work very well for working-class clients.

What brain areas are involved in MI?

We don't know yet. Cognitive neuroscience arose in the late 1980s to find brain areas for perceptual and abstract cognitive abilities; social neuroscience arose in the late 1990s to identify brain areas for face recognition, person perception, and social attribution. There is almost no research so far in 'sexual neuroscience' on brain areas for mate choice and courtship. Neuroscientists are only beginning to identify the brain areas most related to heritable general intelligence, verbal intelligence, and social intelligence (e.g., Posthuma et al., 2003).

The main areas likely to be relevant to MI, based on what we know so far from cognitive and social neuroscience, are the:

- Prefrontal area of the cerebral cortex: for social and sexual behavior, Theory of Mind, perspective-taking, emotional intelligence, motivation, creativity, flexible problem solving, verbal humor appreciation
- Premotor and motor areas of frontal cortex: for spontaneous behavior, learning skilled tasks, complex movement initiation and control, facial expression, language production (Broca's area),
- Temporal lobes: for language comprehension (Wernicke's area), long-term memory
- Parietal lobes: for multi-modal sensory integration, and probably some highly *g*-loaded functions
- Cerebellum (esp. neocerebellum): for coordination and learning of complex voluntary movements
- Basal ganglia (striatum, globus pallidus, subthalamic nucleus, substantia nigra): for complex motor coordination and learning

Brain areas likely to be less important for MI are the:

- Occipital lobes: mostly for vision
- Diencephalon (thalamus, pineal, hypothalamus, pituitary, infundibulum, mammary bodies): for sensory integration, homeostasis, thirst, hunger, circadian rhythms, emotions, learning, memory, hormone regulation,
- Midbrain (tectum, periaqueductal gray, red nucleus): for head and eye movements, coordinating breathing and circulation
- Limbic system (amygdala, hippocampus, cingulated gyrus, fornix, septal nuclei): for motivating key survival and reproductive behaviors, but not usually for controlling advanced courtship or mate choice abilities
- Brainstem (pons, medulla, inferior olive, pyramid): for arousal, balance, heart beat, breathing, swallowing, digestion, sleep

Emerging cognitive neuroscience work is identifying the brain areas most closely associated with general intelligence, such as lateral and medial prefrontal cortex and posterior parietal cortex (e.g., Colom et al., 2006; Gong et al., 2005; Gray et al., 2003; Haier et al., 2004; Lee et al., 2006). These cortical areas will probably underlie many MI systems, especially mental fitness indicators. As would be predicted from a fitness indicator perspective, these g-

loaded areas also tend to be the areas that show the highest heritability in size and functional efficiency (Toga & Thompson, 2005; Winterer et al., 2005).

Such work is progressing rapidly, and might benefit from focusing more on cognitive tasks that are both highly g-loaded and highly relevant to courtship, mate choice, and cross-sex mind-reading. Also, an MI perspective might illuminate some of the dramatic sex differences that are being found in these highly *g*-related cortical areas (e.g., Haier et al., 2005; Jung et al., 2005; Schmithorst & Holland, 2006).

What is the genetic basis of human MI?

We don't know yet. The genetic basis of individual differences in mental fitness indicators is probably related to mutation load (see Keller, this volume). This should result in substantial heritability (and fairly high coefficients of additive genetic variance) in most such indicators (see Miller & Penke, in press). For example, there is strong evidence of substantial heritability in human intelligence, creativity, and personality traits.

The genetic basis of our species-typical MI capacities must have evolved in the last 5-6 million years since our lineage split from the common ancestor of chimpanzees and bonobos. Results of the Human Genome Project (Collins & McKusick, 2001) compared to the Chimpanzee Genome Project (Olson & Varki, 2003) show that about 1.2% of our 3 billion DNA base pairs are different from those of chimpanzees (Ebersberger et al., 2002). Specifically, human-chimpanzee divergence involved at least 35 million single-nucleotide changes, 5 million insertion/deletion events, and significant chromosomal rearrangements (Mikkelsen et al., 2005), plus large segmental duplication events (Cheng et al., 2005), major shifts in the hot-spots for genetic recombination (Ptak et al., 2005), changes in gene promotor region activity patterns (Heissig et al., 2005), and more rapid changes in genes underlying brain development in humans than in chimpanzees (Khaitovich et al., 2005). Thus, it is highly misleading to repeat the 30-year-old claim that "chimpanzees are 98% genetically identical to humans," which implies that the evolved genetic and mental differences are trivial.

Further clarification of the genetic basis of distinctively human MI should follow from sequencing the Neanderthal genome, which diverged from humans about 300,000 years ago (Dalton, 2006; Hublin & Paabo, 2006; Krings et al. 1997). As with most differences between mammalian species, the distinctively human forms of MI are likely to result not so much from differences in basic structural genes that code for proteins, and that tend to be highly evolutionarily conserved, but from differences in genomic cis-regulatory elements that coordinate gene expression during development (Ochoa-Espinosa & Small, 2006; Stathopoulos & Levine, 2005).

Can an individual's MI be increased?

Boosting MI in the form of optimizing mating mechanisms is probably the major adaptive function of the human life-history stage known as adolescence, through gaining experience of sexual attraction, mate choice, and rivalry before the reproductive stakes get very high. In modern societies, boosting mental fitness indicators is probably also a major function of 'extra-curricular activities' by children and adolescence (e.g., art, music, athletics), and of higher education itself (especially a classical liberal arts education). For young adults, whole genres of magazines (e.g., for men: *Esquire, FHM, Maxim*; for women: *Cosmopolitan, Glamour, Marie Claire*) are devoted to boosting MI by increasing one's physical and psychological attractiveness, and revealing the 'secret' beliefs and desires of the other sex. For mature adults, maintaining one's MI (e.g., in order to stay at least marginally interesting to a spouse) is probably a major function of keeping up with news and current affairs, and of reading discussable novels and quotable non-fiction. Boosting MI is also, of course, the main point of

couple's therapy, and of much individual psycho-therapy. Further research is needed to determine how well such putatively MI-boosting goods and services actually work.

Young males seem especially motivated to boost their MI through gaining sexual experience in dating and relationships, and paying for seduction seminars and dating mentors (see Strauss, 2005). Boosting MI may also be a major (though often unconscious) goal of ingesting 'smart drugs' (e.g., Ginkgo biloba, Ma-huang, DMEA, GHB, Hydergine, Piracetam, Aniracetam, Minaprine, Oxiracetam, phenylalanine, choline) and psychoactive drugs (e.g., caffeine, nicotine, Ecstasy, marijuana, cocaine, LSD) – though evidence for their effectiveness is mixed at best.

An individual's maximum attainable MI may be constrained by their general intelligence, social intelligence, and emotional intelligence, but few individuals seem to get anywhere near their limit, since they're too busy working and raising children.

Are there age differences in MI?

Most adaptations mature only when they are needed in the life-history of the organism. We expect MI to mature only after puberty, as humans grow towards sexual maturity. Compared to most capacities studied by developmental psychologists, MI capacities may be among the last-maturing cognitive and emotional capacities in the human behavioral repertoire.

The mental fitness indicator components of MI are predicted to be especially costly, complex, vulnerable to disruption, and correlated with general phenotypic quality. For these reasons, we might expect the fluency, efficiency, and quality of mental fitness indicators that depend upon quick, spontaneous cognitive processing to peak in young adulthood, at the peak of mating effort. This is indeed when 'fluid *g*' (general intelligence in the form of novel problem-solving) peaks, and when creative output is highest in poetry, comedy, mathematics, music composition, and artistic innovation. However, for mental fitness indicators that depend more heavily upon slowly-acquired skills and knowledge ('crystallized *g*'), we expect a later peak, as in literature, science, politics, and architecture.

The mating mechanisms of MI may show a more gradual, monotonic increase with age, compared with the fitness indicators of MI. Indeed, the wisdom that comes with advancing age is in no small part wisdom about human sexual relationships. For example, the mate choices made by teenagers often seem appallingly stupid to their parents. In part, this is because teenagers seem overly influenced by the traits that are easiest to assess: physical attractiveness and status among peers. Parents have decades more experience in assessing the harder-to-discern traits, such as intelligence, conscientiousness, agreeableness, and emotional stability, and they better understand the benefits of these traits, not just in marriage, but even in the short-term relationships that teenagers prefer. As another example, cross-sex mind-reading probably continues to improve throughout life, until senescence. The mind of the opposite sex is an exotic dark continent at age 15, a partly-explored colony at age 35, and an over-familiar garden at age 55. Moreover, in a species where adults live long past their reproductive prime and exert considerable influence over the mate choices and sexual relationships of their children and grand-children, there may have been strong selection pressures to maintain high MI well into old age.

For these reasons, future MI research should include a much broader age-spectrum of participants in research. If we want to do protocol analysis of mate choice by true experts, we must consult people who have lived for 60 years, not just 6 years, past puberty.

Are there sex differences in MI?

If evolution shaped psychological sex differences anywhere in the human mind, we should expect them most prominently in MI abilities, since MI is most closely associated with reproduction, and sex differences arise most prominently in reproductive strategies.

We should expect that these sex differences will sometimes be big, and sometimes small. They will probably be big when the adaptive problems faced by the sexes are very different (e.g., males face paternity uncertainty but females don't; females have ovulatory cycles but males don't). They will probably be small when the adaptive problems faced by the sexes are very similar (e.g., both sexes need to be able to comprehend language in courtship, and to do certain kinds of cross-sex mind-reading).

The patterning of sex differences may be quite different for different components of MI. In the domain of mental fitness indicators, mutual mate choice may result in sexual similarity in the basic cognitive capacities for many courtship displays (e.g., language, humor, art), but higher variance in male reproductive success may have driven higher male motivation, risk-taking, and status-seeking in the drive to display such capacities publicly, to multiple potential mates (Miller, 2000a).

In the domain of mate choice, both sexes should be capable of high accuracy in assessing each other's physical and mental traits, but males may take longer in a relationship to bother reaching this level of accuracy, since females have high incentives to be choosy about both short-term and long-term partners, whereas males only have incentives to be choosy about long-term partners. In the domain of self-evaluation mechanisms for assessing one's own mate value, both sexes should show reasonable accuracy at learning about their physical and psychological attractiveness, but males may be under stronger sexual selection to act confident and cocky, so they may show more of a disjunction between subjective mate value and public behavior.

In the domain of cross-sex mind-reading, both sexes should be pretty good at understanding each other's beliefs and desires, except for the many situations in which there are fitness benefits to having blind spots, empathy deficits, adaptive self-deceptions, willful ignorance, and plausible deniability; these situations are likely to be sex-differentiated, so cross-sex mind-reading abilities will probably show some sex differences that look peculiar until they are investigated from an adaptationist perspective (Haselton & Buss, 2000)

Thus, the MI perspective can lead to finely nuanced, theoretically derived, testable hypotheses about sex differences in human mating psychology.

<u>What fields need to be better integrated into MI research</u>?

- Evolutionary biology, including new developments in sexual selection theory, costly signaling theory, mutual mate choice, and MI across species.
- Genetics, including evolutionary, behavioral, molecular, and neurodevelopmental genetics; the heritability of MI components and their genetic correlations with other traits; heritable individual differences in mating strategies; etc.
- Biological anthropology, including cross-cultural adaptationist studies of mating, courtship, and intimate relationships in small-scale societies.
- Many areas of psychology, including adolescent and young-adult development, social cognition, person perception, intelligence research, personality research, judgment and decision-making, emotion and motivation, and intimate relationships research.
- Linguistics, especially naturalistic observations on conversational pragmatics and sociolinguistics.
- Sex research, women's studies, and science-friendly feminism.
- The fine arts and humanities, including quantitative studies of the role of MI in art, comedy, dance, literature, music, philosophy, and theater.

<u>What fields could be most influenced by advances in MI research</u>?

- Medicine: the roles of MI, sexual competition, and fitness indicators in comorbidity, senescence, stress, exercise, and health psychology, sexually-transmitted infections, and drug and alcohol use, and risky behavior.
- Psychiatry and clinical psychology, including the role of MI disorders and alternative mating strategies in psychopathology.
- Economics: the roles of MI and sexual competition in work, leisure, competition, bargaining, experimental game theory, and behavioral finance.
- Marketing: the roles of MI and mating effort in consumption, advertising, branding, and product design.
- Political science: the roles of MI and ideological display in political attitudes, beliefs, preferences, activism, hierarchies, and power.
- Sociology: the roles of MI, mating effort, and sexual competition in wealth, status, education, gender, marriage, family, ethnic relations, social capital, and culture.
- Education: improved ways to cultivate MI-based skills in language, art, music, drama, etc., and to harness benign sexual competition more effectively in learning evolutionarily novel, counter-intuitive skills in math and science.
- Criminology and law: the roles of MI, sexual competition, and mate choice in aggressive, anti-social, risk-seeking, sexual-coercive, and deceptive behavior.

Should we worry that MI fitness-indicator theory sounds like eugenics?

MI research on mate choice for 'good genes' indicators, including mental fitness indicators, has some parallels to themes in the early 20th century eugenics movement (Carlson, 2001; Lynn, 2001). Both are concerned with genetic quality, mutation load, offspring health, and the dynamics of mating markets (Miller, 2003). However, the differences are significant:

	MI research	Eugenics
Nature:	Descriptive science	Prescriptive policy
Basis of mate choice:	Unconscious, individual	Conscious, socially engineered
Goal:	Healthy relationships and offspring	Genetically purified population
Traits valued:	All forms of MI	Socially & economically useful
Political orientation:	None in particular	Totalitarian (fascist, socialist)
Current human evolution:	Naturally favors good genes	Unnaturally favors bad genes

Basically, MI research supposes that most humans unconsciously favor fitness indicators and good genes, and have been doing so for hundreds of thousands of years, driving human evolution in extraordinarily interesting directions. By contrast, eugenics supposes that most humans have always made stupid, dysgenic mate choices, and therefore need remedial guidance from "genetically enlightened" social activists. The more adaptive complexity we discover in human mate choice and courtship adaptations, the less relevant eugenics should seem.

How does MI relate to psychiatry and clinical psychology?

Some mental disorders such as schizophrenia and depression may represent the low-fitness extremes of mental fitness indicators such as verbal courtship ability (Shaner, Miller, & Mintz, 2004), aesthetic creativity (Nettle, 2001; Nettle & Clegg, 2006), and subjective well-being.

Other mental disorders may represent harmful dysfunctions in mating mechanisms, especially those concerned with mate choice, self-assessment of mate value, cross-sex mind-reading, strategic mating, and management of mating-related emotions. Disorders characterized by adolescent and early-adulthood onset are especially likely to reflect MI dysfunctions, insofar as MI capacities would mature only after puberty (Shaner, Miller, & Mintz, 2004).

Some sexual disorders represent dysfunctional mate choice systems that drive sexual attraction to the wrong age (pedophilia directed at the sexually immature), the wrong species (bestiality/zoophilia directed at non-human animals), the wrong state of living (necrophilia directed at dead people), or the wrong state of animacy (fetishism directed at inanimate objects) (see Freund & Seto, 1998). Within this context, homosexuality might be classed as sexual attraction to the wrong sex (with respect to evolutionarily viable offspring-production -- see below). Other sexual disorders (e.g., exhibitionism, frotteurism, voyeurism, erotomania) may probably reflect over-active, inappropriately modulated courtship tactics that may have been ancestrally common among other social primates, but that are now beyond our cultural norms (see Brune, 2001; Sheets-Johnstone, 1990).

However, many sexual 'dysfunctions' may not really be disorders when considered from an MI perspective. If a woman experiences low sexual interest (sexual aversion disorder, female sexual arousal disorder), vaginal resistance or pain (vaginismus, dyspareunia), or lack of orgasm (female orgasmic disorder), these may reflect adaptive mate choice mechanisms that reject low-fitness or low-commitment mates – even if those mates are socially validated (e.g., husbands, boyfriends) as 'appropriate' (see Reissing, Binik, & Khalife, 1999). For example, a man who seems 'nice' but who lacks compelling mental fitness indicators, foreplay skills, and copulatory courtship abilities, may not provoke orgasm – and that may be the right adaptive response, to inhibit reproduction and pair-bonding with an inferior mate (Shackelford, Pound, & Goetz, 2005; Shackelford, Weekes-Shackelford, et al., 2000; Thornhill, Gangestad, & Comer, 1995). Sometimes these disorders generalize across all sexual partners, but often they do not.

Some mental disorders seem to reflect faulty mechanisms for self-assessing mate value. The eating disorders anorexia and bulimia are often associated with body image distortions (e.g., body dysmorphic disorder) in which someone thinks they are much fatter than the other sex, or same-sex rivals, would find attractive. This results in runaway sexual competition for thinness (Abed, 1998; Faer et al., 2005). This could also be seen as a failure of cross-sex mind-reading (e.g., assuming that men want ultra-skinny super-models, when they actually prefer women with normal gynoid fat distributions that indicate higher fertility – see Furnham, Petrides, & Constantinides, 2005).

Moods disorders such as dysthymia and major depression may also reflect dysfunctions in mechanisms for self-assessing mate value. They are often triggered by sexual rejection, relationship stress or failure, or a sense of being trapped in the wrong relationship (Gilbert & Allan, 1998; Nesse, 2000). They often provoke low sexual self-esteem (subjective mate value), reduced libido, withdrawal from the mating market, and anxieties about socio-sexual interaction. Such responses may be adaptive for a limited time after a mating set-back, but when they become chronic and driven by endogenous cycles rather than external circumstances, they seem dysfunctional (Nesse, 2000). Alternatively, some mood disorders and hypochondria may reflect unconscious tactics to extort higher support, commitment, and care from a reluctant mate (Hagen, 2002; Watson & Andrews, 2002).

Almost all personality disorders seem to reflect MI dysfunctions in some way – or perhaps they are adaptive, alternative mating strategies. Narcissistic personality disorder, which is much more common in males, leads to over-active display of physical and mental fitness indicators, driven by a sense of grandiosity, a need for admiration, and a sense of social and sexual entitlement (Baumeister, Catanese, & Wallace, 2002; Wallace & Baumeister, 2002). It is often associated with over-estimating one's mate value, including one's intelligence,

attractiveness, social status, and sexual popularity. It also drives intense envy and animosity towards sexual rivals who threaten one's relative status. It typically leads to a lot of short-term, impulsive mating, and lower long-term commitment (Campbell & Foster, 2002). Of course, it may be a form of adaptive MI, insofar as some narcissistic males achieve very high short-term mating success. Bipolar disorder can also lead to very high short-term mating success in the manic phases, when individuals invest huge energy into physical and mental fitness indicators (Brody, 2001; Nettle, 2001).

Similarly, antisocial personality disorder (psychopathy) is much more common in males, and leads to a wide variety of exploitative, opportunistic, or coercive short-term mating tactics, ranging from deceptive seduction to forcible rape (Charles & Egan, 2005; Lalumiere & Quinsey, 1996). It combines heightened cross-sex mind-reading (better abilities to understand, deceive, and manipulate potential mates), with reduced cross-sex sympathy (no interest in their suffering). Psychopaths, like narcissists, often achieve very high short-term mating success, until they are ostracized, imprisoned, or lynched. This mating-focused view of psychopathy contrasts with the traditional evolutionary psychology view that it is a generally exploitative social strategy for deception, betrayal, and free-riding (Mealey, 1995; Wilson, Near, & Miller, 1996).

By contrast, borderline personality disorder is much more common in females, and seems to reflect several MI dysfunctions, including reduced subjective mate value (low self-esteem), impulsive short-term mating (promiscuity), and highly unstable assessments of sexual partners' commitment levels, moral virtues, and personality traits (Liotti, 2002; Moeller et al., 2001). Women with borderline tend to cycle between prematurely intense attachment to male sexual partners, and premature rejection of partners who do not reciprocate such attachment immediately (Aaronson et al., 2006). Thus, borderline seems in involve dysfunctions in cross-sex mind-reading, managing mating-related emotions (lust, love, jealousy), mating mechanisms for assessing own mate value, and the strategic modulation of attachment and commitment levels.

Of course, many other mental disorders seem much less related to mating and MI, and much more related to dysfunctions of psychological adaptations for survival (e.g., snake phobias, obsessive-compulsive disorder, post-traumatic stress disorder, pyromania, hypochondriasis) and for general social living (e.g., agoraphobia, generalized anxiety disorder, dissociative disorders, intermittent explosive disorder, kleptomania) (see Cosmides & Tooby, 1999). Nevertheless, an MI perspective may lead to new ways of diagnosing, categorizing, and treating many mental illnesses, and for understand sex differences in mental disorder prevalence rates and symptom patterns.

What about homosexuality?

From a strictly evolutionary-functional viewpoint, homosexuality represents a significant MI malfunction, insofar as it drives sexual attraction to same-sex potential mates who cannot produce offspring with oneself. This is why it has proven so very difficult to explain the existence of heritable homosexual preferences in a small percentage of men and women. The best evolutionary explanations so far seem to view homosexuality as a maladaptive byproduct of X-chromosome alleles that evolved through sexually antagonistic co-evolution to increase female fecundity (Camperio-Ciani, Corna, & Capilucci, 2004).

This is not to say that there is anything morally, politically, or spiritually wrong with homosexuality, or that it should be classed as a mental disorder. Indeed, homosexuality could be viewed in some respects as the triumph of the individual's mating intelligence over the gonads' evolutionary interests. This is because homosexuality eliminates much of the sexual conflict that characterizes heterosexual courtship and relationships (Kurdek, 2005). Mind-reading becomes easier when one's mate is the same sex. Coordinating sexual strategies becomes easier when one's mate has the same preferences with regard to short-term versus

long-term mating, promiscuity versus commitment, and spontaneous intercourse versus leisurely foreplay (Ekstrand et al., 1999; Mackey, Diemer, & O'Brien, 2000). Sexual dysfunctions and frustrations become less likely when mates understand each other's bodies as well as they understand their own. Sexual rivalry becomes easier to undercut when one's rival is the same sex as one's lover, and therefore seducible. Sexual coercion is harder to use and easier to avoid when one's mates have bodies more closely matched in size and strength. Thus, homosexuality solves a lot of MI problems with a peremptory elegance.

For all these reasons, MI research should include a lot more studies of gay men and lesbians. They make highly informative comparison groups in many ways. For example, suppose one studies domestic conflict in heterosexual married couples, and finds that many husbands think their wives nag them too much, and many wives think that husband shirk their domestic duties too often. We can't tell to what extent each sex's view is accurate, because each sex's behavior is conflated with the other sex's reaction. Now, if we found that gay men also think their partners nag them too much, we might suspect that the aversion to nagging is a special case of general male irritability, rather than a righteous defense against female obsessiveness. Whenever we expect sex differences and/or sexual conflicts of interest, MI research should strive to include gay men and lesbians in every multi-study research program, if not in every study.

Is MI research ideologically pernicious in any other ways?

No, but it makes some folks really uncomfortable, until they come to terms with human sexuality – their own, their mates', their rivals', and their children's (see Miller, 2003).

Are the FAQ answers in this chapter intended to be authoritative?

Absolutely not. These are my personal hunches at the moment, as of August 2006, and they do not necessarily reflect the views of any other contributors to this book. If the MI research program is empirically and theoretically successful – if it surprises us, like good science should – I may well change my mind in the future about many of these issues.

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