Mother-calf distance during adult agonistic interactions in captive killer whales (*Orcinus orca*)

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Introduction

Involvement in intra-specific aggression can be very costly to females if it increases the risk of separation from their offspring. This can be particularly true in species in which dependant offspring ordinarily accompany their mother closely throughout the day. We examined inter-whale distance in a captive population of killer whales in order to asses the extent to which a calf was separated from its mother during agonistic interactions between adults.

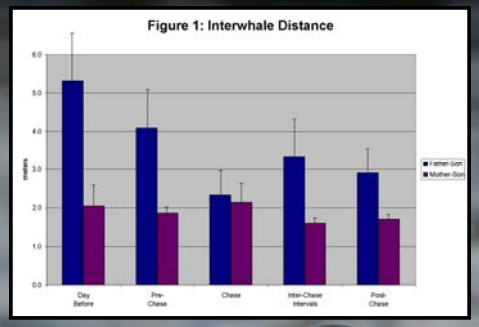
Methods

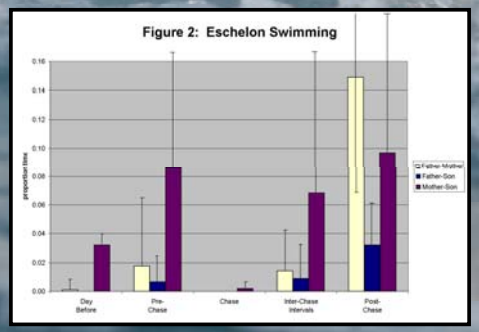
The subjects were three killer whales (one adult male, one adult female, and their joint male offspring) held at Marineland of Canada (Niagara Falls Ontario). The adults were of Icelandic origin; the calf was born in captivity.

The whales were continuously videotaped via an underwater viewing window throughout the calf's first year of life. Screening these tapes revealed eight instances in which one adult rapidly chased another in a way that independent observers rated as agonistic. (In each of these instances, the adult female appeared to be the aggressor.)

For the purposes of this study, the spatial distance between the calf and the two adults was estimated on a second by second basis from one hour before the first chase until one hour after the last chase. Distances were categorized as less than 2 meters, less than 4 meters, or greater than 5 meters. In addition, the presence/absence of parallel swimming among the whales was noted.

To provide a time-matched control comparison, identical measures were taken for one hour on the same whales at the same time on the day before each agonistic episode.





Results

The eight episodes were characterized by brief periods of high intensity chasing that were repeated on average 9.6 times per episode. The individual bursts of chasing averaged 8.1 sec in duration. The period from first chase to last averaged 12.1 mins.

The average inter-whale distance is depicted in Figure 1 as a function of behavioral phase. Overall, the average distance between the calf and its mother was smaller than that between the calf and its father ($F(1,7)=97.4$, $p< .001$). The Father-Son distance differed significantly between the time-matched Day-Before and all four phases on the day of aggression. By contrast, Mother-Son distances did not differ significantly from the time-matched Day-Before.

Subsequent pairwise comparisons for the mother-calf dyad showed the average distance in the Inter-Chase and Post-Chase phases to be significantly lower than during the Chase phase.

Figure 2 presents the proportion of time each whale dyad was observed in echelon swim as a function of those same phases. These proportions were characterized by high variability, and only the Father-Mother and Father-Son Post-Chase data differed significantly from the Day-Before.

Discussion

Our findings provide no evidence that the calf was separated from its mother any more during periods of aggression than at other times.

That the mother- calf distance significantly decreased in the aftermath of the aggression may be consequent to an increased level of fear/distress on the calf's part, and/or an increase in the frequency of pro-social echelon swimming.

We suspect that the post-fight decrease in distance between father and calf may have been an artifact of frequent adult-adult echelon swimming in the aftermath of the aggression.

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