

# Response language and context effects\*

H. R. SCHIFFMAN, JEROME GOLDSTEIN, and RICHARD AROKSAAR  
Rutgers -The State University, New Brunswick, N.J. 08903

The influence of the mode of response on context effects in length scaling was investigated by comparing a familiar, absolute, unrestricted, verbal mode with a length-matching technique. Usual context effects occurred with the verbal mode but not with the length-matching technique. The results suggest that context effects reported from certain length scaling tasks may reflect changes in the reference system under which reports are made rather than changes in the perceived magnitude of the stimuli.

Two interpretations have been assigned to the context and contrast effects occurring in the scaling of a number of physical dimensions: They are the result of a perceptual process reflecting fundamental changes in the appearance of the stimuli or they result from a linguistic process obtaining from limitations in the response language, i.e., from use of an unfamiliar, situationally relative, E-defined, and, in some cases, category-restrictive judgmental language (e.g., Stevens, 1958; Fillenbaum, 1963).

The effects of a shift in context, or in the distribution of stimulus values, obtained in studies on length estimation have been attributed to a perceptual process involving true changes in the perceived length as a function of preceding stimuli. Thus, when the response language is a familiar and absolute scale, without category restrictions, e.g., verbally estimating "in inches," clear context effects obtain (Miller & Enger, 1960; Krantz & Campbell, 1961). However, the fact that a familiar scale with reports in inches rendered either verbally or otherwise is absolute, S-defined, and offers no category restrictions does not necessarily imply that it is free of linguistic influence; it is possible that translating perceived length into the units of a familiar measurement system invokes a linguistic process that could account for context effects.

To assign the production of context effects to a perceptual process demands that a means of reporting perceived length be used that is clearly free of linguistic influence. This is easily accomplished by using a length-matching technique, where S renders his judgment by physically matching the length of the stimulus with an unmarked visual length-comparator instrument. Not only is this technique linguistically free, providing full information

for a length judgment, but it enables the assessment of an apparently perceptual task (length judgment) by a perceptually oriented mode of response (length match).

Accordingly, the present study was performed to assess the effect of this mode of response on context effects. The occurrence of context effects with a length-matching mode of response would not only strengthen the argument that context effects in length estimation are due to a perceptual process, but it would generalize the conditions under which they can be manifest. On the other hand, a failure to obtain context effects with the length-matching mode of response would question the assignment of context effects to a perceptual process and perhaps would restrict context effects to linguistically-bound response modes.

## SUBJECTS

Eighty male volunteers from an introductory course in psychology served as the Ss.

## STIMULI

The stimuli were sets of 35-mm positive transparencies, each of which projected a 5-mm white horizontal line against a black background. The stimuli and their projected line-lengths were:

No. 1	71 mm	No. 8	246 mm
No. 2	97 mm	No. 9	277 mm
No. 3	117 mm	No. 10	312 mm
No. 4	142 mm	No. 11	343 mm
No. 5	168 mm	No. 12	376 mm
No. 6	193 mm	No. 13	406 mm
No. 7	216 mm		

## APPARATUS

The stimuli were shown from an automatic projection tachistoscope (Lafayette Model KT-800, with Alphax tachistoscopic shutter) and cast a 114 x 76 cm image at eye level on a 122 x 91 cm rear-projection screen located about 1 m from S. The shutter of the tachistoscope was set at either 1/5 sec or 1 sec. A length-matching apparatus was located directly in front of S on a table separating him from the viewing screen. It consisted of a black wooden base 20 cm wide and 1 m long with 23-cm vertical rods

at either end that supported a 25-mm-wide black wooden strip that spanned the length of the base. Two adjustable markers, 6.4 mm wide straddled the strip; the inside edges of the markers were painted white, contrasting with the black outside edges. A scale was attached to the side of the strip not facing S and was used by E for measuring S's response. Room illumination was approximately 6 fc.

## DESIGN AND PROCEDURE

The Ss were assigned randomly to each of two levels of three experimental variables resulting in a 2 by 2 by 2 factorial design with eight independent groups, 10 Ss per group.

The first variable was *context*: the slides were organized into two groups, in each of which were sets of seven slides. A *low-context* group included the seven shortest stimuli (Nos. 1 to 7) and a *high-context* group comprised the seven longest stimuli (Nos. 7 to 13). The *trace* stimulus, No. 7, occurred in both contexts—as the longest stimulus of the low-context group and as the shortest stimulus of the high-context group. Each S was shown seven sets of slides for a total of 49 reports; the order of stimuli within a set was random, with the restriction that the trace stimulus was always seventh. The low- and high-context groups were run for each combination of the two other experimental variables.

The second experimental variable was *mode of response*: A *verbal-response* group was instructed as follows: "You will be shown, one at a time, a series of slides; on each slide there is one horizontal line. Your task is to judge the length of the line in inches. Before the presentation of each slide I will call out 'ready.' Please call out your length judgment to the nearest 1/4 of an inch when I say 'respond.'"

A *length-match response* group was instructed to use the length-matching apparatus to indicate their judgment. Their task was to move the two markers together or apart so that the distance between the white inside marker edges appeared to match the length of the line that was shown. The E alternated moving the markers together or apart after each response.

The third experimental variable was *stimulus duration*: The exposure interval was set at .2 sec for a short-exposure group and at 1 sec for a long-exposure group.

The intersimulus interval for all groups was 15 sec. Each S was shown three practice slides consisting of intermediate line lengths prior to the experimental sessions.

## RESULTS

The analyses were based upon the means of each S's reports of the trace stimulus.

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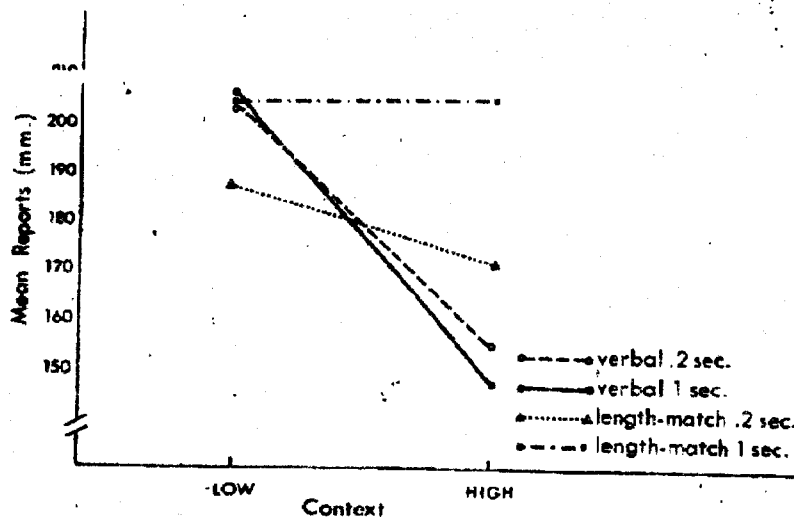


Fig. 1. Mean reports of the trace stimulus by context for mode of response and stimulus duration.

The main results are shown in Table 1 and in Fig. 1, where reports by context are plotted for mode of response and stimulus duration. There were significant effects due to context,  $F(1,72) = 17.44$ ,  $p < .01$ ; however, this is graphically clear only for the verbal mode of response. Main effects due to mode of response and stimulus duration were not reliable. Only the Context by Mode of Response interaction reached significance,  $F(1,72) = 9.91$ ,  $p < .01$ . Thus the mode of response differentially affected the context groups: Although there was a clear context effect by the verbal mode of response, reports made by the length-matching mode of response remained relatively stable over context groups. Though not reaching statistical significance, a trend toward contextual effects for the .2-sec length-match response group is suggested by Fig. 1.

#### DISCUSSION

The present findings indicate that the mode of response is a critical variable for the demonstration of context effects. The fact that, in general, a length-matching technique did not yield the context effects customarily reported when using other

scaling methods, particularly category scaling and verbal estimation, suggests that context effects for certain tasks may not primarily reflect fundamental differences in perception. These findings, coupled with those of Krantz & Campbell (1961), further suggest that the greater the extent of linguistic intrusion in the response mode, the greater the magnitude of the resultant context effects. Thus, with a modified method of magnitude estimation—involving a novel judgmental language—Krantz and Campbell obtained greater context effects than when they had Ss verbally report their estimates of length in inches. That is, the difference between estimations of the trace stimulus when it occurred in the high- and low-context groups was less when Ss reported in inches. Though arguing for both a perceptual and linguistic process, the authors attribute the difference in the magnitude of the context effects to the greater linguistic influence obtaining from use of the modified method of magnitude estimation.

The results of the present study augment the findings of Fillenbaum (1963), who studied contextual effects on the judgment of the height-to-width ratio of a series of

rectangles as a function of the mode of response. The essential results from the introduction of broader and narrower anchors than those presented in the standard series indicate context effects for category scaling (5-point scale) but no context effects for direct height-to-width ratio scaling. Although from a different task than that employed in the present study, Fillenbaum's results support the contention that a more linguistic-free response mode does not yield context effects.

In general, the present experiment does not refute Helson's (1964) theory that a change in perceived magnitude occurs as a function of changes in the distribution of stimulus values: Clearly, under the proper response circumstances, the context-series stimuli provided the frame of reference against which the trace stimulus was judged. However, the failure to obtain context effects with certain procedures stresses the need to clearly specify the necessary conditions for their demonstration. Thus, these results appear to support Stevens's (1958) argument that the context effects observed in some perceptual studies reflect changes in the modulus of judgment or in the reference system under which judgments are made, rather than changes in the perceived magnitude of the stimuli.

These findings are limited to problems of length scaling with sequentially presented stimuli. One must consider whether the results of numerous studies on length scaling are influenced by the various means of extracting reports of perceived length.

#### REFERENCES

- FILLENBAUM, S. Contextual effects in judgment as a function of restrictions in response-language. *American Journal of Psychology*, 1963, 76, 103-109.
- HELSON, H. *Adaptation-level theory*. New York: Harper & Row, 1964.
- KRANTZ, D. L., & CAMPBELL, D. T. Separating perceptual and linguistic effects of context shifts upon absolute judgments. *Journal of Experimental Psychology*, 1961, 62, 35-42.
- MILLER, C. A., & ENGEN, T. Context effects on absolute judgments of length. *Journal of Experimental Psychology*, 1960, 59, 276-277.
- OVER, R. Size and distance estimates of a single stimulus under different viewing conditions. *American Journal of Psychology*, 1963, 76, 452-457.
- STEVENS, S. S. Adaptation-level vs the relativity of judgment. *American Journal of Psychology*, 1958, 71, 63-646.

Table 1  
Means (mm) and Standard Deviations of the Trace Stimulus by Context for Mode of Response and Stimulus Duration

Mode of Response	Stimulus Duration (Sec)	Context			
		Low		High	
		Mean	SD	Mean	SD
Verbal	.2	203.5	12.7	154.9	7.8
	1	206.5	10.3	148.3	11.2
Length-match	.2	186.9	9.8	171.7	7.6
	1	204.2	6.1	205.0	5.9