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ITR-CLUSTERING: A LISP program to compute verbal recall intertrial repetitions

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Shuell (1969) reviewed a number of techniques used in quantifying verbal recall data using various clustering paradigms. One of these paradigms, subjective organization, assumes that subjects recall words in some repetitive fashion from trial to trial. As a measure of subjective organization, Bousfield and Bousfield (1966) suggested tabulating the frequency of occurrence of any given pair of words in one trial list that appear adjacent in the successive trial list as an intertrial repetition (ITR). The sum of ITRs for a given subject compared with the number of ITRs one might expect by chance provides a measure of the degree of word pair association a subject uses in memorizing word lists.

ITR-CLUSTERING was developed to assist verbal learning researchers in searching recall lists for occurrences of ITRs. For N recall lists the program recursively scans the second through Nth list for occurrence of any pair of words in the first through N – 1 lists. The presence of any adjacent pairs in two successive lists is scored as an ITR. The order of the words in any given pair is ignored in scoring ITRs.

Input. ITR-CLUSTERING reads recall lists in free field format. Words comprising each list are punched across cards with each word delimited by one or more blanks. A subject's recall trial is enclosed in parentheses. Recall lists for each subject may be submitted together as one deck for successive processing by the program.

Output. Data returned for each subject include a subject number, the number of words in each of the recall lists by trial, the number of common words in each successive pair of recall lists by pairs of trials, and the ITR count for each successive pair of trial recall lists.

Computer and Programming Language. ITR-CLUSTERING is written in LISP. All of the functions except the input/output functions are written in "standard" LISP as described by Weissman (1967). The input/output function is coded according to the specifications of the University of Texas LISP (UT-LISP) interpreter/compiler, Version 3, Modification Level 7, which is implemented for the CDC 6000/Cyber 70, 170 series of computers. Under UT-LISP, ITR-CLUSTERING required 22 sec and $120{,}000_8$ words of memory to compile. Execution time for 20 subjects and four 9 to 24 word recall lists required 15 sec and $70{,}000_8$ words of memory. This same data required 94 sec and $100{,}000_8$ words of memory to process under the interpreter version of UT-LISP. The above times and memory requirements were determined on a CDC 6400.

Restrictions. The number of words per recall list and the number of trials per subject that ITR-CLUSTERING can process is determined solely by the memory size of the available computer. The input/output function of the program is written to process four recall trials per subject. This part of the program may be easily modified by adding or deleting input/output directives to accommodate the desired number of trials per subject. Since the actual list scanning is accomplished recursively, there are no internal program limitations for the length of any of the recall trial lists. However, the program does not check to insure that all elements of any given recall list are unique. Also, each comparison made by the program is exact; various grammatical and spelling forms of the same word are treated as unique words.

Availability. A listing of the program with test data and sample output is available from the author at no cost.

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