Male pigeons react differentially to altered facial features of female pigeons

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Summary

Male pigeons exhibit robust courtship to the head of a female, but not so much to the body. The specific features in the female head which are critical for triggering courtship from males remain unclear. We examined this issue by studying preference behaviour of male pigeons between a pair of photographic images of female conspecifics: a series of normal female faces and a series of digitally altered facial features. Preference was determined by measuring the duration of male courtship ‘coo’ responses near each of these images. Males preferred intact females compared to those missing the eyes and beak. They also responded less when only the eyes and beak were visible without the head, suggesting that these local features were important, yet more effective when embedded in the context of the head than when they were not. Enlarging or removing the beak had a significant impact on preference, whereas manipulating the eyes had a weaker effect. Finally, males exhibited no preference between normal females and those that had spatially rearranged eyes and beak. These results suggest that pigeons naturally attend to the local features of the head, but not to the spatial configuration, for conspecific recognition.

Keywords: conspecific recognition, spatial configuration, courtship, birds, visual perception.

Introduction

In pigeons, video playbacks of conspecifics can trigger spontaneous courtship displays, such as bowing, tail-dragging and courtship ‘coo’ vocalizations from males (Shimizu, 1998), and circling, tail spreading and ‘coos’ from females (Partan et al., 2005). Shimizu (1998) further showed that the

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courtship behaviour from males was primarily controlled by the head region rather than by the body region of the stimulus bird. In his study, male pigeons responded vigorously to the video playbacks when the stimulus female’s whole head and body were visible. When the body of a female was occluded (i.e., only the head was visible), males still reacted as strongly to the head-only stimulus as they did to the unobstructed view of the whole female pigeon. In contrast, the reaction to the body-only stimulus (i.e., the head was occluded) was significantly weaker and shorter.

The significance of the head region for conspecific recognition has been demonstrated in other avian species as well. Trillmich (1976) trained budgerigars (*Melopsittacaus undulatus*), the head of which is characterized by many distinct stripes and patterns, in a Y-maze to discriminate between two live conspecifics. By obstructing views of different body parts of the stimulus bird, he demonstrated that the head portion conveyed sufficient information for individual discrimination. In Japanese quail (*Coturnix coturnix japonica*), Domjan & Nash (1988) showed that males responded vigorously to a three-dimensional model of a female even when only the head was presented. However, the males’ responses were greatly reduced when the head was not visible. Altogether, these results indicate that the head region of these species often contain visually more salient and biologically important signals compared to the body region.

The head region of a bird is a naturally polymorphous stimulus, containing a number of local facial elements, including the eyes, beak, cere (the exposed skin at the base of the upper beak), and plumage. It can also be said that the manner in which these elements are spatially arranged serves as a global feature characterizing the head. Using operant conditioning techniques, previous studies have clearly shown that birds are visually able to detect subtle variations of this local and global information in the head region (chickens: Candland, 1969; budgerigars: Brown & Dooling, 1992). Specifically for pigeons, Watanabe & Ito (1991) trained pigeons to peck at certain photographs of conspecific faces (S+ pigeon faces) for food reinforcement, but not to peck at other conspecific faces (S− pigeon faces). After the pigeons learned this discrimination successfully, the authors presented ‘chimera’ stimuli, which contained certain features (e.g., eyes, beak) from an S+ bird and others from an S− bird, in order to find out which facial features controlled their discrimination. The authors found that there was no single facial cue controlling the discrimination behaviour.