of the first marker handicaps performance. As Woodrow (1935) showed, the labeling of a gap is affected by the durations of the surrounding markers. But why, in either case, is discrimination affected only by the duration of the first marker and not by the first marker's intensity or by the characteristics of the second marker? One obvious possibility is that the subjects discriminate using as a cue the time between the onsets of the two markers, at least for some of the marker durations used in this experiment. The notion that onset-onset times provide the cue for the subject's judgment has also been suggested by Divenyi and Danner (1975). One test of the onset-to-onset hypothesis could be found in a trial-by-trial breakdown of our data. Unfortunately, technical difficulties allowed only the averages for each block to be collected in this study.

Finally, let us consider the question of whether ΔT must be independent of the marker characteristics if a central timing mechanism is operating. Suppose that ΔT depends on the marker duration and amplitude. It is not impossible that the central timing begins at the perceived offset of the first marker and ends at the perceived onset of the second marker. If so, the perceived duration would depend on any factors which influence the offset perception of the first marker and the onset perception of the second marker. If the marker amplitude or duration influences offset or onset judgments, then a central timing mechanism might well produce results that are dependent on the marker parameters.

In brief, an independence of duration judgments and marker characteristics lends support to the notion of central timing. However, the dependence of duration judgments on marker characteristics would not preclude the operation of a central timing mechanism. Thus, in our random marker conditions, a central timing mechanism may still be operating, but may be timing different cues than in the fixed marker conditions. In particular, the form of the results suggests to us that in at least some of the conditions, it is the onset-onset rather than the offset-onset period that is being timed.

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Erratum

PENNER, M. J. Persistence and integration: Two consequences of a sliding integrator. *Perception & Psychophysics*, 1975, 18, 114-120–The section on page 119 should read as follows:

Click Detection

The decision rule for clicks involves the comparison of the maximum value of y(t) from the two intervals of the forced choice task. In Penner (1975), the "maximum" value for y(t) in the interval containing the click was mathematically expressed as the value of y(t) just after the click occurred. However, the maximum value of y(t) does not always occur just after the click. For large T_3, the maximum value of y(t) occurs at time shortly after $T_3/2$ in the interval containing the signal. For small T_3, the maximum may occur at time T_3 in the interval containing the signal. The following are the corrected calculations for the case of a click in noise.

We use Equation 3 to fit the data for the detection of a click in the temporal center of a noise burst lasting T_3 msec. The response to the masker alone, y_m, is easily computed from Equation 3 using an exponential integrator of Equation 4 with a time constant ξ:

$$w(\xi) = e^{-t/\xi} \qquad t \geq 0.$$

Let $x(t) = A$ for $0 \leq t \leq T_3$, and then the maximum value of y_m occurs at time T_3 and is:

$$y_m = A\xi(1 - e^{-T_3/\xi}).$$

The response to both masker and click at any arbitrary time, t, is

$$y_{c+m}(t) = A\xi(1 - e^{-t/\xi}) + Be^{-[t-(T_3+t_c)/2]/\xi}, \quad (1')$$

where $(T_3 + t_c)/2 \leq t \leq T_3$. t_c represents the click duration and B represents the click amplitude. In order to find the maximum of $y_{c+m}(t)$, let us consider the derivative of Equation 1′):

$$\frac{\partial y_{c+m}(t)}{\partial t} = \frac{A\xi}{\xi}e^{-t/\xi} - \frac{B}{\xi}e^{(T_3+t_c)/2\xi}e^{-t/\xi}$$

$$= Ae^{-t/\xi}\left[1 - \frac{B}{A\xi}e^{(T_3+t_c)/2\xi}\right]. \quad (2')$$

For a fixed T_3, Equation 2′ does not depend on t so that $y_{c+m}(t)$ is in general either a monotonic decreasing or increasing function. It follows that if

$$1 - \frac{B}{A\xi}e^{(T_3+t_c)/2\xi} > 0, \quad (3')$$

then the maximum of $y_{c+m}(t)$ occurs at time T_3. If

$$1 - \frac{B}{A\xi}e^{(T_3+t_c)/2\xi} < 0, \quad (4')$$

then the maximum of $y_{c+m}(t)$ occurs at time $(T_3 + t_c)/2$. If Equation 3′ holds, then the maximum of y_{c+m} occurs at $t = (T_3 + t_c)/2$ and is:

$$y_{c+m} = A\xi[1 - e^{-(T_3+t_c)/2\xi}] + B. \quad (5')$$

If Equation 4′ holds, then the maximum of y_{c+m} occurs at time $t = T_3$ and is:

$$y_{c+m} = A\xi(1 - e^{-T_3/\xi}) + Be^{-(T_3-t_c)/2\xi}. \quad (6')$$

If the ratio of y_{c+m}/y_m determines detection (so that $y_{c+m}/y_m = k$ for constant detectability), and if B/A is propostional to E_c/N_0, then, if the maximum occurs at time T_3, we have:

$$10 \log_{10}\left[C\frac{E_c}{N_0}\right]$$

$$= 10 \log_{10}[\xi(k - 1)e^{(T_3-t_c)/2\xi}(1 - e^{T_3/\xi})]. \quad (7')$$

If the maximum occurs at time $(T_3 + t_c)/2$, then

$$10 \log_{10}\left[C\frac{E_c}{N_0}\right]$$

$$= 10 \log_{10}[\xi(e^{-(T_3+t_c)/2\xi} - ke^{-T_3/\xi} - (1 - k))]. \quad (8')$$

Using Equations 3′ and 4′ to determine whether Equation 7′ or Equation 8′ is appropriate, we can predict the form of the function relating $10 \log_{10} (E_c/N_0)$ to T_3. Two parameters are needed: ξ and k. The remaining parameter, C, merely raises or lowers the entire function (on a log scale). The values of ξ and k that best fit the average click data in Figure 1 are 3.7 msec and 1.07, respectively, with $-10 \log C = 19$. The data and the predictions of this theoretical fit are nearly the same as the fit graphed in Figure 4. The sum of the squared deviations of the average observed value minus the predicted value was 3.7 dB^2.

The fit, in fact, is not visibly better than the incorrect one given in the original paper. However, the parameter estimates have changed considerably. In particular, the time constant of the integrator, ξ, is now estimated to be 3.7 msec. This is similar to the average estimate of ξ from the gap data, which ranged from 2.2 to 3.5 msec. These similar estimates of ξ provide considerably stronger support for the models proposed than do the estimates in the original paper (where ξ was 14 msec).