Behavioural Ecology: Social Networking for Dullards

A recent paper shows that dull-plumaged male house finches can improve their mating success by moving to a different social network, where their plumage is brighter relative to that of other males.

David B. McDonald

Much of the appeal of a painting by Vermeer lies in the contrast between an apparently humble subject, such as a serving girl pouring milk, and the background, such as strong shadows on a wall. Although I might balk at comparing dull male house finches to the beauty of 'The Kitchen Maid', a recent paper [1] suggests that female house finches may think differently. Kevin Oh of Cornell University and Alex Badyaev of the University of Arizona provide evidence that in house finches some dull-plumaged males choose their social backgrounds in order to enhance their own appeal, at least to female conspecifics.

To measure and compare the social backgrounds of male house finches, the authors used social networks. Social network approaches have become useful tools for studying multi-individual interactions that can reduce intra-group conflict, influence the spread of epizootics or parasites, predict future social status or probability of dispersal [2–5]. Oh and Badyaev's study [1] expands this range of topics by showing that social networks may also function as 'movable markets' in which the vendors — in this case courting males — can benefit by finding settings in which their wares are displayed to maximum advantage. The plumages of male house finches are notoriously variable [6]. Just as Vermeer enhanced his subject by masterfully manipulating the background, duller males are able to increase their appeal by choosing a suitable background, in this case a social context, in which their dull plumage is brighter relative to that of their male rivals. Oh and Badyaev [1] found that, holding plumage brightness constant, males that shopped for a social background with a higher proportion of dull males were more likely to succeed in attracting a female. Their result is important, because it demonstrates that the plumage ornament has no absolute value or effect, instead it interacts with the social environment to influence the outcome of sexual selection. Furthermore, Oh and Badyaev [1] found that dull males were more socially labile than were bright males, as assessed by the social network metric, 'betweenness', which assesses how often a focal individual lies along the shortest paths between other individuals in the network. Males that move frequently among subcomponents of the larger social fabric will place themselves along more of these shortest paths and therefore have a higher degree of betweenness. The new study [1] thus serves as a reminder that behavioral context may be essential to proper understanding of the function of morphological and other traits [7,8].

One of the ways in which the study of Oh and Badyaev [1] stands out is that it creates an elegant link between social network analyses, measurement of male plumage differences and the resulting fitness landscape. High probability of pairing success (a component of fitness) had two peaks – one for males with low betweenness (low social mobility) but high color elaboration, and the other for males with high betweenness that compensated for low color elaboration. These are not, however, two stable, alternative mating strategies. Rather, if a male is dull-plumaged, then social lability (a male's likelihood of moving among social networks) is a good choice. For most of the dull-plumaged males, dullness is a temporary condition owing to their youth. Therefore, social lability is a conditional strategy, adopted only when males are young and dull-plumaged [9]. In subsequent seasons these dull males are likely to brighten and have different options. But, as the authors point out, even if it is a good response to a temporary condition, social lability may incur high costs. Socially labile males may incur sampling costs, increased risk of contracting disease, or increased energy expenditure in dominance interactions needed to force their way into new social groups.

One might expect that duller males would also be inferior in dominance interactions. In fact, however, female house finches dominate males, and duller males are often competitively dominant over brighter males [10]. This poses interesting questions for future studies: Are duller males dominant because that helps them force their way into groups (dominance as selective driver) or because they must be socially labile in order to compensate for dull plumage? Do they acquire social skills as a secondary consequence (dominance as a side effect of being constrained to be socially labile)? Even in fission–fusion societies, such as those of schooling fish, social network analyses can identify stable interactions and core social groups in the face of rapidly shifting memberships in social groups [11]. A key insight in the history of animal behavior was that the best strategy depends upon what others are doing [12]. Increasingly, studies such as Oh and Badyaev's [1] find that animals may be able to influence fate by choosing the best social context for their current state.

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Department of Zoology and Physiology, University of Wyoming, Laramie, 1000 E University Ave. Dept 3166, WY 82071, USA.
E-mail: dbmcd@uwyo.edu

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