

BRIEF REPORT

Role of the Mystacial Vibrissae in the Control of
Isolation Induced Aggression in the Mouse¹

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Adult male Swiss Albino mice were isolated from conspecific contact for 10 days. Removal of the mystacial vibrissae and subsequent anesthesia of the vibrissal pad reduced the number of aggressive social encounters that normally ensue upon the reintroduction of a conspecific. This reduction occurred under conditions in which latencies for initial social contact were essentially unchanged. These results are consistent with previous reports upon the importance of vibrissal integrity in the control of attack behaviors in a variety of other aggressive paradigms, and extend previous observations to a novel species and attack paradigm.

Recent developments in the study of agonistic behavior have pointed to the importance of highly specific sensory input for the elaboration of a variety of aggressive responses. In particular, trigeminal mechanisms including the sensory organs located at the facial lipline and the mystacial vibrissae have been shown to influence the occurrence of terminal attack components such as facial orientation and biting in many models of aggression. For example, Flynn and his colleagues (Flynn, 1967, 1972; Flynn *et al.* 1971; MacDonnell and Flynn, 1966a, b) have pointed to the importance of sensory factors in the control of centrally elicited attack in the cat, both through the direct alteration of sensory fields subsequent to central stimulation of aggression producing sites, and additionally through the disruption of terminal attack patterns subsequent to the interruption of afferent trigeminal input. In addition, afferent factors have been implicated in the control of shock elicited, biochemically induced, and predatory aggression in the rat via a variety of peripheral manipulations including facial anesthesia and vibrissal removal (Thor and Ghiselli, 1973, 1974a, b, 1975). It would appear from

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these findings that sensory factors, especially the facial senses, are fundamentally involved in the control of many forms of aggression.

It might be noted, however, that despite the above experiments little work to date exists extending these findings to isolation induced aggression. The present report examined the effects of vibrissal inactivation upon the aggressive social behaviors that typically follow isolation and subsequent conspecific reintroduction in the mouse. In addition to extending previous work upon sensory factors to a novel aggressive paradigm the present work also extends previous work upon sensory control of dyadic escalation in the mouse (e.g., Cairns, 1972; Cairns and Nagelski, 1970) by examining the influence of a single circumscribed and highly manipulable sensory variable upon this process.

Subjects were 32 experimentally naïve adult male HA-ICR Swiss-Albino Outbred mice (30-40 g each). All subjects were obtained locally (Dept. of Animal Care, School of Medicine, University of Michigan). Prior to any experimental manipulation all subjects were housed in groups of six, in 29 × 18 × 13 cm Plexiglas cages. Food and water were available *ad lib.* throughout the experiment and day/night cycles of 12 hr each were maintained by artificial lighting.

Experimental procedure involved removing all subjects from grouped housing. Each subject was assigned to an individual cage identical to those already described. Individual mice were isolated for 7 days, and at the close of the 7th day were randomly assigned to experimental or control condition. On Day 8 all experimental subjects (eight pairs) were removed from their cages 60 min prior to testing and shaved with a commercial shaver until no facial vibrissae were visible. In addition, and to further ensure vibrissal inactivation, a local anesthetic (1.1% Lidocaine) was topically applied to the vibrissal area 15 min prior to testing. The remaining 16 control mice were briefly handled 60 and 15 min prior to testing. In addition, all control mice received a topically applied nonanesthetic base at the same time experimental mice were anesthetized. All subjects were returned to their individual home cages after their final handling, and remained undisturbed until testing.

Testing consisted of the removal of a subject of a given condition from its cage and immediately introducing it into the home cage of a subject of its respective condition. Subjects were placed in the cage corner most distal from the already occupying subjects. Care was taken to avoid reintroducing animals that had been previously housed together. Four measures of social behavior were taken. There were: (1) latency (in sec) to initial social contact (i.e., latency from introduction to any body contact whatsoever); (2) latency (in sec) to initial aggressive encounter (latency from introduction to initial biting episode). If no aggression occurred a score of 600 was entered; (3) Aggressive Encounters Minutes 0-5; a measure of discrete attacks in the first 5 min following introduction, in order to control for varying attack lengths an

TABLE 1
Effects of Vibrissal Inactivation upon Isolation Induced Aggression^a

Group	Contact latency	Aggression latency	Aggressive encounters (0-5)	Aggressive encounters
Experimental (N ₁ = 8)	11 (5-15)	600 (60-600)	0 (0-5)	0 (0-12)
Control (N ₂ = 8)	12 (5-18)	72 (10-300)	8 (5-9)	5 (3-19)
U Score	32.0	6.5	2.0	11.0
Probability	< 0.5	< 0.01	< 0.01	< 0.05

^aAll scores are presented as medians (and ranges), all scores are two-tailed.

additional score (1 per every 5 sec) was added to this figure for fights extending past an initial 5 sec (e.g., a fight of 15 sec would receive a score of 3); and (4) Aggressive Encounters Minutes 5-10 a measure equivalent to (3) but for the final 5 min observation period. All differences between groups were evaluated by Mann-Whitney *U* tests.

Results are presented in Table 1. All figures are presented as medians and group ranges. It may be seen therein that initial contact patterns do not differ significantly from each other, at least in terms of contact latencies. Despite intact contact patterns, however, there are significant reductions in three attack measures for vibrissally inactivated mice, in comparison to controls.

The present findings are quite consistent with Flynn *et al.* (1971) who reported intact approach but disrupted terminal aggression in cats in which facial cues were experimentally disrupted. Finally, it might be noted that Cairns (1972) has hypothesized that dyadic escalation leading to aggression is due at least in part to sensory "hyper-reaction." It appears from the present results that facial cues are a critical sensory aspect in the triggering of the aggressive escalation process itself.

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