

## Abstract

### When Predator Becomes Prey:

#### Testing for Differences in the Striking Behavior of Western Ratsnakes

For all life, survival depends on feeding and defense. Successful organisms likely change their behavior in each situation, as defending one's self and securing prey are two very different actions. However, there is an organism for which very little research has been conducted and behaviors are hard to differentiate—the snakes. My hypothesis is that there will be a difference in the way snakes strike at different targets. To better understand how snakes strike at various targets, this study measured the strikes of the Western ratsnake (*Pantherophis obsoletus*;  $n = 11$ ). They were presented with two different strike targets, one simulated predator (a gloved human hand) and one prey (pre-killed mice). For each strike, performance measurements included strike distance, duration, velocity, acceleration, and time to start gape. Except for the time to mouth gape, peak performances were significantly different between strike types with performance measurements being higher in defensive strikes (all  $P < 0.05$ ). Defensive strikes took longer (duration =  $130 \pm 14$  ms), reached greater distances ( $15.9 \pm 1.2$  cm), had higher velocities ( $1.86 \pm 0.07$  ms<sup>-1</sup>), and accelerations ( $105.2 \pm 14.1$  ms<sup>-2</sup>). Offensive strikes had much shorter durations ( $49 \pm 5$  ms), covered a shorter distance ( $4.3 \pm 0.5$  cm), had lower velocities ( $1.06 \pm 0.10$  ms<sup>-1</sup>), and lower accelerations ( $81.4 \pm 18.9$  ms<sup>-2</sup>). The results for average performance measurements are similar to the maximum performance comparisons. My results show that snakes can recognize and differentiate prey from threats and respond very differently to each target. Further, my results show that while striking behavior appears qualitatively similar, offensive and defensive strikes are quantitatively distinct behaviors that should be evaluated and analyzed separately from one another.