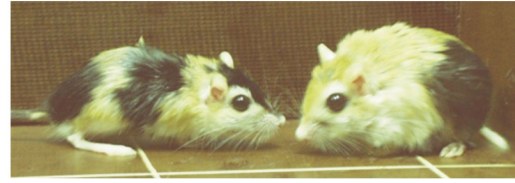


CALL FORM AND ITS LINK TO SIGNALING SITUATIONS DURING FIGHTING IN THE PALLID GERBIL

Maria V. Voinilowitch (1), Ilya A. Volodin (1,2) & Elena V. Volodina (2)

(1) Dept. of Biology, Moscow State University, Russia, e-mail rokamadur@yandex.ru

(2) Scientific Research Dept., Moscow Zoo, Russia, e-mail popovsv@orc.ru

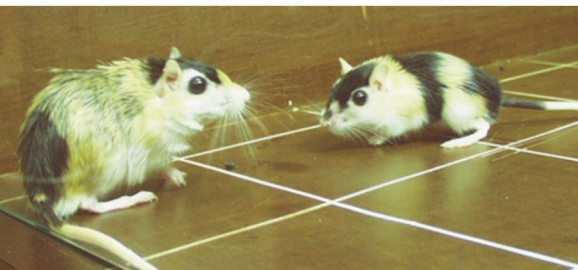
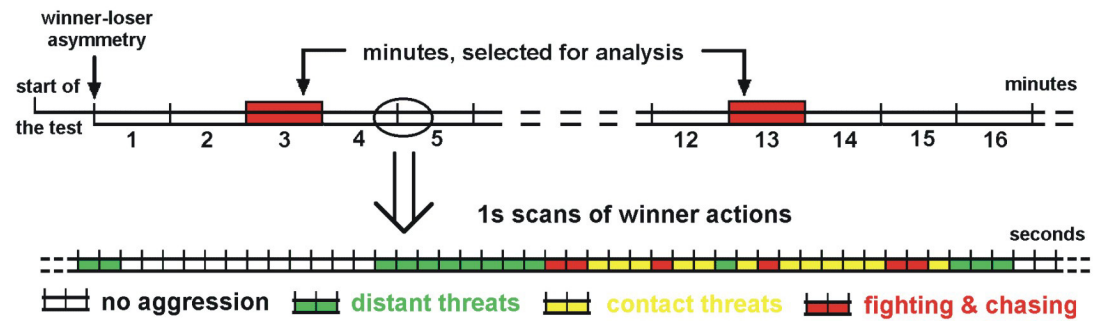


INTRODUCTION

In animals, calls may be used as express-indicators of internal state. It is especially important for Zoo keepers, who face with a problem of social conflicts between animals and estimate, if calling animal is threaten and should be removed from a group. But these promising tools are not yet well-developed, because relations between call structures and animal internal states are poor understood. Here we investigate, how winner actions and prolongation of fighting results in call structures of a loser.

ANIMALS AND METHODS

We videotaped 14 male-male 15-minutes conflicts between unrelated and unfamiliar Pallid gerbil (*Gerbillus perpallidus*) males on a neutral arena. We selected from each of the tests two 60 s time intervals, corresponding to third and thirteenth minute after the winner-loser asymmetry establishing. Throughout these intervals we analysed data about winner actions (scan sampling method with 1-s scans, behaviours ranged from absence of aggression to threats or fights) and call structures of a loser (all sounds throughout these two 60-s intervals, in total 1471 analysed sounds for 14 tests).



We analysed how the call structure depends on the immediate actions of the winner (by analysing data inside minutes) and effect of being under conflict situation (by analysing of cumulative effect using comparison of data for the third and thirteenth minute).

Comparison of call structures (1471 calls in 14 tests)

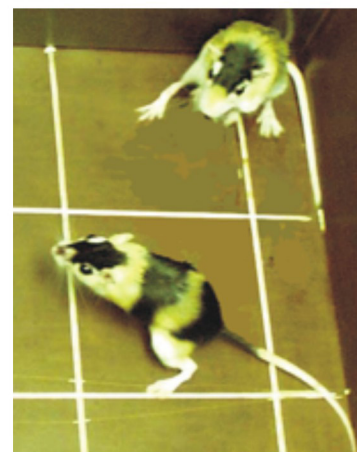
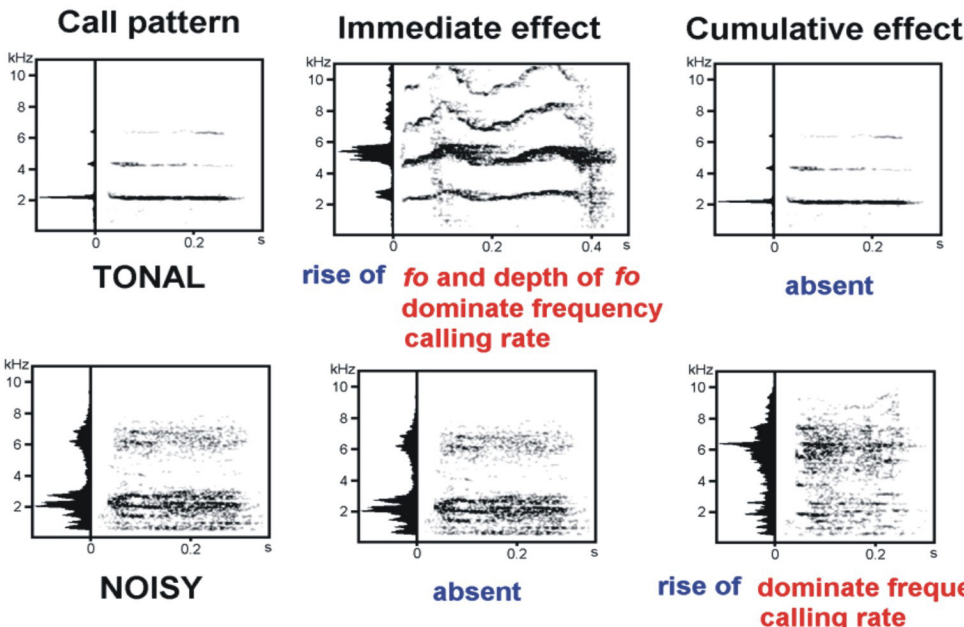
I. Immediate effect (increase of winner aggression)



II. Cummulative effect (time of being under conflict)



RESULTS



CONCLUSION

Both increase and prolongation of social aggression resulted in displacement of call energy in higher frequency range and increase of calling rate. Tonal calls were sensitive only to increase of winner aggression (immediate effect), whereas noisy calls – to conflict prolongation (cumulative effect).

Loser calls represented two basic patterns: tonal and noisy. Tonal calls were sensitive only to immediate effects and response to increase of aggression by rising of fundamental frequency, depth of frequency modulation, dominate frequency and calling rate (all differences were significant, $p < 0.001$, Mann-Whitney U-test). In contrast, noisy calls were sensitive only to cumulative effects and responded to prolonged being under social conflict by rising of dominate frequency and calling rate ($p < 0.001$ and $p = 0.054$ respectively, Mann-Whitney U-test).