

created by the user that contains multiple records, each describing one subject's performance on one problem (or block of trials within a problem). Each record contains header information and specifications of which side was rewarded on each trial (reward sequences) and whether the subject's choices were correct or incorrect (outcome sequences). The program summarizes each record into a  $4 \times 4$  matrix in which the columns correspond to all possible combinations of two-trial response sequences (i.e., which sides the animal chose on each trial) and the rows correspond to all possible combinations of two-trial outcome sequences. Next, each matrix is weighted to compensate for incomplete balancing. Weighting is achieved by adjusting each frequency in the matrix to correct for the presentation frequency of the reward sequences. If, for example, a reward sequence occurs on more than one fourth of the two-trial sequences, then each corresponding response-sequence frequency is reduced proportionately. Application of weights to all frequencies in the matrix does not alter the total number of two-trial response sequences.

After the cells in the matrix have been weighted, ERROR performs two types of error analyses. The first involves calculation of a number of summary measures describing the matrix. These include single-trial measures (e.g., proportion of trials on which the right side was chosen), as well as two-trial measures (e.g., proportion of two-trial sequences during which a win-shift-for-object was evidenced). In addition, a formal error analysis based on sequential state theory is performed (see King & Michels, 1989, for details of the theory and the computational formulas). Both hard copy and file output (suitable for input to statistical packages) can be generated.

**System requirements.** ERROR runs on PC-compatibles equipped with GW-BASIC or BASICA, 512K RAM, and a minimum of one disk (for loading the program and writing the files).

**Availability.** ERROR, along with a user's guide (in ASCII), is available from the first author at no charge by sending a formatted double-sided, double- (or high-) density floppy diskette (5.25 or 3.5 in.) with a self-addressed stamped mailer. Requests should be sent to John P. Capitanio, Department of Psychology, University of California, Davis, CA 95616-8686. Both the program (in the ASCII version of BASIC) and manual can also be obtained via e-mail (jpcapitanio@ucdavis.edu, or jpcapitanio@ucdavis.bitnet).

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## BACCuS 2.01: Computer Software for Quantifying Alcohol Consumption

BACCuS is a menu-driven IBM-compatible computer program and manual for use in quantifying alcohol consumption. BACCuS provides a means of comparing reported drinking across national conventions and aids in the adoption of standard measures of alcohol consumption in research and clinical practice.

BACCuS 2.01 is an enhanced version of BACCuS 1.00 for international use. The program can use English, Imperial, or metric liquid units and metric or English weight units. Furthermore, on the basis of the suggestions of Miller, Heather, and Hall (1991), BACCuS can calculate any of five standard drink units (American, Australian, British, Canadian, or International). Thus, it is possible to use BACCuS to convert drinking reported in various liquid volume units to any of the five standard drink units (SDUs) described by Miller, Heather, and Hall. On the basis of any of these standard drink units, BACCuS estimates blood alcohol concentration (BAC) and summarizes reported drinking. BACCuS estimates BAC for a single drinking episode or for reported drinking over a 7-day period. It can also summarize reported alcohol consumption in several ways. BACCuS includes features that support several widely used assessment instruments (Miller, 1991; Miller & Marlatt, 1984).

## Features

**Calculating standard drinks.** BACCuS provides three functions for use in calculating standard drinks: a standard drink calculator, a beverage library, and a conversion table. The standard drink calculator computes standard drinks from number of drinks consumed, volume of alcoholic beverage in each drink, and the beverage's alcohol content (percent alcohol). It will calculate any of five types of SDUs. The beverage library allows users to look up the alcohol content of 100 different beverages. Users can add, delete, or change listings in the library. The conversion table is a table of conversion coefficients for converting among various units of measure. Users can modify this table to suit their specific needs.

Together, these three features of the BACCuS program provide a means of quantifying and standardizing reported alcohol consumption. Users can customize these features to base calculations on different units of measure and to calculate different types of SDUs.

**Estimating BAC.** BACCuS estimates BAC based on any of the five SDUs mentioned above. To estimate BAC, BACCuS uses an algorithm derived from the Rutgers *Alco-Calculator* (Rutgers University Center of Alcohol Studies, 1983). BACCuS produces tables for estimating BAC on the basis of gender, weight, number of standard drinks consumed, and the number of hours taken to consume them. These tables provide estimates for up to 50 drinks over 25 h. BACCuS also computes estimated BAC for a single drinking episode on the basis of the client's gender and weight, the number of standard drinks consumed, and the time taken to consume the drinks.

Finally, BACCuS provides BAC summary statistics for a full week of reported drinking. On the basis of records of the number of SDUs consumed and time of consumption for all drinking during a 7-day period, BACCuS will estimate peak BAC for each day, estimate peak BAC for the entire week, and provide a table of estimated BAC for every half hour of the week.

It is important to note that BACCuS provides *estimations* of peak BAC. Because of individual differences in alcohol metabolism, the accuracy of BAC estimations may vary among individuals. Therefore, estimations of BAC should not be substituted for direct measures of BAC (e.g., breath or blood analysis) when direct measurement of BAC is possible.

**Summarizing reported consumption.** Three of BACCuS's features serve to summarize the quantity and frequency of reported alcohol consumption. The Quantity/Frequency calculator computes summary consumption statistics on the basis of a weekly drinking pattern, such as that obtained in the Comprehensive Drinker Profile (Miller & Marlatt, 1984). The Form 90 Summary function calcu-

lates summary statistics used by the Form 90 assessment instrument (Miller, 1991). Finally, the Weekly Drinking Summary function will calculate detailed quantity statistics for 1 week of reported drinking.

**System requirements.** The BACCuS program requires an IBM-compatible computer with at least 512K of RAM, one floppy disk drive, and a text or graphics monitor. The program will run under MS-DOS and PC-DOS. The program is distributed on double-density 5.25- or 3.5-in. disks.

**Availability.** Copies of BACCuS 2.01 are available from William R. Miller, Department of Psychology, University of New Mexico, Albuquerque, NM 87131. BACCuS is freeware, so users may copy and distribute the software and manual subject only to the restriction that users treat BACCuS as a scholarly publication (i.e., that they cite BACCuS properly and do not modify it, plagiarize it, or sell it for profit).

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