

The Impact of Chronological Age on the Quiet Eye in Youth Development Phase Goalkeepers in a Professional Youth Academy

Benjamin Franks, Oxford Brookes University

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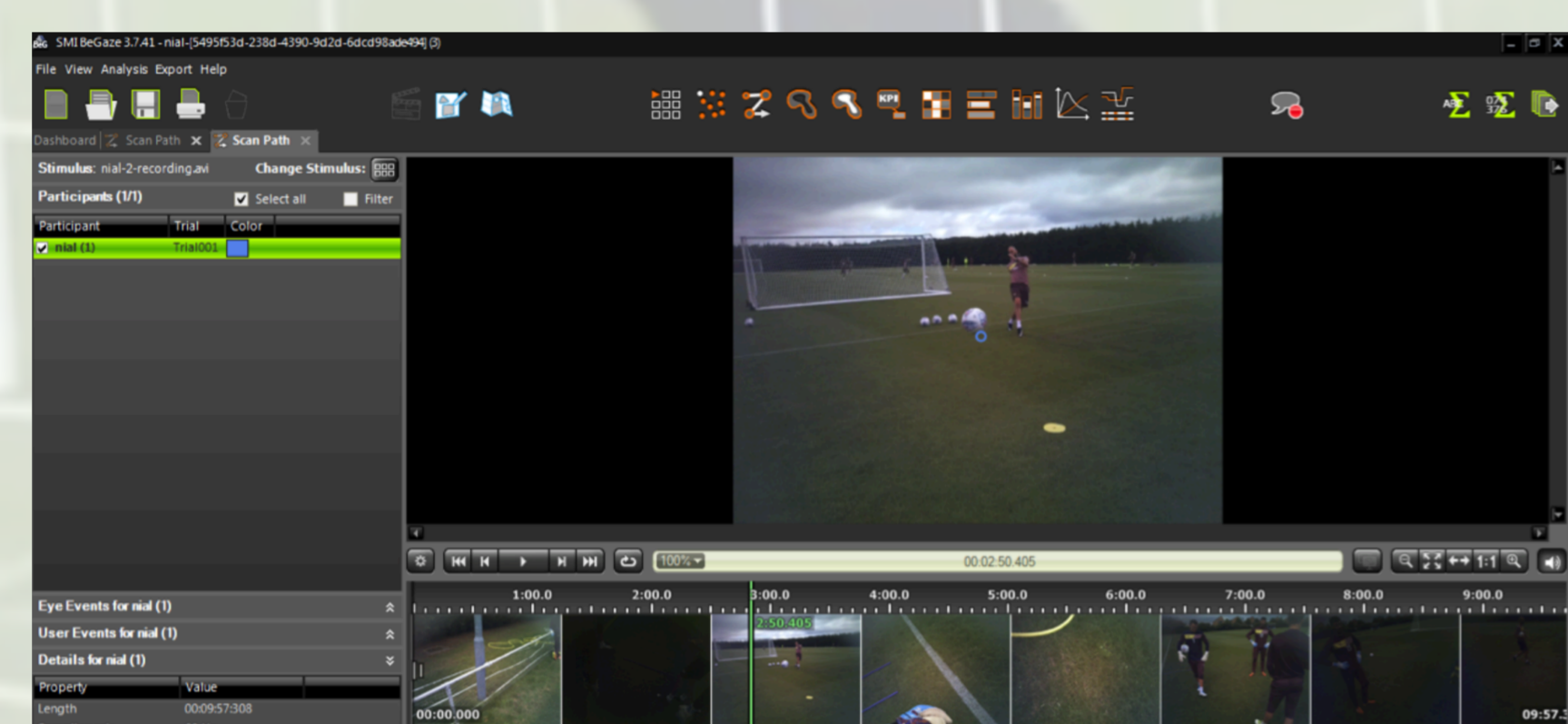
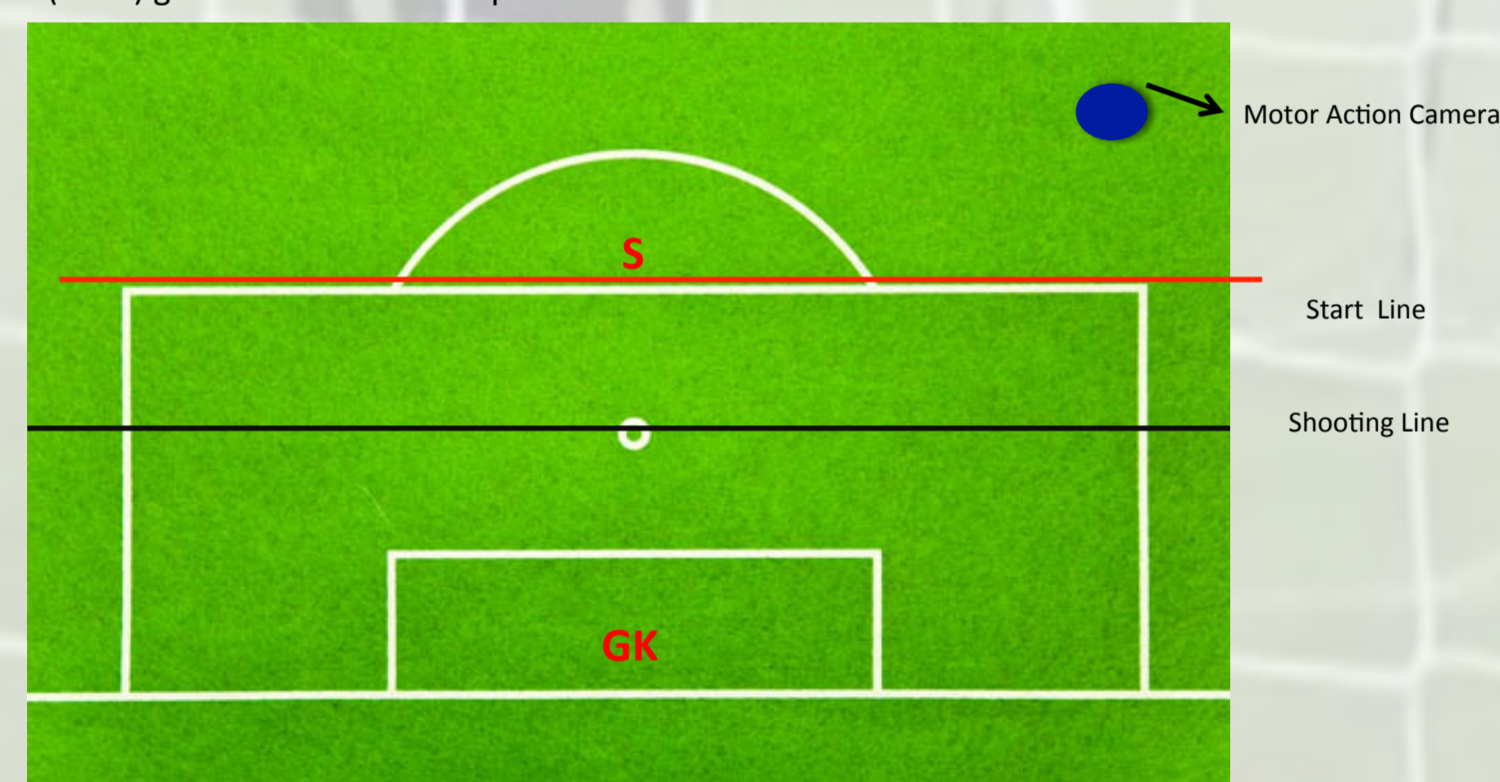
Introduction and Broader Context

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 100ms (Vickers, 2016). It is reasonable to suggest that QE describes the variable in which to examine the relationship between perception and action (Vickers, 1996; Panchuk and Vickers, 2006)

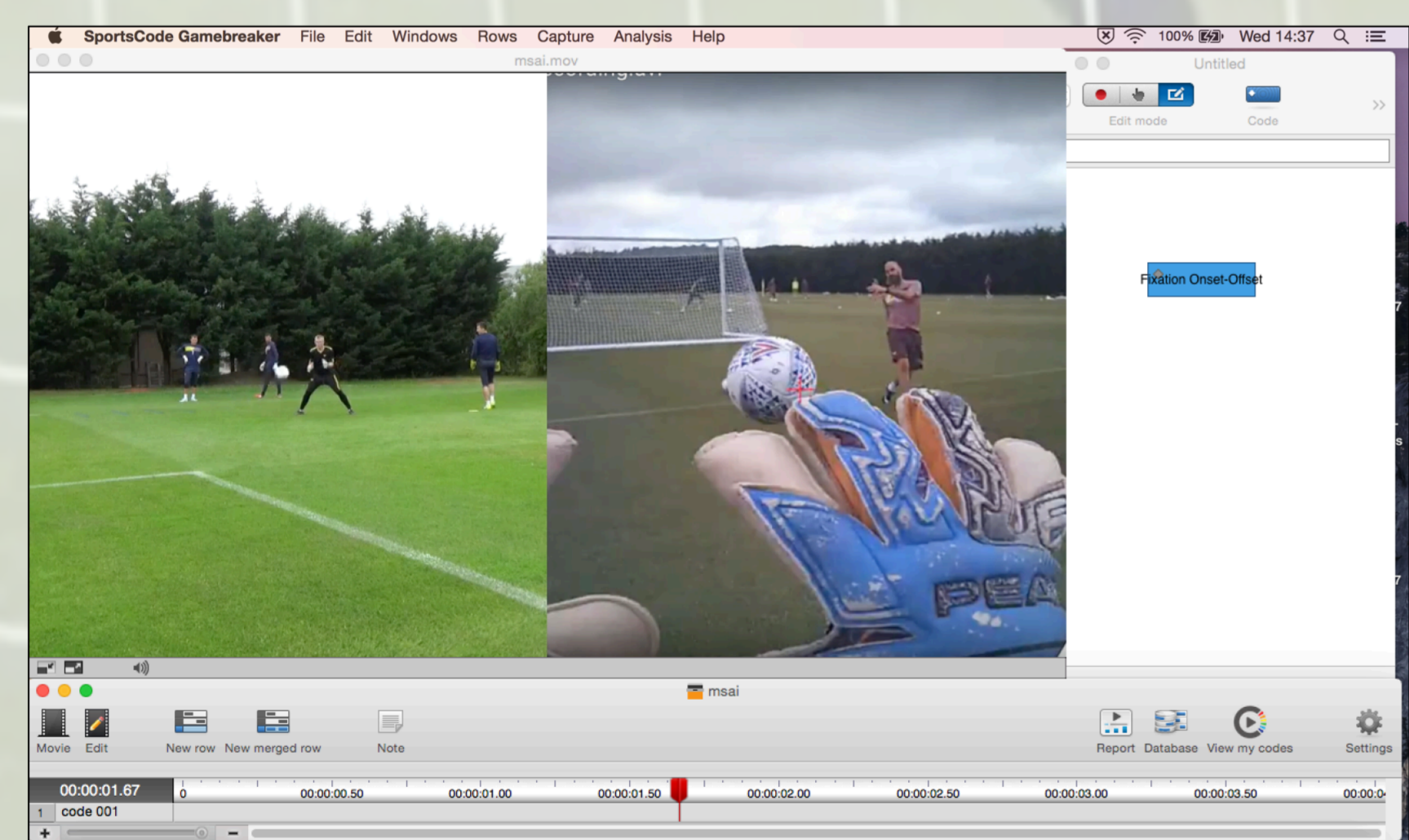
There is a requirement to view the QE beyond an isolated and interventionist approach, for which the QE could become used as a key perceptual tool to measure the transfer of skill from training to competitive performance (Reinhold et al., 2015; Davids & Araujo, 2016). Approaching the design of research practices for the study of perception must be categorised under a key experimental research principle. Originally introduced by Egon 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

Task Designs were scaled in accordance with English Football Association (2018) guidelines for relative pitch dimensions.



The BeGaze analysis software, supplied from Tracksys



Time sequenced motor video and Gaze cursor – Time synchronised in Gamebreaker+

SMI-ETG to collect Gaze footage over 3 participants per participant group. Tasks were designed as a 1 v 1 representative dyad. 10 practice trials (unrecorded) followed by 20 recorded trials. Glasses were checked for calibration faults after every 5 recorded trials.



Footage from the SMI-ETG was analysed via BeGaze analysis software and a scan path was extracted at a 60Hz frame rate. This scan path was time sequenced with a commercial video editing software before a manual frame by frame analysis was done via Gamebreaker+, as well as reviewing the raw code data from BeGaze analysis.

Table 1: Mean Quiet Eye (QE) duration, % of trial, over the number of trials completed. Alongside this, Standard Deviation and Confidence Interval is depicted.

Participant group	Mean QE Duration m/s	Mean QED %	Number of Trials Analysed	Standard Deviation	Confidence Interval
13	321	26%	15	17.89	285.72 - 355.49
15	360	27%	15	33.95	293.46 – 426.54
18	412	36%	15	30.61	352.00 - 471.99
Pro	634	60%	15	103.65	430.85 - 837.16

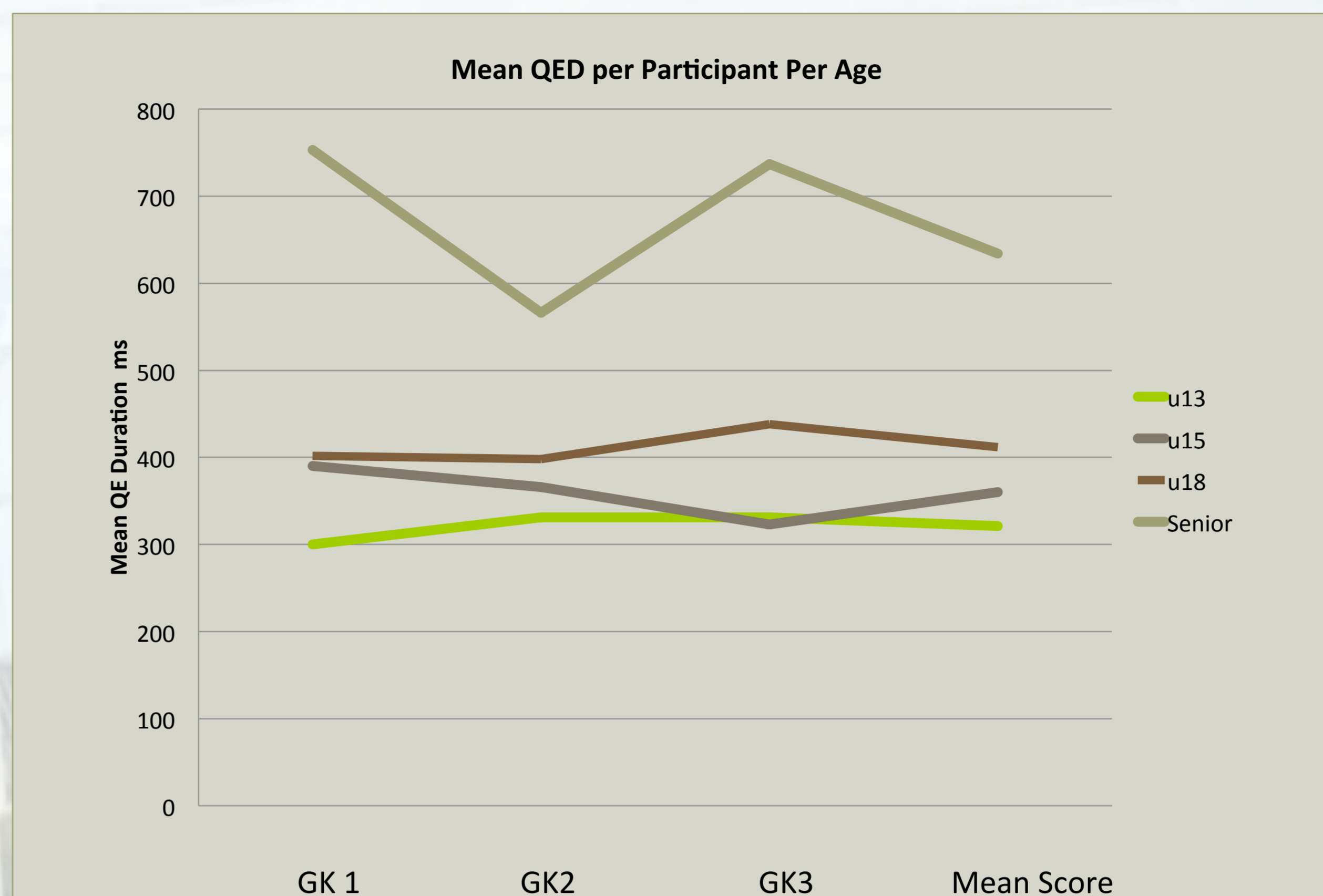
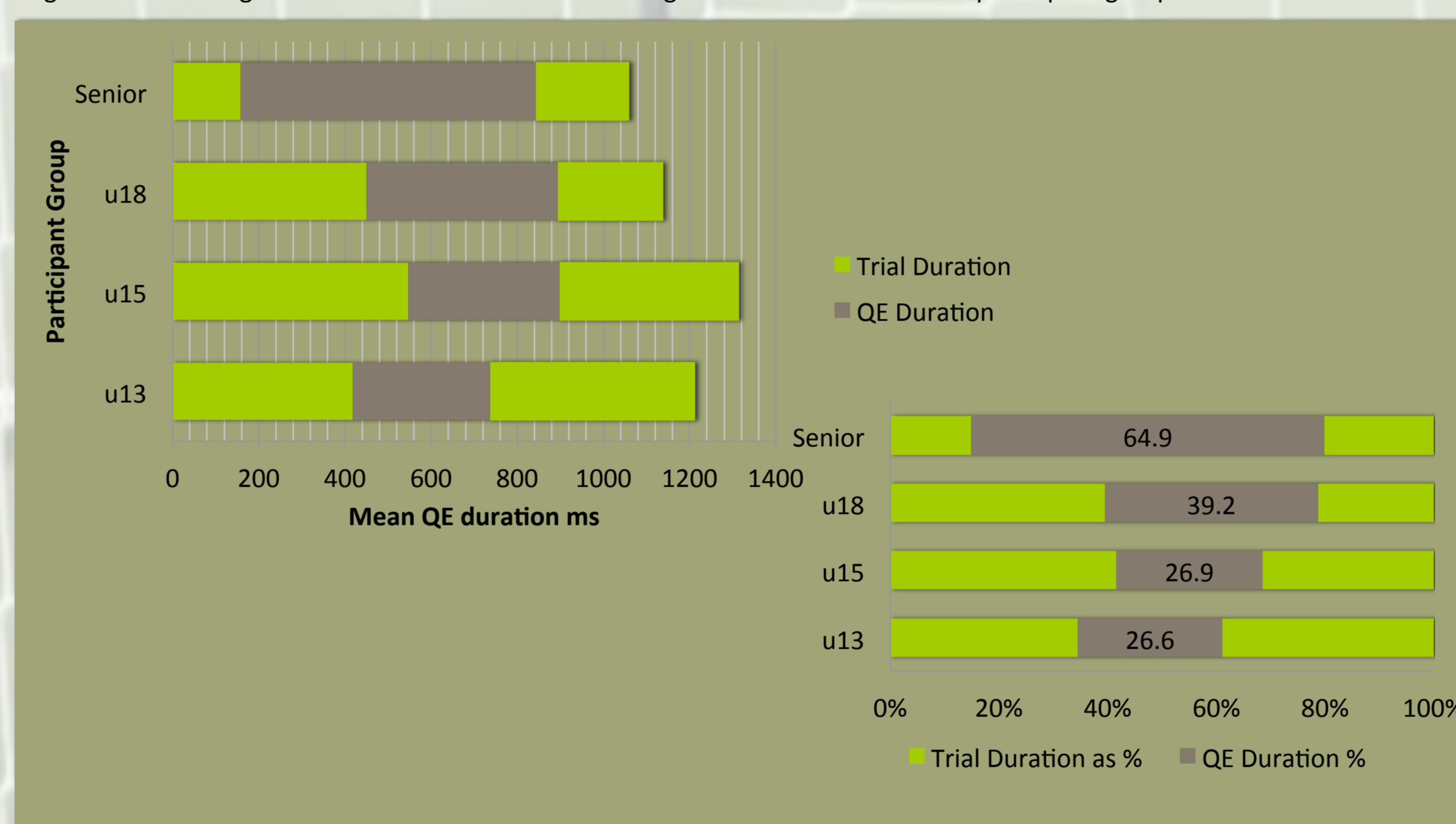


Fig 1: Graph depicting the mean QE duration across Goalkeepers to demonstrate the intra-individual variance

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; Btton 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 variability 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.



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 utilise 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 generalisations across groups can negatively impact the behaviours of practitioners and coaches.

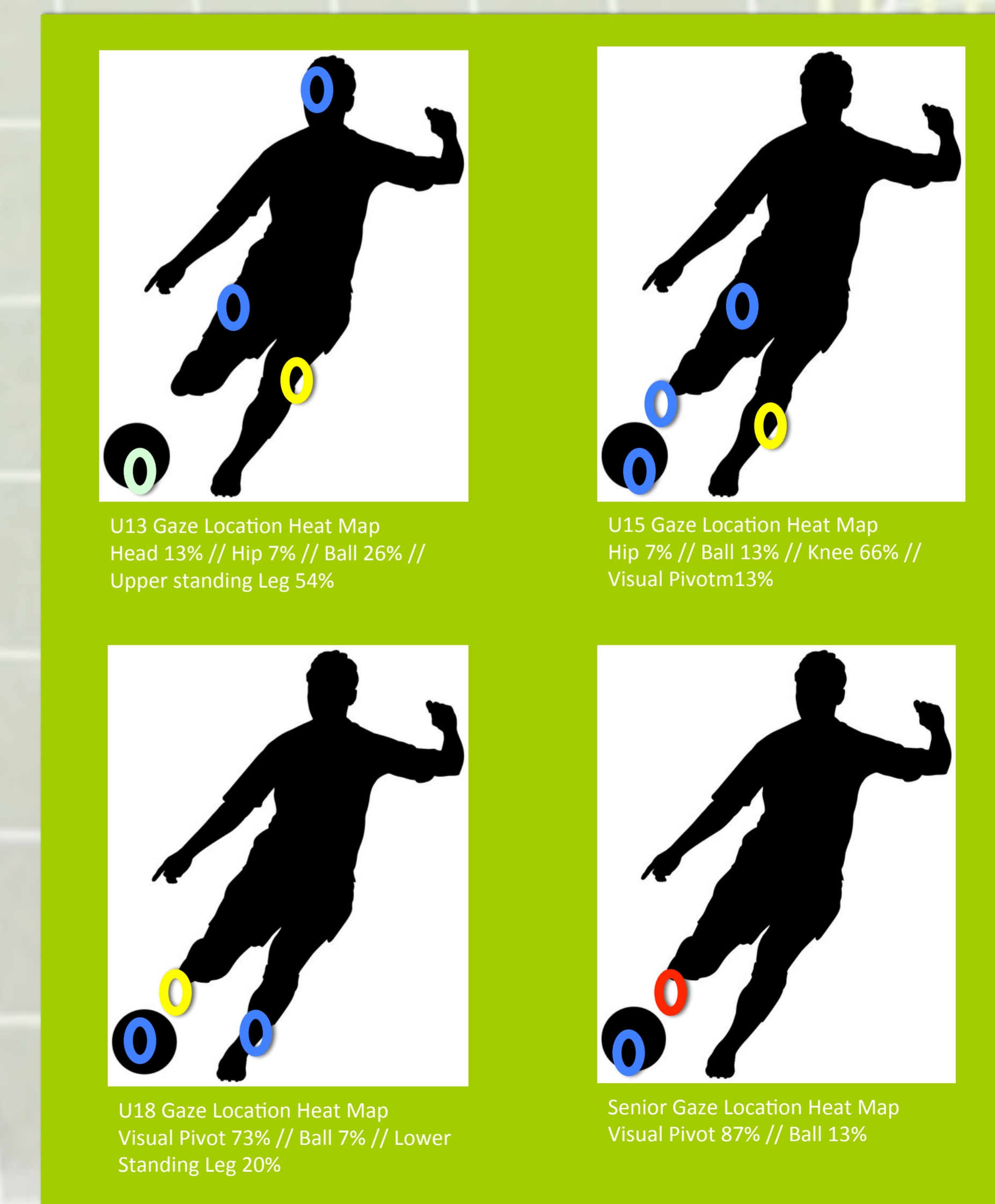


Fig 3: The Quiet Eye location by participant group. 0-25%: Blue / 25%-50%: Green / 50-75%: Yellow / 75-100%: Red

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