

Protocol for Retrospective Analysis of Baseline Concussion Testing Records

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Background

- There are numerous assessments available, and needed, to determine sports-related concussion diagnoses (SRC).¹
- Because of the nature of the cognitive assessments, mental fatigue can be detrimental to results.^{2,3}
- Mental fatigue is defined as the feeling individuals develop during or after prolonged cognitive activity.³
- It is vital that athletes perform their best on baseline assessments to understand the athlete's "normal", so they receive appropriate treatment following SRC.
- By optimizing order of baseline assessments to reduce mental fatigue, there can be greater certainty when athletes return to sport following an SRC, that they are safe.²

Project Purpose

- To identify tests that increase cognitive fatigue during baseline assessments.
- To analyze order of administration during baseline concussion assessments to recognize patterns of fatigue and decreased performance.

Acknowledgments

- Thank you to the Iowa Phoenix for allowing data usage for research purposes.
- Thank you to DPT students and Rec Plex PT & ATC staff involved in baseline assessments and gathering/preparing data for this project.

Methods

- IRB approval was granted and records from athletic training services have been reviewed for data utilization consent for research purposes by an ATC.
- Participants include adult, female athletes involved in contact sports (tackle football).
- Records have been de-identified using numeric identifiers for each participant.
- Key data points include performance results and testing sequence for baseline testing:
 - Modified COBALT
 - VOMS
 - BlazePod tests
 - DropStick tests
 - Grip strength
- Ongoing data extraction and analysis includes self-reported information related to:
 - Demographics
 - Medications
 - Past medical/surgical history
 - Medical diagnoses related to concussion recovery
 - King Devick
 - Post Concussion Symptom Scale (PCSS)
 - SCAT-5

List	Alternate 10 word lists					Score (of 10)		
						Trial 1	Trial 2	Trial 3
G	Finger	Penny	Blanket	Lemon	Insect			
	Candle	Paper	Sugar	Sandwich	Wagon			
H	Baby	Monkey	Perfume	Sunset	Iron			
	Elbow	Apple	Carpet	Saddle	Bubble			
I	Jacket	Arrow	Pepper	Cotton	Movie			
	Dollar	Honey	Mirror	Saddle	Anchor			
Immediate Memory Score						of 30		
Time that last trial was completed								

Figure 1: Excerpted from the SCAT-5, pg. 4
https://assets.ctfassets.net/76117gh5x5an/YrqtLFIKpJLzsoVklx3/1a984cfe6cf9e3c2316f2377b067136/SCAT-5_BMX_ENG_Sept_2022.pdf

Proposed Analysis

- Tests will be grouped into two categories:
 - Cognitive
 - SCAT-5
 - King Devick
 - PCSS
 - Physical
 - Modified COBALT
 - VOMS
 - BlazePods
 - DropStick
 - Grip Strength
- Results for each test will be grouped into three categories (early, middle, and late) based on when athletes performed each type of test.
- Performance results will be analyzed by comparing early and late groups to determine if timing impacted physical or cognitive results.

Participant Demographics

Age (yrs)	Weight (lbs)	Height (in)
31.1±6.8	195.6±53	66±1.9

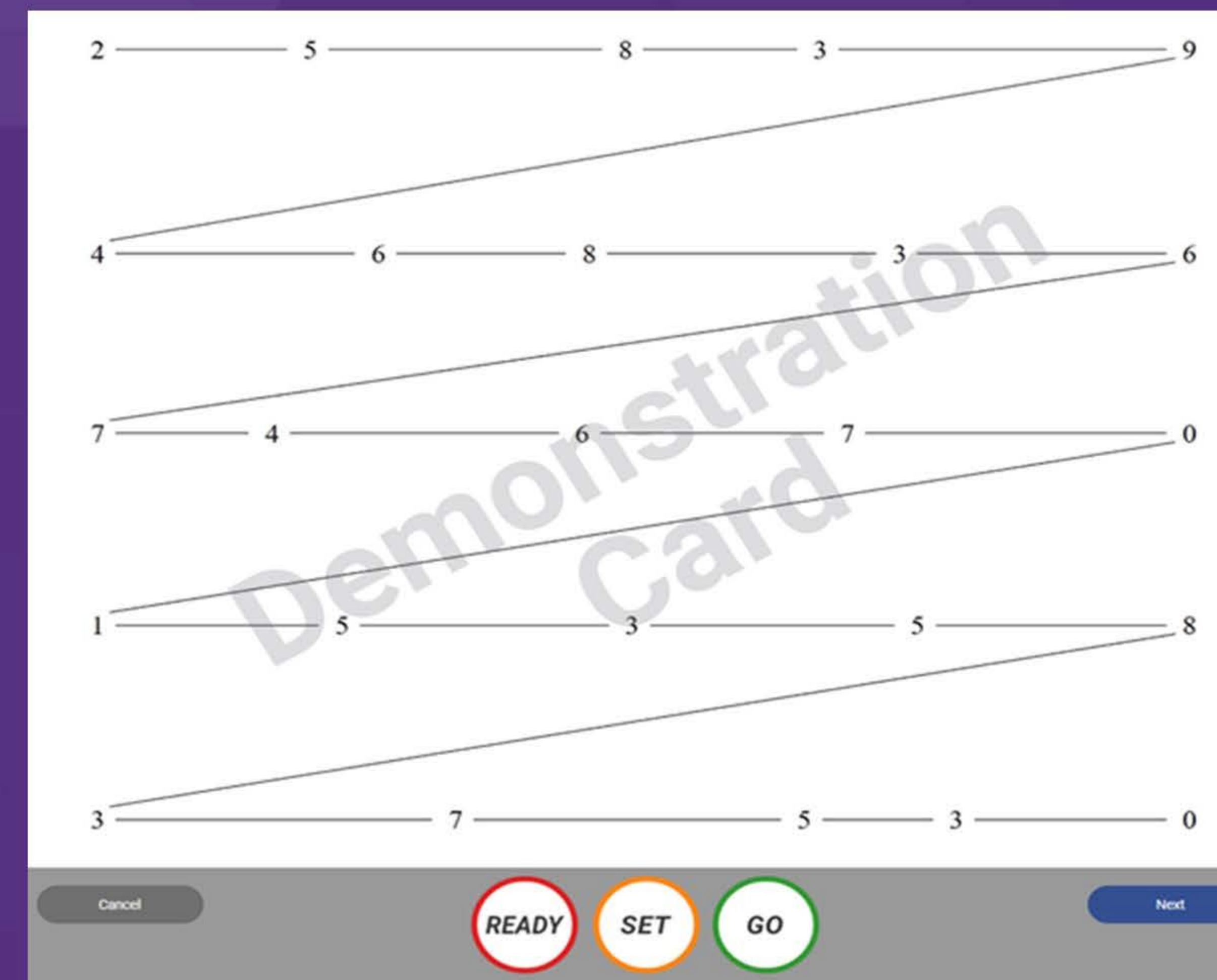


Figure 2: Example excerpted from the King Devick online assessment, sample of 1 card of 3.

Limitations/Conclusion

- The current limiting factor is sample size.
 - The Iowa Phoenix is a small team consisting of only 15 athletes.
 - Not all athletes allowed use of their performance data.
 - The roster is always changing.
- The final objective of the protocol is to develop an optimal order of assessment to be performed at baseline to provide the best possible results without impact from cognitive fatigue.



Figure 3: Performance of the first balance condition of the mBESS within the SCAT-5.

References

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