

Turn taking in rodents, macaques, and birds and its relation with behavioral synchronization

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In many social animals, turn taking by a short vocalization occurs in one-to-one context and it has certain function as maintaining social hierarchy. The eusocial naked mole-rats, animals when passing by in a narrow tunnel, each animal emitted soft chirps, which is categorized as a social contact call (Yosida et al 2007). Inter-call-interval was shorter when measured between individuals than within individual, the call was considered as turn taking behavior. Furthermore, when individuals in different cast pass-by, the one with lower cast emitted more calls than the one with higher cast (Yosida et al 2009). Thus, soft chirps are used not only as a social affiliation signal, but also as a social hierarchy signal.

Japanese macaques continuously emit short calls including grunts, girney, and short coo calls. When two individuals are close by and emitting these calls, exchanged call intervals were significantly shorter than solo call intervals. With longer solo call interval, response interval tends to be longer while with shorter interval, it became shorter, suggesting a dynamic adjustment of inter-response intervals (Katsu et al, 2018). Results suggest dynamic, affiliative inter-group cohesion function of these short calls in macaques.

Budgerigars, a species of parrots, when visually isolated from colony mates, emit contact calls. The calls are exchanged several times with the colony mates. Bengalese finches, a species of songbirds, also emit distance calls when isolated from cage mates (Okanoya & Kimura, 1993). In both species, Again, the inter-call intervals are shorter in response calls than in solo calls. When responder was replaced with an computer program, birds most likely to responded at inter-call interval of 250 ms.

These faculty of social synchronization might be, in part, supported by animals' ability to synchronize or de-synchronize with external events. When Budgerigars were trained to peck a key that if flashing at certain interval, they learned to synchronize the pecking at a limited inter-stimulus interval (Hasegawa et al 2011). Within a similar procedure, Bengalese finches and rats (Katsu et al, submitted; Seki et al, submitted) showed reactive synchronization, meaning that when stimulus was presented at certain interval, response was followed with the stimulus, with certain delay, but when stimulus was omitted, animals emitted the response at the correct interval where the stimulus should have occurred. The relation between turn taking, synchronization, and de-

synchronization need to be studied at behavioral and neural level to understand physical basis of social behavior. (Supported by MEXT #4903. Evolving linguistics.)

References

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