Does target-location repetition bias attention in a competitive first-person shooter?

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Background

Increasingly popular; useful test-case for generalisability of basic attention research (Bediou et al., 2018)

• Targets (enemies) are encountered when “holding” or “peeking”
• Recent target locations show inhibition when “holding”
Based on basic attention findings, expected that:
• Targets likely detected via onset capture vs. visual recognition
• Targets (enemies) are encountered when “holding” or “peeking”

Attention

Inhibition of return (IOR: Lupiánez et al., 2006)
• Slower responses to stimuli appearing at recently attended locations
• Often when targets appear alone (cue-target or target-target tasks)
• Can depend on stable visible background (e.g. Redden, Klages, & Klein, 2017)

Evidence for location-repetition effects using video-game stimuli
Evidence for different attentional dynamics for holding vs. peeking

Exp 1: Attention is inhibited at repeated locations (IOR) when targets onset into view

Online reaction time experiment (Psytoolkit; Stoet, 2017)
Views of scenes with/without enemies captured from Counter-Strike: Global Offensive (CS:GO; Valve Software 2012)
• HOLD blocks: static view of scene, target onsets into view after variable response-stimulus interval
• PEEK blocks: dynamic view of scene; occluded view replaced by scene view after variable response-stimulus interval

Simple response time measured to targets in varying locations (left, centre, right)
Comparison RTs based on previous target location (different vs. same location)

When targets are revealed by viewpoint change, repeated locations showed facilitation
Similar to visual search (e.g., Talcott & Gaspelin, 2020)

Exp 2: Conflicting results when measuring in-game reactions

No IOR evident in REACT or AIM response times (left)
Location repetition benefit in aiming (right)

Exp 3: Inhibition (IOR) returns when using scenes in-game

IOR evident in REACT RTs, early AIM measures (left)
No location repetition benefit in aiming (right)

Same paradigm as exp. 2 (REACT/AIM tasks; N = 21)
Locations changed to match study 1

Conclusions

Evidence for location-repetition effects using video-game stimuli
• IOR may impact target detection in complex visual environments found in FPS games
• Evidence for different attentional dynamics for holding vs. peeking

Inconsistent repetition effects in aiming performance measured in-game
• IOR may not lead to consistent changes in FPS aiming
• Inconsistent findings may reflect variability target locations, motor demands, speed/accuracy trade-offs

References and acknowledgements
Thank you to Alejandro Anguera de la Rosa and Rick Lamesch for assistance with data collection for experiment 2

Competitive first-person shooter games

Online reaction time experiment (Psytoolkit; Stoet, 2017)
Views of scenes with/without enemies captured from Counter-Strike: Global Offensive (CS:GO; Valve Software 2012)

Recent target locations show inhibition when “holding”
• No inhibition when “peeking”

• Target onset
• Detection RT
• Localisation RT
• Localisation p(hit) RT
• Localisation Elim. time

Three target locations:
• Left, Centre, Right
24 random targets/block
32 blocks/ppt
(16 REACT, 16 AIM, randomised)

Measures:
Detection RT (REACT blocks)
Localisation RT (AIM blocks)
First Shot Time (AIM blocks)
Elimination time (AIM blocks)

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