



# The sum and its parts: Learning from a spider's vibratory courtship

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In the life of most spiders substrate vibrations play an important role making them an ideal example for studies in related behavior. Some years ago we chose a large Central American wandering spider (*Cupiennius salei* Keys.) and its closest relatives to analyze vibratory courtship. A rich blend of reductionist laboratory work and field work in the spider's natural habitat revealed many of the basic properties, which one wants to understand when studying this type of communication and aiming at an insight into the numerous selective pressures having shaped it during evolution: (i) The signals: their generation by the sender, properties and transmission to the receiver; (ii) the vibration sensors of the receivers: structure and function; (iii) neural responses to the vibrations: in the periphery and the CNS; (iv) the meaning of the messages of the signals for male and female behavior, respectively, and (v) the relation of all this to the ecology, habitat and general questions about ultimate functions in a broader biological context (like species recognition and reproductive isolation). I will first try to summarize these analyses, mainly to illustrate how all the parts fit together to end up as a well-organized whole.

More recent work regarding proximate mechanisms related to some surprisingly small details of the vibration receptor's micromechanical properties will not only add to our appreciation of the richness and multi-functionality of adaptations at work. It will also stress the value of interdisciplinary work and again underline the importance of taking into consideration the details AND the ordered sum of them, before we can hope to understand the entire story and the biophysical effectiveness of a communication system reasonably well.