Some Pretty RT Data

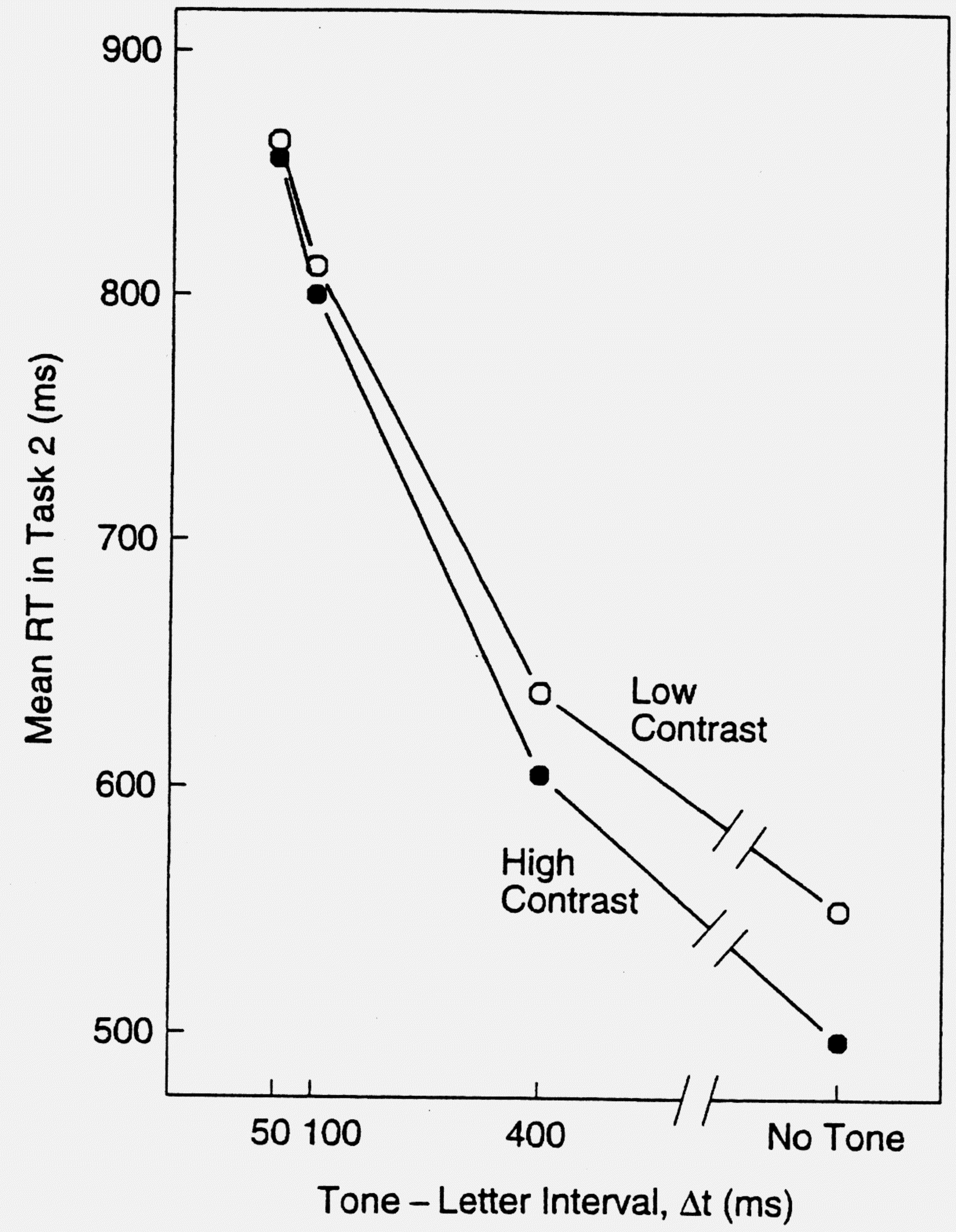

Figure 14.31
Mean reaction times in task 2 from overlapping-tasks experiment in which task 1 was di- crimination of pitch of tone and task 2 was letter identification. $\overline{RT}''$ for high-contrast lette (filled circles) and low-contrast letters (open circles) is plotted for intervals Δt between ton and letter of 50, 100, and 400 ms, and for a condition in which no tone was presente (effectively a very large value of Δt). As Δt shrinks (moving leftward in the figure), $\overline{RT}$ can be seen to increase, and the effect of contrast to decrease, an underadditive interactio of the contrast and $F_{\Delta t}$ factors. This pattern of data would be expected from the deferrec processing model if contrast influences a stage before the bottleneck, such as **U** in figure 14.2 Data from Pashler and Johnston 1989, experiment 1.

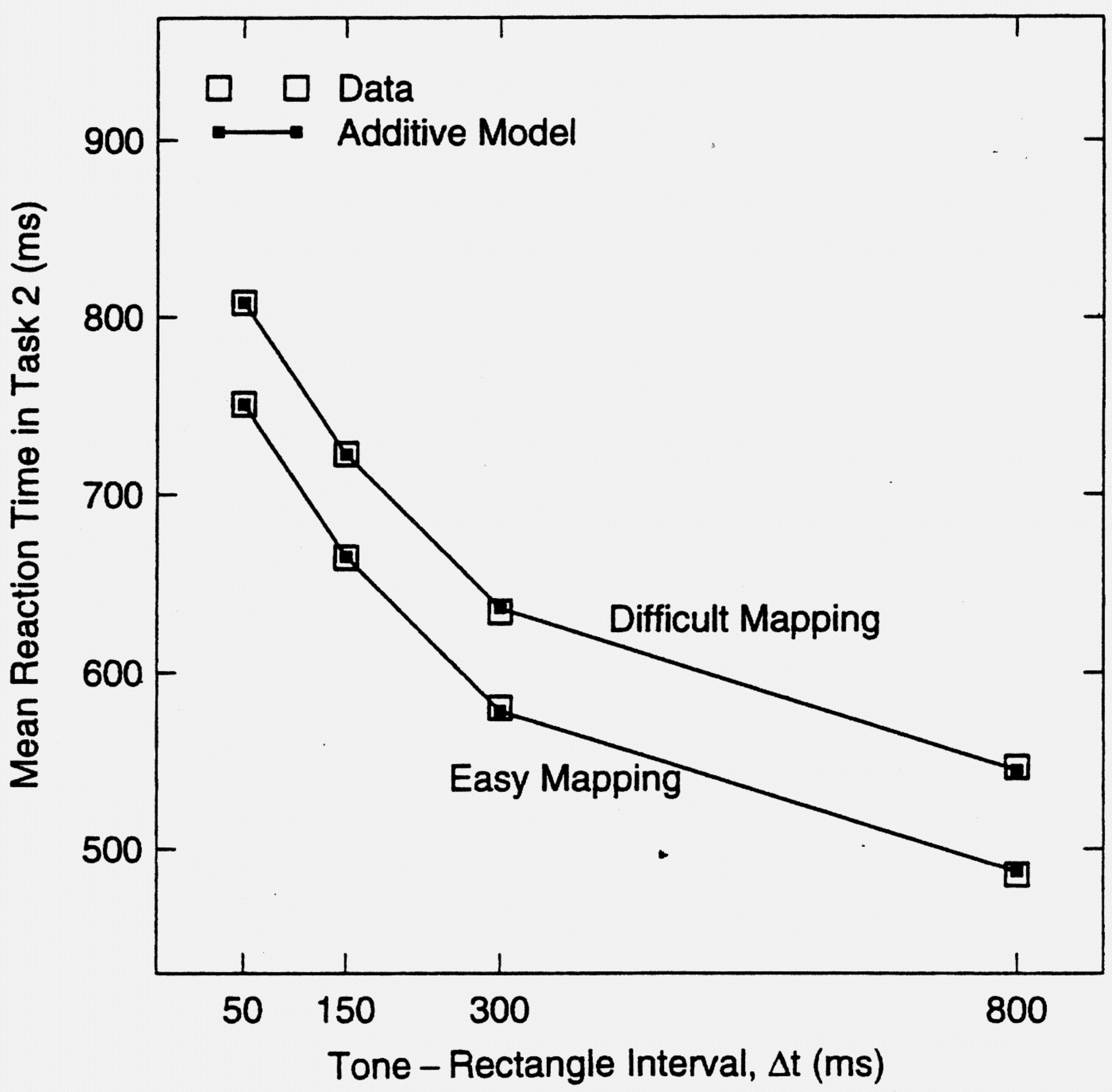

Figure 14.30
Mean reaction times in task 2 from overlapping-tasks experiment in which task 1 was discrimination of pitch of tone, and task 2 was classification of size of rectangle, achieved by either easy or difficult size mapping. $\overline{RT}''$ (open squares) for each level of mapping difficulty (*MD*) is plotted as a function of the interval Δt between tone and rectangle (factor $F_{\Delta t}$); as the interval shrinks (moving leftward in the figure) it can be seen to increase. The excellent fit of the additive model (filled squares connected by lines) shows that the effect of *MD* is invariant over levels of $F_{\Delta t}$. This finding as well as the increase in $\overline{RT}''$ as Δt shrinks would be expected from the deferred-processing model if *MD* influences a stage at or after the bottleneck, such as **V** or **W** in figure 14.27. The impression that the curves diverge is a visual illusion. Data from McCann and Johnston 1989.

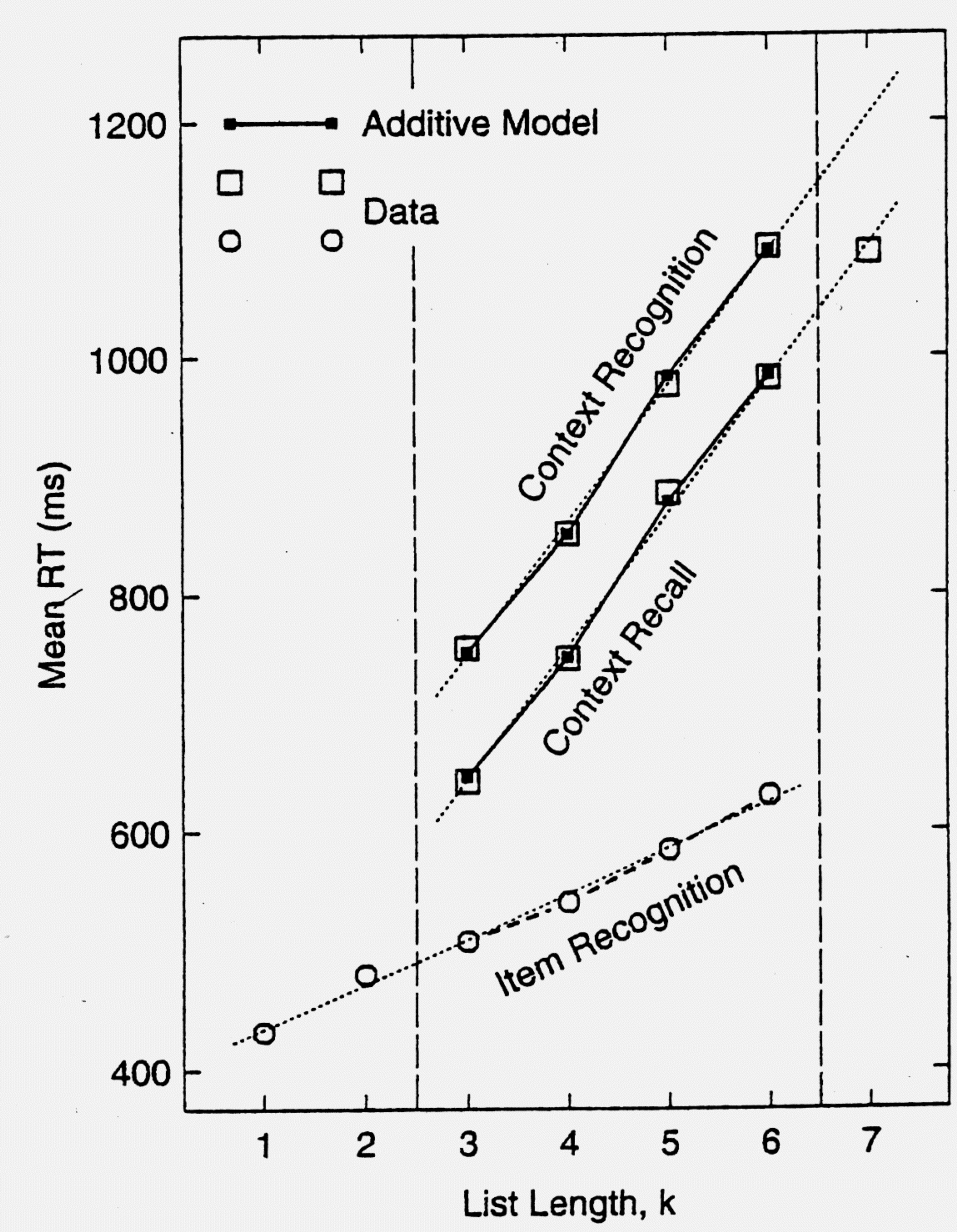

Figure 14.3
Results from three tasks requiring retrieval of information from the memory of a list. The data are represented by open circles and open squares. For the two recognition tasks, means of the *RTs* for positive and negative responses are shown. An additive model (filled squares connected by solid lines) has been fitted to the data from the two context tasks (open squares), and fits well, indicating that the effect of list length is invariant over those two tasks. On the other hand, there is a substantial interaction between list length and the item versus context task difference over the $3 \le k \le 6$ range they share. The linear functions fitted to the full range of each set of data (dotted lines) are $\overline{RT} = 397 + 38k$ (item recognition), $\overline{RT} = 305 + 113k$ (context recall), and $\overline{RT} = 407 + 114k$ (context recognition). Data from Sternberg 1969b, experiments 1, 7, and 8.

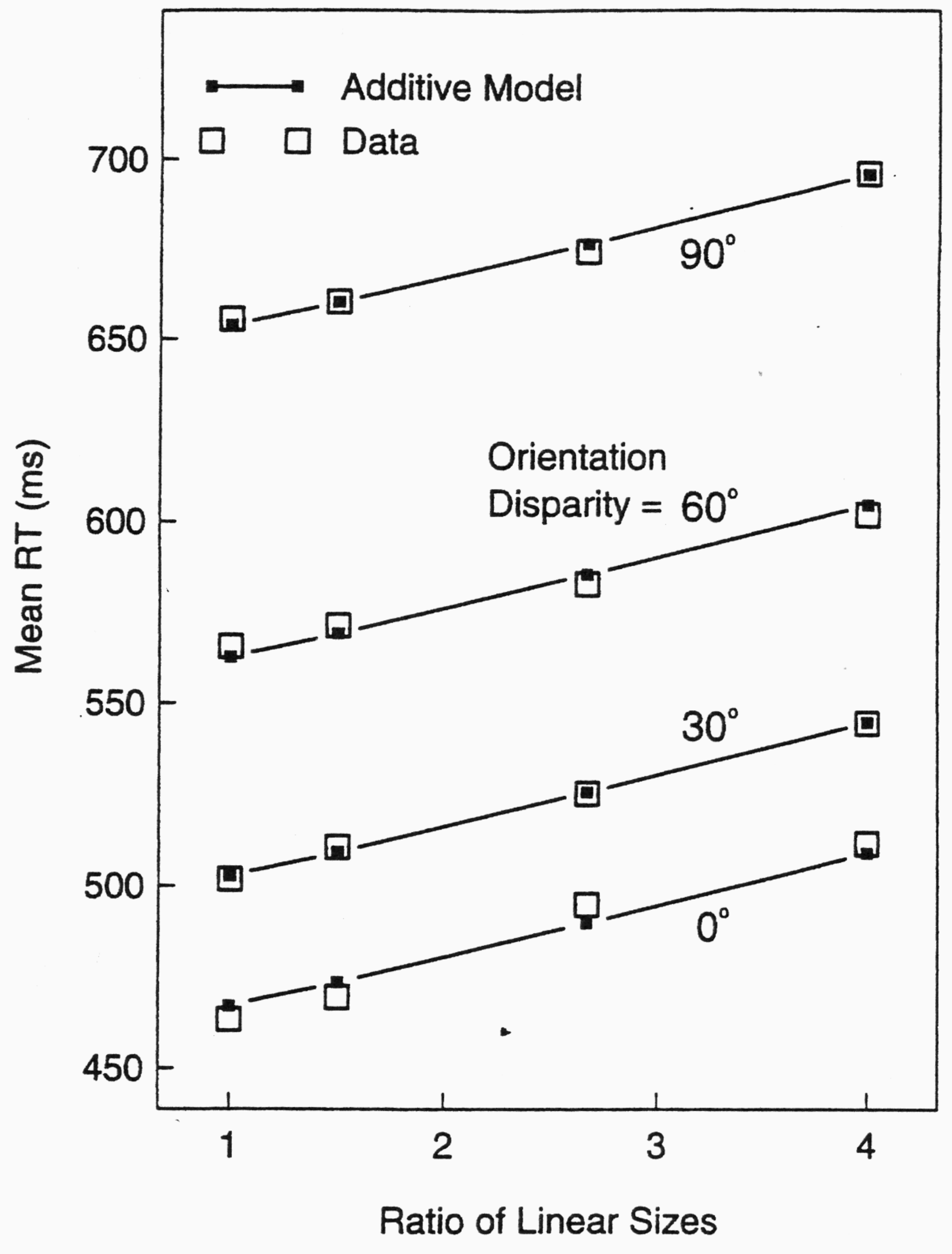

Figure 14.21
Effects of orientation and size disparities between target and probe in same-different experiment. Mean *RT* averaged over "same" and "different" responses (open squares) is shown as a function of the ratio of linear sizes of target and probe, for each of four orientation disparities indicated in degrees. An additive model (filled squares connected by lines) has been fitted to the data, and fits well, indicating that the effect of each kind of disparity is invariant over levels of the other. Data from Bundesen, Larsen, and Farrell 1981.

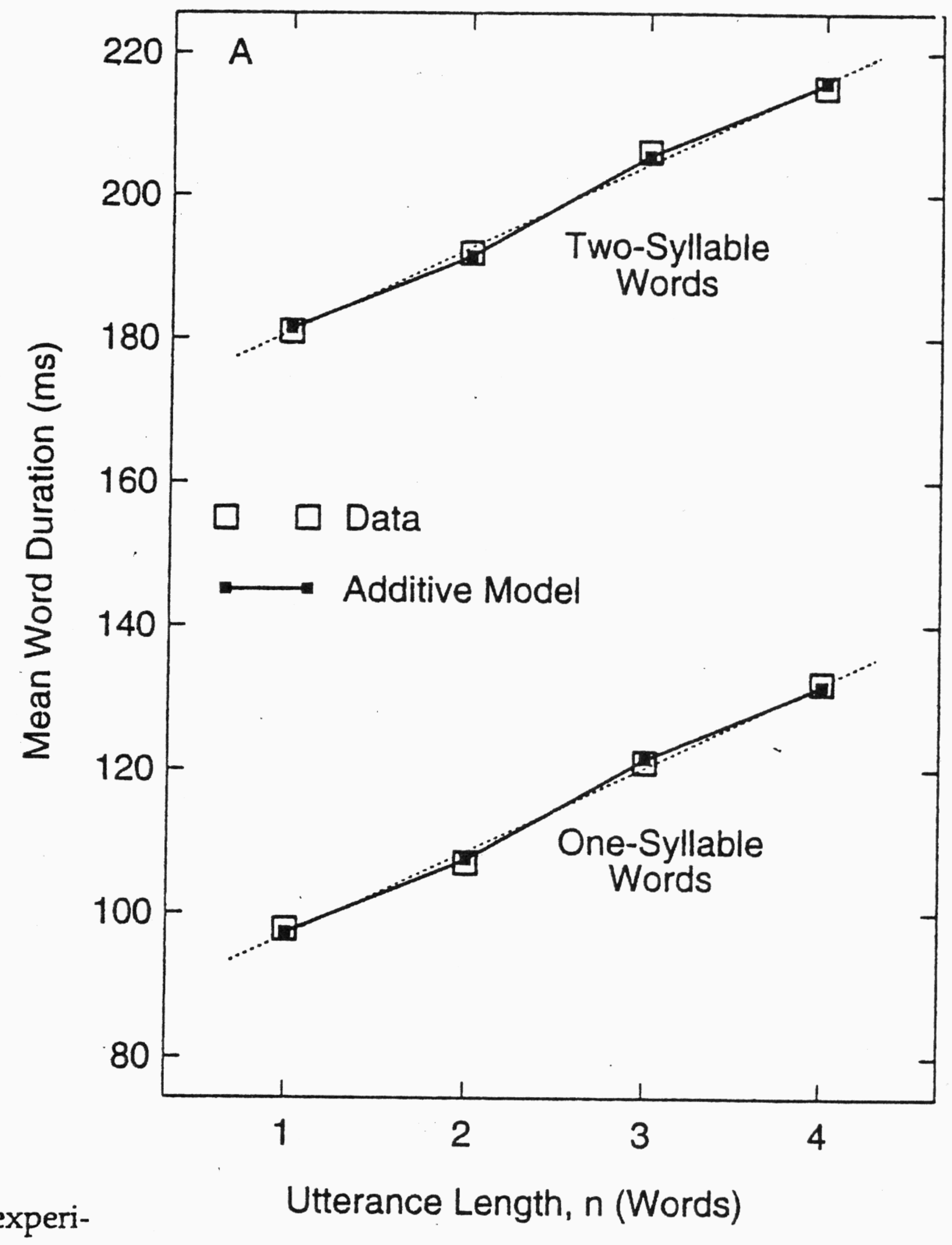

Figure 14.19
Effects of utterance length on word and segment durations. Panel A shows effects of utterance length (number of words, *n*) and word size (number of syllables per word) on mean word-duration. An additive model (filled squares connected by solid lines) has been fitted to the data (open squares) and fits well, indicating that the effect of utterance length on word duration is invariant over word size (and vice versa). The fitted linear functions (dotted lines), constrained to have the same slope, are $85 + 12n$ ms (one-syllable words) and $169 + 12n$ ms (two-syllable words).

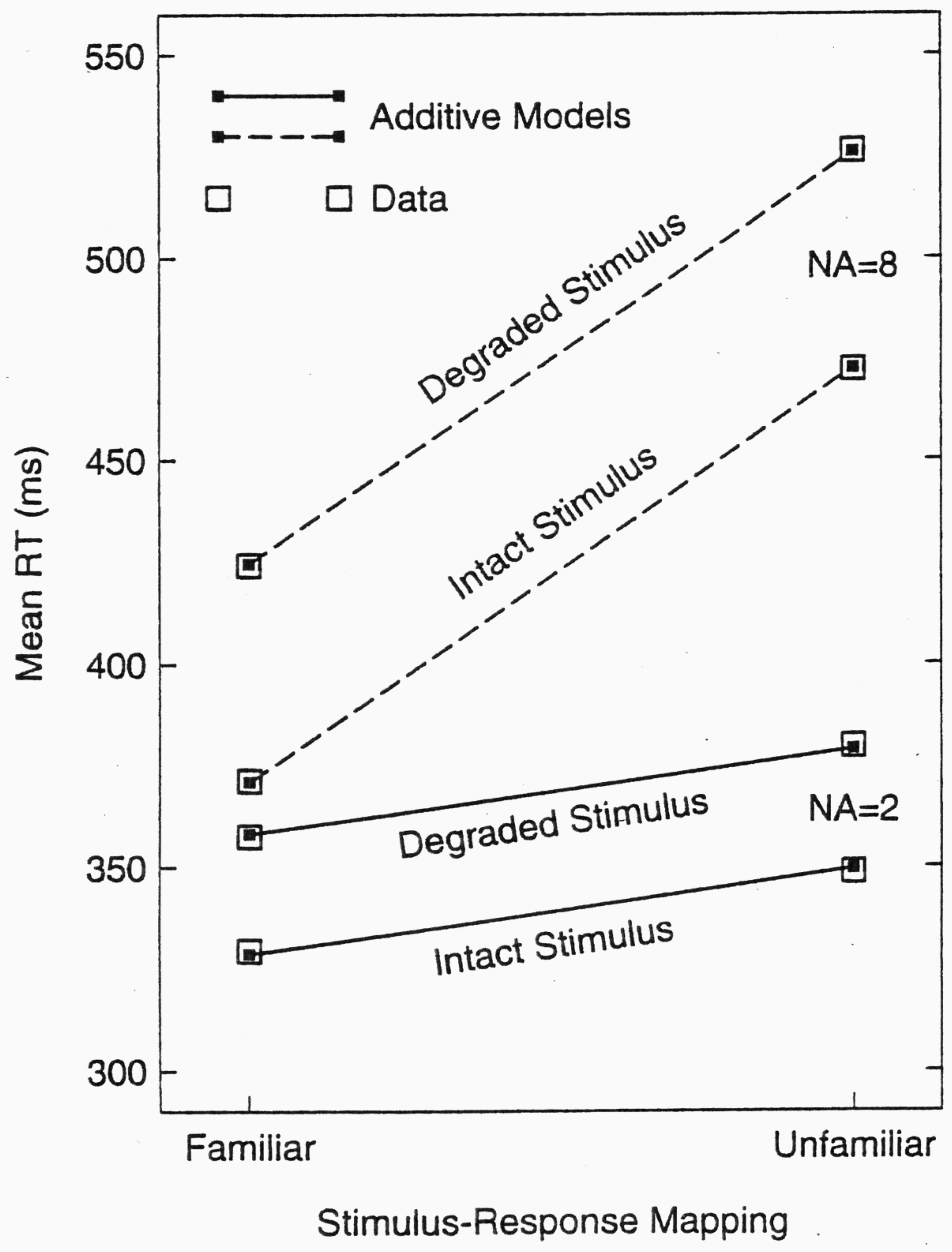

Figure 14.10
Results of experiment with digits as stimuli and names of digits as responses, also shown in figure 14.1. The experiment had eight conditions, generated by combining two levels of each of three factors: mapping familiarity (*MF*), stimulus quality (*SQ*), and number of stimulus-response alternatives (*NA*). Here the mean *RTs* from all eight conditions are shown as open squares. The connected filled squares represent additive models fitted separately to the data for $NA = 2$ (solid lines) and $NA = 8$ (broken lines). The excellence of the fit of the model indicates that at each level of *NA*, the effect of *MF* is invariant over levels of *SQ* (and vice versa). The figure also shows that an increase in the level of *NA* increases the effects of *SQ* (broken lines are more separated than solid lines) and of *MF* (broken lines are steeper than solid lines). Data from table 14.4.

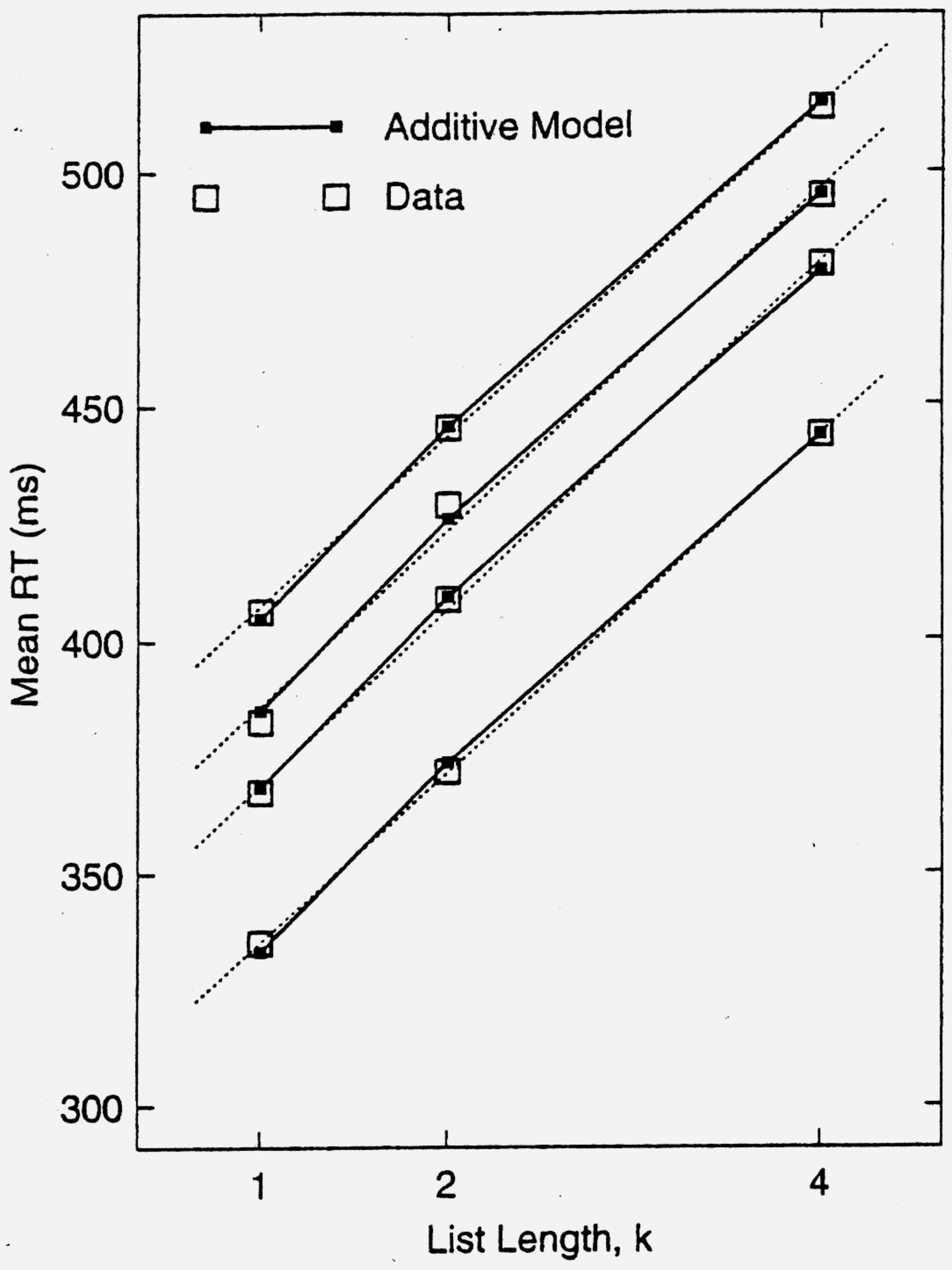

Figure 14.15
Effects of training on item recognition in data drawn from two experiments (experiment 1 from Sternberg 1967; experiment 2 from Kristofferson 1972). The four sets of data (open squares which show means of the $\overline{RT}$s for positive and negative responses) were generated after increasing amounts of training, from top to bottom. Sources of the data are as follows: Top curve: experiment 1, session 1. Second curve: experiment 2, sessions 1–5. Third curve: experiment 1, session 2. Bottom curve: experiment 2, sessions 26–30. The average numbers of training trials when the data were collected, starting with the top curve, are 215, 365, 645, and 4,015. An additive model (filled squares connected by solid lines) was fitted to the four data sets, and fits well, indicating that the effect of list length (k) is invariant over levels of training. Dotted lines are linear functions fitted separately to each data set. From the top function down, their equations are $371.7 + 35.6k$, $349.4 + 36.8k$, $331.7 + 37.2k$, and $299.2 + 36.0k$.

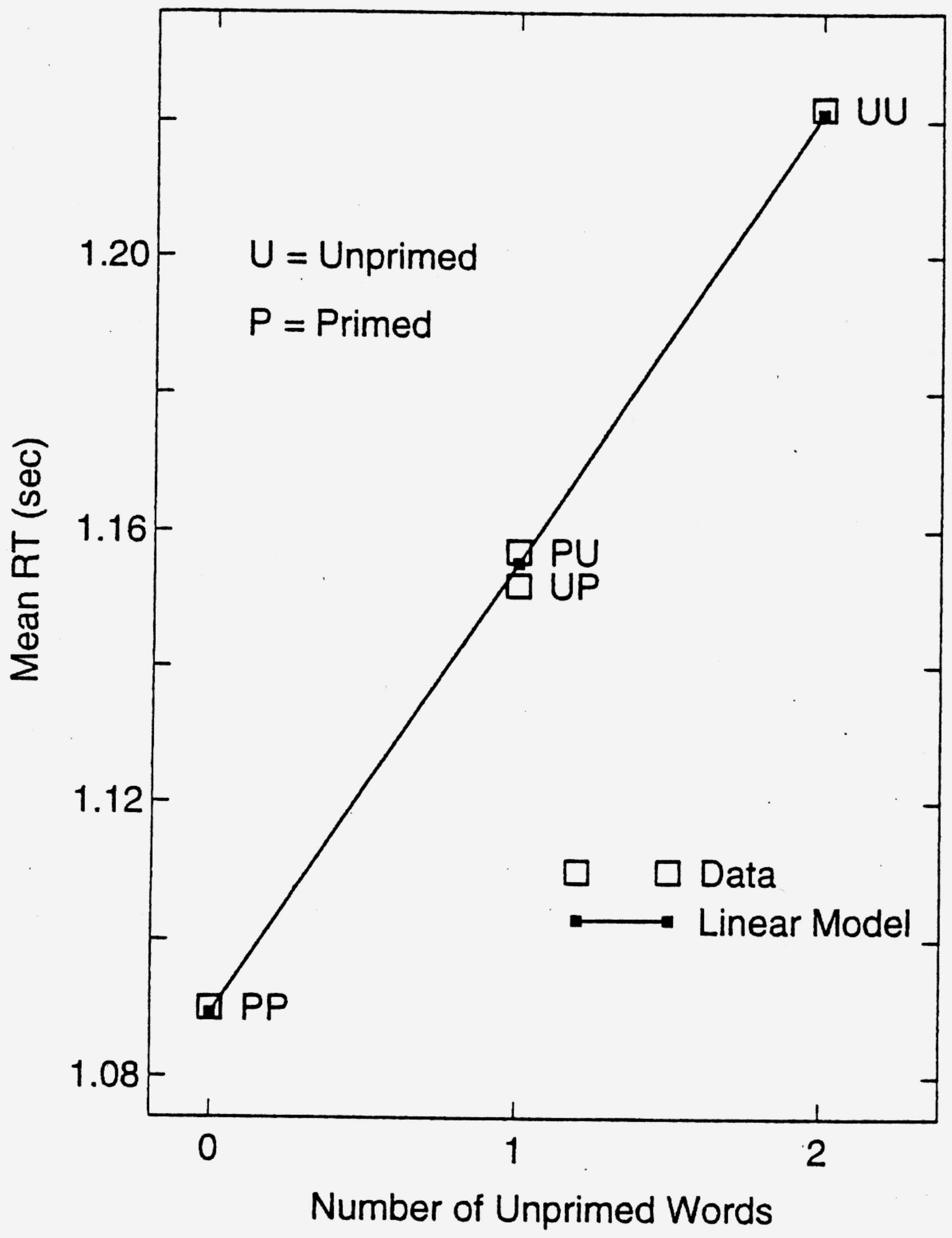

Figure 14.34
Results from "yes" trials in two-string lexical decision task in which subjects were to respond "yes" only if both strings were words. Some of the word and nonword strings had been primed by being presented in a previous one-string lexical decision task. $\overline{RT}$s (open squares) are shown as a function of the number of unprimed words in the stimulus pair. Also shown is a fitted linear function (filled squares connected by lines). This function expresses a model with two properties. First, the effect of priming the left-hand word is invariant over primed and unprimed right-hand words (and vice versa), that is, the effects of priming are additive. Second, the effects of priming the left-hand and right-hand words are equal. Data from Scarborough and Landauer 1981, experiment 2.

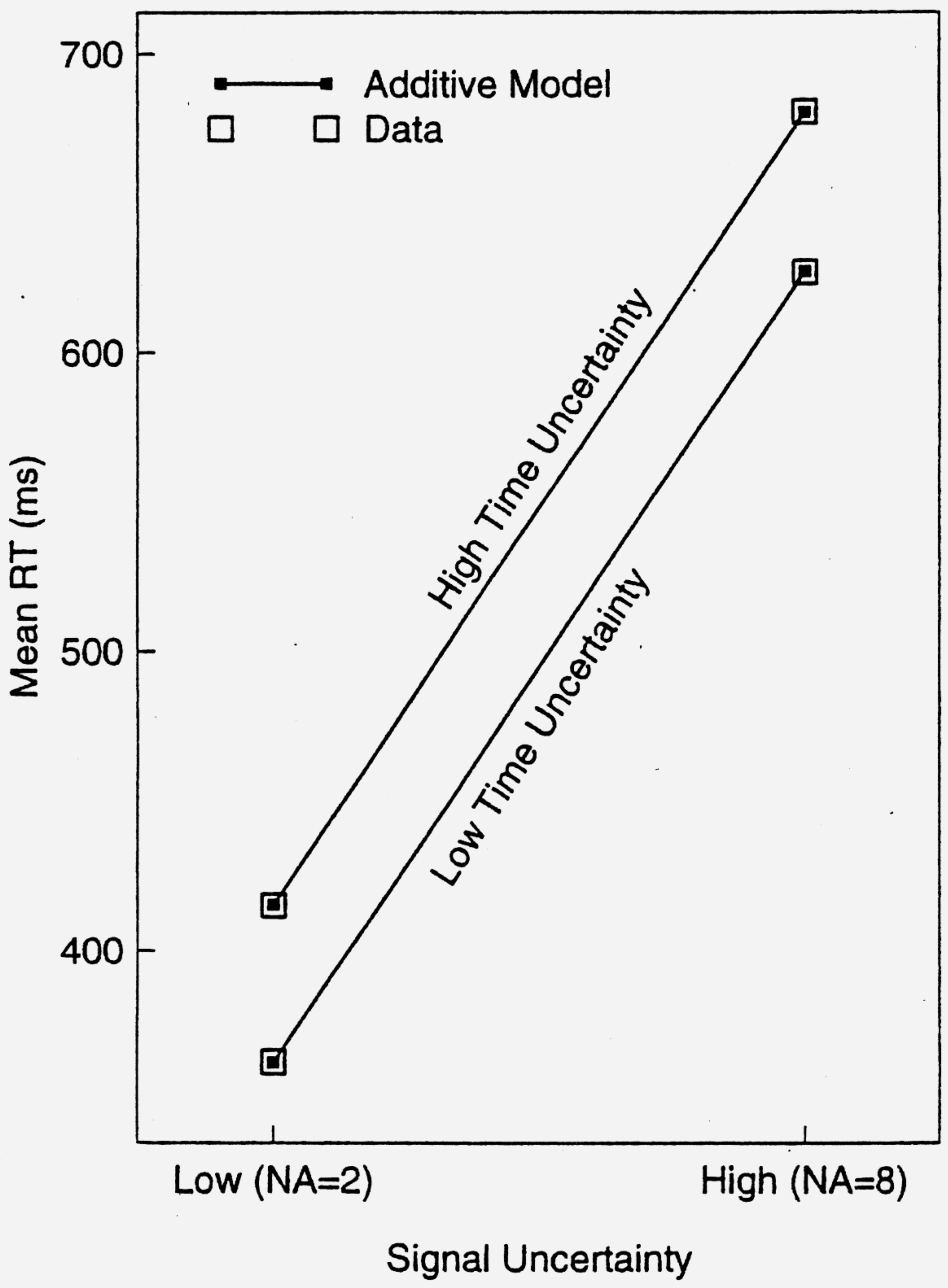

Figure 14.13
Additive effects of signal uncertainty and time uncertainty. Data from Alegria and Bertelson 1970, experiment 2.

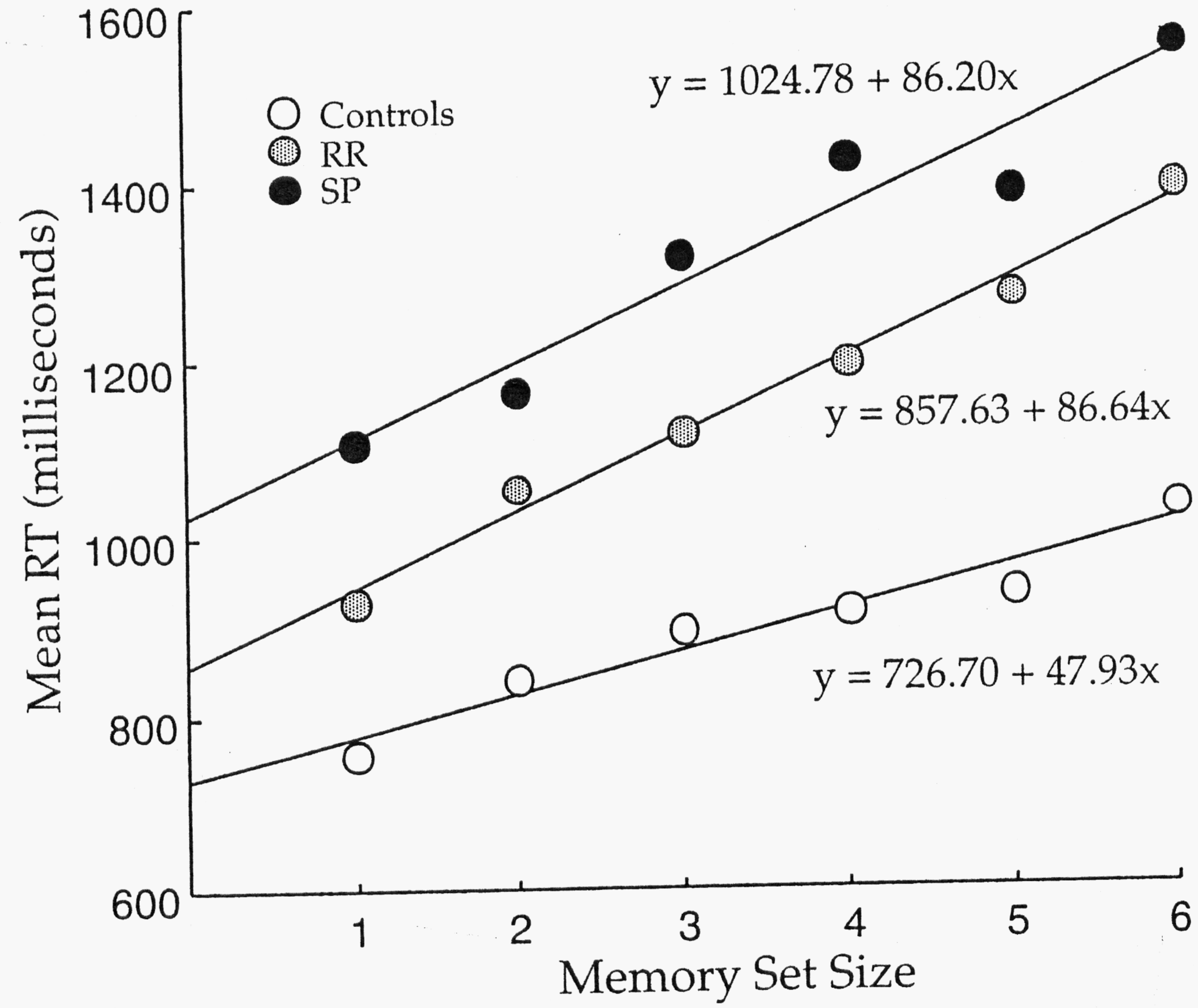

Fig. 2. Memory Scanning Test: Mean reaction times (RT) for the patient and normal control samples as a function of memory set size (positive and negative trials combined; RR = relapsing-remitting course of multiple sclerosis; SP = secondary-progressive course).

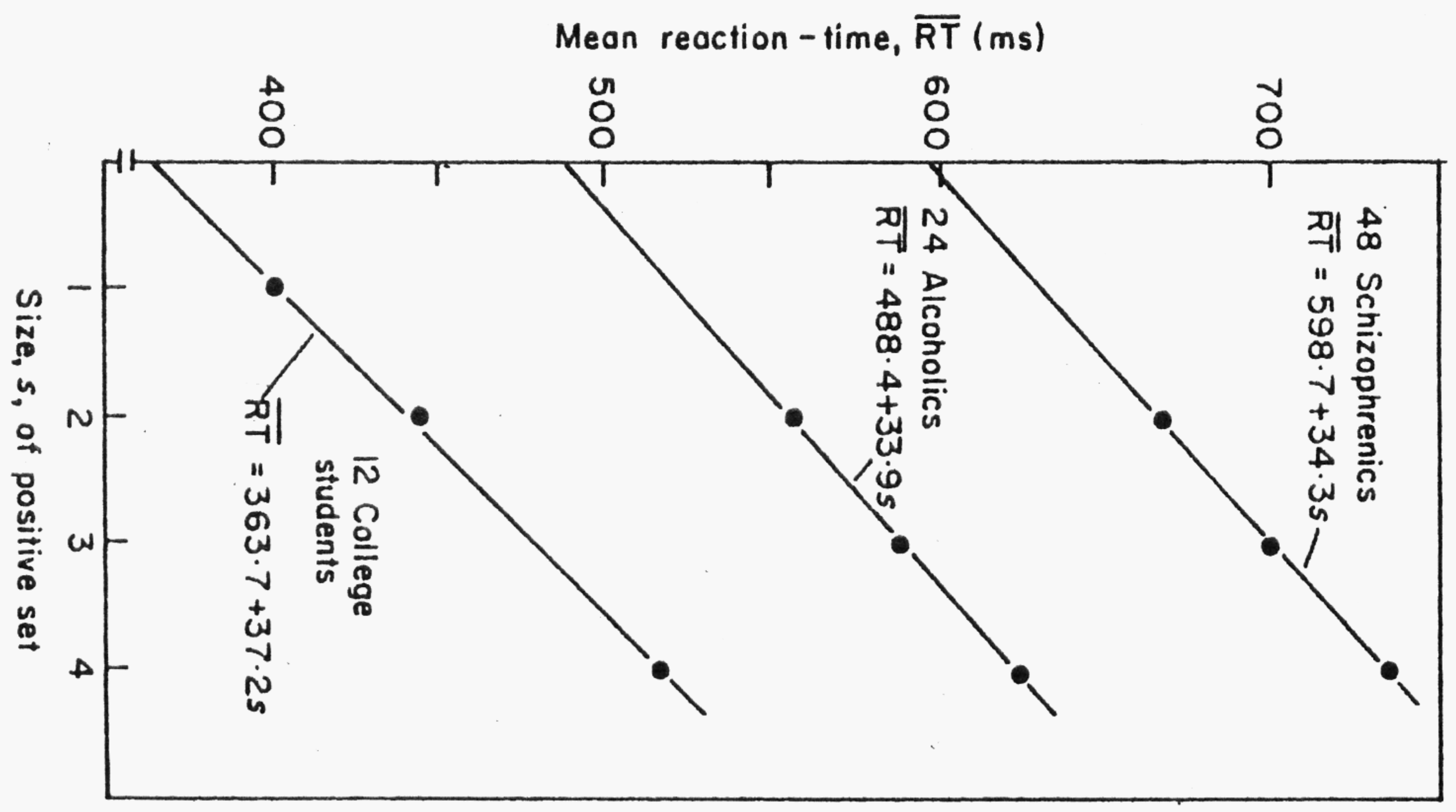

Fig. 5. **Results from item-recognition experiments with three groups of subjects. Overall mean RTs as functions of size of positive set, and lines fitted by least squares. Data for schizophrenics (average hospitalization, 15 months) and alcoholics (average hospitalization, 8 months) from an unpublished study by S. F. Checkosky. For both groups the s.e. of the mean slope was about 2·2 ms, and slopes of separately fitted functions for positive and negative responses differed by less than 2·5 ms. Data show performance after an average of 1728 trials of practice (8 test days preceded by 4 practice days, with 216 trials per day). Data for college students from a similar study shown for comparison (Sternberg, 1967*a*, session 2); data show performance after an average of 630 trials of practice. Standard error of the mean slope for these data was about 3·4 ms.**

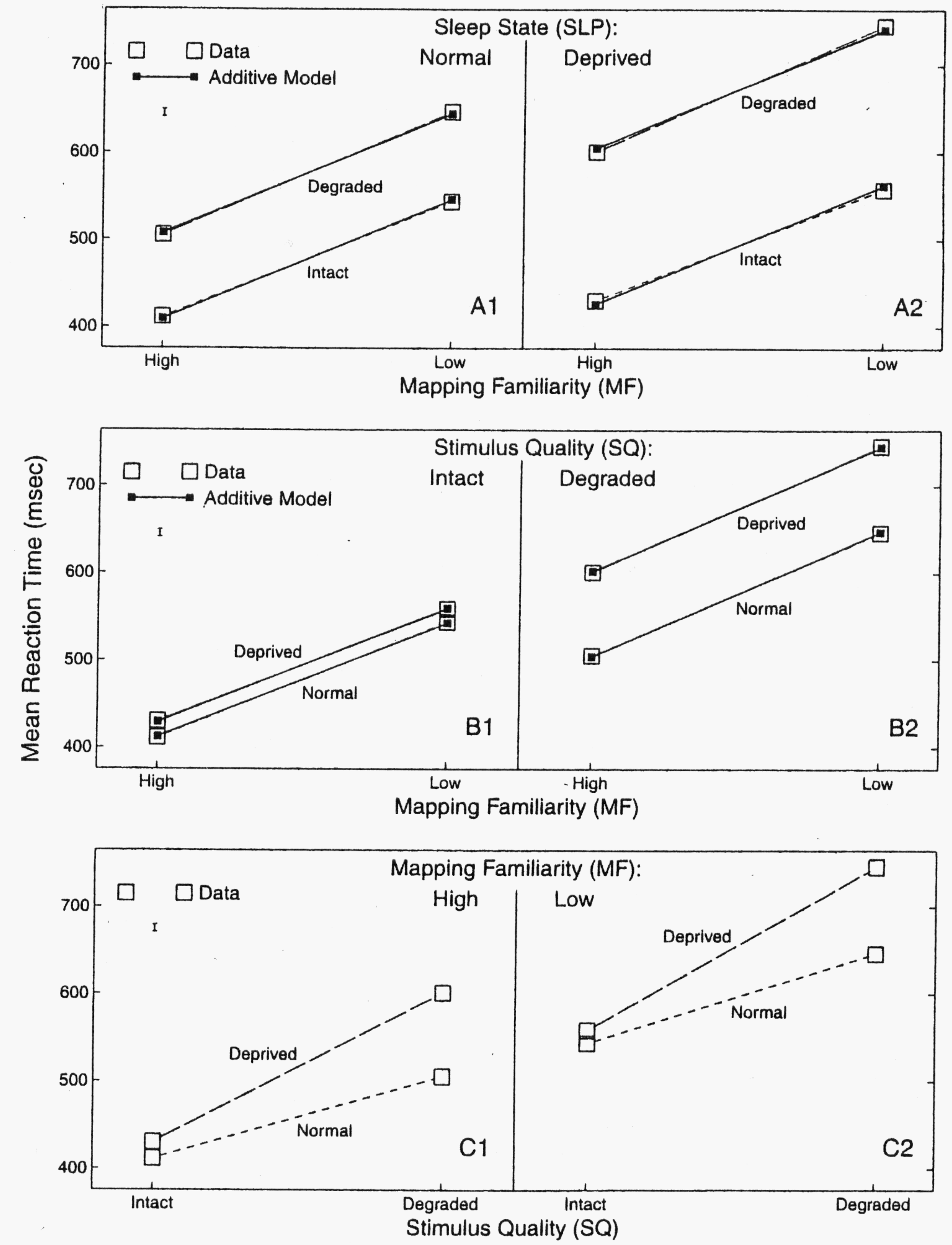

Fig. 14. Data from Sanders et al. (1982, Experiment 1). Means over the two levels of *TD*. Each pair of panels shows the same $2 \times 2 \times 2 = 8$ data points, plotted in different ways. Each point is the mean of about 300 RTs from each of 16 subjects. A fitted additive model is also shown in each of the top four panels. Mean absolute deviations of data from model are 3.3 (panels A1, A2) and 1.0 ms (panels B1, B2). Because basic data are no longer available, values were obtained from Fig. 1 of Sanders et al. (1982). For the same reason, neither within-cell nor between-subject measures of variability are available. The ±S.E. bars were therefore determined by separating the data by *TD*, fitting a model that assumes the additivity of *MF* with *SQ*, *SLP*, and *TD*, and using the deviations (7 df) to estimate S.E.

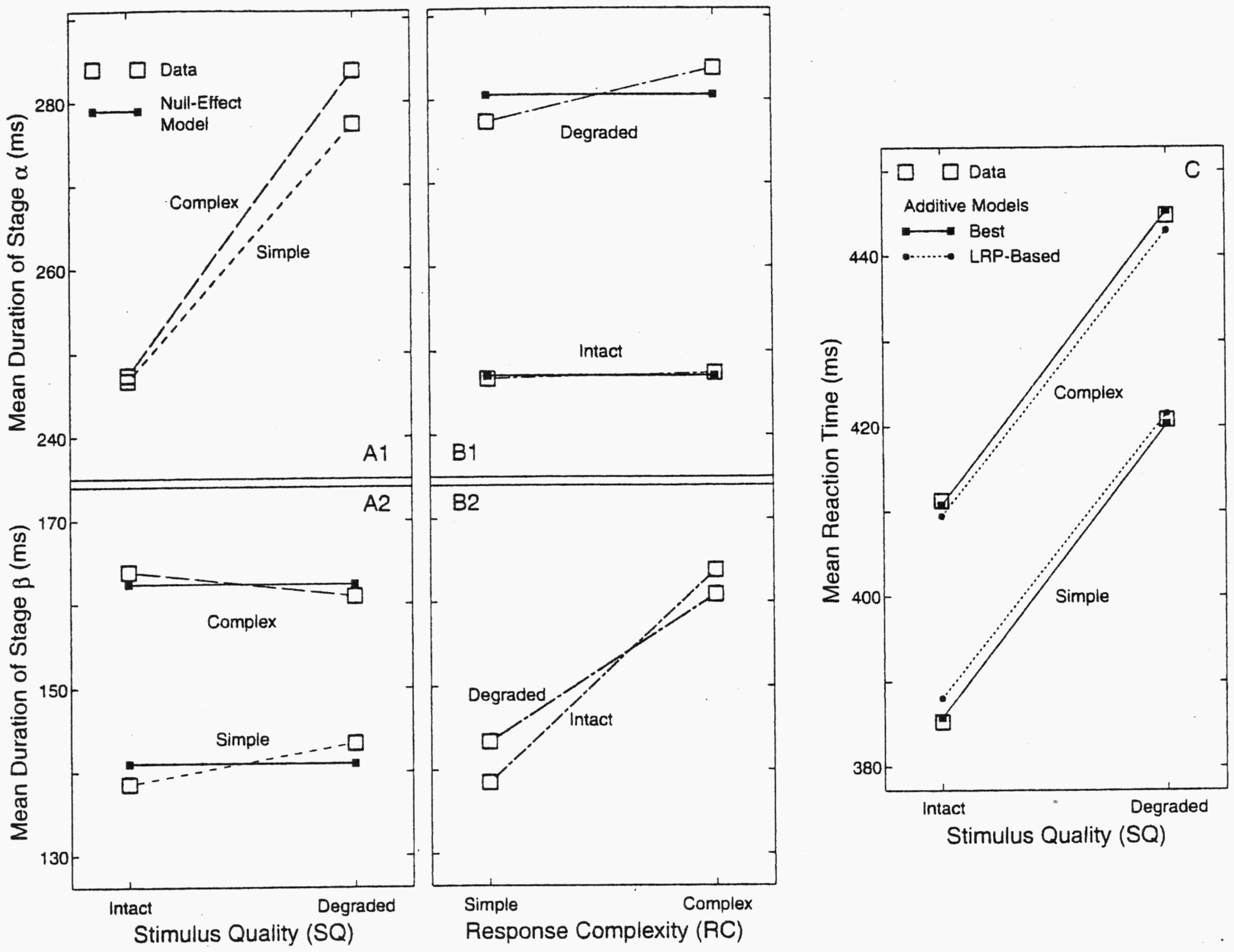

Fig. 15. Means over 14 subjects of data from Smulders et al. (1995). Estimated durations D_α of Stage α, from stimulus presentation to LRP onset (panels A1, B1); and D_β of Stage β, from LRP onset to response (panels A2, B2). These are shown as functions of *SQ* (panels A1, A2), and of RC (panels B1, B2). Data in panels A1 and A2 are separated by level of *RC*; those in panels B1 and B2 are separated by level of *SQ*. Also shown in panels A2 and B1 are null-effect models. Main effects of *SQ* on D_α and D_β are 34 ± 6 (panel A1) and 1 ± 8 ms (panel A2), respectively; the corresponding main effects of *RC* are 4 ± 8 (panel B1) and 21 ± 7 ms (panel B2), respectively. The $\overline{RT}$ data are shown in panel C, together with two fitted models. One is the best-fitting additive model (mean absolute deviation 0.5 ms); the other is an additive model based on the LRP data (see text; mean absolute deviation 1.8 ms).

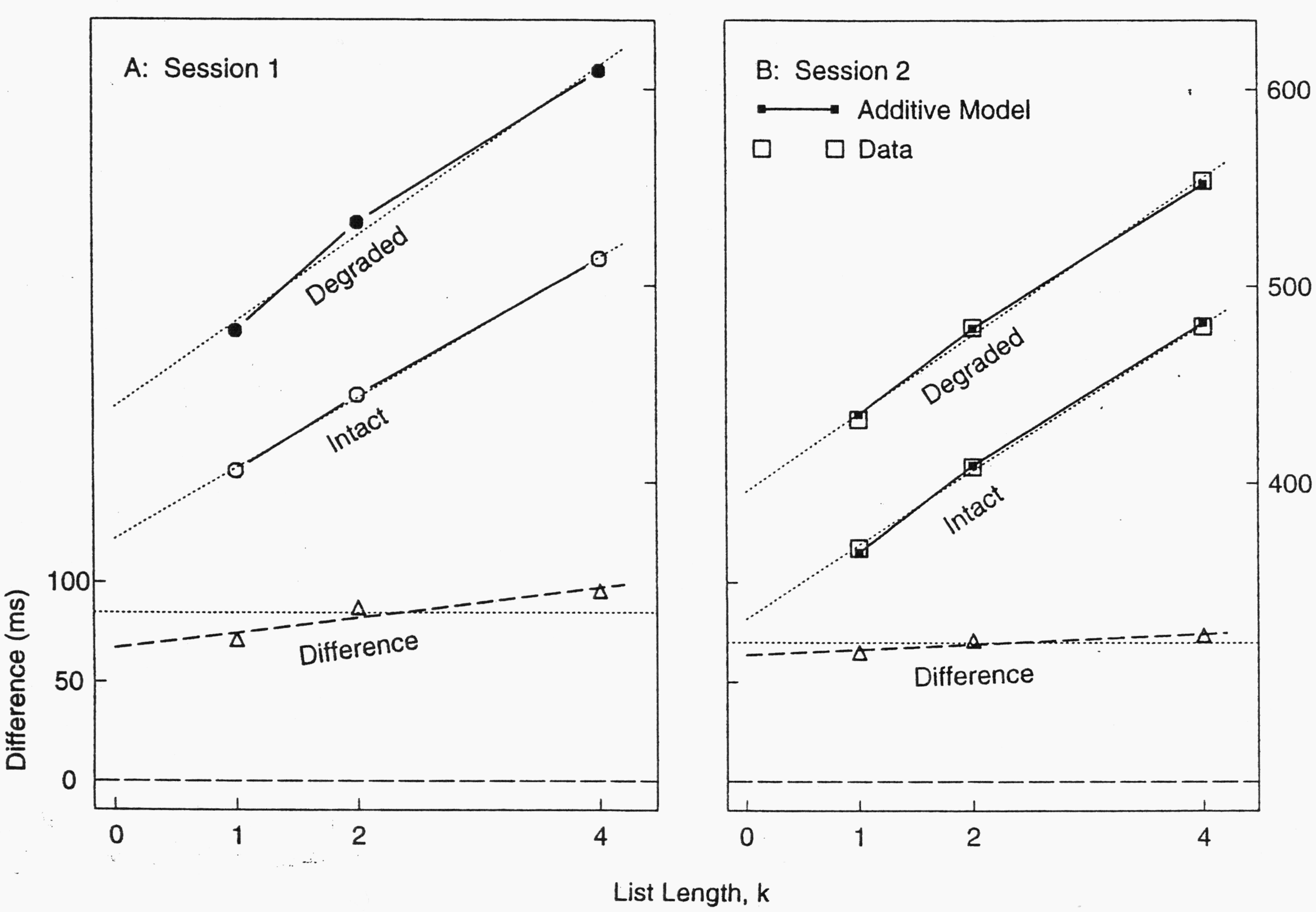

Figure 14.39
Results from two sessions of an item-recognition experiment. For each session $\overline{RT}$ averaged over positive and negative responses (right-hand ordinate) is plotted as a function of list length for intact and degraded test items. Also shown is the effect of *SQ* (left-hand ordinate, triangles) and a linear function fitted to that effect (broken line). Panel A shows that in session 1 the functions for degraded and intact test items (dotted lines) differ in slope as well as intercept. The equations are $\overline{RT} = 371.7 + 35.6k$ (intact) and $\overline{RT} = 438.8 + 43.2k$ (degraded); the broken line fitted to the difference (effect of *SQ*) is $D_i(\overline{RT}_{ik}) = 67.1 + 7.6k$. Panel B shows that in session 2 the observed functions (open squares) for degraded and intact test items differ in intercept, but do not differ reliably in slope; they are well described by an additive model (filled squares connected by solid lines) in which the effect of *SQ* is invariant over levels of *LL*. The equations of the linear functions fitted to the data (dotted lines) are $\overline{RT} = 331.7 + 37.2k$ (intact) and $\overline{RT} = 395.4 + 39.9k$ (degraded); the broken line fitted to the difference (effect of *SQ*) is $D_i(\overline{RT}_{ik}) = 63.7 + 2.7k$. Data from Sternberg 1967.

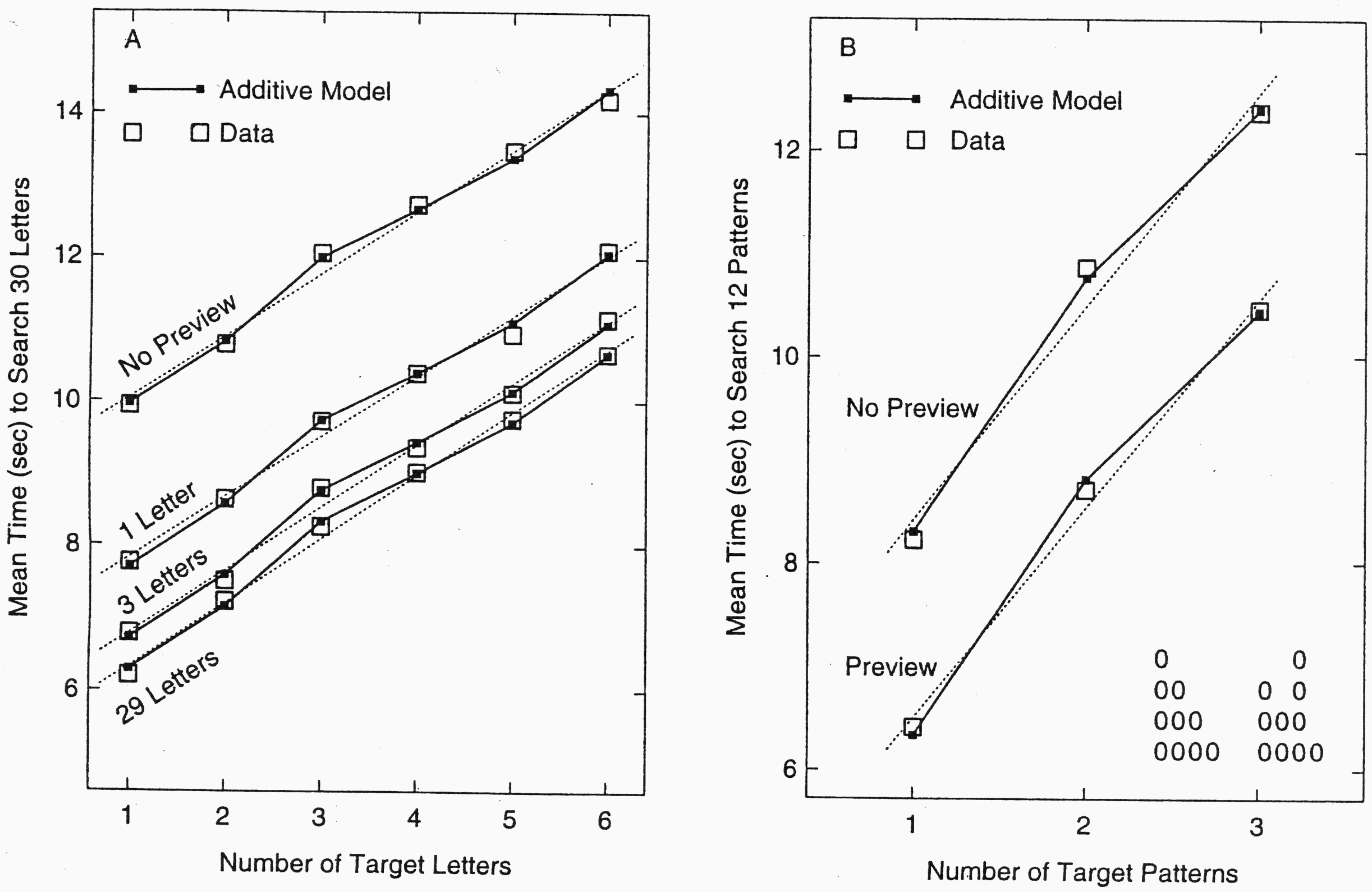

Figure 14.41
Additive effects on total time of preview (*PV*) and number of targets (*NT*) in visual search, evidence against model shown in figure 14.40B. Data (open squares), additive model (filled squares connected by lines) and fitted linear functions (dotted lines). In panel A, target set contains $1 \leq NT \leq 6$ letters; four levels of *PV*; button press during search for each target found in rows of 30 letters. Note similar deviation from linearity at each level of *PV* (unexplained). Slopes of the fitted linear functions for increasing amounts of preview are 0.87, 0.86, 0.84, and 0.86 sec/target. In panel B, target set contains $1 \leq NT \leq 3$ nonsense patterns (illustrated); two levels of *PV*; count of targets found in rows of 12 patterns reported at end of search. Data from Chase 1969, experiments 1 and 5 for panels A and B, respectively.

100 Concatenated Target-Nontarget Decisions:
Time per Displayed Item versus Size of Target Set
Under Two Levels of Preview