Singing & Social Neuroscience Greenberg et al

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Title	The Social Neuroscience of Music: Understanding the Social Brain Through Human Song
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Research question/s	Examines how individuals' musical adaptations to the COVID-19 pandemic inform better understanding of the social neuroscience of music; the authors provide a comprehensive model of the social brain regarding music and highlight key neural/hormonal mechanisms involved in musical production.
Methodology	The authors synthesized and streamlined prior theory and research; through this process a model of the brain was formulated that reveals the social functions and brain mechanisms underlying the musical adaptations used for human connection.
Summary of findings	During the COVID-19 pandemic, in response to the requirement to isolate/socially distance, many individuals turned to music to attempt to fulfil the basic human need for social connection and bonding.

The Evolutionary Origins of Music
Emphasis is placed on the evolutionary understanding of music as a social bonding mechanism, and the musical connections made during the Covid 19 pandemic (including communal singing and synchronised clapping) are seen as related to this. Rhythmic synchronisation and the sense of a shared emotional experience through music are viewed as enhancing the sense of group cohesion. The authors place value on the evolutionary hypothesis linking vocalizations and signalling in nonhuman primates to the social structures of music in human social groups; such arguments underline the important role of music in terms of social connectedness, emotional communication, and shared experience.

Social Cognition of Music
The social cognition of music surrounds the social process embedded in musical perceptions, preferences, and emotions. Music preferences, particularly in Western culture, communicate group affiliation and social identity. Two forms of empathy, cognitive and affective, are viewed as having a pivotal role in music production, and the social benefits derived from music. Recent evidence has demonstrated universal features, form and function of human song cross-culturally, suggesting a social-cognitive mechanism of music in group formation.

The Social Neuroscience of Music
The social musical behaviors that took place during the Covid-19 are seen by the authors as linked to the human biobehavioural circuitry devoted to interconnectedness; additionally stress can increase the need to bond. Joining together in groups, or herding, is a strategy based in the evolutionary need to survive and thrive. Synchronised behaviour,

| | including rhythmical and musical activities help to facilitate rapport within the group.
Neurobiological Candidates
A number of neurobiologocal candidates are outlined as comprising the neural basis for social music production; these include oxytocin, a neuropeptide that plays a central role in social behavior, and dopamine, a neurotransmitter associated with motivation and reward.
Proposed Model
The model outlines the social brain networks implicated in music production as overlapping with the brain networks associated with mentalization, empathy, and synchrony, all social processes of human cognition. Additionally, the suggestion is made that certain aspects of musical activity can have positive impact on the immune system, something that might be of importance in the study of music making during the pandemic. Similarly, music listening and group singing have been associated with lowering cortisol levels, a process that might play a part in buffering psychological and physiological harm via stress during Covid-19. |
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| **Comments/discussion points** | A deeper understanding of the social neuroscience of music is seen as having the potential to facilitate greater cultural understanding between those historically in conflict. Whilst it is acknowledged within the study that there isn't, as yet, direct empirical data to support the hypothetical model, the authors suggest that scientists across disciplines might study the social impact of musical adaptations during Covid-19 with the model in mind. Three main areas are suggested for such future research; firstly surrounding musical engagement pre and post Pandemic, secondly focusing on the mechanisms underlying the social effects of music, and lastly elucidating the neural basis of how music might be used for interventions for populations who struggle with social connection. |