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## STIMULUS-RESPONSE FACTORS IN INFANTILE PLANTAR PHENOMENA

T. W. RICHARDS

In the course of some work preliminary to a genetic study of plantar responses of infants and children, it occurred to Dr. Irwin and myself, on the basis of considerable confusion in the literature, that a study of stimulus factors plus a check on methods of judgment of responses might be worth while.

Fifteen infants were used in the study, aged one to ten days, each infant being stimulated from twelve to fourteen times, so as to include stimuli under these conditions: direction of stroke, heel-to-toe or toe-to-heel; area stroked, midline, internal or external borders; pressure, calibrated by means of a specially constructed instrument at approximately 10 and 100 grams. Moving pictures were taken throughout, one individual stimulating, the other photographing.

The moving pictures will illustrate the method used, and typical responses secured.

In an effort to study possible variables due to judgments of response, the following judgment technique was used:

1. Each of two observers judged every response for the element of extension of toes; the pictures were then re-projected, and flexion of toes was noted, and so on for ankle extension and flexion, ankle rotation, and for withdrawal responses.

2. After the individual judgments had been secured, the observers went over the film for each of these responses, then repeated the performance until an agreement was reached for each element of each response. The responses so judged were called for the sake of convenience "specific responses."

3. After these "specific responses" had been judged and agreed upon, an attempt was made to duplicate the actual clinical condition. The film was run through once for each observer, and he was asked to judge whether the response was a pattern of extension, flexion, mixed type, or no response. The responses so judged were called "pattern responses."

### RESULTS

Groups were segregated according to the various methods of stimulation, and percentages of each response obtained were deter-

mined. No reliable differences were found between the responses elicited by varying pressure, direction of stroke or area stroked. Apparently, on the basis of these results, these factors do not alter greatly the character of the response.

The observers agreed in their judgments of specific responses as follows: toe flexion, 87.0 per cent, ankle rotation, 74.4 per cent, toe extension 71.5 per cent, ankle extension or flexion 66.4 per cent.

Agreement in the case of judgments of pattern responses occurred in but 55.8 per cent of cases.

The judgments of specific responses were now pooled, to give a composite picture for each response to stimulation: for example, if the total picture contained extension only it was called extension; if extension and flexion, it was called a mixed response, etc. These data were then correlated with the single judgments of pattern responses. Yule's method of Mean Square Contingency gave a coefficient of .840. It seems justifiable to conclude on the basis of these results that in judging plantar phenomena, the "aufgabe" is an important factor: when an element such as extension of toes is sought, to the exclusion of all else, results thus obtained do not correspond in high degree to those obtained when the observer is asked to judge a pattern as one of extension or flexion, etc. It is possible that the great disagreement in the literature as to the characteristic responses at various age levels and in various conditions of health and disease may be due in part to this factor of clinical error, the "aufgabe."