MEMORIA: A computer program for experimental control of verbal learning and memory experiments with the Apple II microcomputer

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The program presented here provides a general framework for implementing experimental procedures in human memory experiments. The goal is to allow the user as much flexibility as possible in the choice of experimental parameters without the need for programming modifications. Only when fundamental modifications in the usual experimental procedure have to be carried out is there a need for program editing. Even in this case, the modular design of the package allows the user easy implementation of his experimental design.

Description. The MEMORIA program is written as a series of interdependent programming modules. Upon loading the MENU, the program sets up a series of choices, including the modification of experimental parameters or the actual implementation of a free-recall, paired-associate, serial-learning, or recognition experiment. At present, the number of trials, the stimulus duration, and the interstimulus and intertrial intervals constitute the parameter set defined in the program.

A choice of any of the experimental procedures loads a second program module, RECOGIDA DE PARAMETROS, which carries out the randomization process for the series of trials specified in the parameters. This routine also loads from the disk the verbal stimuli corresponding to the selected experiment. Then the experimental run begins, and the routine corresponding to the selected experiment presents the verbal material according to the parameters specified by the user.

Input. The program allows the input of parameters and verbal material either from a file stored on a diskette or from the keyboard. It creates a file called PARAMETROS, in which the parameter set is stored. Once any of the experimental procedures is loaded, the program reads the necessary parameters from PARAMETROS.

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The program also creates an independent file for each experimental procedure, in which the verbal stimuli for that procedure are stored.

Because the experimenter cannot assume that the subject knows the Apple keyboard, no provision for response input is made within the program. The experimental subject must provide an answer on a separate sheet of paper. This procedure has two advantages: It allows the experimenter to separate the computer from the monitor, and it gives the opportunity for using more than one monitor simultaneously. Therefore, the experimenter can run more than one subject at a time.

Output. A program module called IMPRESORA allows the choice of printing the trial-by-trial sequence of items presented by the computer. Thus, the response of any experimental subject can be appropriately scored, which allows comparison of the sequence of words as presented by the computer with the subject's protocol. The module also provides the opportunity for storing the entire sequence of words on disk for later recovery.

Language and Computer. The program was developed for an Apple II Plus with 48K memory and disk drive. The program makes heavy use of the disk drive. The total length of all the programming modules is presently about 8 KB. All but one of the routines are written in APPLESOFT, Apple's version of BASIC. Only the subroutine, which is in charge of temporal parameters, is written in 6502 machine language. The APPLESOFT program passes parameters to this machine-language subroutine. This subroutine allows the implementation of any timing parameter to a minimum of .5 sec. Lower values would require modifications of the binary file.

While the experiment is being run, the timing routine maintains the information in the display for as long as it is specified in the parameter set.

The package makes use of the CHAIN subroutine, which is included with the Apple master diskette to preserve arrays and variable values in the successive booting of the program modules.

Availability. Requests for reprints and a copy of either an English or a Spanish version of the program should be sent to Salvador Algarabel, Departamento de Psicología Experimental, Facultad de Filosofía y Ciencias de la Educación, Universidad de Valencia, Paseo Blasco Ibañez 28, Valencia-10, Spain.

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