Title
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Introduction

In his work on the perception of biological motion, Johansson found that people can readily detect a human figure in point-light displays — displays where the motion of human walkers is represented by lights corresponding to major human joints (Johansson, 1973). Following up on his work, researchers have examined a number of effects related to the perception of biological motion. Observers have been shown to accurately detect gender and identify specific types of motion, such as dancing. It appears that people have a special ability to detect upright human figures in these, and similar, displays. When such figures are inverted accuracy of figure identification and detection sharply declines (Bertenthal and Pinto, 1994). Inversion effects such as those found in humans have been found by Pinto and Shiffrar (1999) in some non-human animal displays (horses and dogs), but not others (birds). It has been hypothesized that the ability to detect upright humans and the inability to detect some animals and inverted humans can be linked to the human motor system. Observers walk, and the information provided by their own walking may help organize the complex motion patterns that are present in point-light displays. Another possibility is that experience provides an organizational framework for point-light displays. If this were so, previous findings that observers did not accurately identify non-human animals and showed no inversion effect might both be traced to a lack of pertinent experience. Most of the subjects who participated in these studies had had extensive experience observing and interacting with moving people; few had a comparable history of interaction with non-human animals. The current study examines the potential role of experience in the identification and detection of animal figures in masked point-light displays.

Methods

To test the effect of experience on the perception of point-light animals, the performance of professional seal trainers was compared with that of professional dog trainers and naive subjects on detection of point-light seals, dogs and humans. Subjects included professional seal trainers from the Camden Aquarium in New Jersey, professional dog trainers from the Philadelphia area, and Temple University undergraduates. On average, seal trainers had been employed by the aquarium or a similar agency for 3 years and dog trainers had spent 4 years training dogs at the time of this study. Dog trainers had no professional experience with seals; 5 of the 7 seal trainers had dogs as pets, and one also worked as a professional dog trainer.

Displays were generated from a video segment of a seal, dog or human walking. Seals, dogs, and humans were marked with spots at homologous joints and then videotaped as they moved from one place to another on land. A 2-second point-light display was generated for each animal. Subjects were presented with a signal-detection task, in which they were to determine the presence and absence of point-light humans, seals and dogs when presented within a set of masking points. Each species was presented upright and upside-down. Two levels of masking were used. Signal-present displays had either one masking point for each point on the animal or two masking points for each point on the animal. Signal-absent displays were generated by combining 2 or 3 sets of masking points so that they had the same number of elements as the corresponding signal-present display. Masking points were generated by randomly perturbing the spatial location and phase of each element in the display. Subjects were shown a target display where the stimulus was shown repeatedly over a period of 20 seconds without any masking elements. They were then asked to decide whether that target was present in each of the following 40 trials. Each subject completed one block of trials for each of the 12 conditions.

Results and Discussion

All groups detected humans more accurately than seals or dogs. There was no overall effect of expertise, seal trainers were no better than the other subjects at detecting seals, and vice versa. All subjects showed an inversion effect for humans, but there was no inversion effect for familiar animals. If anything, the opposite of the anticipated effect was found—a small inversion effect was present for the less familiar animal (e.g., seal trainers were better at detecting right-side-up dogs than up-side-down dogs). These findings suggest that experience does not play a role in the grouping of complex motion in point-light displays. These results support an account of perception of point light displays that is based on some unique, perhaps structural, aspect of humans. They may reflect the use of a motor code to represent motion. Such a code, which might normally allow us to copy the movements of others, might also unify the elements of a point-light display.

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