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acoustics of shape recognition by a dolphin in a cross-modal matching-to-sample paradigm

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A pacific bottlenose dolphin was trained in a two-alternative cross-modal matching-to-sample paradigm. The animal was able to inspect complex PVC-pipe shapes through echolocation or vision but never through both senses simultaneously. Acoustic data was collected through a 3-channel high-frequency recording system while the dolphin performed one of the following tasks: (1) match a complex shape with its sonar only (pure echoic matching), (2) match from vision to echolocation and (3) match from echolocation to vision. Simultaneously, synchronized in-air and underwater video was recorded documenting the approach path of the dolphin to either the sample object or to the alternative objects. The collected data was analyzed for type of click signals used, the frequency range of the emitted clicks, number of clicks emitted before a successive match and variations of click type with different objects.