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Proceedings of the Annual Meeting of the Cognitive Science Society

Title

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Permalink

<https://escholarship.org/uc/item/2cv2k2zk>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 43(43)

ISSN

1069-7977

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Publication Date

2021

Peer reviewed

Multimodal signalling of attractiveness

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Keywords: animal behaviour; empirical aesthetics; courtship; multisensory processing; person perception; comparative aesthetics

Introduction

A large literature on human facial attractiveness has adopted an evolutionary approach (Little et al., 2011). Much less research has examined cues in other modalities, such as smell (Groyecka et al., 2017) and audition (Zäske et al., 2020). Although these different modalities may interact significantly in human mate choice (Feinberg, 2008), it is not yet understood how humans integrate cues from different sensory modalities. In the literature on animal communication, the most prominent theories suggest that different modalities either signal different qualities of an individual (multiple messages hypothesis) or communicate the same information (back-up signal hypothesis; Moller & Pomiankowski, 1993). These theories tend to disregard the possible interaction of different sensory modalities, and the role of multisensory integration.

In non-human animals, different sensory modalities have individually received much more empirical attention and work remains to be done in understanding whether and how multimodal cues may be integrated by observers in the context of mate choice (Halfwerk et al., 2019; Mitoyen et al., 2019). Studies investigating the human perception of attractiveness often rely on questionnaire ratings, while animal studies into mate choice often infer preference from behaviour. Comparative approaches are missing. Cross-species comparisons are essential to disentangle and enhance existing human psychological theories by studying the origins and evolutionary functions of multimodal signalling of attractiveness.

In this symposium, we will provide an overview of the current state of research into multimodal signalling of attractiveness in humans and non-human animals. Four international speakers will present their latest experimental results, and we will also examine the issue from the viewpoint of comparative studies directly comparing humans and non-human animals.

We hope that this symposium encourages further work into multimodal aspects of sexual and social signalling and that it reinforces the value of comparative research.

Symposium speakers

Anthony Little's research examines human perception and attractiveness judgements from an evolutionary perspective. His research mainly focuses on the visual domain of faces but also address the links between face perception and perception in other modalities, especially human voices.

Romi Zäske's research interests centre on the cognitive and neuronal mechanisms subserving human voice perception and memory. In various DFG-funded projects she investigated high-level auditory adaptation effects in the perception of non-linguistic speaker information, as well as learning and recognition of unfamiliar voices.

Clíodhna Quigley is co-PI in the ongoing interdisciplinary project 'Comparative Aesthetics: A novel approach to investigate multi-modal attractiveness in humans and animals' (<https://comparative-aesthetics.org/>). Her research focuses on the female response to male audiovisual courtship displays in ring doves.

Katharina Riebel investigates causes and consequences of condition and learning dependent phenotypic variation in sexually selected traits and preference in songbirds. Her recent Human Frontier Science Program project 'Seeing Voices' investigated the role of multimodal cues in vocal learning.

Symposium talk abstracts

The symposium and a concluding discussion will be moderated by **Christina Krumpholz**. She is a PhD student in the interdisciplinary project 'Comparative Aesthetics', doing research on multimodal signalling in humans.

Anthony Little: Spontaneous integration of facial and vocal information during judgements of attractiveness

Much research on human mate preferences has focused on facial and vocal information, generally presenting stimuli from only one modality. We still know little about how different cues to attractiveness in different modalities are integrated by perceivers. The current experiments examined integration of attractiveness information across voices and

faces by asking participants to rate faces for attractiveness while listening to attractive or unattractive voices and to rate voices while viewing attractive or unattractive faces. Despite participants being explicitly asked to ignore the other modality, the attractiveness of voices influenced the perception of faces and the attractiveness of faces influenced the perception of voices. Participants spontaneously integrated visual and auditory information such that their judgements of attractiveness reflected information drawn from both modalities. This finding suggests that face and voice information become bound together when presented simultaneously and the attractiveness information coded in one modality cannot be ignored when judging the other.

Romi Zäske: Stable first impressions from the voice and face

People rapidly form impressions about others' traits based on their facial appearance (Willis & Todorov, 2006). We asked when vocal first impressions of attractiveness (Exp. 1) and audiovisual impressions of trustworthiness and dominance (Exp. 2) become stable. In Experiment 1 we replicated findings of a rapid stabilization of first impressions from unimodal faces (within ~100ms from stimulus onset) and extended these findings by showing that impressions of voice attractiveness stabilize considerably later (within ~1000ms from stimulus onset). This is likely owed to the nature of voice stimuli, with social information unfolding over time, whereas information from static faces is instantly available. Experiment 2 showed that audiovisual face-voice impressions of trustworthiness and dominance stabilize within ~125ms and ~300ms, respectively, suggesting a different timing of audiovisual impression formation depending on the type of the social signal.

Clíodhna Quigley: Lab-based comparative investigations of multimodal sexual signalling

The presentation of auditory and visual stimuli is relatively uncomplicated for human experiments, aside from controlling for low-level stimulus differences. In studies with animals, the display of pre-recorded or synthesized behaviour of conspecific animals ('playback') is becoming more common. Although there has been huge progress in video acquisition and display equipment, all currently available technology is targeted at the human visual system, meaning that there is a possible mismatch with the spatial, temporal, or spectral properties of the viewing animal's sensory and perceptual system. In this talk I will review the few playback experiments with audiovisual courtship stimuli that have been conducted in birds, including results from two studies with ring doves from our own lab. The overall outlook is surprisingly good – carefully designed playback is a viable stimulus to investigate courtship behaviour.

Katharina Riebel: Development and learning of multimodal mating signals

Bird song is a textbook example for a culturally transmitted mating signal. Song is also multimodal – often it is

accompanied by conspicuous visual displays. Next to these facultative visual components, there are also fixed visual components – when singing, birds use specific beak movements to produce specific sounds just like humans use specific lip movements during speech. We tested whether these visual cues are important for the development and function of learned bird song and raised zebra finches manipulating quality and quantity of visual input (using live, video and robot song models) during song exposure. Birds engaged differently with uni- than multimodal stimuli but not all stimulus engagement improved song learning. The results to date show birds to pay attention to visual cues offered concurrently with song but also that future work will have to further improve our understanding of the interplay between different modalities during development versus adult multimodal signalling on both the producers' and receivers' side.

Acknowledgments

Funding information: Zäske: German Research Foundation (DFG) ZA745/1-2; Riebel: Human Frontier Science Program RGP0046/2016; Quigley: Vienna Science & Technology Fund (WWTF) CS18-021.

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