

TITLE: Visual reaction time cannot detect expertise in soccer goalkeepers versus controls

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INTRODUCTION:

Visual reaction time (VRT) has been shown to be an expertise factor in some sports, compared to controls without prior sports training. [1] At the same time, it seems to play a relevant role in injury prevention, and return-to-play contexts.[2] While VRT evaluation is commonly assessed with computer-based tools, there is a need to develop new methods that better recreate the sport reality. [2] We investigated the reliability of a VRT test in athletes with high reaction time demands (soccer goalkeepers, GK) and a physically active population; and compared the differences between them.

METHODS:

A group of 21 male semi-professional GKs and 19 male students (STUD) practicing sports without a strong VRT component, participated in the study. A subset of 17 GKs and another group of 18 STUD, participated in two different sessions, within a two-week period, for the reliability analysis.

Field VRT Test: Two pairs of two FitLight sensors were placed 160cm apart at 90 & 170 cm height. Participants had to stand in the middle and “deactivate” a series of 12 visual stimuli (3 per sensor) as fast as possible by passing the side-matching hand <30cm in front of the sensor. An additional sensor was placed in front of the participant to pace the two-second pauses between stimuli. The mean of all responses was used for analysis.

Computer-based tests: Simple Response Time Task (SRT); Four Choice Visuospatial Response Task (4Cho); and Go/No-Go Response Inhibition Test (GoNoGo). Mean response time and number of errors were used for analysis.

We used Two-Way Mixed ICC for test-retest reliability; Wilcoxon and T-test for group comparisons (for $p < .05$ and $> .05$ Shapiro Tested normality, respectively). Significance was set at $p < .05$

RESULTS:

The reliability of the proposed VRT test was “moderate” (ICC=.74). GKs were not significantly faster than STUD (657±96 ms vs 680±69 ms, $p=.400$). GKs were also non-significantly faster on SRT (317±37 ms vs 329±42 ms, $p=.531$), 4Cho (455±98 ms vs 460±122 ms, $p=.925$), GoNoGo (438±42 ms vs 440±3 ms, $p=.896$); and had fewer errors on GoNoGo (9.6±7 vs 11.6±6, $p=.273$).

CONCLUSION:

Non-significant group differences suggest that VRT is not an expertise factor for GKs. Practitioners interested in performance assessment or talent identification are advised to prioritize the evaluation of other parameters. A multifactor use of VRT for these purposes remains to be explored.

In this population, the field test appears to be a reliable measure of VRT. Further studies in injury prevention and return to sport could explore the use of this test to incorporate VRT into common field practices (preseason testing, rehabilitation protocols, etc.).

1 Meng F-W, Yao Z-F, Chang EC, et al. Team sport expertise shows superior stimulus-driven visual attention and motor inhibition. PLOS ONE. 2019;14:e0217056

2 Gokeler A, Benjaminse A, Della Villa F, et al. Anterior cruciate ligament injury mechanisms through a neurocognition lens: implications for injury screening. BMJ Open Sport Exerc Med. 2021;7:e001091

CONFLICT OF INTEREST:

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