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Title:
„Quiet Eye"-functions, an inhibition hypothesis and focus-specific inhibition processes in golf putting

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Abstract:
Introduction:
Although the performance-enhancing effect of the Quit Eye (QE) is well documented (Vickers, 2007), possible mechanisms has been only rudimentarily studied. Therefore, an inhibition hypothesis is proposed (Klostermann, 2012), postulating that in the QE period interfering movement variants are inhibited so that the most appropriate movement variant can be optimally parameterized (both, online and offline). In a golf-putting study, fundamental predictions of this mechanism were tested, by manipulating inhibition demands through different focus of attention (FoA) instructions.
Methods:
12 experts and 12 amateurs performed 3m golf putts under movement-related, effect-related and neutral FoA conditions (16 trials per block in balanced order). Putt strokes and eye movements were recorded with a VICON system (500 Hz) and an integrated mobile eye-tracker (220 Hz). As dependent variables the QE (final fixation before the initiation of the backswing, in ms) and putting performance (radial error RE, in mm) were calculated, as means per block as well as averaged over shortest vs. longest QE durations and earliest vs. latest QE on- and offsets, respectively.
Results and Discussion:
The results confirm the inhibition hypothesis in that (1) inter-individual differences were found for the QE (see Figure 1 left), duration: $t(11) = 2.43$, $p < .05$, $d = 1.03$, offset: $t(11) = 4.0$, $p < .01$, $d = 1.49$, and (2) a smaller RE was found for longer QE durations, $F(1, 22) = 25.2$, $p < .01$, $\eta^2 = .53$. Additionally, the expectation was confirmed that (3) a smaller RE between early compared to late QE offset was particularly found in the movement-related FoA, $t(23) = 4.49$, $p < .01$, $d = 0.83$ (see Figure 1 right). Apparently, (1) experts require a longer QE duration for successfully inhibiting a larger number of available movement variants, (2) performance (in both expertise groups) increases with increased inhibition time and (3) the performance increase is particularly pronounced if, due to a movement-related FoA, a specific movement variation must shielded against interferences.

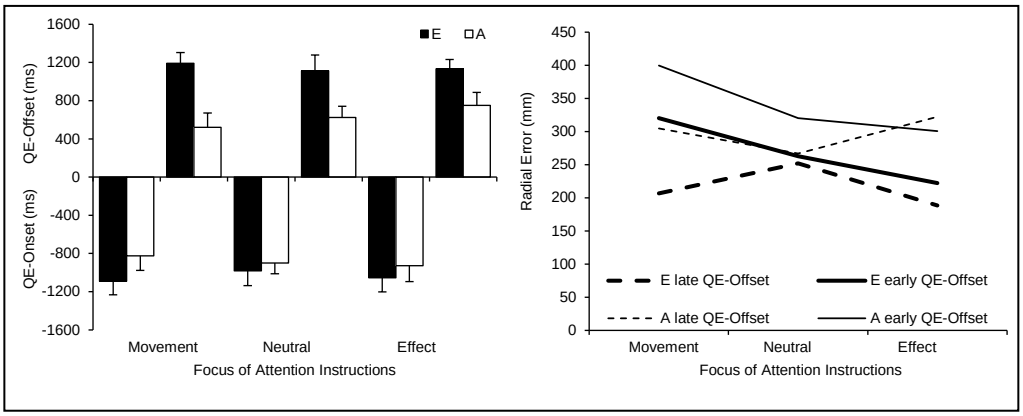

Figure 1. QE data and putting performance as a function of of expertise (E = experts, A = amateurs) and focus of attention instructions; left: QE onsets and offsets (relative to the moment of movement initiation, *M* and *SE*); right: Radial Error (*M*) for trials with early resp. late QE offset.

References:

Klostermann, A. (2012). *Finale Fixationen und sportmotorische Leistung: Mechanismen des „Quiet Eye".* Manuskript zur Publikation eingereicht.

Vickers, J. N. (2007). *Perception, cognition, and decision training. The quiet eye in action*. Champaign, IL: Human Kinetics.