

Supplementary Material

DATA-CLEANING

IQR are used for data cleaning due to each individual having a small sample of trials ($n = 9$), as with these low numbers, standard deviations may not be reliable.[1]

Stroop

Times

Individual times under 250 msec were removed as they were determined to be a guess or double click.[2] In order to detect outliers within a user's questions due to concentration lapses or exiting the app, Tukey's fences ($k=4.5$) were used for the upper-bound of users individual times (247 individual times were removed due to this criteria).[1]

As a sensitivity analysis to check the validity of this data-cleaning step a simple regression was done to assess whether having a value removed by this step changed overall scores in a specific direction as this would indicate we were biasing our scores. This regression was non-significant ($p = 0.746$)

Difficulty with Test

From the total pool of users 39/2235 users either skipped or indicated they were having trouble with the test and hence were removed from the analysis.

Users with none of the incongruent questions correct or less than 50% of the congruent questions correct were determined to misunderstand the test (73 & 3 users met these criteria respectively). In total 153 users were removed, leaving 2120 users to proceed to the analysis.

Symbols

Times

Individual response times for each set of 3 symbols were analysed. Users with an outlier time on any question (Tukey's fences ($k=4.5$), $n = 50$) had that time censored.[1] Users who required more than one time censored were removed from the analysis ($n = 8$).

Difficulty with Test

From the total pool of users 59/2235 users either skipped or indicated they were having trouble with the test and hence were removed from the analysis.

Users who get less than 2 digits correct were determined to either misunderstand the task or be guessing ($n = 24$). Due to technical errors some sets of 3 questions were submitted as blank. In users where this occurred this answer was censored (171 censored).

In total 99 users were removed, leaving 2136 to proceed to the analysis.

LIST OF QUESTIONS AND CHOICES

Age {to nearest year}

How have you been feeling recently - {Great, Fine, Anxious, Worried, Tired, Forgetful, Depressed, Other}

Have you been finding any of these more difficult than usual? - {doing paperwork, driving or cycling, planning ahead, mental maths, remembering appointments, recalling conversations, none apply to me, other}

Had Concussion - {Yes, No}

No. Of Concussions - { 1 ,2-4, >4, Don't Know}

Smoke cigarettes or vape - {Never, I currently do, I have in the past}

Alcohol - {Never, Currently, Past}

Alcohol Amount - (For Current Users) - {<3, 4-7, 7-14, >14 drinks/week}

CAGE questionnaire {Cut down, Annoyed, Guilty, Eye opener}

Any neurological or mental health conditions {No, Yes, Don't know}

- If yes, tap one or multiple of {Mental health, Dementia, Epilepsy, Migraines, MS, Parkinsons, Stroke, Other}
- If yes to mental health, tap which {Anxiety, Aspergers, Bipolar disorder, Depression, PTSD, OCD, Schizophrenia, Other} - select 4 max

The feelings questions were based on common feelings and used mainly to guide the application.

The functional impairment question was created by extracting from several known questions. [3]

References

1. Tukey JW. Exploratory data analysis.. Reading, Mass. : Addison-Wesley Pub. Co., 1977
2. Pilli, R., Naidu, M.U.R., Pingali, U.R et al., 2013. A computerized stroop test for the evaluation of psychotropic drugs in healthy participants. *Indian journal of psychological medicine*, 35(2), p.180.
3. Nichol AD, Higgins AM, Gabbe BJ, Murray LJ, Cooper DJ, Cameron PA. Measuring functional and quality of life outcomes following major head injury: common scales and checklists. *Injury*. 2011 Mar;42(3):281-7. doi: 10.1016/j.injury.2010.11.047. Epub 2010 Dec 8. PMID: 21145059.