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**Arbitrary evoked potentials: using AEPs to measure hearing in fishes**

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Auditory evoked potential (AEP) techniques have become commonly used to measure hearing of a wide variety of animals. However, there is no standard way of defining a threshold from auditory evoked potential data. There are two arbitrary factors affecting the precision of AEP data: the number of sweeps averaged together to detect the AEP, and the method of calculating a threshold from the AEP data. While these arbitrary factors do not invalidate comparative studies where these variables are standardized, different laboratories use different techniques. We describe sources of variation in estimating thresholds using evoked potential techniques using the goldfish as an example. There was little variation in AEP thresholds due to variation in electrode placement or in the method of arbitrarily assigning an AEP threshold. The largest variation was due to differences in the number of sweeps averaged. Under controlled conditions using the same goldfish in the same test tank with the same number of sweeps averaged, AEP's better predicted behavioral thresholds at high frequencies than low frequencies. Since averaging reduces uncorrelated background noise (neural and electrical), it should theoretically be possible to obtain AEP measurements below behavioral thresholds with enough sweeps averaged together.