The Effect of Language Status on Immediate Post-concussion Assessment and Cognitive Testing (ImPACT) Performance
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Introduction

- Computerized neurocognitive tests are used to manage return-to-play decisions after sports-related concussions.
- Previous research has shown that English speakers performed better on ImPACT compared to English-Spanish bilinguals (Ott et al., 2014) and native-Spanish speakers (Jones et al., 2013).
- Other factors, such as educational attainment and socioeconomic status may account for language differences.
- Other research has demonstrated that bilingual children show an advantage on tasks that involve the control of attention (Martin-Rhee & Bialystok, 2008).
- This research project aimed to investigate the effect of the test-taker’s language status on ImPACT.
- It was hypothesized that monolingual subjects would perform better than multilingual subjects on Verbal Memory.
- In contrast, it was predicted that multilingual subjects would outperform monolingual subjects on Impulse Control.

Method

- Sixty subjects were recruited from Purdue University. The final sample was comprised of 58 subjects (34 female, 24 male), with a mean age of 19.41 (1.16).
- The study was conducted in individual lab rooms using the English version of ImPACT, in the following order:
  - Answer demographic questions and indicate their native language and second language (if any)
  - Rate current symptoms and conditions of concussion
  - Complete cognitive testing (see Figure 1 for example)
  - Debriefed by experimenter

Results

- Separate independent-samples t-tests were used to test for differences in the five ImPACT cognitive composite scores between (a) native English speakers (n = 47) and non-native English speakers (n = 11) and (b) between monolinguals (n = 40) and multilingual (n = 18) subjects.

Discussion

- The results revealed significantly (p < .05) better performance on the Motor Speed composite for the monolingual native-English speakers compared to the bilingual speakers.
- This difference was driven primarily by performance on the counting backwards distraction task on the Three Letters subscale, consistent with previous work (Ott et al., 2014).
- There was no evidence of a “bilingual advantage” or language effects on other composites.

Limitations and Future Directions

- The subjects are non-concussed college students, whereas the test is for sports players with symptoms of concussion.
- The current subjects have similar levels of education and socioeconomic status, compared to those from previous work.
- Having more bilingual and non-native English speakers in the sample would provide more confidence in the results.
- Individuals’ self-report of language status may not be accurate to determine the fluency for bilinguals and non-native speakers.

Conclusion

- Consistent with previous research, monolingual native-English speakers outperformed bilingual speakers on Motor Speed.
- Clinical use and interpretation of ImPACT should consider the test-taker’s language status in post-concussion management.