

# **Visual and Auditory Vigilance in the Bottlenosed Dolphin**

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## Dedication

To Elele



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## Abstract

Two bottlenosed dolphins were trained vigilance tasks that required them to monitor rapidly occurring series of arbitrary stimuli for the presence of up to five "critical" targets embedded within the series. For one dolphin, the stimuli were arbitrary black/white images that required visual attention. For the second dolphin, the stimuli were arbitrary sounds that required auditory attention. In each case, critical stimuli were embedded within a large set of non-critical stimuli. Each visual stimulus was projected for 1.25-sec on a video screen viewed by the dolphin through an underwater window. Each sound stimulus was projected through an underwater speaker for 1.0 sec. Inter-stimulus intervals were 0.75 sec (visual) and 1.25 sec (auditory). Each dolphin pressed a paddle to report the detection of a critical stimulus. A test session consisted of 10 trials with up to 60 successive stimuli per trial. The dolphins reported on average 99.45% (visual) and 92.52% (auditory) of the critical stimuli. False alarm rate averaged only 0.55% (visual) and 7.84% (auditory). No significant decrement of performance was detected over the duration of a trial or across consecutive trials. Reaction time increased significantly from 0.69 s to 0.79 s in the visual tests as the number of critical stimuli increased from 1 to 5, but there was no similar finding in the auditory tests. In both visual and auditory tasks, performance accuracy remained at equivalently high levels despite changes in the probability of a critical stimulus from 10%, 20%, 30%, 40% or 50%. The results revealed a well-developed ability of the dolphin to sustain attention for rapidly appearing visual and auditory materials, and suggested that those vigilance decrements typically experienced by humans in sustained attention tasks (Davies & Parasuraman 1982), may be experienced by the dolphin with more substantial manipulations than were conducted here.