CNPscore Reference Manual
Release 0.50

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Chapter 1

Introduction

The Brain Behavior Laboratory (BBL) at the University of Pennsylvania has developed a set of computerized neuropsychological (CNP) tasks (cite...) that run in the `PowerLab` program (...cite) developed by Doug Chute. The purpose of the `CNPscore` is to provide an automated method for scoring these tasks; it replaces an earlier scoring program written in `Excel` which runs only on a specific obsolete version of `Mac OS` and `Excel`. The purpose of this report is to provide the `CNPscore` user with sufficient information to install the software and to use it to automatically score a small- to medium-scale research project. BBL has written some additional software to support large-scale projects but this software is highly specific to our own needs and requires a skilled system administration to set up and run it; thus we have not tried to package it for general distribution.

The CNP tasks which this program is capable of scoring are available to qualified researchers at `http://www.med.upenn.edu/bbl`, as is the `PowerLab Player` program needed to run them. See the paper [2] for a more-detailed discussion of the tasks.

...citeable paper for `CNPscore` itself?

If you are contemplating a new project, bear in mind that the `PowerLab` program in which the current version of the CNP tasks run will not run directly under Mac OS X, but requires either Mac OS 9 or the Classic environment. BBL is developing a new implementation, called `WebCNP`, of the CNP tasks which uses Macromedia Flash and will run under any operating system that supports the Mozilla 1.6 browser, and you should probably use that in preference to `PowerLab`; contact us for details on the current status of that project.

Since `CNPscore` was developed primarily for our own use, and the tests that it scores run only on a rapidly obsolesing platform, we cannot promise to provide support for `CNPscore`. We are, nevertheless, open to suggestions for improvement, and reports of bugs, though we may not have time to do anything about them. Since this package includes the source code, you do have the option of hiring a programmer to make the particular changes that you need; if so, we would appreciate the changes so that we can consider them for inclusion in our master copy.

Chapter 2

Organizing a Project

Using `CNPscore` successfully on more than a few subjects requires some planning and organization; this chapter discusses some possible approaches.

2.1   Installation

The installation instructions are given in the `README` file and will not be repeated here. It should be possible to install the `CNPscore` software on any Unix-compatible platform, including Mac OS X, but administrator privileges and a basic understanding of Unix system adminstration will be required.

The software is organized as a set of command-line programs rather than as a GUI; this is to facilitate automatic processing.

2.2   Concepts

Each cognitive *task* corresponds to a single run of `PowerLab`, and is represented by a `PowerLab` *response file* which records the subject responses and reaction times to each item in that task. These response files are the input to `CNPscore`. Some tasks, particularly memory tasks, actually correspond to two `PowerLab` runs, one for the initial item presentation and one for testing recall, and are thus represented by two response files.

A *session* is a set of cognitive tasks administered to a single person at one time; all the response files for a given session must be contained in a single directory. Associated with each session is a session id, or *sessid*, which uniquely identifies that session, at least within a single project.

In normal use of the `CNPscore` package, all files relating to a particular session are contained in the *session* directory named on the command line, the sessid is taken as the name of that directory, and all the files generated by `CNPscore` are written to that directory.

In certain large-scale, automated applications, the *session* name has the special form *yyyy.mm.dd.sss*, where *yyyy.mm.dd* is the date that the session is received and *sss* is a serial number distinguishing sessions received on the same date, and the session information and response files are contained in a subdirectory. In this case, the sessid is taken as *yyyy.mm.dd.sss* and the files output by `CNPscore` are written to the directory of that name rather than to the directory containing the response files.

A *battery* is a a script that administers several tasks as a unit and collects demographic information of the subject. One administration of a battery generates a session, which might be subdivided into sittings over one or more days. `CNPscore` does not provide any tools for constructing batteries, but they are mentioned in the documentation because BBL has constructed several for their own use.

Effective use of `CNPscore` for more than a few sessions requires properly organizing the data on disk. All sessions for a project should be contained in a single *home* directory; there may be a single home directory containing multiple projects, or each project may be contained in its own home directory.

In most projects it is necessary to also record demographic information for each subject, or information as to the time, place, and test administrator; a *session information* file associated with each session is available to record such information. This file is always named `Session Information` and, if used, is in the same directory as the other response for the session. The `cnpsessinfo` command may be used to create or edit the session information file. A battery, as described above, constructs the session information file at the time it is administered.

Similarly, it is often useful to be able to mark certain sessions as valid or invalid. The *validity file* is available for this purpose. This file is always named `CNPscore.val` and is stored in the session directory. Validity marking is normally done after sessions have been collected into the home directory, by a supervisor other than the person who originally administered the tasks.

It is not uncommon that some but not all of the tasks in a session will be invalid. The recommended way to mark this is to rename the response file for that task so that the filename begins with the four letters `bad_`; files so named will be silently ignored by the scoring program. A few other file-

names, typically editor backups and system files, will also be ignored; other filenames that are not recognized as a scoreable response file will generate an error message. Similary, prefixing `bad_` to a directory name will cause that directory to be silently ignored.

The `CNPscore` software is organized into four Unix-style command-line programs to do specific scoring and management tasks, plus some shared libraries that are invisible to the user. These will be described briefly here; consult the man pages for full details. The `cnpscore` program is used to do the actual scoring and is the only required program; it can score either single sessions or multiple sessions contained in a single directory. The `cnpsessinfo` program is optional and can be used to attach demographic information to a session. Similarly, the `cnpvalid` program is optional and can be used to attach a validity code to a session. The `cnpmerge` program is used to convert the file-per-session scores generated by the `cnpscore` program to file-per-task scores that can be read into a database or statistical analysis program.

2.3   Small Projects

For a small project—no more than a couple dozen subjects—only a simple organization is required. Each session should be contained in a single directory, which we will call *session*. Then use the command

    cnpscore *session*

to score the directory *dir* containing a session and display the scores for each task in that session; copy the desired scores by hand into whatever form you need.

2.4   Medium-size Projects

For medium-size projects of up to a few hundred subjects, a more complex organization may be appropriate. As before, put each session into its own directory, which we will call *session*; then put all the sessions into some larger directory, which we will call *home*. If you have multiple projects, you can decide whether to put each project into its own *home* directory, or put all sessions into the same *home* directory, regardless of the project. Thus the directory structure will look something like this:

`project1`	Home directory for first project
`project1/123`	Session directory for subject number 123
`project1/123/aim`	First task for subject 123
`project1/123/...`	Other tasks for this subject
`project1/220`	Ditto for subject 220
...	Other subjects
`project2`	Second project
`project2/99`	Subject 99 in second project
...	

You now have several commands to help manage the project. The descriptions here are suggestions for use; see the man pages for more details and options. The environment variable `CNPHOME`, if defined, sets the default home directory for the commands to be described below.

The command

> `cnpsessinfo` *home/session*

allows you to create or edit a session information file for the indicated session. You will want to set the environment variable `EDITOR` to choose your favorite editor. The use of this command is optional.

The command

> `cnpvalid -V`*code home/session*

will attach a validity *code* to the indicated session. The use of this command is optional.

The command

> `cnpscore` *home/session*

will score that single session and display the scores for each task on the console. This is useful for reviewing a single session.

The command

> `cnpscore -rbe` *home*

will score all the sessions in the *home* directory and store the results for `cnpmerge` to collect, including any session information that you have recorded. The scores will be stored in one file for each session. The `-a` option should be added unless you are providing session information files.

The command

```
cnpmerge -D scores home
```

will collect all the scores saved by the `cnpscore` command, plus session information and validity codes, into a set of files in the *scores* directory. There will be one file for each task, with session information and validity treated as pseudotasks, which contains scores on that task for all sessions. These files are in an enhanced CSV format which can be read into many database and statistical analysis programs.

2.5   Large Projects

BBL has written its own customized code to manage projects with several thousand subjects and spread over several sites. This code must be configured and maintained by a Unix systems administrator and is not included in the `CNPscore` package. If you really need this added level of complexity, contact us and we may be able to give you a copy of the software to customize to your own needs. For the moment, though, it suffices to note that this software uses a three-level directory structure

> *home/session/subject*

is used, where *session* is always in the form *yyyy.mm.dd.sss* and indicates the date on which the session was received and a serial number to distinguish sessions received on the same date. The man pages documenting the `CNPscore` software allow for this case, which is why you need to know that it's possible.

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Chapter 3

Scoring Rules

This chapter gives, for each task, the precise scoring rules for that task and the names of each score computed. Unforturnately, I originally wrote this as a reference while writing the scoring code and it is not particularly useful for the user. See ... for a more user-oriented description of the scores.

...add some background on what the taskname, etc, are.

...see also Felipe's fact sheet on the tests

3.1 Session Information

This file is named "Session Information" and is generated by the CNP wrapper rather than by PowerLab; it has its own format. A session is divided internally into sittings but only a summary is provided to the end user. The taskname used in the CSV file is "Session".

FIXME: Add info as appropriate from the cnpfetch or other wrapper.

FIXME: Make sure code provides both FAMID and SUBID. Handle BBLID.

RATER gives the initials of the rater administering the battery, taken from the first sitting; it is always uppercased.

(The data and time of the sittings as a whole are not given; the date and time at which each task is administered is given as part of that task.)

WRAT gives the WRAT score for the subject, taken from the first sitting.

PROJECT gives the project name.

SITEID gives the site id, taken from the first sitting. This is generally the NIMH site/project id number, padded with leading zeros to make three

digits. Other strings may be used, including 'BBL' for non-genetics projects at BBL.

FAMID gives the family id for the subject, taken from the first sitting. The string 'NonFam' should be used to indicate a subject not affiliated with any family. (There may still be some datasets that use 09999 for this purpose.)

SUBID gives the subject id, taken from the first sitting. For non-BBL subjects, the SITEID, FAMID, and SUBID taken together uniquely defined the subject and link to the pedigree database.

BBLID gives the bblid for a BBL subject, taken from the first sitting. For a BBL subject, this fields uniquely identifies the subject and links to the pedigree and admin databases.

DOB gives the date of birth for the subject, taken from the first sitting.

SEX gives the sex of the subject, taken from the first sitting. It is coded either "M" or "F".

HAND gives the handedness of the subject, taken from the first sitting. It is coded as "R", "L", or "A".

EDUC gives the education of the subject, taken from the first sitting.

MOMED gives the education of the subject's mother, taken from the first sitting.

DADED gives the education of the subject's father, taken from the first sitting.

COMMENT gives the rater's comment from the last sitting, if any.

STATUS gives the rater's status from the last sitting, if any.

3.2   Standard PowerLab Task Fields

The following fields appear in every PowerLab output file, or are provided by the scoring program. They appear in the SAS database as the name given in parentheses, where * is some abbreviation of the task name.

SESSID is the session id, which is used as a key to associate the different tests administered at the same session. This field does **not** take a prefix, because it is the key.

*FILE (formerly FILENAME) is the name of the PowerLab output file being scored.

*FDATE (formerly FILEDATE) is the modification date attached to the PowerLab output file being scored.

*FTIME (formerly FILETIME) is the modification time attached to the PowerLab output file being scored.

FILEMTIME (*MTIME) is no longer provided, but was the mtime of the PowerLab output file being scored, in seconds since the epoch.

*PLVERS (formerly VERSION) is the version of PowerLab or PowerLab Player used.

*PLTASK (formerly TASK) is the name of the task taken from the PowerLab output file, but (usually) omitting any serial numbers at the end.

*SCORER (formerly SCORER) is the name of the class actually used to compute the scores.

*SCVERS (formerly SCORVERS) is the (CVS) version of the class used to compute the scores.

*DATE (formerly DATE) is the date on which the task was administered, as reported in the PowerLab output file. The canonical format is '4-Feb-2003'.

*STIME (formerly STIME) is the time at which the task was started, as reported in the PowerLab output file. The canonical format is '16:52:20'.

*ETIME (formerly ETIME) is the time at which the task was finished, as reported in the PowerLab output file. The canonical format is '16:52:20'.

*TTIME (formerly TTIME) is the time interval in seconds between STIME and ETIME, with some magic that usually handles rollovers into the next calendar day.

*NERR (formerly NERR or NERRORS) is the number of errors detected by the scoring code.

*NWARN (formerly NWARN or NWARNINGS) is the number of warnings detected by the scoring code.

*CANS1 (formerly CORANS1) is the string contained in the first correct answer, which is used in some older BBL tests to record a subject identifier. If the first correct answer is blank but the first incorrect answer is not, then the first incorrect answer is used instead.

3.3   Excel/Python Differences

The new Python scoring scripts have some generic differences from the old AppleScripts.

The new scripts treat a negative reaction time as bogus and ignore it in all following calculations; the old scripts take a negative reaction time at

face value. This has caused differences in the outputs from the two scripts. In particular, many scores are defined as median reaction times and differ between Python and Excel.

3.4   AIM

The prefix AIM_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "AIM".

The trials must be sorted into order by page before the following scoring is done; the trial numbers below refer to the trial numbers after sorting. (Trial 1 is page 1, so it doesn't matter if the sort includes that first trial.)

For those trials where no response was provided, the incorreect response time for that trial should be set to 10,000ms.

A1 is the number of correct answers on trials 2-11.
A2 is the number of correct answers on trials 22-31.
A3 is the number of correct answers on trials 42-51.
AM1 is the number of correct answers on trials 12-21.
AM2 is the number of correct answers on trials 32-41.
AM3 is the number of correct answers on trials 52-61.
AI is the number of correct answers on trials 62-69.
AI2 is the number of correct answers on trials 70 and 71.
AIM is the number of correct answers on trials 72-79.
AIM2 is the number of correct answers on trials 80 and 81.
A1RTCR is the median reaction time for correct answers on trials 2-11.
A2RTCR is the median reaction time for correct answers on trials 22-31.
A3RTCR is the median reaction time for correct answers on trials 42-51.
A1RTER is the median reaction time for incorrect answers on trials 2-11.
A2RTER is the median reaction time for incorrect answers on trials 22-31.
A3RTER is the median reaction time for incorrect answers on trials 42-51.
AM1RTCR is the median reaction time for correct answers on trials 12-21.
AM2RTCR is the median reaction time for correct answers on trials 32-41.
AM3RTCR is the median reaction time for correct answers on trials 52-61.
AM1RTER is the median reaction time for incorrect answers on trials 12-21.
AM2RTER is the median reaction time for incorrect answers on trials 32-41.

AM3RTER is the median reaction time for incorrect answers on trials 52-61.

AIRTCR is the median reaction time for correct answers on trials 62-69.

AIRTER is the median reaction time for incorrect answers on trials 62-69.

AI2RTCR is the median reaction time for correct answers on trials 70 and 71.

AI2RTER is the median reaction time for incorrect answers on trials 70 and 71.

AIMRTCR is the median reaction time for correct answers on trials 72-79.

AIMRTER is the median reaction time for incorrect answers on trials 72-79.

AIM2RTCR is the median reaction time for correct answers on trials 80 and 81.

AIM2RTER is the median reaction time for incorrect answers on trials 80 and 81.

AIM_NM is A1 + A2 + A3.

AIM_M is AM1 + AM2 + AM3.

CRRT_NM is the mean of A1RTCR, A2RTCR, and A3RTCR.

CRRT_M is the mean of AM1RTCR, AM2RTCR, and AM3RTCR.

AIMTOT is AIM_NM + AIM_M.

AIMTOTRT is (CRRT_NM + CRRT_M) / 2.0.

AIMEARLY is the number of trials on which the response time is negative; Powerlab records all such trials as incorrect.

3.5   CJOLO

The prefix CJOLO_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "CJOLO".

Trials are not in order. Trials 2-11 are in cells 62-71; trials 12-71 are in cells 2-61. Also the summary scores are not simple computations on the answers.

Pages are taken in pairs, and each pair is considered correct only if both pages are correct. The following table gives the correct answers for each listed pair of pages; the answers are correct in either order.

(4, 5) : "EJ", (6, 7) : "EF", (8, 9) : "FG", (10, 11) : "AB", (12, 13) : "BK", (14, 15) : "AG", (16, 17) : "AJ", (18, 19) : "AG", (20, 21) : "GI", (22, 23) : "AC", (24, 25) : "EK", (26, 27) : "DE", (28, 29) : "GH", (30, 31)

: "BF", (32, 33) : "CE", (34, 35) : "JK", (36, 37) : "BE", (38, 39) : "AD", (40, 41) : "AI", (42, 43) : "BI", (44, 45) : "IK", (46, 47) : "FJ", (48, 49) : "CK", (50, 51) : "HI", (52, 53) : "CH", (54, 55) : "GJ", (56, 57) : "CD", (58, 59) : "CJ", (60, 61) : "EH", (62, 63) : "HK"

If a participant repeats a correct response twice within a pair listed above, PowerLab will identify both items as correct and place them in the correct column of the response file. This, however, should not be identified as a correct pair, and should be included in the incorrect column. For instance, with the first pair listed above, (4, 5) : "EJ", if the participant responds with "E" for both pages 4 and 5, Powerlab will identify each response within both pairs correct, but when scored, this pair should be identified as incorrect.

CJOLO_FILE, CJOLO_MTIME, CJOLO_VERSION, CJOLO_TASK, CJOLO_DATE, CJOLO_STIME, and CJOLO_ETIME are the standard PowerLab task fields described above.

CJOLO is the number of correct pairs of responses.

CJORTCR is the median reaction time for the correct responses. Only pages for which both responses within the pair are correct are included.

CJORTER is the median reaction time for the incorrect responses. A page is included here if either it, or its co-pair, or both are incorrect.

3.6 CPF

The prefix CPF_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "CPF".

SetTP consists of trials 4, 5, 6, 7, 9, 10, 11, 15, 20, 21, 22, 23, 26, 29, 30, 32, 35, 36, 37, and 41.

SetTN consists of trials 2, 3, 8, 12, 13, 14, 16, 17, 18, 19, 24, 25, 27, 28, 31, 33, 34, 38, 39, and 40.

CPF_FILE, CPF_MTIME, CPF_VERSION, CPF_TASK, CPF_DATE, CPF_STIME, and CPF_ETIME are the standard PowerLab task fields described above.

CPFTP is the number of correct answers in trials 4-7, 9-11, 15, 20-23, 26, 29, 30, 32, 35-37, and 41.

CPFTN is the number of correct answers in trials 2, 3, 8, 12, 13, 14, 16, 17, 18, 19, 24, 25, 27, 28, 31, 33, 34, 38, 39, and 40.

CPFFP is the number of incorrect answers is trials 2, 3, 8, 12, 13, 14, 16, 17, 18, 19, 24, 25, 27, 28, 31, 33, 34, 38, 39, and 40.

CPFFN is the number of incorrect answers in trials 4, 5, 6, 7, 9, 10, 11, 15, 20, 21, 22, 23, 26, 29, 30, 32, 35, 36, 37, and 41.

CPFTPRT is the median reaction time for correct answers in trials 4-7, 9-11, 15, 20-23, 26, 29, 30, 32, 35-37, and 41.

CPFTNRT is the median reaction time for correct answers in trials 2, 3, 8, 12, 13, 14, 16, 17, 18, 19, 24, 25, 27, 28, 31, 33, 34, 38, 39, and 40.

CPFFPRT is the median reaction time for incorrect answers in trials 2, 3, 8, 12, 13, 14, 16, 17, 18, 19, 24, 25, 27, 28, 31, 33, 34, 38, 39, and 40.

CPFFNRT is the median reaction time for incorrect answers in trials 4, 5, 6, 7, 9, 10, 11, 15, 20, 21, 22, 23, 26, 29, 30, 32, 35, 36, 37, and 41.

IFAC_TOT is CPFTP + CPFTN.

IFAC_RTC is the median reaction time for all correct answers.

3.7   CPFd

The prefix CPFD_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "CPFD".

SetTP consists of trials 3, 4, 5, 8, 10, 11, 15, 16, 17, 20, 21, 23, 25, 26, 27, 28, 31, 34, 35, and 40.

SetTN consists of trials 2, 6, 7, 9, 12, 13, 14, 18, 19, 22, 24, 29, 30, 32, 33, 36, 37, 38, 39, and 41.

CPFD_FILE, CPFD_MTIME, CPFD_VERSION, CPFD_TASK, CPFD_DATE, CPFD_STIME, and CPFD_ETIME are the standard PowerLab task fields described above.

CPFDTP is the number of correct answers in trials 3, 4, 5, 8, 10, 11, 15, 16, 17, 20, 21, 23, 25, 26, 27, 28, 31, 34, 35, and 40.

CPFDTN is the number of correct answers in trials 2, 6, 7, 9, 12, 13, 14, 18, 19, 22, 24, 29, 30, 32, 33, 36, 37, 38, 39, and 41.

CPFDFP is the number of incorrect answers in trials 2, 6, 7, 9, 12, 13, 14, 18, 19, 22, 24, 29, 30, 32, 33, 36, 37, 38, 39, and 41.

CPFDFN is the number of incorrect answers in trials 3, 4, 5, 8, 10, 11, 15, 16, 17, 20, 21, 23, 25, 26, 27, 28, 31, 34, 35, and 40.

CPFDTPRT is the median reaction time for correct answers in trials 3, 4, 5, 8, 10, 11, 15, 16, 17, 20, 21, 23, 25, 26, 27, 28, 31, 34, 35, and 40.

CPFDTNRT is the median reaction time for correct answers in trials 2, 6, 7, 9, 12, 13, 14, 18, 19, 22, 24, 29, 30, 32, 33, 36, 37, 38, 39, and 41.

CPFDFPRT is the median reaction time for incorrect answers in trials 2, 6, 7, 9, 12, 13, 14, 18, 19, 22, 24, 29, 30, 32, 33, 36, 37, 38, 39, and 41.

CPFDFNRT is the median reaction time for incorrect answers on trials 3, 4, 5, 8, 10, 11, 15, 16, 17, 20, 21, 23, 25, 26, 27, 28, 31, 34, 35, and 40.

CPFD_WAIT is the time interval in seconds between the end of the CPF and the beginning of the CPFd; it is computed in the SAS database.

DFAC_TOT is CPFDTP + CPFDTN.

DFAC_RTC is the median reaction time for all correct answers.

3.8   CPW

The prefix CPW_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "CPW".

SetTP consists of trials 2, 4, 6, 10, 11, 13, 14, 17, 18, 20, 22, 23, 25, 26, 30, 32, 33, 37, 40, and 41.

SetTN consists of trials 3, 5, 7, 8, 9, 12, 15, 16, 19, 21, 24, 27, 28, 29, 31, 34, 35, 36, 38, and 39.

CPW_FILE, CPW_MTIME, CPW_VERSION, CPW_TASK, CPW_DATE, CPW_STIME, and CPW_ETIME are the standard PowerLab task fields described above.

CPWTP is the number of correct answers in trials 2, 4, 6, 10, 11, 13, 14, 17, 18, 20, 22, 23, 25, 26, 30, 32, 33, 37, 40, and 41.

CPWTN is the number of correct answers in trials 3, 5, 7, 8, 9, 12, 15, 16, 19, 21, 24, 27, 28, 29, 31, 34, 35, 36, 38, and 39.

CPWFP is the number of incorrect answers in trials 3, 5, 7, 8, 9, 12, 15, 16, 19, 21, 24, 27, 28, 29, 31, 34, 35, 36, 38, and 39.

CPWFN is the number of incorrect answers in trials 2, 4, 6, 10, 11, 13, 14, 17, 18, 20, 22, 23, 25, 26, 30, 32, 33, 37, 40, and 41.

CPWTPRT is the median reaction time for correct answers in trials 2, 4, 6, 10, 11, 13, 14, 17, 18, 20, 22, 23, 25, 26, 30, 32, 33, 37, 40, and 41.

CPWTNRT is the median reaction time for correct answers in trials 3, 5, 7, 8, 9, 12, 15, 16, 19, 21, 24, 27, 28, 29, 31, 34, 35, 36, 38, and 39.

CPWFPRT is the median reaction time for incorrect answers on trials 3, 5, 7, 8, 9, 12, 15, 16, 19, 21, 24, 27, 28, 29, 31, 34, 35, 36, 38, and 39.

CPWFNRT is the median reaction time for incorrect answers on trials 2, 4, 6, 10, 11, 13, 14, 17, 18, 20, 22, 23, 25, 26, 30, 32, 33, 37, 40, and 41.

IWRD_TOT is CPWTP + CPWTN.

IWRD_RTC is the median reaction time for all correct answers.

3.9 CPWd

The prefix CPWD_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "CPWD".

Subset A consists of trials 2, 6, 7, 11, 13, 14, 15, 17, 18, 21, 22, 23, 25, 29, 30, 33, 35, 37, 38, and 39.

Subset B consists of trials 3, 4, 5, 8, 9, 10, 12, 16, 19, 20, 24, 26, 27, 28, 31, 32, 34, 36, 40, and 41.

CPWD_FILE, CPWD_MTIME, CPWD_VERSION, CPWD_TASK, CPWD_DATE, CPWD_STIME, and CPWD_ETIME are the standard PowerLab task fields described above.

CPWDTP is the number of correct answers in subset A.

CPWDTN is the number of correct answers in subset B.

CPWDFP is the number of incorrect answers in subset B.

CPWDFN is the number of incorrect answers in subset A.

CPWDTPRT is the median reaction time for correct answers in subset A.

CPWDTNRT is the median reaction time for correct answers in subset B.

CPWDFPRT is the median reaction time for incorrect answers in subset B.

CPWDFNRT is the median reaction time for incorrect answers in subset A.

CPWD_WAIT is the time interval in seconds between the end of the CPW and the beginning of the CPWD; it is computed in the SAS database.

DWRD_TOT is CPWDTP + CPWDTN.

DWRD_RTC is the median reaction time for all correct answers.

3.10 C-TAP

The prefix CTAP_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "CTAP".

The trials are in order by page, but with gaps; the page numbers don't appear to have any useful meaning.

In at least one sample file, the correct response on trial 1 is given as "LEFTdom", suggesting that this field is used to record the subjects handedness.

Otherwise, the only values of interest are the correct answers on the odd-numbered trials. Each such value is a string containing characters typed by the subject, separated by commas provided by PowerLab. The desired value is the number of spaces contained in that string, plus 1 for a space typed on the preceding page; other characters are ignored.

TAP_FILE, TAP_MTIME, TAP_VERSION, TAP_TASK, TAP_DATE, TAP_STIME, and TAP_ETIME are the standard PowerLab task fields described above.

TAP_HAND is the string contained in the correct answer for trial 1 and indicates the dominant hand of the subject.

TAP_DOM is the mean number of spaces typed in trials 3, 7, 11, 15, and 19.

TAP_NON is the mean number of spaces type in trials 5, 9, 13, 17, and 21.

TAP_DOMSD is the standard deviation of number of spaces typed in trials 3, 7, 11, 15, and 19.

TAP_NONSD is the standard deviation of the number of spaces type in trials 5, 9, 13, 17, and 21.

3.11   EDF40

The prefix EDF40_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "EDF40".

The trials are sorted by page; pages 13-51 are used. The page number is the spreadsheet row number plus 11. The answer "c" indicate correct; answers "1", "2", and "3" are different incorrect responses. The Powerlab output puts all answers in the correct column.

The happy subset consists of pages 13, 14, 15, 16, 19, 20, 24, 25, 29, 30, 31, 34, 35, 36, 38, 42, 48, 50, and 53.

The sad subset consists of pages 17, 18, 21, 22, 23, 26, 27, 28, 32, 33, 37, 39, 40, 41, 43, 44, 45, 47, 49, 51, and 52.

Note: Page 46 does not appear in the PowerLab task. Also, it is not an error that there are unequal lengths of pages in the happy and sad subsets.

EDF_FILE, EDF_MTIME, EDF_VERSION, EDF_TASK, EDF_DATE, EDF_STIME, and EDF_ETIME are the standard PowerLab task fields described above.

HAP_CR is the number of "c" responses on the happy pages.

HAPRTCR is the median reaction time for "c" responses on the happy pages.

HAPRTER is the median reaction time for other than "c" responses on the happy pages.

SAD_CR is the number of "c" responses on the sad pages.

SADRTCR is the median reaction time for "c" responses on the sad pages.

SADRTER is the median reaction time for other than "c" responses on the sad pages.

3.12   ER40

The prefix ER40_ is used for the standard PowerLab task fields described above. The taskname in the PowerLab response file is apparently "ER40", often followed by additional non-significant digits. The taskname used in the CSV file is "ER40".

Trials are have been sorted by page number; pages 10 through 49 are used. The page number is the spreadsheet row number plus 8.

The mild subset consists of pages 10, 11, 14, 15, 18, 19, 22, 23, 26, 27, 30, 31, 34, 35, 38, 39, 42, 43, 46, and 47.

The extreme subset consists of pages 12, 13, 16, 17, 20, 21, 24, 25, 28, 29, 32, 33, 36, 37, 40, 41, 44, 45, 48, and 49.

ER40_FILE, ER40_MTIME, ER40_VERSION, ER40_TASK, ER40_DATE, ER40_STIME, and ER40_ETIME are the standard PowerLab task fields described above.

ER40_CR is the number of correct answers on pages 10-49.

ER40_CRT is the median response time for correct answers on pages 10-49.

ER40_FC is the number of correct answers on pages 10-29.

ER40_MC is the number of correct answers on pages 30-49.

ER40FCRT is the median reaction time for correct answers on pages 10-29.

ER40MCRT is the median reaction time for correct answers on pages 30-49.

ER40ANG is the number of correct answers on pages 10-13 and 30-33.

ER40FEAR is the number of correct answers on pages 14-17 and 34-37.

ER40HAP is the number of correct answers on pages 18-21 and 38-41.

ER40NOE is the number of correct answers on pages 22-25 and 42-45.

ER40SAD is the number of correct answers on pages 26-29 and 46-49.

ER40_FPA is the number of incorrect "Anger" responses on pages 10-49.

ER40_FPF is the number of incorrect "Fear" responses on pages 10-49.

ER40_FPH is the number of incorrect "Happy" responses on pages 10-49.

ER40_FPN is the number of incorrect "No Emotion" responses on pages 10-49.

ER40_FPS is the number of incorrect "Sad" responses on pages 10-49.

ER40ANGRT is the median response time for correct answers on pages 10-13 and 30-33.

ER40FEARRT is the median response time for correct answers on pages 14-17 and 34-37.

ER40HAPRT is the median response time for correct answers on pages 18-21 and 38-41.

ER40NOERT is the median response time for correct answers on pages 22-25 and 42-45.

ER40SADRT is the median response time for correct answers on pages 26-29 and 46-49.

ER40_FPART is the median response time for incorrect "Anger" responses on pages 10-49.

ER40_FPFRT is the median response time for incorrect "Fear" responses on pages 10-49.

ER40_FPHRT is the median response time for incorrect "Happy" responses on pages 10-49.

ER40_FPNRT is the median response time for incorrect "No Emotion" responses on pages 10-49.

ER40_FPSRT is the median response time for incorrect "Sad" responses on pages 10-49.

ER40MILD is the number of correct answers on the mild subset.

ER40EXTR is the number of correct answers on the extreme subset.

ER40MDRT is the median reaction time for the correct answers on the mild subset.

ER40EXRT is the median reaction time for the correct answers on the extreme subset.

3.13 FACESTIM

The prefix FStim_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "FaceStim". This task is also known as CPF_Targets, and presents the stimuli used for the CPF and CPFd tasks.

This task is not scored, except that the start and stop times are recorded.

3.14 HAR40 (Humor Task)

The prefix HAR40_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "Har40"

Correct responses in the Humor task are coded as "c". Incorrect responses are coded as "1" for false positives or "2" for false negatives. There are 40 stimuli total, 20 non-verbal and 20 verbal. The task first presents instructions, after which follows a block of all twenty non-verbal stimuli in a randomized order. It then presents the participant with a second page of instructions, after which follows a block of all twenty verbal stimuli in a randomized order. The resulting output file is organized with rows 2 through 21 containing responses to non-verbal stimuli, and with rows 22 two through 41 containing responses to verbal stimuli.

Har40_FILE, Har40_MTIME, Har40_VERSION, Har40_TASK, Har40_DATE, Har40_STIME, and Har40_ETIME are the standard PowerLab task fields described above.

NVer is the total number of correct answers to trials 2 - 21.

Ver is the total number of correct answers to trials 22 - 41.

NVerRTcr is the median reaction time for correct answers to trials 2 - 21.

VerRTcr is the median reaction time for correct answers to trials 22 - 41.

3.15 Letter N-Back

There are two versions of the Letter N-Back test; the first version has some bugs that are corrected in the newer version. The two versions can be distinguished by the filename and task name within the PowerLab output file.

The old, buggy version has a PowerLab output filename of Letter_N_ and a task name of Letter_N1. The following corrections need to be made to the raw PowerLab data before it is scored. (1) The correct and incorrect columns

on trials 23, 31, and 61 need to swapped. (2) Trial 135 needs to be ignored entirely.

The new, debugged version has a PowerLab output filename of LNB2_ and a task name inside the file of LNB2_1. No corrections are needed before scoring.

The 0-back trials consist of trials 2-16, 77-91, and 107-121. The 1-back trials consist of trials 17-31, 47-61, and 122-136. The 2-back trials consist of trials 32-46, 62-76, and 92-106.

The prefix LNB2_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "LNB2".

LNB_FILE, LNB_MTIME, LNB_VERSION, LNB_TASK, LNB_DATE, LNB_STIME, and LNB_ETIME are the standard PowerLab task fields described above.

LNB_TP is the number of correct answers on trials 2-136.

LNB_FP is the number of incorrect answers on trials 2-136.

LNB_RTC is the median reaction time for correct answers on trials 2-136.

LNB_TP0 is the number of correct answers on the 0-back trials.

LNB_FP0 is the number of incorrect answers on the 0-back trials.

LNB_RTC0 is the median reaction time for correct answers on the 0-back trials.

LNB_TP1 is the number of correct answers on the 1-back trials.

LNB_FP1 is the number of incorrect answers on the 1-back trials.

LNB_RTC1 is the median reaction time for correct answers on the 1-back trials.

LNB_TP2 is the number of correct answers on the 2-back trials.

LNB_FP2 is the number of incorrect answers on the 2-back trials.

LNB_RTC2 is the median reaction time for correct answers on the 2-back trials.

3.16   MPRACT

The prefix MPRT_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "MPRACT". This task has been renamed as Motor Praxis, so that administrators are less likely to skip this task because computer-literate users "don't need to practice"; but all the code still uses the old name.

MP_FILE, MP_MTIME, MP_VERSION, MP_TASK, MP_DATE, MP_STIME, and MP_ETIME are the standard PowerLab task fields described above.

MP1RT is the median reaction time for correct answers on trials 2-21.

MP2 is the number of correct answers on trials 22-41.

MP2RTCR is the median reaction time for correct answers on trials 22-41.

3.17   Numlet_cpt

The trials must be sorted into order by page before the following scoring is done; the trial numbers below refer to the trial numbers after sorting. (Trial 1 is page 1, so it doesn't matter if the sort includes that first trial.)

The prefix NLCPT_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "NumLetCPT".

CP_FILE, CP_MTIME, CP_VERSION, CP_TASK, CP_DATE, CP_STIME, and CP_ETIME are the standard PowerLab task fields described above.

CPn_TP is the number of correct answers on trials 2-61.

CPn_TN is 120 minus CPn_FP.

CPn_FP is the number of incorrect answers on trials 62-181.

CPn_TPRT is the median reaction time for correct answers on trials 2-61.

CPn_FPRT is the median reaction time for incorrect answers on trials 62-181.

CPL_TP is the number of correct answers on trials 182-241.

CPL_TN is 120 minus CPL_FP.

CPL_FP is the number of incorrect answers on trials 242-362.

CPL_TPRT is the median reaction time for correct answers on trials 182-241.

CPL_FPRT is the median reaction time for incorrect answers on trials 242-362.

3.18   PCET

Trial 1 is the start page and is excluded from all score variables below.

This task requires the subject to select the one out of four possible responses on each trial the one that does not fit; the "sorting" principle determining which one does not fit depends on the trial. The sorting principle is also called the category. Only one sorting principle is correct for any trial,

but a given response may match more than one sorting principle. The different sorting principles are named 1, 2, and 3, and a given response may match more than one principle, in which case both the principles are listed in the PowerLab response. A response is an unambiguous match to some principle if it matches only that principle; it is an ambiguous match to some principle if it matches both that principle and some other principle. For example, the response 12 is an ambiguous match to both principles 1 and 2; the response 1 is an unambiguous match to principle 1 but does not match principle 2.

PowerLab scores a response as "correct" if it matches the current sorting principle; in this case the response in the correct column contains the number of the current sorting principle and optionally the number of any other principles which that response also matches. (The test is designed such that a given response never matches more than one sorting principle.) Otherwise the response is scored as "incorrect" and appears in the incorrect column of the PowerLab output; the response text consists of the principle(s) that that response matches. (Is it true that only one principle is ever matched by an incorrect response?)

The Excel scripts for the PCET were obscure and possibly buggy; the Python code may produce the same scores as did Excel, particularly for scores relating to perseverations.

The prefix PCET_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "PCET".

PCET_FILE, PCET_MTIME, PCET_VERSION, PCET_TASK, PCET_DATE, PCET_STIME, and PCET_ETIME are the standard PowerLab task fields described above.

PCETCR is the number of correct responses.

PCETRTCR is the median reaction time for the correct responses.

PCETER is the number of incorrect responses.

PCETRTER is the median reaction time for the incorrect responses.

PCET_NUM is the total number of trials, and is equal to PCETCR + PCETER.

Unfortunately, PowerLab does not report the sorting principle in effect at each trial; the scoring program must deduce it from the transcript. The sorting principle is initially 1 and normally shifts to 2 and then 3 during the test. The shift occurs when the subject makes 10 consecutive correct responses. Note that some subjects may fail to reach the first, or second, shift before the task ends.

CAT1_TR is the number of trials spent with the sorting principle equal

to 1, including the final 10; if the principle is never guessed, it is None (or Null, or whatever the local equivalent of Not Applicable is).

CAT2_TR is the number of trials spent with the sorting principle equal to 2, including the final 10; if the principle is never guessed, it is None.

CAT3_TR is the number of trials spent with the sorting principle equal to 3, including the final 10; if the principle is never guessed, it is None.

PCET_CAT is the number of categories that the subject successfully learns.

More complexity comes in the scoring of perseverations. The subject is not told of the shift in principle and must discover it from the fact that the old principle no longer works. The unsuccessful attempts to apply the old principle are known as perseverations and are scored as follows:

The perseverative principle–not to be confused with the sorting principle– is the scoring program's current estimate of the sorting principle being used by the subject. It has an initial value of None and is set to the sorting principle when the subject achieves 10 consecutive correct responses. Thereafter, whenever the subject makes three incorrect responses that unambiguously match a single principle with no intervening responses that fail to match that same principle, the perseverative principle changes to that common principle.

An unambiguously incorrect perseverative response (coded I) occurs when the current response is incorrect, matches the current perseverative principle, and does not match any other principle. An ambiguously incorrect perseverative response (coded i) occurs when the current response is incorrect, matches the current perseverative principle, and matches some other principle. An ambiguously correct perseverative response (coded c) occurs when the current response is correct, matches the current perseverative principle, and matches some other principle. An unambiguously correct perseverative response is not possible. All other responses are non-perseverative responses (coded N).

An unambigously incorrect pserseverative response (I) is always counted as a perseverative error. An ambiguously incorrect perseverative response (i) is counted as a perseverative error if it occurs in the context defined by the regular expression 'I[ic]*I'; an ambiguously correct perseverative response (c) is counted as a correct perseverative response in the same contexts. In plain language, an ambiguous response is counted only if bounded by unambiguously incorrect responses. For example, the i's and c's in IiI, IcI, IiiI, IicI, IciI, IccicicI would all count as perseverations, but not in NicI, IiNcI, or IcciN.

PER_ER is the number of perseverative errors.

PER_RESP is the number of perseverative errors plus the number of correct perseverative responses.

3.19   PCPT

This task is not included in the PAARTNERS battery and no work has yet been done on an automatic scoring program.

3.20   PEAT40 1.1

The prefix PEAT40_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "PEAT40".

The correct answers are as follows, per page:

$$
\begin{array}{lllll}
11:1 & 12:1 & 13:2 & 14:2 & 15:2 \\
16:2 & 17:3 & 18:3 & 19:3 & 20:3 \\
21:4 & 22:4 & 23:4 & 24:4 & 25:4 \\
26:4 & 27:4 & 28:4 & 29:4 & 30:4 \\
31:5 & 32:5 & 33:5 & 34:5 & 35:6 \\
36:6 & 37:6 & 38:6 & 39:7 & 40:7 \\
41:4 & 42:4 & 43:4 & 44:4 & 45:4 \\
46:4 & 47:4 & 48:4 & 49:4 & 50:4
\end{array}
$$

The vey sad (VS) set consists of pages 11 through 16.

The sad/neutral (SN) set consists of pages 17-30.

The neutral (N) set consists of pages 21-30 and 41-50.

The happy/neutral (HN) set consists of pages 31-34 and 41-50.

The very happy (VH) set consists of pages 35-40.

The total set (T) consists of pages 11-50.

TC is the number of correct answers in set T.

TRT is the median reaction time for all correct answers in set T.

TW1 is the number of answers within 1 of the correct answer in set T.

TW1RT is the median reaction time for the answers within 1 of the correct answer and in set T.

VHC is the number of correct answers in set VH.

VHRT is the median reaction time for all correct answers in set VH.

VHW1 is the number of answers within 1 of the correct answer in set VH.

VHW1RT is the median reaction time for the answers within 1 of the correct answer and in set VH.

HNC is the number of correct answers in set HN.

HNRT is the median reaction time for all correct answers in set HN.

HNW1 is the number of answers within 1 of the correct answer in set HN.

HNW1RT is the median reaction time for the answers within 1 of the correct answer and in set HN.

NC is the number of correct answers in set N.

NRT is the median reaction time for all correct answers in set N.

NW1 is the number of answers within 1 of the correct answer in set N.

NW1RT is the median reaction time for the answers within 1 of the correct answer and in set N.

SNC is the number of correct answers in set SN.

SNRT is the median reaction time for all correct answers in set SN.

SNW1 is the number of answers within 1 of the correct answer in set SN.

SNW1RT is the median reaction time for the answers within 1 of the correct answer and in set SN.

VSC is the number of correct answers in set VS.

VSRT is the median reaction time for all correct answers in set VS.

VSW1 is the number of answers within 1 of the correct answer in set VS.

VSW1RT is the median reaction time for the answers within 1 of the correct answer and in set VS.

All scores for answers within 1 of the correct answer for another set (ex. HCW1) include the actual number of correct answers for the condition in question.

The Excel scoring code differs from the Python code in the following rules (all of which are considered bugs) and will produce different scores in some datasets: (1) Multiple responses in a trial cause that trial to be omitted from the count scores and cause any median RT using that trial to become missing. (2) All scores and RTs in the HN block are incorrect because the responses are pasted into the wrong place in the spreadsheet. (3) The exact RTs are computed using all trials, correct or incorrect.

See the peat40 directory in the cnptest project from CVS for a statistical comparison of the differences in the Python and Excel scoring codes.

3.21 PERT96

The prefix PERT_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "PERT96".

PERT_CR is the number of correct responses on pages 10 and up.

PERT_CRT is the median reaction time for correct responses on pages 10 and up.

PERT_FCR is the number of correct responses on pages 10 through 57.

PERT_MCR is the number of correct responses on pages 58 through 105.

PF_CRT is the median reaction time for correct responses on pages 10 through 57.

PM_CRT is the median reaction time for correct responses on pages 58 through 105.

Anger_C is the number of correct responses on pages 10, 11, 12, 13, 14, 15, 16, 17, 58, 59, 60, 61, 62, 63, 64, and 65.

DisgustC is the number of correct responses on pages 18, 19, 20, 21, 22, 23, 24, 25, 66, 67, 68, 69, 70, 71, 72, and 73.

Fear_C is the number of correct responses on pages 26, 27, 28, 29, 30, 31, 32, 33, 74, 75, 76, 77, 78, 79, 80, and 81.

Happy_C is the number of correct responses on pages 34, 35, 36, 37, 38, 39, 40, 41, 82, 83, 84, 85, 86, 87, 88, and 89.

NoEmo_C is the number of correct responses on pages 42, 43, 44, 45, 46, 47, 48, 49, 90, 91, 92, 93, 94, 95, 96, and 97.

Sad_C is the number of correct responses on pages 50, 51, 52, 53, 54, 55, 56, 57, 98, 99, 100, 101, 102, 103, 104, and105.

FP_Anger is the number of incorrect "anger" responses on pages 2 and up.

FPDisgust is the number of incorrect "disgust" responses on pages 2 and up.

FP_Fear is the number of incorrect "fear" responses on pages 2 and up.

FP_Happy is the number of incorrect "happy" responses on pages 2 and up.

FP_NoEmo is the number of incorrect "no emotion" responses on pages 2 and up.

FP_Sad is the number of incorrect "sad" reponses on pages 2 and up.

FAC is the number of correct responses on pages 10, 11, 12, 13, 14, 15, 16, and 17.

FDC is the number of correct responses on pages 18, 19, 20, 21, 22, 23, 24, and 25.

FFC is the number of correct responses on pages 26, 27, 28, 29, 30, 31, 32, and 33.

FHC is the number of correct responses on pages 34, 35, 36, 37, 38, 39, 40, and 41.

FNC is the number of correct responses on pages 42, 43, 44, 45, 46, 47, 48, and 49.

FSC is the number of correct responses on pages 50, 51, 52, 53, 54, 55, 56, and 57.

MAC is the number of correct responses on pages 58, 59, 60, 61, 62, 63, 64, and 65.

MDC is the number of correct responses on pages 66, 67, 68, 69, 70, 71, 72, and 73.

MFC is the number of correct responses on pages 74, 75, 76, 77, 78, 79, 80, and 81.

MHC is the number of correct responses on pages 82, 83, 84, 85, 86, 87, 88, and 89.

MNC is the number of correct responses on pages 90, 91, 92, 93, 94, 95, 96, and 97.

MSC is the number of correct responses on pages 98, 99, 100, 101, 102, 103, 104, and 105.

FXC is the number of correct responses on pages 10, 11, 12, 13, 18, 19, 20, 21, 26, 27, 28, 29, 34, 35, 36, 37, 50, 51, 52, and 53.

FZC is the number of correct responses on pages 14, 15, 16, 17, 22, 23, 24, 25, 30, 31, 32, 33, 38, 39, 40, 41,54, 55, 56, and 57.

MXC is the number of correct responses on pages 58, 59, 60, 61, 66, 67, 68, 69, 74, 75, 76, 77,82, 83, 84, 85,98, 99, 100, and 101.

MZC is the number of correct responses on pages 62, 63, 64, 65, 70, 71, 72, 73, 78, 79, 80, 81, 86, 87, 88, 89, 102, 103, 104, and 105.

Anger_CRT is the median reaction time for correct responses on pages 10, 11, 12, 13, 14, 15, 16, 17, 58, 59, 60, 61, 62, 63, 64, and 65.

DisgustCRT is the median reaction time for correct responses on pages 18, 19, 20, 21, 22, 23, 24, 25, 66, 67, 68, 69, 70, 71, 72, and 73.

Fear_CRT is the median reaction time for correct responses on pages 26, 27, 28, 29, 30, 31, 32, 33, 74, 75, 76, 77, 78, 79, 80, and 81.

Happy_CRT is the median reaction time for correct responses on pages 34, 35, 36, 37, 38, 39, 40, 41, 82, 83, 84, 85, 86, 87, 88, and 89.

NoEmo_CRT is the median reaction time for correct responses on pages 42, 43, 44, 45, 46, 47, 48, 49, 90, 91, 92, 93, 94, 95, 96, and 97.

Sad_CRT is the median reaction time for correct responses on pages 50, 51, 52, 53, 54, 55, 56, 57, 98, 99, 100, 101, 102, 103, 104, and105.

FP_AngerRT is the median reaction time for incorrect "anger" responses on pages 2 and up.

FPDisgustRT is the median reaction time for incorrect "disgust" responses on pages 2 and up.

FP_FearRT is the median reaction time for incorrect "fear" responses on pages 2 and up.

FP_HappyRT is the median reaction time for incorrect "happy" responses on pages 2 and up.

FP_NoEmoRT is the median reaction time for incorrect "no emotion" responses on pages 2 and up.

FP_SadRT is the median reaction time for incorrect "sad" reponses on pages 2 and up.

FACRT is the median reaction time for correct responses on pages 10, 11, 12, 13, 14, 15, 16, and 17.

FDCRT is the median reaction time for correct responses on pages 18, 19, 20, 21, 22, 23, 24, and 25.

FFCRT is the median reaction time for correct responses on pages 26, 27, 28, 29, 30, 31, 32, and 33.

FHCRT is the median reaction time for correct responses on pages 34, 35, 36, 37, 38, 39, 40, and 41.

FNCRT is the median reaction time for correct responses on pages 42, 43, 44, 45, 46, 47, 48, and 49.

FSCRT is the median reaction time for correct responses on pages 50, 51, 52, 53, 54, 55, 56, and 57.

MACRT is the median reaction time for correct responses on pages 58, 59, 60, 61, 62, 63, 64, and 65.

MDCRT is the median reaction time for correct responses on pages 66, 67, 68, 69, 70, 71, 72, and 73.

MFCRT is the median reaction time for correct responses on pages 74, 75, 76, 77, 78, 79, 80, and 81.

MHCRT is the median reaction time for correct responses on pages 82, 83, 84, 85, 86, 87, 88, and 89.

MNCRT is the median reaction time for correct responses on pages 90, 91, 92, 93, 94, 95, 96, and 97.

MSCRT is the median reaction time for correct responses on pages 98, 99, 100, 101, 102, 103, 104, and 105.

FXCRT is the median reaction time for correct responses on pages 10, 11, 12, 13, 18, 19, 20, 21, 26, 27, 28, 29, 34, 35, 36, 37, 50, 51, 52, and 53.

FZCRT is the median reaction time for correct responses on pages 14, 15, 16, 17, 22, 23, 24, 25, 30, 31, 32, 33, 38, 39, 40, 41,54, 55, 56, and 57.

MXCRT is the median reaction time for correct responses on pages 58, 59, 60, 61, 66, 67, 68, 69, 74, 75, 76, 77,82, 83, 84, 85,98, 99, 100, and 101.

MZCRT is the median reaction time for correct responses on pages 62, 63, 64, 65, 70, 71, 72, 73, 78, 79, 80, 81, 86, 87, 88, 89, 102, 103, 104, and 105.

If there are multiple responses in a trial, the Python scoring program takes the first response, as determined by the reaction times and the order of responses in the incorrect column; if, however, the reaction time is less than 100 ms, it will generate an error message. (This was decided by XNP committee on 2004-2-13.)

The Excel spreadsheet scoring program used the following weird rules for multiple responses in a trial; since the Python scoring program consistently uses the first response, it will produce different scores. (Revision 1.120 of cnpscore.py contains Python code that will exactly reproduce the Excell scores, should you ever need to go back.)

(1) Multiple identical responses in the correct or incorrect response field are treated as a single correct or incorrect response, except that five or more identical correct responses are treated as an invalid response which will be ignored in scoring. (My test data never includes five multiple incorrect responses, so I don't know if the same rule applies to incorrect responses.)

(2) Multiple non-identical responses in the correct or incorrect response field are treated as an invalid response and are ignored in scoring.

(3) If a trial includes both correct and incorrect responses, BOTH are counted in the scoring.

(4) Reaction times are counted in the scoring whether the corresponding responses are valid or not.

See the pert96 directory in the cnptest project from CVS for a statistical comparison of the differences in the Python and Excel scoring codes.

The stimuli used in the PERT96 are a superset of those used in the ER40, so it is also possible to compute the ER40 scores on the appropriate subset. That yields the following additional scores, where the prefix PER40 is used to distinguish these scores from the regular ER40 and the PERT96.

The following subsets of the stimuli are used; the values are PERT96 page numbers.

The PER40 subset consists of pages 10, 12, 14, 17, 26, 29, 32, 33, 34, 37, 38, 39, 42, 45, 47, 49, 51, 53, 54, 55, 58, 61, 63, 65, 74, 75, 79, 81, 82, 83, 87, 88, 91, 92, 96, 97, 98, 100, 102, and 104.

The PER40 anger subset consists of pages 10, 12, 14, 17, 58, 61, 63, and 65.

The PER40 fear subset consists of pages 26, 29, 32, 33, 74, 75, 79, and 81.

The PER40 happy subset consists of pages 34, 37, 38, 39, 82, 83, 87, and 88.

The PER40 no emotion subset consists of pages 42, 45, 47, 49, 91, 92, 96, and 97.

The PER40 sad subset consists of pages 51, 53, 54, 55, 98, 100, 102, and 104.

The PER40 female subset consists of pages 10, 12, 14, 17, 26, 29, 32, 33, 34, 37, 38, 39, 42, 45, 47, 49, 51, 53, 54, and 55.

The PER40 male subset consists of pages 58, 61, 63, 65, 74, 75, 79, 81, 82, 83, 87, 88, 91, 92, 96, 97, 98, 100, 102, and 104.

The PER40 mild subset consists of pages 10, 12, 26, 29, 34, 37, 42, 45, 51, 53, 58, 61, 74, 75, 82, 83, 91, 92, 98, and 100.

The PER40 extreme subset consists of pages 14, 17, 32, 33, 38, 39, 47, 49, 54, 55, 63, 65, 79, 81, 87, 88, 96, 97, 102, and 104.

PER40_CR is the number of correct answers on the PER40 subset.

PER40_CRT is the median response time for correct answers on the PER40 subset.

PER40_FC is the number of correct answers on the PER40 female subset.

PER40_MC is the number of correct answers on the PER40 male subset.

PER40FCRT is the median reaction time for correct answers on the PER40 female subset.

PER40MCRT is the median reaction time for correct answers on the PER40 male subset.

PER40ANG is the number of correct answers on the PER40 anger subset.

PER40FEAR is the number of correct answers on the PER40 fear subset.

PER40HAP is the number of correct answers on the PER40 happy subset.

PER40NOE is the number of correct answers on the PER40 no emotion subset.

PER40SAD is the number of correct answers on the PER sad subset.

PER40_FPA is the number of incorrect "Anger" responses on the PER40 subset.

PER40_FPF is the number of incorrect "Fear" responses on the PER40 subset.

PER40_FPH is the number of incorrect "Happy" responses on the PER40 subset.

PER40_FPN is the number of incorrect "No Emotion" responses on the PER40 subset.

PER40_FPS is the number of incorrect "Sad" responses on the PER40 subset.

PER40ANGRT is the median response time for correct answers on the PER40 anger subset.

PER40FEARRT is the median response time for correct answers on the PER40 fear subset.

PER40HAPRT is the median response time for correct answers on the PER40 happy subset.

PER40NOERT is the median response time for correct answers on the PER no emotion subset.

PER40SADRT is the median response time for correct answers on the PER40 sad subset.

PER40_FPART is the median response time for incorrect "Anger" responses on the PER40 subset.

PER40_FPFRT is the median response time for incorrect "Fear" responses on the PER40 subset.

PER40_FPHRT is the median response time for incorrect "Happy" responses on pages the PER40 subset.

PER40_FPNRT is the median response time for incorrect "No Emotion" responses on the PER40 subset.

PER40_FPSRT is the median response time for incorrect "Sad" responses on the PER40 subset.

PER40MILD is the number of correct answers on the PER40 mild subset.

PER40EXTR is the number of correct answers on the PER40 extreme subset.

PER40MDRT is the median reaction time for the correct answers on the PER40 mild subset.

PER40EXRT is the median reaction time for the correct answers on the PER40 extreme subset.

3.22 Picture Test

The Picture Test contains two sections where the participant is asked to perform memory tasks. The participant is first given instructions and then shown a picture of a room full of objects. In the first task, the participant is shown pictures of objects and asked to identify if those particular objects were located in the room that they had just seen. There are 40 objects shown at random in the first task, 20 of which are target objects that had been in the original room, 20 of which are interference objects that had not been in the room. Correct responses in the first task are coded as "correct", whereas incorrect responses are coded as either "0" or "1".

In the second task, the participant is shown 20 pictures of objects that were in the room, each alongside a picture of an empty room. The participant is then asked to click on the location in the empty room where they think the object was found. The clickable areas in the room are divided into 8 equal areas. The correct responses are coded "correct" and the incorrect responses are coded with the numbers 1 through 8, which correspond to the incorrect quadrant that the participant had clicked on.

The resulting output file is organized with responses to the first task in trials 2 through 41 and responses to the second task in trials 42 through 61. Both correct and incorrect responses are listed in the "incorrect" column of the PowerLab response file. The responses must be sorted by page number before the scores described below are computed.

The Excel scoring code sorted trials 2 through 41 by page number to unrandomize the set, resulting in trials 2 through 21 being responses to target stimuli and trials 22 through 41 being responses to interference stimuli.

The Excel scoring code contained a bug that will be resolved in the Python scoring code. This will lead to different scores produced by the two methods for some data sets. The Excel scoring code erroneously omitted trial 21 from calculations when TargCor was calculated. This would lead to a possible variance of 1 on all TargCor scores that were produced by the Excel scoring code.

PICT_FILE, PICT_MTIME, PICT_VERSION, PICT_TASK, PICT_DATE, PICT_STIME, and PICT_ETIME are the standard PowerLab task fields described above.

RegCor is the number of correct answers on trials 2 through 41.

TargCor is the number of correct answers for target stimuli, which are in trials 2 through 21 after they have been sorted.

IntrCor is the number of correct answers for interference stimuli, which are in trials 22 through 41 after they have been sorted.

LocCor is the number of correct answers on trials 42 through 61.

3.23   PIT

The usual PowerLab filename should appear as either pit_1.1 or pit_31; the task name inside the file is consequently either PIT_1.1 or PIT_31.

The prefix PIT_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "PIT"

This task is not included in any current BBL battery, but has been distributed on the web and to collaborators, and scoring code has been written to process output from this task.

The Penn Inhibition Task (PIT) contains three categories of trials: "Training", "Condition", and "Inhibition".

Each time a "Training" block is administered, there are two different trial sub-set blocks which are administered. The exact number of trials from each of these sub-set blocks is variable, but the total number of trials administered between the two sub-set blocks is always 20. In the first of these sub-set blocks, a correct answer is two clicks of the "1" button. In the second of these sub-set blocks, a correct answer is one click of the "1" button.

In the "Condition" category, two sets of nine trials are given. Each one comprises one subset, and they are separated by one "Inhibition" trial. This is the first of two inhibition trials. The second inhibition trial follows the 18th trial of the Condition category. In the first of these "Condition" trials, a correct answer is two clicks of the "1" button. In the second "Condition" trial, a correct answer is one click of the "1" button. In the first of the "Inhibition" trials, a correct answer is one click of the "1" button. In the second trial, a correct answer is two clicks of the "1" button.

The above procedure is completed once using visual stimuli as cues to respond, and then repeated using auditory stimuli as cues to respond. This adds up to four blocks each of the "Training", "Condition" and "Inhibition" trials.

When the visual PIT is being administered, "Training" trials are identified as PowerLab pages 10 and 11, "Condition" trials are identified as PowerLab pages 12 and 13, and "Inhibition" trials are identified as the first instance of page 13 and the only instance of page 14.

When the auditory PIT is being administered, "Training" trials are identified as PowerLab pages 23 and 24, "Condition" trials are identified as PowerLab pages 25 and 26, and "Inhibition" trials are identified as the first instance of page 26 and the only instance of page 27.

Below is an example of the order in which PIT trials may be administered:

Trial	Page	Block
3	10	Training 1
4	11	Training 2
5	11	Training 2
6	10	Training 1
7	11	Training 2
8	11	Training 2
9	10	Training 1
10	10	Training 1
11	11	Training 2
12	10	Training 1
13	11	Training 2
14	10	Training 1
15	10	Training 1
16	10	Training 1
17	11	Training 2
18	10	Training 1
19	11	Training 2
20	11	Training 2
21	11	Training 2
22	11	Training 2
23	12	Condition 1
24	12	Condition 1
25	12	Condition 1
26	12	Condition 1
27	12	Condition 1
28	12	Condition 1
29	12	Condition 1

Trial	Page	Block
30	12	Condition 1
31	12	Condition 1
32	13	Inhibition 1
33	13	Condition 2
34	13	Condition 2
35	13	Condition 2
36	13	Condition 2
37	13	Condition 2
38	13	Condition 2
39	13	Condition 2
40	13	Condition 2
41	13	Condition 2
42	14	Inhibition 2
43	24	Training 4
44	23	Training 3
45	24	Training 4
46	24	Training 4
47	23	Training 3
48	23	Training 3
49	23	Training 3
50	24	Training 4
51	23	Training 3
52	23	Training 3
53	24	Training 4
54	23	Training 3
55	24	Training 4
56	24	Training 4
57	23	Training 3
58	24	Training 4
59	23	Training 3

Trial	Page	Block
60	24	Training 4
61	23	Training 3
62	23	Training 3
63	25	Condition 3
64	25	Condition 3
65	25	Condition 3
66	25	Condition 3
67	25	Condition 3
68	25	Condition 3
69	25	Condition 3
70	25	Condition 3
71	25	Condition 3
72	26	Inhibition 3
73	26	Condition 4
74	26	Condition 4
75	26	Condition 4
76	26	Condition 4
77	26	Condition 4
78	26	Condition 4
79	26	Condition 4
80	26	Condition 4
81	26	Condition 4
82	27	Inhibition 4

FIXME: Describe the dimensions of the test in a more concise, cogent and psychologically meaningful manner.

PTT1 is the total number of correct responses for the first "Training" trial block in response to visual stimuli.

PTT1RTCR is the median response time to correct responses for the first "Training" trial block in resposne to visual stimuli.

PTT1RTER is the median response time to incorrect responses for the first "Training" trial block in response to visual stimuli.

PTT2 is the total number of correct responses for the second "Training" trial block in response to visual stimuli.

PTT2RTCR is the median response time to correct responses for the second "Training" trial block in response to visual stimuli.

PTT2RTER is the median response time to incorrect responses for the second "Training" trial block in response to visual stimuli.

PTi1 is the total number of correct responses for the first inhibition trial in response to visual stimuli.

PTi1RTCR is the median response time to correct responses for the first inhibition trial in response to visual stimuli.

PTi1RTER is the median response time to incorrect responses for the first inhibition trial in response to visual stimuli.

PTC1 is the total number of correct responses to the first "Condition" trial block in response to visual stimuli

PTC1RTCR is the median response time to correct responses for the first "Condition" trial block in response to visual stimuli.

PTC1RTER is the median response time to incorrect responses for the first "Condition" trial block in response to visual stimuli.

PTC2 is the total number of correct responses for the second "Condition" trial block in response to visual stimuli.

PTC2RTCR is the median response time to correct responses for the second "Condition" trial block in response to visual stimuli.

PTC2RTER is the median response time to incorrect responses for the second "Condition" trial block in response to visual stimuli.

PTi2 is the total number of correct responses for the second inhibition trial in response to visual stimuli.

PTi2RTCR is the median response time to correct responses for the second inhibition trial in response to visual stimuli.

PTi2RTER is the median response time to incorrect responses for the second inhibition trial in response to visual stimuli.

PTT3 is the total number of correct responses for the first "Training" trial block in response to auditory stimuli.

PTT3RTCR is the median response time to correct responses for the first "Training" trial block in resposne to auditory stimuli.

PTT3RTER is the median response time to incorrect responses for the first "Training" trial block in response to auditory stimuli.

PTT4 is the total number of correct responses for the second "Training" trial block in response to auditory stimuli.

PTT4RTCR is the median response time to correct responses for the second "Training" trial block in response to auditory stimuli.

PTT4RTER is the median response time to incorrect responses for the second "Training" trial block in response to auditory stimuli.

PTi3 is the total number of correct responses for the first inhibition trial in response to auditory stimuli.

PTi3RTCR is the median response time to correct responses for the first inhibition trial in response to auditory stimuli.

PTi3RTER is the median response time to incorrect responses for the first inhibition trial in response to auditory stimuli.

PTC3 is the total number of correct responses to the first "Condition" trial block in response to auditory stimuli.

PTC3RTCR is the median response time to correct responses for the first "Condition" trial block in response to auditory stimuli.

PTC3RTER is the median response time to incorrect responses for the first "Condition" trial block in response to auditory stimuli.

PTC4 is the total number of correct responses for the second "Condition" trial block in response to auditory stimuli.

PTC4RTCR is the median response time to correct responses for the second "Condition" trial block in response to auditory stimuli.

PTC4RTER is the median response time to incorrect responses for the second "Condition" trial block in response to auditory stimuli.

PTi4 is the total number of correct responses for the second inhibition trial in response to auditory stimuli.

PTi4RTCR is the median response time to correct responses for the second inhibition trial in response to auditory stimuli.

PTi4RTER is the median response timeq to incorrect responses for the second inhibition trial in response to auditory stimuli.

PTT1num is the total number of responses for the first "Training" trial block in response to visual stimuli.

PTT2num is the total number of responses for the second "Training" trial block in response to visual stimuli.

PTT3num is the total number of responses for the first "Training" trial block in response to auditory stimuli.

PTT4num is the total number of responses for the second "Training" trial block in response to auditory stimuli.

PTC1num is the total number of responses for the first "Condition" trial block in response to visual stimuli.

PTC2num is the total number of responses for the second "Condition" trial block in response to visual stimuli.

PTC3num is the total number of responses for the first "Condition" trial block in response to auditory stimuli.

PTC4num is the total number of responses for the second "Condition" trial block in response to auditory stimuli.

PTTTRAIN = PTT1 + PTT2 + PTT3 + PTT4

PTCOND = PTC1 + PTC2 + PTC3 + PTC4

PTINHIB = PTI1 + PTI2 + PTI3 + PTI4

PTCRTCR is the median of PTC1RTCR, PTC2RTCR, PTC3RTCR, and PTC4RTCR.

PTIRTCR is the median of PTi1RTCR, PTi2RTCR, PTi3RTCR, and PTi4RTCR.

3.24   PLLT and PLLTd

The prefixes PLLT_ and PLLTD_ are used for the standard PowerLab task fields described above. The taskname used in the CSV file is "PLLT" for the PLLT and "PLLTD" for the PLLTd.

This task consists of 11 blocks of responses in the initial task and 5 in the delayed task; the blocks are numbered continously from 1 to 16. Each block is usually terminated by a PowerLab trial for which the incorrect response is 'NEXT'; but if page numbers 133, 176, 219, 289, 309, or 319 (for the PLLT) or page numbers 29 or 40 (for the PLLTd) are reached, the block terminates without an explict NEXT. In one known case, the response NEXT was replaced by a normal response. The following BBL data sets exhibit missing NEXT responses and other problems and may be useful for testing: 2004.03.31.000, 2004.04.02.003, 2004.04.02.010, 2004.04.05.006, 2004.08.19.005, 2004.08.30.002, 2004.01.28.001, and 2004.05.04.011.

Within each block there are 4 or 16 valid reponses (which depend on the block) and one invalid response, which is always 'INTRUSION'.

A response within a block is classified as correct if it is one of the 4 or 16 valid responses and has not appeared previously in the block; a response is a perseveration if it is one of the 4 or 16 valid responses and has been given previously in the block; and a response is an intrusion if it is anything other than one of the 4 or 16 correct responses.

Each valid response is assigned to one of 4 sematic categories. A response is counted as a semantic cluster if it is correct (but not a perseveration) and in the same sematic category as the previous reponse.

Each response is also assigned a sequence number. A response is counted as a serial cluster if it is correct (but not a perseveration) and has a sequence

number one larger than the previous response.

The following table shows the correct responses and their categories and sequence numbers used in all blocks except block 6:

lion animal 1 emerald jewel 2 tent shelter 3 teacher job 4 sapphire jewel 5 dentist job 6 hotel shelter 7 horse animal 8 engineer job 9 opal jewel 10 tiger animal 11 cave shelter 12 professor job 13 pearl jewel 14 cow animal 15 hut shelter 16

The following table shows the same information for block 6:

trumpet instrument 1 coal fuel 2 sugar spice 3 lettuce vegetable 4 kerosene fuel 5 bean vegetable 6 garlic spice 7 violin instrument 8 potato vegetable 9 wood fuel 10 clarinet instrument 11 vanilla spice 12 corn vegetable 13 gasoline fuel 14 flute instrument 15 cinnamon spice 16

Blocks 1 through 5 are learning trials using all categories from the first list above. Block 6 is a distraction trial using all categories from the second list. Block 7 is a short delay free recall trial using the entire first list again. Blocks 8 through 11 are short delay cued recall trials using in turn each of the categories of the first list. A delay is imposed between blocks 11 and 12 to test delayed recall. Block 12 is a long delay free recall trial using all categories from the first list. Blocks 13 through 16 are long delay cued recall trials using in turn each of the four categories from the first list.

PLLTD_WAIT is the time interval in seconds between the end of the PLLT and the beginning of the PLLTd.

The following variables are computed for each block; the lowercase n denotes the block number.

PLLT_FILE, PLLT_MTIME, PLLT_VERSION, PLLT_TASK, PLLT_DATE, PLLT_STIME, and PLLT_ETIME are the standard PowerLab task fields described above.

PLLTCORn is the number of correct responses in the block, excluding perseverations.

PLLTPERn is the number of perseverations in the block.

PLLTINTn is the number of intrusions in the block.

PLLTSEMOn is the number of semantic clusters observed in the block. This variable is omitted in blocks 8-11 and 13-16.

PLLTSEMEn is the expected number of semantic clusters in the block and is computed as (PLLTCORn - 1) / 5, but must be at least zero. This variable is omitted in blocks 8-11 and 13-16.

PLLTSEMAn is the chance-adjusted number of semantic clusters in the block and is computed as (PLLTSEMOn - PLLTSEMEn). This variable is

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omitted in blocks 8-11 and 13-16.

FIXME: SEM* is omitted in some blocks but SER* is not. It would seem that they be symmetric.

PLLTSEROn is the number of serial clusters observed in the block.

PLLTSEREn is the number of serial clusters expected in the block and is computed as (PLLTCORn - 1) / 16. FIXME: Limit below at zero?

PLLTSERAn is the chance-adjusted number of serial clusters in the block and is computed as (PLLTSEROn - PLLTSEREn).

PLLTSLOPE is the learning slope over blocks 1-5 and is computed using the standard linear regression formula for slope.

3.25 PVRT

The prefix PVRT_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "PVRT".

There are two forms of this test. The long form is the original 30-item test; the short form uses only 8 items (item numbers 4, 6, 8, 12, 16, 17, 24, and 29) and estimates the score on the long form from those.

Trials are out of order. The following table gives the correspondence between item numbers on the full test, the correct answers, page numbers on the long test, and page numbers on the short test. Page 1 is used to enter the subject id; page 2 does not exist. Page 9 (item 7) of the long form is ignored.

item	answer	long page#	short page#
1	3	3	
2	4	4	
3	1	5	
4	2	6	3
5	4	7	
6	4	8	4
7	-	9	
8	2	10	5
9	2	11	
10	2	12	
11	2	13	
12	3	14	6
13	2	15	
14	1	16	
15	3	17	
16	4	18	7
17	3	19	8
18	4	20	
19	3	21	
20	3	22	
21	2	23	
22	3	24	
23	1	25	
24	3	26	9
25	2	27	
26	2	28	
27	4	29	
28	3	30	
29	2	31	10
30	2	32	

PVRT_FILE, PVRT_MTIME, PVRT_VERSION, PVRT_TASK, PVRT_DATE, PVRT_STIME, and PVRT_ETIME are the standard PowerLab task fields described above.

PVRT_FORM is 'Long' for the long form, and 'Short 1' for the short form.

PVRTCR for the long form is the number of correct answers.

PVRTCR for the short form is computed as follows; all but the last value are temporary and can be thrown away after the computation is complete.

```
# Estimated decrement from full score for omitted items
est = round(exp(1.228 +
0.241*PVRTI4 + 0.248*PVRTI6 + 0.113*PVRTI8 +
0.227*PVRTI12 + 0.200*PVRTI16 + 0.249*PVRTI17 +
0.277*PVRTI24 + 0.170*PVRTI29))

# Decrement from full score for included items
inc = PVRTI4 + PVRTI6 + PVRTI8 + PVRTI12 + PVRTI16 +
PVRTI17 + PVRTI24 + PVRTI29

# Subtract decrements from full score and lower bound at
zero
PVRTCR = max(29-est-inc, 0)
```

where $PVRTIi = 0$ if item i was correct and $PVRTIi = 1$ if item i is incorrect. NOTE that the scoring rule is given in terms of the *original* item numbers, and the sense is reversed from what you would expect.

PVRT_PC is percentage correct for the long form and is computed as PVRTCR / 29. NOTE: In was decided in the CNP meeting of 2004-11-19 that the divisor should be 29 rather than 30, for consistency with the legacy Excel data; this documentation and the Python scoring module were changed to match.

PVRTRTTO is the median reaction time taken over all answers.

PVRTRTCR is the median reaction time for correct answers.

PVRTRTER is the median reaction time for incorrect answers.

FIXME: Statistically test whether the reaction times are different between the two forms.

3.26   PWIR

The prefix PWIR_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "PWIR".

PWIR_FILE, PWIR_MTIME, PWIR_VERSION, PWIR_TASK,PWIR_DATE, PWIR_STIME, and PWIR_ETIME are the standard PowerLab task fields

described above.

WTOT_30T is the total correct responses to trials 2, 3, 4, 6, 8, 10, 12, 14, 16 and 18.

WTOT_40T is the total correct responses to trials 5, 7, 9, 11, 13, 15, 17, 19, 20 and 21.

WRT30TCR is the median response time for correct responses to trials 2, 3, 4, 6, 8, 10, 12, 14, 16 and 18.

WRT40TCR is the median response time for correct responses to trials 5, 7, 9, 11, 13, 15, 17, 19, 20 and 21.

WRT30TER is the median response time for incorrect responses to trials 2, 3, 4, 6, 8, 10, 12, 14, 16 and 18.

WRT40TER is the median response time for incorrect responses to trials 5, 7, 9, 11, 13, 15, 17, 19, 20 and 21.

WRT30TTO is the median response time for all responses to trials 2, 3, 4, 6, 8, 10, 12, 14, 16 and 18.

WRT40TTO is the median response time for all responses to trials 5, 7, 9, 11, 13, 15, 17, 19, 20 and 21.

PWIRTOT is the total correct responses, trials 2 through 21.

PWIRRTC is the median response time for correct responses to trials 2 through 21.

3.27   PWTR

The prefix PWTR_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "PWTR".

PWTR_FILE, PWTR_MTIME, PWTR_VERSION, PWTR_TASK, PWTR_DATE, PWTR_STIME, and PWTR_ETIME are the standard PowerLab task fields described above.

PWTRTOT is the number of correct responses for trials 2 through 22.

PWTRRTC is the median response time for all responses to trials 2 through 22.

W3P6TOT is the total correct responses to trials 2, 5, 8, 11, 14, 17 and 20.

W3P9TOT is the total correct responses to trials 3, 6, 9, 12, 15, 18 and 21.

W6P9TOT is the total correct responses to trials 4, 7, 10, 13, 16, 19 and 22.

W3P6RTCR is the median response time for correct responses to trials 2, 5, 8, 11, 14, 17 and 20.

W3P9RTCR is the median response time for correct responses to trials 3, 6, 9, 12, 15, 18 and 21.

W6P9RTCR is the median response time for correct responses to trials 4, 7, 10, 13, 16, 19 and 22.

W3P6RTER is the median response time for incorrect responses to trials 2, 5, 8, 11, 14, 17 and 20.

W3P9RTER is the median response time for incorrect responses to trials 3, 6, 9, 12, 15, 18 and 21.

W6P9RTER is the median response time for incorrect responses to trials 4, 7, 10, 13, 16, 19 and 22.

W3P6RTTO is the median response time for all responses to trials 2, 5, 8, 11, 14, 17 and 20.

W3P9RTTO is the median response time for all responses to trials 3, 6, 9, 12, 15, 18 and 21.

W6P9RTTP is the median response time for all responses to trials 4, 7, 10, 13, 16, 19 and 22.

3.28   RAVEN

There are two forms of this test. The long form is the original 60-item test; the short form uses only 9 items and estimates the score on the long form from those.

The prefix RAV_ is used for the standard PowerLab task fields described above.The taskname used in the CSV file is "Raven".

RAV_FILE, RAV_MTIME, RAV_VERSION, RAV_TASK, RAV_DATE, RAV_STIME, and RAV_ETIME are the standard PowerLab task fields described above.

RAV_FORM is 'Long' for the long form, and 'Short 1' for the short form.

RAV_CR for the long form is the number of correct answers in trials 2-61, which correspond to items 1-60 of the original long form. (Trial 1 is not part of the actual test.)

RAV_CR for the short form is computed as follows; all but the last value are tempory and can thrown away once the computation is done.

```
# Estimated decrement from full score for omitted items
est = round(exp(1.323 +
```

```
0.198*RAVI11 + 0.216*RAVI24 + 0.237*RAVI28 +
0.142*RAVI36 + 0.374*RAVI43 + 0.304*RAVI48 +
0.178*RAVI49 + 0.458*RAVI53 + 0.289*RAVI55))

# Decrement from full score for the included items
inc = RAVI11 + RAVI24 + RAVI28 + RAVI36 + RAVI43 +
RAVI48 + RAVI49 + RAVI53 + RAVI55

# Subtract decrements from full score and lower bound at
zero
RAV_CR = max(60-est-inc, 0)
```

where RAVIi = 0 if item i was correct and RAVIi = 1 if item i is incorrect. NOTE that the scoring rule is given in terms of the *original* item numbers, and the sense is reversed from what you would expect.

RAVRT_CR is the median reaction time for correct answers in trials 2-61.

RAVRT_ER is the median reaction time for incorrect answers in trials 2-61.

RAVRT_TO is the median reaction time for all answers, correct or incorrect.

FIXME: Statistically test whether the reaction times are different between the two forms.

3.29   ShortVOLT

The ShortVOLT is intended to be used with the SVDelay task, which tests recall of the stimuli presented by the ShortVOLT.

See also the VOLT, which presents more learning trials and is ancestral to this task; the VOLT was found to be no more informative than the Short-VOLT, and the ShortVOLT is recommended for new projects.

The prefix SVT_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "ShortVolt".

Subset A consists of trials 2, 3, 5, 6, 9, 10, 11, 14, 16, and 20.

Subset B consists of trials 4, 7, 8, 12, 13, 15, 17, 18, 19, and 21.

SVT_FILE, SVT_MTIME, SVT_VERSION, SVT_TASK, SVT_DATE, SVT_STIME, and SVT_ETIME are the standard PowerLab task fields described above.

SVT is the number of correct answers in trials 2-21.

SVTRT is the median reaction time for all answers in trials 2-21.

SVTCRT is the median reaction time for correct answers in trials 2-21.

SVTIRT is the median reaction time for incorrect answers in trials 2-21.

SVTTP is the number of correct answers on subset A.

SVTTN is the number of correct answers on subset B.

SVTFP is the number of incorrect answers on subset B.

SVTFN is the number of incorrect answers on subset A.

SVTTPRT is the median reaction time for correct answers on subset A.

SVTTNRT is the median reaction time for correct answers on subset B.

SVTFPRT is the median reaction time for incorrect answers on subset B.

SVTFNRT is the median reaction time for incorrect answers on subset A.

3.30   STROOP

The prefix STRP_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "Stroop"

The STROOP task includes two major sets of trials, each divided further into three subsets for each major set.

The first set contains trials 2 through 46. During these trials, particiants are shown congruent stimuli (names of colors with text color matching the name).

The second set contains trials 47 through 91. During these trials, participants are shown incongruent stimuli (names of colors with text color not matching the name).

Earlier versions of the STROOP task contained programming errors that invalidated the data collected on the third incongruent subset. Therefore, data collected for the third incongruent data subset is not included when scoring correct/incorrect responses and median response times for the entire task.

CON1 is the number of correct responses in the first subset of congruent stimuli, trials 2 through 16.

CON2 is the number of correct responses in the second subset of congruent stimuli, trials 17 through 31.

CON3 is the number of correct responses in the third subset of congruent stimuli, trials 32 through 46.

INCON1 is the number of correct responses in the first subset of incongruent stimuli, trials 47 through 61.

INCON2 is the number of correct responses in the second subset of incongruent stimuli, trials 62 throguh 76.

INCON3 is the number of correct responses in the third subset of incongruent stimuli, trials 77 through 91.

C1_RTCR is the median response time for correct responses to the first subset of congruent stimuli, trials 2 through 16.

C1_RTER is the median response time for incorrect responses to the first subset of congruent stimuli, trials 2 through 16.

C2_RTCR is the median response time for correct responses to the second subset of congruent stimuli, trials 17 through 31.

C2_RTER is the median response time for incorrect responses to the second subset of congruent stimuli, trials 17 through 31.

C3_RTCR is the median response time for correct responses to the third subset of congruent stimuli, trials 32 through 46.

C3_RTER is the median response time for incorrect responses to the third subset of congruent stimuli, trials 32 through 46.

iC1_RTCR is the median resposne time for correct responses to the first subset of incongruent stimuli, trials 47 through 61.

iC1_RTER is the median response time for incorrect responses to the first subset of incongruent stimuli, trials 47 through 61.

iC2_RTCR is the median response time for correct responses to the second subset of incongruent stimuli, trials 62 through 76.

iC2_RTER is the median response time for incorrect responses to the second subset of incongruent stimuli, trials 62 through 76.

iC3_RTCR is the median response time for correct responses to the third subset of incongruent stimuli, trials 77 through 91.

iC3_RTER is the median response time for incorrect responses to the third subset of incongruent stimuli, trials 77 through 91.

STC is the number of correct responses to all congruent stimuli, trials 2 through 46.

STC_RTCR is the median response time for all correct responses to congruent stimuli, trials 2 through 46.

STI is the number of correct responses to the first two subsets of incongruent stimuli, trials 47 through 76.

STI_RTCR is the median response time for correct responses to the first two subsets of incongruent stimuli, trials 47 through 76.

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3.31   SV_DELAY

The SV_Delay tests recall of the stimuli presented in the ShortVOLT task and is intended to be used in conjunction with it.

The taskname in the PowerLab response file is "SV_DELAY", often followed by other non-significant digits. The prefix SVD_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "SVDelay" for the ShortVOLT and "VOLTd" for the Long VOLT.

SetTP consists of the trials on which "1" is the correct (TP) answer; this is trials 2, 4, 5, 8, 9, 12, 13, 14, 18, and 19.

SetTN consists of the trials on which "2" is the correct (TN) answer; this is trials 3, 6, 7, 10, 11, 15, 16, 17, 20, and 21.

The prefix SVTD_ is used for the standard PowerLab task fields described above.

SVTD_FILE, SVTD_MTIME, SVTD_VERSION, SVTD_TASK, SVTD_DATE, SVTD_STIME, and SVTD_ETIME are the standard PowerLab task fields described above.

SVTD_WAIT is the time interval in seconds between the end of the Short-Volt and the beginning of the SV_Delay.

SVT_LD is the number of correct answers in trials 2-21.

SVTLDRTC is the median reaction time for correct answers on trials 2-21.

SVTLDRTER is the median reaction time for incorrect answers on trials 2-21.

SVT_LDTP is the number of times that the answer is correct and equal to 1 on trials 2-21.

SVT_LDTN is the number of times that the answer is correct and equal to 2 on trials 2-21.

SVT_LDFP is the number of times that the answer is incorrect and equal to 1 on trials 2-21.

SVT_LDFN is the number of times that the answer is incorrect and equal to 2 on trials 2-21.

SVT_LDTPRT is the median reaction time for trials that the answer is correct and equal to 1 on trials 2-21.

SVT_LDTNRT is the median reaction time for trials that the answer is correct and equal to 2 on trials 2-21.

SVT_LDFPRT is the median reaction time for trials that the answer is incorrect and equal to 1 on trials 2-21.

SVT_LDFNRT is the median reaction time for trials that the answer is incorrect and equal to 2 on trials 2-21.

3.32   TRUCKS

The prefix TRUK_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "Trucks"

TRUK_FILE, TRUK_MTIME, TRUK_VERSION, TRUK_TASK, TRUK_DATE, TRUK_STIME AND TRUK_ETIME are the standard PowerLab task fields described above.

TRKCR is the number of correct responses to trials 2 through 10.

TRKRTCR is the median response time for Correct responses to trials 2 through 10.

TRKRTER is the median response time for Incorrect responses to trials 2 through 10.

TRKRTTO is the median reaction time for all responses to trials 2 through 10.

3.33   VOLT

The VOLT presents stimuli for which immediate recall is tested at the end of the test, and for which delayed recall is tested later by the VOLTd.

The VOLT is an ancestral version of the ShortVOLT, and is not recommended for new projects. It differs from the ShortVOLT in presenting more learning trials, a distractor trial and an immediate recall trial, but these were no found to be informative relative to the ShortVOLT.

There are two extant versions of this task, known as the VOLT1 and VOLT2. The VOLT1 puts all responses, correct or incorrect, in the "correct" columns of the PowerLab response file; the VOLT2 gets responses in the proper columns in reference to correctness.

The prefix VT_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "VOLT". The ¡¡¡¡¡¡¡ cnpscore.tex taskname in the Powerlab response file is "VOLT_" followed by ======= taskname in the Powerlab response file is "VOLT_", followed by ¿¿¿¿¿¿¿ 1.24 the version number (1 or 2), and then usually followed by a period and some insignificant numbers.

Subset A consists of trials 2, 3, 5, 6, 9, 10, 11, 14, 16, and 20.

Subset B consists of trials 4, 7, 8, 12, 13, 15, 17, 18, 19, and 21.

Subset LA consists of trials 2, 3, 5, 6, 9, 10, 11, 14, 16, 20, 23, 24, 26, 28, 30, 31, 32, 35, 37, 40, 42, 43, 45, 46, 49, 50, 51, 54, 56, 60, 63, 64, 66, 68, 70, 71, 72, 75, 77, 80, 82, 83, 85, 86, 89, 90, 91, 94, 96, 100, 103, 105, 106, 109, 110, 111, 114, 116, 120, 121

Subset LB consists of trials 4, 7, 8, 12, 13, 15, 17, 18, 19, 21, 22, 25, 27, 29, 33, 34, 36, 38, 39, 41, 44, 47, 48, 52, 53, 55, 57, 58, 59, 61, 62, 65, 67, 69, 73, 74, 76, 78, 79, 81, 84, 87, 88, 92, 93, 95, 97, 98, 99, 101, 102, 104, 107, 108, 112, 113, 115, 117, 118, 119

VT_FILE, VT_MTIME, VT_VERSION, VT_TASK, VT_DATE, VT_STIME, and VT_ETIME are the standard PowerLab task fields described above.

VT is the number of correct answers in trials 2-21.

VTRT is the median reaction time for all answers in trials 2-21.

VTCRT is the median reaction time for correct answers in trials 2-21.

VTIRT is the median reaction time for incorrect answers in trials 2-21.

VTTP is the number of correct answers on subset A.

VTTN is the number of correct answers on subset B.

VTFP is the number of incorrect answers on subset B.

VTFN is the number of incorrect answers on subset A.

VTTPRT is the median reaction time for correct answers on subset A.

VTTNRT is the median reaction time for correct answers on subset B.

VTFPRT is the median reaction time for incorrect answers on subset B.

VTFNRT is the median reaction time for incorrect answers on subset A.

LVT is the number of correct answers in trials 2-121.

LVTRT is the median reaction time for all answers in trials 2-121.

LVTCRT is the median reaction time for correct answers in trials 2-121.

LVTIRT is the median reaction time for incorrect answers in trials 2-121.

LVTTP is the number of correct answers on subset LA.

LVTTN is the number of correct answers on subset LB.

LVTFP is the number of incorrect answers on subset LB.

LVTFN is the number of incorrect answers on subset LA.

LVTTPRT is the median reaction time for correct answers on subset LA.

LVTTNRT is the median reaction time for correct answers on subset LB.

LVTFPRT is the median reaction time for incorrect answers on subset LB.

LVTFNRT is the median reaction time for incorrect answers on subset LA.

3.34 VOLTd

The VOLTd task tests recall of the stimuli presented in the VOLT task and is intended to be used in conjunction with it.

The VOLT and VOLTd are ancestral versions of the ShortVOLT and SV_Delay, and are not recommended for new projects. They differ from the ShortVOLT in presenting more learning trials as well as an immediate recall trial, but these were no found to be informative relative to the ShortVOLT.

The taskname in the PowerLab response file is "voltd_", followed by the version number (1 or 2), and then often followed by other non-significant digits. The prefix VTD_ is used for the standard PowerLab task fields described above. The taskname used in the CSV file is "VOLTd".

SetTP consists of the trials on which "1" is the correct (TP) answer; this is trials 2, 4, 5, 8, 9, 12, 13, 14, 18, and 19.

SetTN consists of the trials on which "2" is the correct (TN) answer; this is trials 3, 6, 7, 10, 11, 15, 16, 17, 20, and 21.

The prefix VTD_ is used for the standard PowerLab task fields described above.

VTD_FILE, VTD_MTIME, VTD_VERSION, VTD_TASK, VTD_DATE, VTD_STIME, and VTD_ETIME are the standard PowerLab task fields described above.

VTD_WAIT is the time interval in seconds between the end of the VOLT and the beginning of the VOLTd.

VT_LD is the number of correct answers in trials 2-21.

VTLDRTCR is the median reaction time for correct answers on trials 2-21.

VTLDRTER is the median reaction time for incorrect answers on trials 2-21.

VT_LDTP is the number of times that the answer is correct and equal to 1 on trials 2-21.

VT_LDTN is the number of times that the answer is correct and equal to 2 on trials 2-21.

VT_LDFP is the number of times that the answer is incorrect and equal to 1 on trials 2-21.

VT_LDFN is the number of times that the answer is incorrect and equal to 2 on trials 2-21.

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