Comments

Comment by Duifhuis:

In the Duifhuis (1980) paper that you are referring to, I did report that for $f_{suppressor} > f_{suppressee}$ suppression increased with increasing level of the suppressor. However, this does not imply the increase of suppression with level of the suppressee, or with overall level. The real prediction from my data, and from my interpretation, is that for a fixed suppressor level, suppression will increase with increasing suppressee level up to the point where the suppressee will dominate and overtake the response. Then the suppression will decrease with further increase of suppressee level (Duifhuis 1989).

The situation is somewhat different for $f_{suppressor} < f_{suppressee}$. In that case we always found a suppressor level that gave maximum suppression for a fixed suppressee level.

Duifhuis, H (1989) Power-law nonlinearities: a review of some less familiar properties. In: J.P. Wilson and D.T. Kemp (Eds), *Cochlear mechanism. Structure, Function and Models*. Plenum, New York, pp 395-401.

Reply:

In the study by Duifhuis (1980), pulsation thresholds were measured for a fixed-level suppressee and different (increasing) levels of a suppressor. The same was repeated for a few levels of the suppressee, but it was always the suppressor level that was varied to estimate the amount of suppression. Thus, across all conditions considered in that study, the level of the suppressor was varied alone or the level of the suppressor and the suppressee were both varied. According to our data, a suppressor affects the shape of the I/O function in response to the suppressee by making it more linear. Our data (in particular for S1 who exhibited the greatest suppression) show that the degree of the linearization increases with increasing suppressor level. Based on our findings, we believe that by varying the level of the suppressor and the suppressee, one monitors responses along different shapes of the I/O function. Because of this, Duifhuis's data led him to state that "This led us to discover that suppression is not merely an effect of suppressor-suppressee amplitude ratio but that it also increases as the overall level increases." Since suppression was not measured in that study for different suppressee levels when keeping the level of the suppressor fixed, the change of the rate of response growth in the presence of a fixed-level suppressor could not be revealed by the data.

Our data also do not agree with the trend described in the above comment. They demonstrate that suppression will decrease (and not increase) with increasing level of the suppressee even when the suppressee level is considerably lower than the level of the suppressor. This is because the suppressor produces a reduction in gain which appears to be monotonically related to the gain that the active mechanism applies to the tone in the absence of the suppressor. Because gain

decreases with increasing level, the amount of suppression produced by a fixed-level suppressor also decreases. This finding could not be revealed in the data of Duifhuis because of the way suppression was measured in his study.