

Introductory Editorial to ‘The Neuroscience and Evolutionary Origins of Sexual Learning’

We (your guest editors) have established a productive professional and personal relationship through discussions of the role of experience and, in particular, basic learning processes in shaping sexuality in humans and animals. We are grateful to Harold Mouras as well as our contributors for allowing us to organize this special issue of *Socioaffective Neuroscience & Psychology*, which highlights what we believe to be an underrepresented perspective in the scientific study of sexual behavior and psychology. Craig (1912, 1918) suggested, and Zitovitch (as cited by Pavlov, 1928) as well as – more recently – Hall, Arnold and Myers (2000) have demonstrated that behaviors as straightforward as approaching food, and water require learning. Surely (human) sexuality, for which the approach is even more complicated, is shaped by experience. We offer nine papers from leading researchers in the field that we hope will inspire divergent thinking and scholarship regarding the evolution and development of sexual preferences in both humans and animals.

In our lead article, Woodson situates *learned sexuality* – biologically predisposed, possibly irreversible, learning about stimulus properties of a sexual incentive – in a broader cultural context (Woodson, 2012). He discusses how good intentions, false dichotomies, and tradition from both outside as well as within the fields of neuroscience and psychology continue to impair the optimal integration of learned sexuality in understanding the development of sexual preferences.

Pfaus, Kippin, and Coria-Avila (2003) has persuasively argued that many evolutionary endpoints of sexual behavior are well-conserved across species, including appetitive and consummatory aspects. Hence, non-human models offer powerful tools both for establishing causal links between conditioning processes and sexual behavior and also for investigating the neurochemical and hormonal systems that underlie such learning in humans. Three of the articles in this special issue present recent, exciting data from the well-established experimental models, of sexual learning in rats and Japanese quail. Coria-Avila (2012) reviews animal studies on the development of partner preference with a focus on how the experience of reward and some of its key neurochemical correlates (i.e. dopamine and peptide neurotransmitters) impact heterosexual, and homosexual partner preference

in rats. Holloway (2012) reviews the literature on the role of opioid peptides in learned sexual behavior in animals. He addresses inconsistencies in the literature, potentially moderated by the use of different species, paradigms, and procedures, and proposes that opioids may mediate the persistence of conditioned sexual responding in the absence of reward. Domjan, Mahometa and Matthews (2012) demonstrate the ultimate benefit of conditioned sexuality – reproductive fitness. This first review of their impressive work on conditioned fertility evidences a variety of situations in which quail that experienced sexual classical conditioning show increased reproductive potential relative to unconditioned birds. Kohl (2012) rounds out the animal section with a theoretical paper centered on the honeybee as a model organism for understanding how olfactory cues can influence the genetically predisposed behaviors of food and mate preference. He outlines how this evolutionary endpoint may be achieved by epigenetically altering steroid hormonal function within the GnRH pathway in mammals, including humans.

Despite the numerous studies showing robust sexual learning in animals, only a handful of studies convincingly show cue-conditioned sexual arousal in humans. Hoffmann, Petersen and Garner (2012) add to this literature by reporting an experiment that finds increased genital responding as well as evidence for affective or evaluative conditioning in men to an initially novel, neutrally preferred scent that was paired with partnered sexual interaction. Roche, O’Reilly, Gavin, Ruiz and Arancibia (2012) explain how derived relational responding can broaden the impact of basic conditioning on human sexual behavior. In addition, they show how a behavior-analytic framework has been useful in constructing implicit tests of sexual preferences.

An additional two papers maintain a focus on human sexual behavior and its neural basis in reviews of the sexual imaging literature. Georgiadis (2012) discusses cortical involvement in human sexual activity and highlights structures and mechanisms that could play a role in sexual learning. Safron (in press) discusses research of gender differences in orientation that have emerged from psychophysiological studies of sexual arousal, considers how functional neuroimaging may help to resolve previously unanswered questions, reviews neuroimaging studies of human sexuality, and proposes

a theoretical framework for understanding the neural mechanisms underlying the development of sexual orientation and preferences more generally.

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