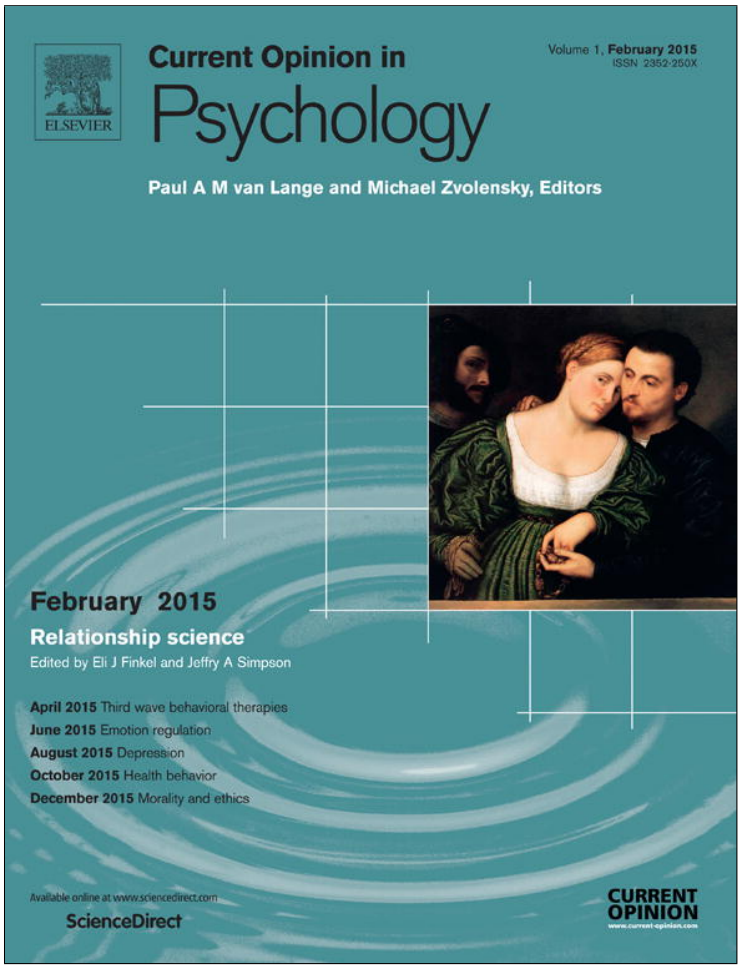

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Current Opinion in Psychology

Adaptive workarounds

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Adaptive workarounds are recently evolved features that function to mitigate or manage some maladaptive element of a pre-existing adaptation. This article discusses three adaptive workarounds in the human mating repertoire. First, a strong attachment bond between adult mating partners may mute or refocus older features (e.g. testosterone in men, ovulatory shifts in women) in a manner that protects and preserves the pair-bond. Second, humans' ability to identify a stranger as an ingroup or an outgroup member moderates the function of ovulatory shifts. Third, self-control enables people to inhibit evolutionarily older impulses in cases where those impulses could disrupt pair-bonds or thwart long-term goals. Information about the time course of human evolution (i.e. phylogeny) can generate new insights about human mating.

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The field of evolutionary psychology draws from evolutionary biological principles to develop and test hypotheses about the form and function of the human mind. One such principle is *adaptation*, which refers to a feature of an organism that emerged via natural selection because it enhanced reproductive success. For example, if a man encounters a young, attractive woman, adaptations in his mind might trigger feelings of attraction, which could subsequently inspire him to attempt to initiate a romantic or sexual relationship with her. Evolutionary psychologists argue that the human mind contains many mental adaptations, each designed to produce thoughts, feelings, or behaviors that would have been functional in humans' evolutionary past [1,2].

In a given context, more than one mental adaptation may be relevant for guiding behavior, and sometimes the functions of these adaptations work at cross-purposes [3]. The mind must somehow resolve these conflicts: For example, a man might possess mental adaptations designed to maintain his devotion and commitment to an existing long-term partner, eliminating the behaviors he would otherwise have enacted in the presence of a young, attractive woman [4]. Broadly speaking, adaptations designed to facilitate mating may not exhibit their typical effects — or they might even exhibit new effects — under particular circumstances where conflicts between adaptations arise.

The *adaptive workaround* is a concept that may help scholars to generate *a priori* predictions about how conflicts between different mating-relevant adaptations will be resolved. Also borrowed from the evolutionary biological literature, adaptive workarounds are features that evolved relatively recently in an organism's evolutionary history and function to mitigate or manage some maladaptive element of a pre-existing adaptation [5]. Adaptive workarounds arise because older features of organisms are sometimes resistant to selection and serve as sources of evolutionary constraint [6–8]. For example, the transition to bipedalism among hominids narrowed the birth canal and therefore placed a constraint on these organisms' cranial capacity. Natural selection produced an adaptive workaround to evade this constraint: Early Homo experienced a shift in the timing of infant development such that a greater proportion of cranial growth took place after birth rather than prenatally. This shift allowed early Homo to grow large adult brains without compromising the ability of newborn heads to fit through the narrow birth canal [9].

In order for scholars to make reasonable inferences about which adaptations might serve as adaptive workarounds, they must draw from an existing knowledge base about how the features of an organism have changed over evolutionary time (i.e. phylogeny). For psychologists, generating hypotheses about adaptive workarounds thus requires knowledge of how the human mind has evolved over time. Although our understanding of the psychology of early hominids is far from complete, archeological, anthropological, and comparative biological approaches may reveal clues about the psychology of these species and can thereby guide hypotheses about the modern human mind [5,10–13].

Importantly, the adaptive workaround concept predicts that when a more recent psychological adaptation is activated in a given context, the effect of a previously evolved, conflicting adaptation may be muted (i.e. it may be reduced or eliminated) or refocused (i.e. it may be rechanneled to have a different adaptive function). The current article describes recent evidence for adaptive

workarounds in the domain of human mating. Although this literature is in its infancy, there is growing evidence that three adaptations that emerged relatively recently within the hominid lineage (i.e. less than two million years ago) have adaptive workaround-like properties: Attachment bonds (i.e. pair-bonds) between romantic partners, the ability to categorize unknown others as ingroup versus outgroup members, and the use of self-control to facilitate the pursuit of future goals.

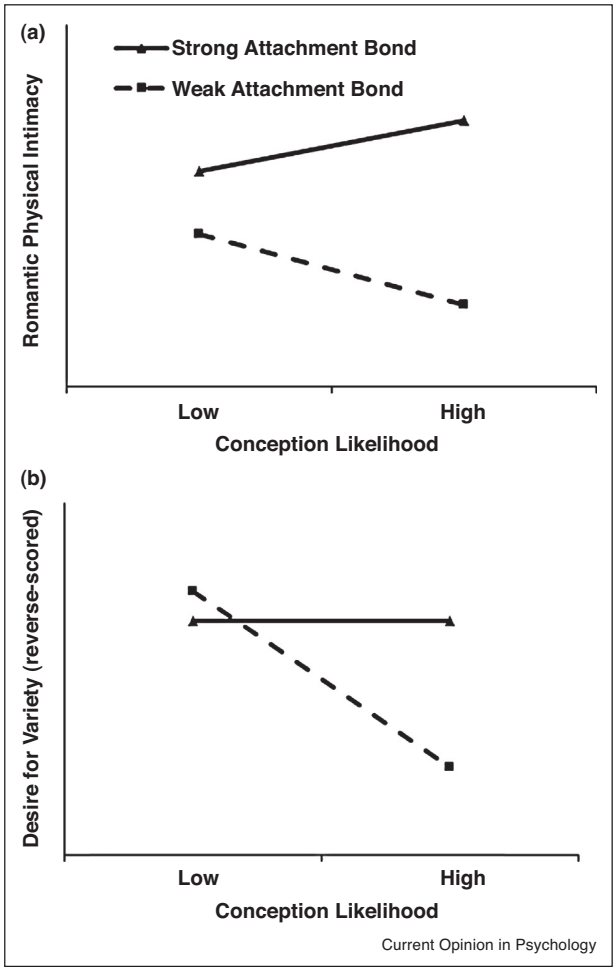
Attachment bonds as adaptive workaround

Attachment bonds (i.e. pair-bonds) between adult mating partners likely first emerged in the hominid lineage between 1.5 and 2 million years ago, a period of time when sexual dimorphism decreased and infants required considerable investments in the form of calories and caregiving [14,15]. Attachment bonds would have increased reproductive success in early Homo by promoting intersexual cooperation and encouraging paternal investment in offspring [16•,17]. Yet despite ongoing selection pressures for pair-bonding, these same early hominids would have already possessed many mental adaptations that served functions related to mating effort. For example, both male and female Homo would have been drawn to attractive opposite-sex partners, and like other primates, they possessed sex hormones (e.g. testosterone, estrogen) that facilitated mating behavior. Thus, the evolution of pair-bonding set the stage for possible conflicts between older adaptations designed to identify and acquire mates and newer adaptations designed to maintain the pair-bond [5].

If the attachment bond functions as an adaptive workaround, then features associated with pair-bonding should mute or refocus previously evolved mating-effort adaptations. One example may be that the pair-bond decreases the presence of circulating testosterone in men. Testosterone is linked to intrasexual competition and the pursuit of new mating partners, and it may disrupt effective caregiving and nurturing behavior [18–20]. Thus, high levels of testosterone should be adaptive for men who are attempting to acquire mates but might be maladaptive among men who are pair-bonded. Consistent with this hypothesis, men who are involved in a committed romantic relationship have lower testosterone than unpaired men [21–24], and this decline in testosterone has been documented longitudinally as men make the transition into marriage and fatherhood [25].

Attachment bonds may also function as adaptive workarounds with respect to shifts in women's sexual interests across the ovulatory cycle. On average, women are especially likely to desire men with features that indicate genetic fitness (e.g. dominance, masculinity) when they are in the fertile phase of their menstrual cycle [26]. If these desires encouraged women to have sex with men who were not their primary partners, however, these desires could have been maladaptive in the context of a strong pair-bond. Two studies suggested that strong attachment bonds rechannel ovulatory shifts to inspire women's desire for intimacy-promoting sexual contact with their current partners [27••]. In these studies (Figure 1, panel a), attachment bond strength was assessed as the extent to which the woman reported that her male partner exhibited several attachment-related features and functions (e.g. safe haven, separation distress; [28]). Women with weak pair-bonds were less likely to desire romantic physical intimacy with their partner in the fertile than the nonfertile phase of their cycle (see also [29]). Yet consistent with the adaptive workaround logic, women with strong pair bonds were *more* likely to desire romantic physical intimacy with their partner in the fertile than the nonfertile phase of their cycle. It is possible that

Figure 1



Patterns of data illustrating the Attachment Bond Strength × Conception Likelihood interaction on the desire for romantic physical intimacy ([27••], Studies 1 and 2) and desire for variety ([31••], Studies 2 and 4). Results are combined across the two relevant studies within both articles.

the presence of a strong attachment bond acts as a filter that channels the outputs of ovulatory cycle adaptations to facilitate adaptive behaviors (e.g. intimacy-building sex) other than the acquisition of good genes (see also [30]).

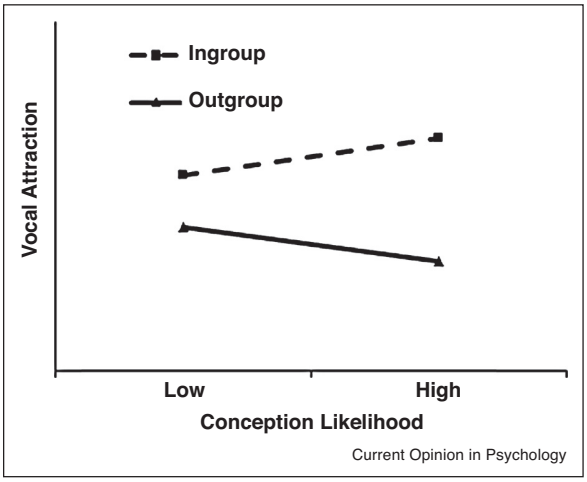
Another set of studies (Figure 1, panel b) documented similar moderational patterns predicting ovulatory shifts in women's desire for variety [31••]. One study (Study 2) found that fertility was positively associated with the desire for variety among weakly bonded women, but this association was reduced considerably for strongly bonded women. Another study (Study 4) used an experimental manipulation of attachment bond strength: Fertility was associated with the desire for variety for women who were told to remove their wedding ring (weakly attached condition) but not for women who were told to wear their ring (strongly attached condition). Women may desire more variety in the fertile rather than nonfertile phase of their cycle as a way to expand their pool of mates and find the best available sexual partner, but attachment bonds may function as an adaptive workaround and reduce the strength of this particular ovulatory shift.

Ingroup membership as adaptive workaround

A second adaptive workaround example again involves ovulatory shifts, this time examining men's and women's attraction to opposite-sex members of ingroups versus outgroups. The ability to differentiate strangers based on symbolic cues to group membership is a uniquely human skill not shared with other primates [32], and it likely arose within the last several hundred thousand years as Homo sapiens evolved to use abstract symbols [5,33]. In the romantic domain, preferences for ingroup members are quite strong [34], and sexual intercourse with outgroup members could have been counternormative or even dangerous in ancestral environments. Thus, once humans could differentiate ingroup members from outgroup members, previously evolved adaptations designed to facilitate mating could potentially have been maladaptive if oriented toward outgroup members.

Two moderational patterns of data consistent with this adaptive workaround logic have been documented. First, although fertility is typically associated with increases in women's desire for masculine, dominant men [26], fertility is actually associated with stronger *negative* evaluations of outgroup members to the extent that those men are physically dominant [35]. Second, men tend to find women's voices more attractive when they are in the fertile rather than the nonfertile phase of their cycle [36]; presumably, this evaluative shift would make men more likely to exert mating effort in the pursuit of women who are especially likely to conceive. However, men exhibit this pattern only when the women are ingroup members — that is, when they are the same ethnicity as the participant or attend the same school — not when they are outgroup members (Figure 2; [37]). In summary, adaptations that facilitate ovulatory shifts in women's preferences for dominant males and men's preferences for fertile women may be deactivated when the target is an outgroup member.

Figure 2



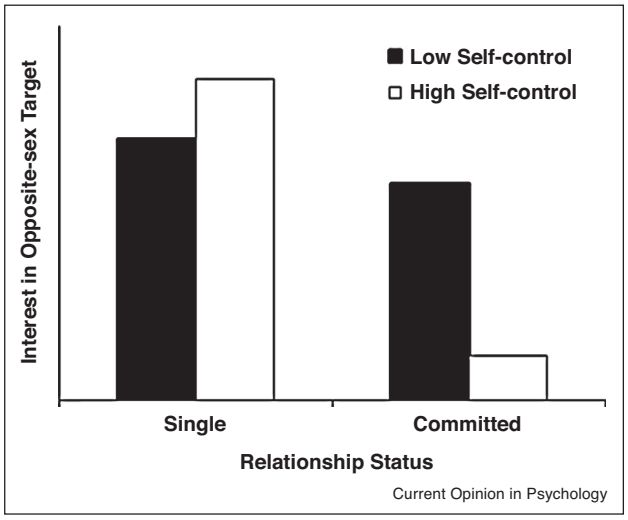
Pattern of data illustrating the Group Membership × Conception Likelihood interaction on men's attraction to women's voices ([37], Studies 1–3). Results are combined across the four relevant analyses (ethnicity moderation in Studies 1–3, school membership moderation in Study 2).

Self-control as adaptive workaround

When humans evolved the capacity for culture and the ability to plan for the distant future approximately 50 000–100 000 years ago, the use of self-control to regulate behavior would have become an increasingly important tool that aided early humans in becoming a valued member of a cultural group [5,38,39]. Therefore, maladaptive effects of previously evolved impulses might be muted or refocused in cases where people exert self-control to conform to group norms. Evidence consistent with this hypothesis comes from diverse domains (e.g. aggression, eating behavior; [40]). Specifically within the mating domain, the exertion of self-control limits the extent to which people pursue mating opportunities outside of a committed partnership [41]. For example, participants who are currently involved in a romantic relationship are (a) less likely to want to meet and (b) less likely to flirt with an attractive opposite-sex individual to the extent that they are high in self-control capacity [42]. In addition, although romantically involved participants typically derogate the appeal of romantic alternatives, they are less successful at this endeavor to the extent that they have had their self-control reserves temporarily depleted (Figure 3; [43•]).

The adaptive workaround perspective may also explain why men are more likely than women to succumb to

Figure 3



Pattern of data illustrating the Self-Control × Relationship Status interaction on romantic interest in opposite-sex targets ([43•], Studies 1 and 2). Results are combined across the two studies.

sexual temptations (e.g. commit infidelity). The ability to exert self-control in order to conform to cultural norms and future goals emerged during a recent period in human evolution when sexual selection pressures were relatively weak [5]; thus, self-control is an unlikely candidate for explaining sex differences in infidelity. Yet men tend to have stronger sexual impulses than women, a sex difference that may have deep evolutionary roots [44]. Two recent studies derived separate estimates of impulse strength and self-control ability, and the results suggested that the sex difference in the strength of the sexual impulse explained (i.e. mediated) the effect of participant sex on the likelihood of succumbing to sexual temptations [45••]. There was no sex difference in participants' ability to exert self-control, and among participants with strong self-control, the sex difference in the tendency to succumb to sexual temptations was eliminated. Once again, the evidence is consistent with predictions deriving from an adaptive workaround framework: When older evolved impulses conflict with norms and goals, self-control may mute the behavioral consequences of those impulses.

Conclusion

Part of the human mating psyche derives from our shared ancestry with other primates, and many of these mechanisms have been honed by natural selection over millions of years. But other mating-relevant adaptations evolved more recently in the hominid lineage, and some might even be unique to our species. Knowledge about the time course of evolutionary events (i.e. phylogeny) may inform researchers' ability to make predictions about how these different adaptations interact to produce adaptive outcomes. The adaptive workaround concept predicts a specific pattern of effects such that newer adaptations mute or refocus the effects of older adaptations. The effects documented here illustrate the utility of the phylogenetic perspective for achieving a more complete understanding of the human mind.

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