EYES ON THE PRIZE: LINKING OCULOMOTOR BEHAVIOR TO MATCH PERFORMANCE IN COLLEGIATE WOMEN'S SOCCER ATHLETES

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BACKGROUND

- Enhanced visual function facilitates athletic performance[1,2]

Higher-Level Athletes
- Fixations primarily toward task-relevant areas
- Perform fewer fixations of longer duration
- Use visual pivots or gaze anchors
- Prolonged Quiet Eye (QE)
- Enhanced visual information processing (anticipation, decision-making, reaction time)

Less-Skilled Athletes
- More fixations toward task-redundant areas
- Perform more fixations of shorter duration
- Erratic scanning behavior
- Later QE onset
- Slower & less accurate visual information processing

Previous research has shown enhanced oculomotor, perceptual, and visual-motor function correlates with greater performance statistics[3,4]

Figure 1 – Example scan paths of higher-level (orange) & less-skilled (blue) soccer athletes preparing to take a free kick. (Fractal Media, 2018)

<u>This exploratory analysis investigated relationships between oculomotor, perceptual, and visual-motor functioning with match performance statistics of women's soccer athletes</u>

METHODOLOGY

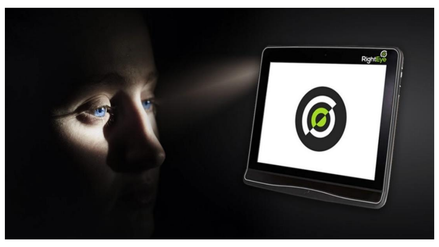

Figure 2 – RightEye Vision System

Participants: 25 NCAA Division 1 Women's Soccer Athletes with no history of traumatic brain injury (TBI)
Task: RightEye Sports Vision EyeQ Assessment
Measures: 22 measures of oculomotor, perceptual, and visual-motor function; 68 different match performance statistics scraped from WyScout over previous 2 seasons
Statistical Analyses: Spearman Rank Correlation Tests (w/ Bonferroni corrections) conducted between RightEye measurements & match performance statistics

RESULTS

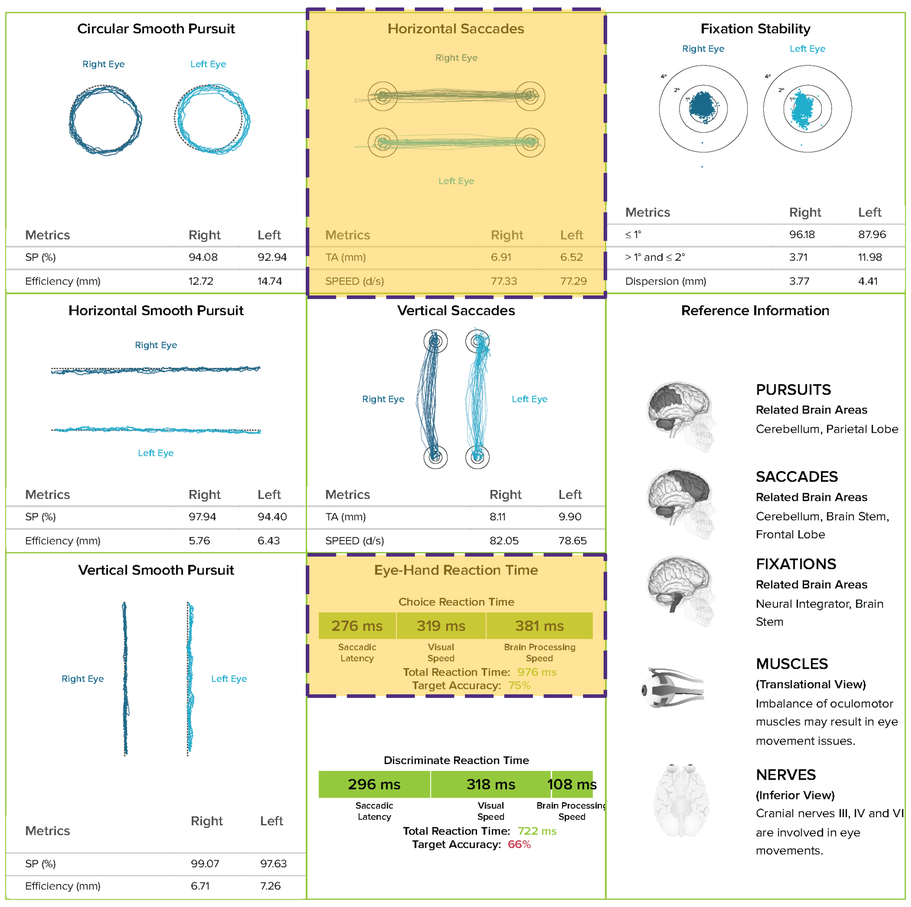

Figure 2 – Sample *RightEye* Report containing variables of interest.

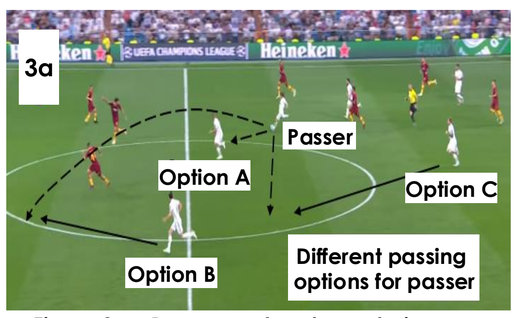

Figure 3a – Passer must make a choice on where to pass the ball next. Adapted from Cauchi, 2019

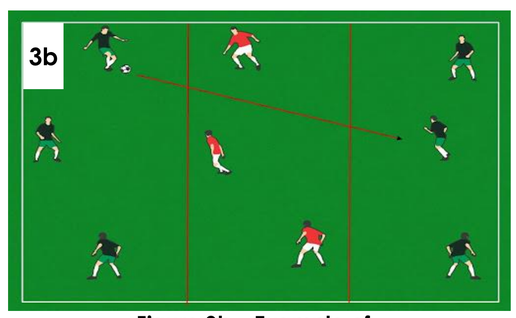

Figure 3b – Example of progressive passing (Roth, n.d.)

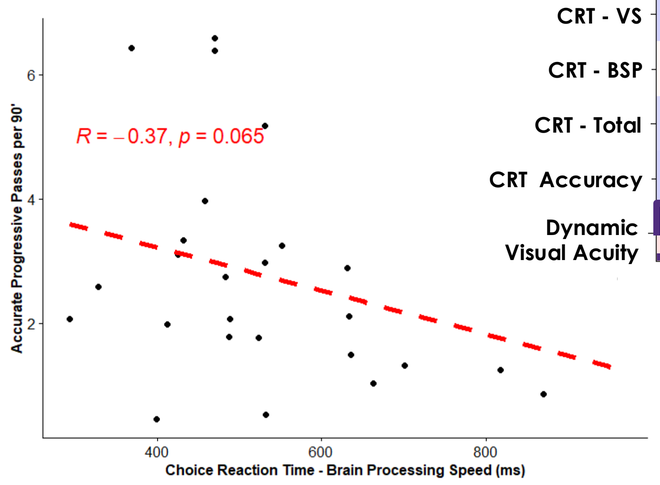

Figure 5 – Relationship between brain processing speed component of choice reaction time and number of accurate progressive passes completed per 90 minutes

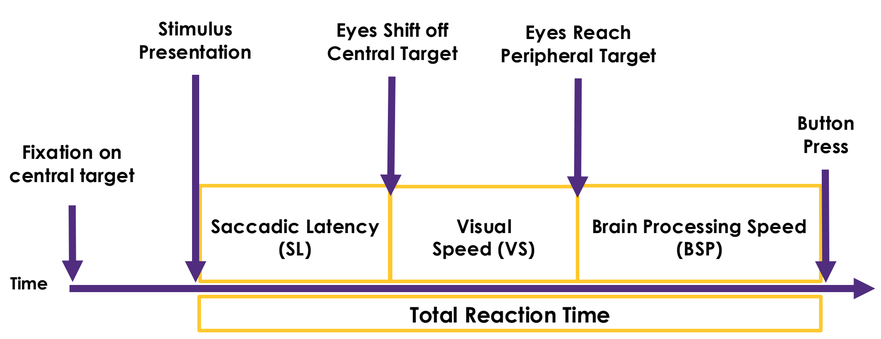

Figure 3 – Illustration depicting fractionated reaction time. Adapted from Lange, Hunfalvay, & Murray, 2018

Correlation Matrix of Visual Function to Match Statistics

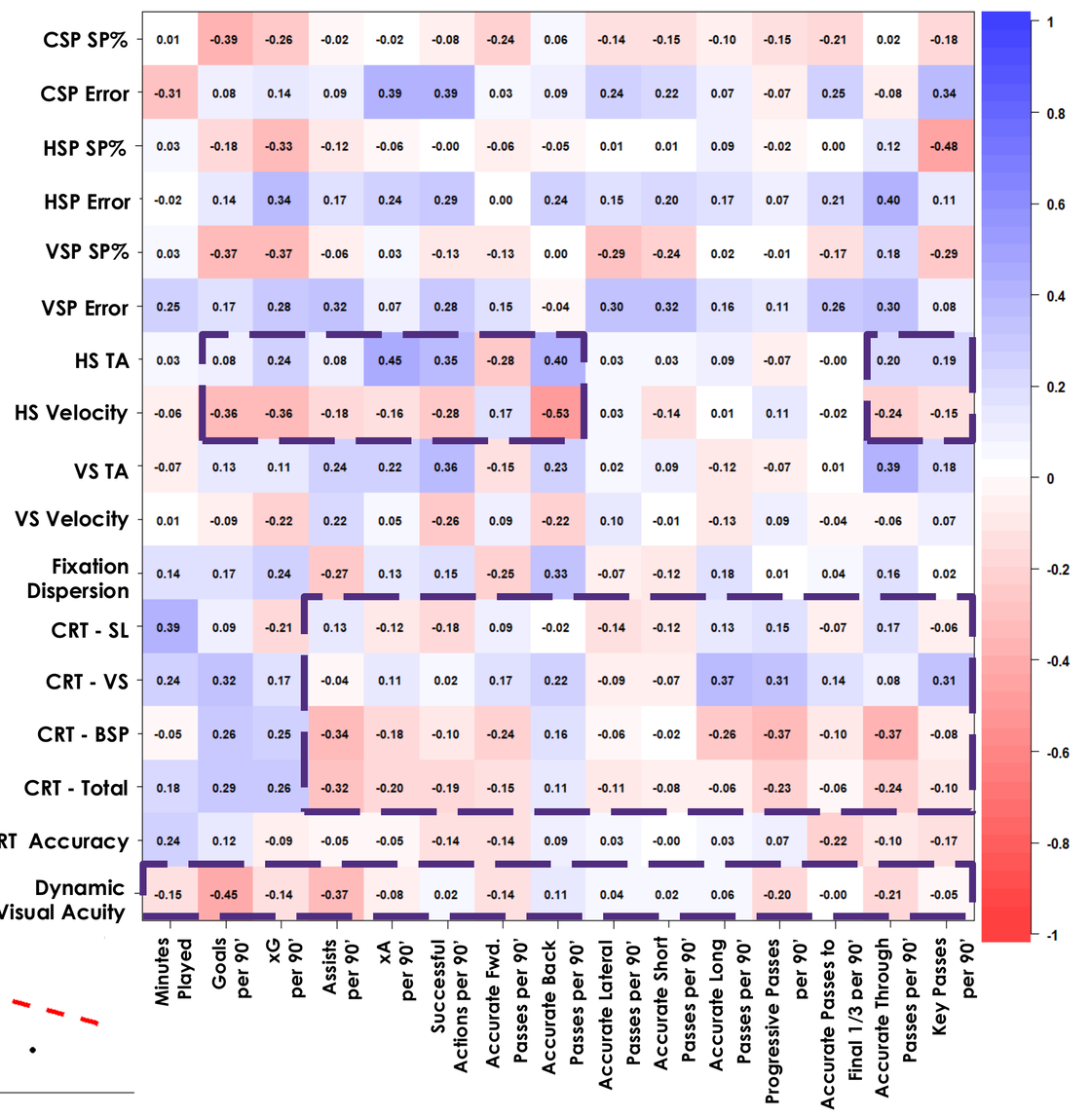

Figure 6 – Spearman Correlation Coefficients depicting effect of relationships between visual function variables and match performance statistics

DISCUSSION

- Saccadic Latency & Brain Processing Speed components of RT inversely related with passing success, but not Visual Speed
- Neither Smooth Pursuit nor Fixations show clear relationships to passing performance
- Saccadic Speed-Accuracy Trade-off [4]
- Dynamic Visual Acuity, a metric to further investigate

APPLICATIONS

By uncovering relationships between basic visual function and women's soccer performance, we can:
- compare these results to sport-specific measures of visual function
- identify conditions/scenarios under which visual advantages exist for athletes
- investigate the effects of TBI on the visual functioning of soccer athletes

CONCLUSION

Our results suggest that enhanced saccadic ability, along with efficient visual-motor processing, correlates to improved passing ability in soccer

Soccer athletes must rapidly shift their attention in an optimal & efficient manner to facilitate perception of relevant information

References

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Abstract