

forward, and ones that are consistent with the data reviewed by Del Giudice. The major challenge now is to develop and test a range of more critical empirical predictions.

We propose one particular set of predictions for future research. The hypothesized link between attachment and adaptive variation in reproductive strategies (e.g., mating vs. parenting effort) implies that sexual relationships should be a key area for study. Much evidence suggests that women's sexual strategies correlate with mate preferences on certain dimensions of physical attractiveness, such as male facial and vocal masculinity (Gangestad & Simpson 2000; Gangestad & Thornhill 2008; Provost et al. 2008). In combination with the arguments of the target article, this leads to the prediction that attachment styles should correlate with females' preference for masculine faces and voices. In populations characterized by low paternal investment and high levels of aggressive male-male competition, there is a significantly stronger average preference among females for masculinized facial features than in populations characterized by higher paternal investment (Penton-Voak et al. 2004). The evolutionary logic is that, where there is low paternal investment, women's mate choices should be more strongly biased towards males of high competitive ability. Similarly, women seeking short-term sexual relationships have a stronger preference for masculine features than those seeking long-term relationships (Little et al. 2002), again indicating a link between likelihood of paternal investment and preference for masculinity. The theoretical link to attachment processes is that female dismissiveness should correlate positively with masculinity preferences. On the other side of the coin, males with more masculine faces tend to have more sexual partners and be less interested in long-term relationships (Boothroyd et al. 2008). Consequently, facial masculinity should correlate with attachment profiles in males.

Sexual strategies also vary according to the individual's perception of their own "market value" (Little & Mannion 2006). An intriguing corollary of the target article is that these perceptions may correlate not only with physical attractiveness, but also with the experience of attachment relationships in middle childhood. This would predict an association between attachment profile and self-rated attractiveness.

Finally, female sexual strategies have been shown to be hormonally influenced. During the menstrual cycle, women become more interested in short-term relationships, are more likely to be unfaithful to their long-term partner, and are more attracted to masculine facial and vocal features around the time of ovulation, when the risk of conception is high (Penton-Voak et al. 1999; Feinberg et al. 2006; Gangestad & Thornhill 2008). This has been interpreted as reflecting a "dual" sexual strategy, promoting mating with competitive but low-investing males while also garnering paternal investment via a long-term relationship. A further prediction is therefore that attachment profiles should vary cyclically, directly mirroring the cyclicity in sexual behaviour. This would imply that attachment profiles, albeit perhaps largely fixed early in life, also have some previously unsuspected adaptive plasticity.

## What love has to do with it: An attachment perspective on pair bonding and sexual behavior

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**Abstract:** Del Giudice proposes that short-term mating strategies are adaptive for attachment-avoidant men. We argue that this model

- (1) does not apply to the majority of avoidant men (fearful-avoidants);
- (2) is based on limited evidence that the remaining subset of avoidant men (dismissing-avoidants) engage in short-term mating strategies; and
- (3) disregards the importance of pair bonding even for dismissing-avoidants.

A central assumption of Del Giudice's model is that insecurely attached male infants develop an avoidant attachment strategy in adulthood that is associated with short-term mating strategies that maximize fitness. In this commentary, we first argue that Del Giudice's model ignores the majority of men who engage in avoidant attachment strategies, namely, fearful-avoidant men, who constitute approximately 21% of the population (Bartholomew & Horowitz 1991). Moreover, the model does not accurately apply to dismissing-avoidant men, who make up approximately 18% of the population. Second, we question Del Giudice's claim that the "link between avoidance and short-term mating style is well supported by research in adult attachment" (sect. 5.2, para. 3), as well as the idea that short-term strategies increase fitness for dismissing-avoidant men. Finally, we discuss a point overlooked by Del Giudice: the benefits of pair bonding on, and in the absence of, direct reproductive outcomes.

Del Giudice claims that an avoidant attachment strategy is related to short-term mating strategies (e.g., an earlier onset of first sexual experience and higher frequency of sexual activity with different partners). However, empirical work does not unequivocally support this claim. There is evidence that avoidant male adolescents are less likely to ever have had sex, to have engaged in fewer sexual behaviors before trying intercourse, and to have sex less frequently (Tracy et al. 2003). In a sample of 327 adult men between the ages of 19 and 35 years, attachment avoidance was unrelated to frequency of sexual intercourse (Bogaert & Sadava 2002). Even though there is some evidence that attachment avoidance is associated with a higher frequency of casual sex (i.e., sex in the absence of a committed relationship) (Brennan & Shaver 1995; Schachner & Shaver 2002), this is only true for a subset of avoidant males.

One explanation for this discrepancy is a distinction that Del Giudice relatively ignores: the difference between *dismissing-avoidance* and *fearful-avoidance*. According to adult attachment theory (Bartholomew & Horowitz 1991; Hazan & Shaver 1987), both dismissing-avoidant and fearful-avoidant people are uncomfortable with closeness and intimacy and avoid relying on attachment figures. A critical distinction between the two is in their level of attachment anxiety (i.e., concerns about rejection and abandonment by partners). Dismissing individuals avoid intimacy and closeness because, at least explicitly as part of an emotion-regulation strategy (Fraley & Shaver 1997), they devalue the importance of close others and emotional ties. In contrast, fearful individuals avoid intimacy and closeness because they strongly fear being rejected. Thus, dismissing-avoidance is characterized by high avoidance and low anxiety, whereas fearful-avoidance is characterized by high avoidance and high anxiety.

With respect to sexual behaviors, these two avoidant patterns share some similarities but also differ in important ways. Because both are uncomfortable with closeness, sexual activity is less satisfying, less pleasurable, and even aversive (Birbaum et al. 2006), and consequently, is engaged in less frequently (e.g., Brassard et al. 2007). However, only dismissing-avoidance is associated with engaging in casual sex in lieu of intimate relationships (Schachner & Shaver 2004).

Thus, Del Giudice's model does not apply to a significant proportion of avoidant individuals, namely, fearful-avoidants. Further, even if one distinguishes between the two avoidant patterns, as proposed by attachment theory, Del Giudice's model may still not be correct with respect to the short-term mating strategies of dismissing-avoidants. Although they engage in casual sex, there is no clear evidence that dismissing-avoidants have an earlier onset of sexual activity (Bogaert & Sadava

2002), or that they engage in other short-term mating strategies, such as extra-paired sexual affairs (Bogaert & Sadava 2002; Gangestad & Thornhill 1997). Thus, there is limited evidence supporting Del Giudice's claim that dismissing-avoidant men engage in short-term mating strategies.

As an alternative explanation, we propose that dismissing men who engage in casual sex do so to satisfy attachment-related needs, irrespective of direct reproductive outcomes. Research shows that avoidant individuals are more likely to cite external motivations for engaging in sex ("to fit in better," "to be able to say you've done it"), which suggests that they engage in sex to seek social status and to avoid peer rejection (Schachner & Shaver 2004). Consistent with the idea that attachment-related needs underlie engaging in sexual behaviors for avoidant individuals, greater frequency of casual sex appears to be independent of sex drive (Schachner & Shaver 2002).

Moreover, we question whether a short-term strategy is more beneficial than a long-term strategy for dismissing individuals. We consider this from both a sexual strategies perspective, in which individuals aim to maximize their fitness, as well as an attachment perspective (Bowlby 1982), according to which individuals aim to maintain close ties with others to promote feelings of security and well being.

From a sexual strategies perspective, pair bonding in humans increases fitness (Hazan & Diamond 2000). It promotes parental investment in offspring, thereby increasing offspring survival. Further, it increases the chance of fertilization, given the covert ovulation cycle in women and that the frequency of women's ovulation cycles increases within pair bonds (Veith et al. 1983). As a result, sex within a committed relationship is more likely to lead to reproductive success than promiscuous sex. Moreover, although individuals who engage in casual sex may have a greater number of partners per year, the frequency of engaging in sex is likely to still be higher for dismissing individuals within committed relationships. In short, it has not been established that a short-term mating strategy will increase fitness for dismissing men.

From an attachment perspective, the physical, psychological, and social benefits of mother-child bonds (Harlow & Harlow 1965) and pair bonds (Uchino et al. 1996) are well-documented. The magnitude of attachment-related benefits on health and mortality are approximately the same as the detrimental effect of smoking on health (House et al. 1988). Moreover, the benefits of pair bonding and the costs associated with lack of a mate may be greater for men than women (Cramer & Neyedley 1998). Further, the nonrandom pairing of anxious women and avoidant men (Kirkpatrick & Davis 1994) may be extremely beneficial for dismissing-avoidant men. This pairing of dismissing men, who have low levels of caregiving, with anxious women, who are prone to compulsive caregiving, would enable dismissing men to benefit from pair bonding without the cost of having to provide care (Feeney & Collins 2001). Given these considerations, it is not surprising that a substantial proportion of dismissing-avoidant individuals still commit to relationship partners (Bogaert & Sadava 2002), instead of remaining unpaired (although less so than secure individuals).

In summary, we argue that Del Giudice's model ignores the majority of avoidant men, namely, fearful-avoidant men. Moreover, given the limited evidence that dismissing-avoidant men engage in short-term mating strategies, it may not even apply to the subset of men who are dismissing-avoidant. Finally, Del Giudice ignores the benefits of human pair bonding both on, and independent of, reproductive outcomes for dismissing men.

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## Author's Response

### Human reproductive strategies: An emerging synthesis?

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**Abstract:** In the first part of this response, commentators' critiques to the target article are reviewed and addressed. The main discussion topics are the role of attachment in developmental plasticity; the relationship between attachment, mating, and reproductive strategies; the existence, magnitude, and developmental timing of sex differences in attachment; the adaptiveness of insecure styles; and the neurobiology of attachment and reproduction. The model's assumptions are clarified, and a number of methodological issues that can confound the interpretation of research findings are examined. In the second part, various proposals made by commentators are synthesized, and directions for future research and theoretical improvement are outlined. In addition, the issue of disorganized and fearful attachment is tentatively addressed. It is argued that different theoretical perspectives are converging toward a consistent and comprehensive theory of human reproductive strategies.

Receiving so much feedback is nothing short of thrilling, and the commentators did a great job dissecting my model, criticizing its assumptions, and suggesting novel ways to improve our understanding of human life histories – my thanks to all of them. I am excited at the new opportunities for interdisciplinary integration that are clearly emerging from this lively area of research.

In the target article, I presented an updated evolutionary-developmental model of human reproductive strategies, integrating the life history framework of Belsky, Steinberg, and Draper (Belsky et al. 1991) and Chisholm (1999) with sexual selection and parental investment theory. In this model, insecure attachment in infancy and early childhood entrains reproductive strategies that are based on current reproduction and high mating effort; however, the optimal strategies (and the optimal balance of mating versus parenting effort) differ between males and females. This is reflected in a reorganization of the attachment system in middle childhood, leading to sex differences in insecure attachment styles. In particular, insecure males tend to adopt avoidant styles, whereas insecure females show higher levels of anxiety. In a parental investment/sexual selection framework, sex-specific attachment styles are adaptive both in adults, where they regulate commitment and investment in couple bonding, and in children, where they affect a suite of traits involved in same-sex peer competition. The reproductive strategy adopted by an adult individual is thought to reflect an interplay between early stress and attachment security, genotypic factors, and later experiences (see Fig. 2 of the target article). Finally, I proposed that adrenarche acts as an endocrine switch at the beginning of middle childhood, affecting the sex-specific development of attachment styles and of nascent reproductive strategies.