

# Modelling behaviour on classical timing tasks: Verbal estimation, production, and reproduction

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The three “classical” timing tasks, verbal estimation of duration, interval production, and temporal reproduction, have been used in Psychology since the 19<sup>th</sup>. century (see Lejeune & Wearden, 2009, for some examples), and are commonly used in recent studies. The tasks may owe part of their attractiveness to the fact that they are easy to carry out, make sense to experimental participants, and quickly yield (fairly) orderly data. Yet, compared with experimental procedures which have been more recently invented, such as temporal generalization or temporal bisection, we have few (or no) theoretical models of how people perform them, and many mysteries remain. This tutorial is designed to (a) discuss the use of the classical techniques in recent work, and (b) discuss attempts (mostly my own, and mostly from as yet unpublished work) to develop theoretical models of performance, generally based on similar principles to those used to develop models of temporal generalization and bisection (e.g. Wearden, 1991, 1992; Wearden & Ferrara, 1995). These modelling attempts appear to indicate a range of unappreciated problems involved in our understanding of the classical trio of tasks. Some of these are outlined below.

## *Verbal estimation*

In verbal estimation, verbal labels in conventional time units like seconds or milliseconds are assigned to stimuli or other events. Among the questions of interest are (i) what are the implications of “quantization” of the values used (i.e. people may say “500 ms” or “750 ms” for short stimuli, but much more rarely “473 ms”, even when the stimulus is actually 473 ms long), for measures of the mean and variability of estimates? (ii) is there a role for feedback or some sort of “calibration” in verbal estimation?

## *Interval production*

Interval production can involve accurate performance-related feedback, or be “uncalibrated” (i.e. without feedback). What does each of these tell us? When feedback is used, mean times produced can track target times accurately (Wearden & McShane, 1988), but how does feedback actually improve performance? One possibility is that there is trial by trial adjustment based on feedback, but there are alternatives such as a “motorway lane” model, where performance is only adjusted if

the feedback indicates that performance has “strayed” from some limits close to the target time. What are the implications for the mean and variability of performance of different sorts of uses of feedback?

### *Temporal reproduction*

Temporal reproduction provided early demonstrations of Vierordt’s Law (i.e. short durations are judged as longer than they really are whereas longer durations are judged as shorter than their real value), although (a) this is not always found in reproduction and (b) it is sometimes found in the other classical tasks as well. One issue in the modelling of temporal reproduction is the possible separation of observed behaviour into two sequential components, one involving timing the target interval, and the other involving generating and executing the motor response itself, although this is not the only approach. What role does a person’s response time actually play in reproduction? Can models be developed which sometimes allow Vierordt-like effects, but do not require them?

There are no special requirements for the tutorial audience, although a basic knowledge of time perception research would be an advantage.

### *References*

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