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PLEASE SCROLL DOWN FOR TEXT.
The Impact of Chronological Age on the Quiet Eye in Youth Development Phase Goalkeepers in a Professional Youth Academy

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1st Movement & Skill Acquisition Ireland (MSAI) Conference, CIT

Introduction and Broader Context

The Quiet Eye (QE) has become increasingly popular (Vickers, 2016), it details the final fixation towards a specific location or object within 3° of visual angle or less for a minimum of 100m/s (Vickers, 2016). It is reasonable to suggest that QE describes the variable in which to examine the relationship between perception and action (Vickers, 1996; Fandrich and Vickers, 2006)

There is a requirement to view the QE beyond an isolated and interventionist approach, for which the QE could suggest that QE describes the variable in which to examine the relationship between perception and action (Reinhoft et al., 2015; Davis & Araujo, 2016). Approaching the design of research practices for the study of perception must be categorized under a key experimental research principle. Originally introduced by Egino Brunswik (1956), representative design advocates for the dynamics of any experimental task must host some reciprocity with that of the natural task constraints present.

Methodology and Data Analysis

Footage of U13, U15, U18, Senior Goalkeepers, Senior Goalkeepers

Footage from the SMG ETG was analyzed via Gaze analysis software and a scan path was extracted as a visual tracker. This was path was then reanalyzed with a computerized video analysis system (BeGaze, 2020) and analyzed using a dominant gazebreaker, as well as reviewing the raw video data from Belarda analysis.

<table>
<thead>
<tr>
<th>Participant group</th>
<th>Mean QE Duration (s)</th>
<th>Mean QE %</th>
<th>Number of Trials Analyzed</th>
<th>Standard Deviation</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>U13</td>
<td>321</td>
<td>20%</td>
<td>15</td>
<td>17.89</td>
<td>285.72 - 355.49</td>
</tr>
<tr>
<td>U15</td>
<td>360</td>
<td>27%</td>
<td>15</td>
<td>33.95</td>
<td>293.46 - 426.54</td>
</tr>
<tr>
<td>U18</td>
<td>412</td>
<td>36%</td>
<td>15</td>
<td>30.61</td>
<td>352.00 - 471.99</td>
</tr>
<tr>
<td>Pro</td>
<td>634</td>
<td>60%</td>
<td>15</td>
<td>103.65</td>
<td>430.85 - 837.16</td>
</tr>
</tbody>
</table>

Fig 1: Graph depicting Mean QE duration across Goalkeepers to demonstrate the intra-individual variance

Mean QE per Participant Per Age

Fig 2: Chart showing the onset and offset of the QE during the trial as a mean across participant groups

Considerations Going forward

There is significant reason to assume that there may be ‘perceptual anchors’ that specify action-relevant properties and provide opportunities for action in Goalkeepers. Fig 3 shows that expert Goalkeepers regularly fixate on a ‘visual pivot’ (Savelsburgh et al, 2002; Kim and Lee, 2006; Bitton et al, 2011) that highlights a relative subjective area in the search field where multiple interactions occur (extension of the knee, relative force applied in the kick, direction and line of movement of the leg). Further study that pushes the methodological boundaries into more ecologically valid and representative experimental conditions is needed to truly understand how Goalkeepers may acquire certain perceptual habits.

Dicks and colleagues (2017) have provided an interesting insight into the future of gaze research, advocating for more appreciation of ‘variable between-and-within individuals. Some blueprints are marked here, notably the relatively large ranges seen in the confidence interval may indicate that gaze patterns are not as linear and robust as first assumed. Further study across a number of different experimental trial conditions and across much greater sample ranges is needed.

Mountain Peak Retaining Visual Field (% / Sec)

Fig 4: Mean QE duration heat map showing relative frequency and duration of gaze deviating from visual field.

Pilot Results and Discussion

Mean Quiet Eye data has indicated that Expert Goalkeepers view action specifying objects in the visual field for longer than younger, less experienced Goalkeepers. This result is supported in a number of gaze tracking studies within Goalkeeping (Savelsburgh et al, 2010). Fig 1 illustrates how younger Goalkeepers tend to view a single location for less time, the youngest participant groups spending just 26% of the trial fixating on the action-specifying variable. Likewise, Fig 4 supports this further still, indicating that over the 15 trials explored, younger Goalkeepers, gaze behaviour is highly variable as they try to utilize a number of objects in the perceptual field in order to couple actions with their relative perceptual properties. Another compelling finding is that Senior Goalkeepers tend to hold their gaze much later in to the trial (Fig 2). This could lead to some hypothesis that experts engage in an early searching strategy as they attune to invariants and filter out variants.

There are relatively large confidence interval ranges which most likely relate to using a relatively small sample size. However, it may provide some indications that gaze behaviour is highly variable at the inter-individual level and previous generalizations across groups can negatively impact the behaviours of practitioners and coaches.