

FRAMES & LENSES

Framing Gameplay Experience in Games with Eye Movement Based Adaptation

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WHAT DO THESE THINGS MEAN?

FRAMING GAMEPLAY EXPERIENCE IN
GAMES WITH EYE MOVEMENT BASED
ADAPTATION

Psychology: "frames as informationally equivalent labels" (Scheufele and Iyengar, 2012, p.2)

Attribute Framing (Positivity vs. Negativity)

If we suggest technological novelty, how does that fare to actually implementing it?

FRAMING **GAMEPLAY EXPERIENCE** IN
GAMES WITH EYE MOVEMENT BASED
ADAPTATION

Presence (a.o. Takatalo, 2006)

Involvement (a.o. Brown and Cairns, 2004)

Flow (a.o. Csikszentmihalyi, 1991)

Immersion (a.o. Ermi and Mäyrä, 2005)

Gameplay Experience Questionnaire (GEQ) by IJsselsteijn et al., 2013

containing aspects of

competence

sensory and imaginative immersion

flow

tension/annoyance

challenge

negative affect

positive affect

If we suggest technological novelty, how does Gameplay Experience change compared to games actually implementing it?

FRAMING GAMEPLAY EXPERIENCE IN
GAMES WITH **EYE MOVEMENT** BASED
ADAPTATION

Fixations – 200-300 ms (Holmqvist et al., 2011)

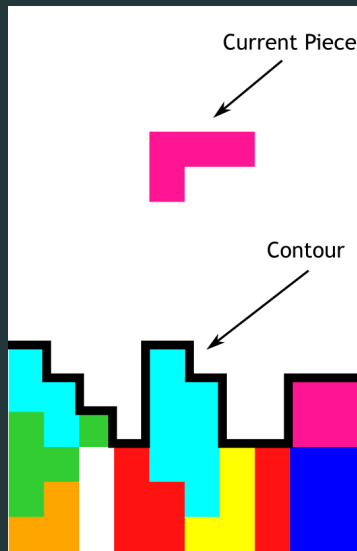
Saccades – 30-80 ms (ibid.)

Fixations – 200-300 ms (Holmqvist et al., 2011)

Saccades – 30-80 ms (ibid.)

Focus Areas

EYE MOVEMENTS



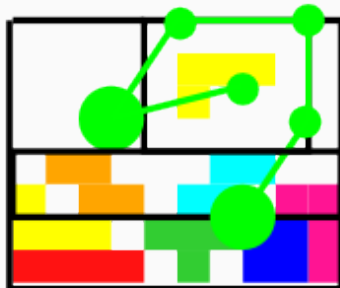
Fixations – 200-300 ms (Holmqvist et al., 2011)

Saccades – 30-80 ms (ibid.)

Focus Areas

Transitions

EYE MOVEMENTS



Fixations – 200-300 ms (Holmqvist et al., 2011)

Saccades – 30-80 ms (ibid.)

Focus Areas

Transitions

Scanpaths

If we suggest technological novelty, how do Gameplay Experience and expert behaviour as measured by eye movements change compared to games actually implementing it?

What has more effect on Gameplay Experience and expert behaviour as measured by eye movements: The implementation of eye movement based adaptation or simply the suggestion of this technology?

WHY IS THAT AN INTERESTING QUESTION?

Wetzel et al., 2014: Dynamically Adapting an AI Game Engine Based on Players' Eye Movements and Strategies

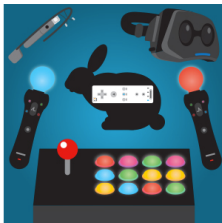
	Same Behaviour	Different Behaviour
K (n = 15)	7 (K1)	8 (K2)
C (n = 15)	3 (C1)	12 (C2)



New Interfaces Inspire Inventive Computer Games

Novel modes of interaction are inspiring independent game companies to come up with completely new types of games.

By Simon Parkin on December 9, 2013



The cliché is that technological innovation in video game development is the domain of the blockbuster studios. These are companies with the requisite manpower and cash reserves to explore new ways for players to interact with digital games, or to ever more closely replicate the detail and texture of reality on screen. The indie developers, meanwhile, innovate in the area of game design, where they are small and agile enough to take creative risks.

There is some truth to this, and the interplay of technological progress and creativity between the two loose groups has produced a healthy ecosystem. Technological innovations made by the blockbuster developers are passed on to indie devs, while new forms of gameplay uncovered by the indies routinely

WHY IT MATTERS

U.S. consumers spent more than \$20 billion on computer games last year.

EyePlay

1st. Workshop on the
Applications for
Gaze in Games @ CHI Play

OCT. 19 2014 \\ CHI PLAY \\ RADISSON ADMIRAL \\ TORONTO, CA

Game Design Jam

Presentation of Paper-prototypes



Eye Frog Frenzy Saga Deluxe
by Eye Candy

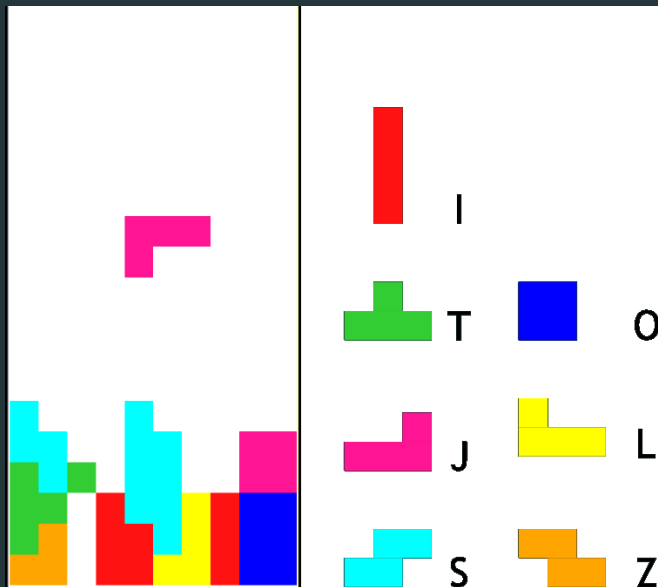


Doramcus
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HOW DID YOU DO THAT?

TETRIS

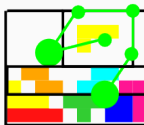


ADAPTING ALGORITHMS

Bumpiness



Transition Value

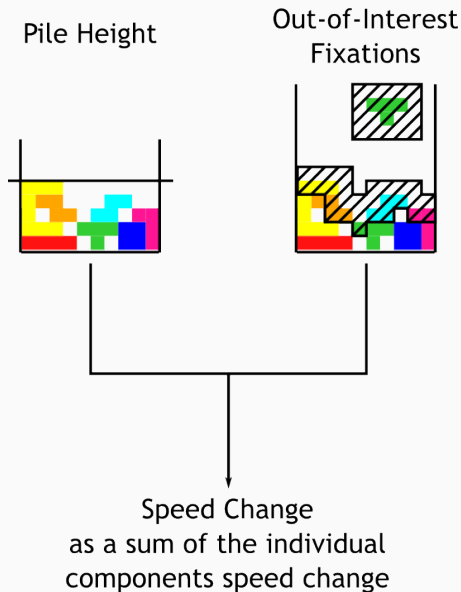


Algorithms

$$\frac{\text{algo}(\text{Bumpiness}) + \text{algo}(\text{TV})}{2}$$

2

ADAPTING SPEED

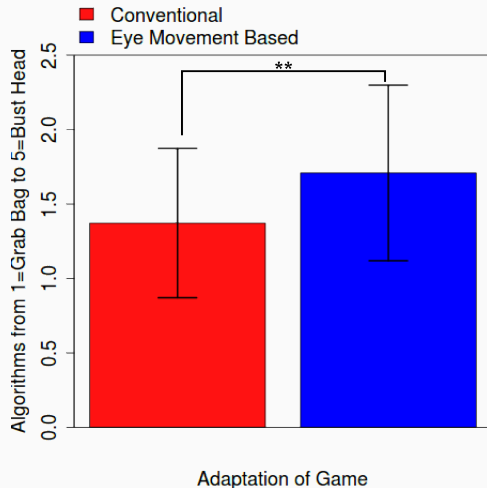


STUDY SETUP

	eye movement based adaptation	conventional adaptation
player framed (n = 22)	FE	FC
player not framed (n = 21)	NE	NC

WHAT DID YOU FIND OUT?

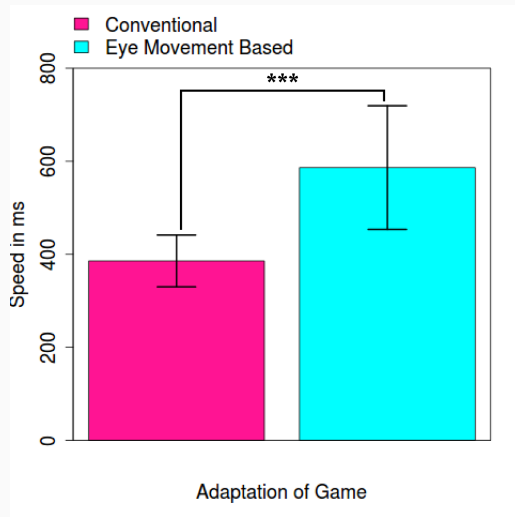
PROOF OF CONCEPT – ALGORITHM ADAPTATION



	eye movement based adaptation	conventional adaptation
player framed (n = 22)	FE	FC
player not framed (n = 21)	NE	NC

$C = 1.37, E = 1.71, p < 0.01, d = 0.622$

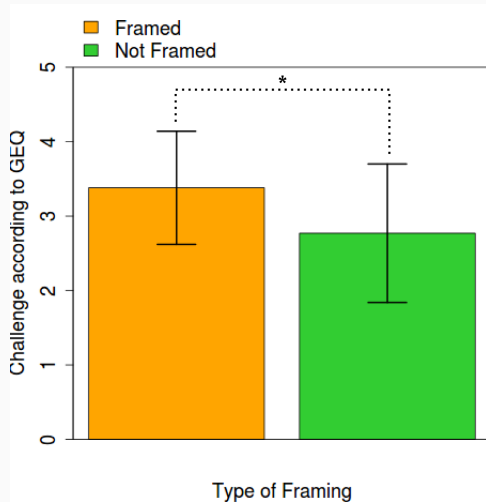
PROOF OF CONCEPT – SPEED ADAPTATION



	eye movement based adaptation	conventional adaptation
player framed (n = 22)	FE	FC
player not framed (n = 21)	NE	NC

$C = 385.7\text{ms}$, $E = 586.5\text{ms}$, $p < 0.001$, $d = 1.971$

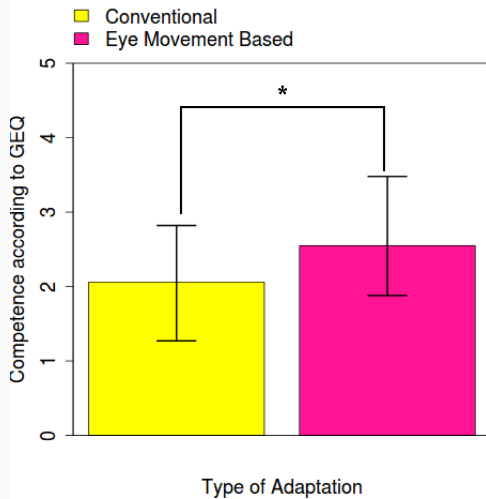
PERCEIVED CHALLENGE



	eye movement based adaptation	conventional adaptation
player framed (n = 22)	FE ↕	FC
player not framed (n = 21)	NE ↕	NC

$F = 3.38, N = 2.77, p < 0.05, d = 0.718$

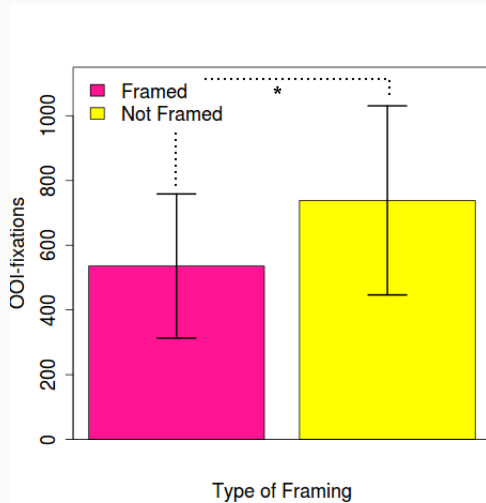
PERCEIVED COMPETENCE



	eye movement based adaptation	conventional adaptation
player framed (n = 22)	FE	FC
player not framed (n = 21)	NE	NC

$C = 2.06, E = 2.55, p < 0.05, d = 0.669$

EXPERT EYE MOVEMENTS



	eye movement based adaptation	conventional adaptation
player framed (n = 22)	FE ↕	FC
player not framed (n = 21)	NE ↕	NC

$F = 535.8, N = 738.5, p < 0.05, d = 0.78$

What has more effect on Gameplay Experience and expert behaviour as measured by eye movements: The implementation of eye movement based adaptation or simply the suggestion of this technology?

What has more effect on Gameplay Experience and expert behaviour as measured by eye movements: The implementation of eye movement based adaptation or simply the suggestion of this technology?

They both have different effects on different aspects!

WHERE CAN WE GO FROM HERE?

Remote Eyetracker

Qualitative Methods

Other Games

Historic Eye Movement Data

Prediction of Eye Movements

Considering Different Patterns of Eye Movements

Investigation into framing effects of the suggestion of technological advance

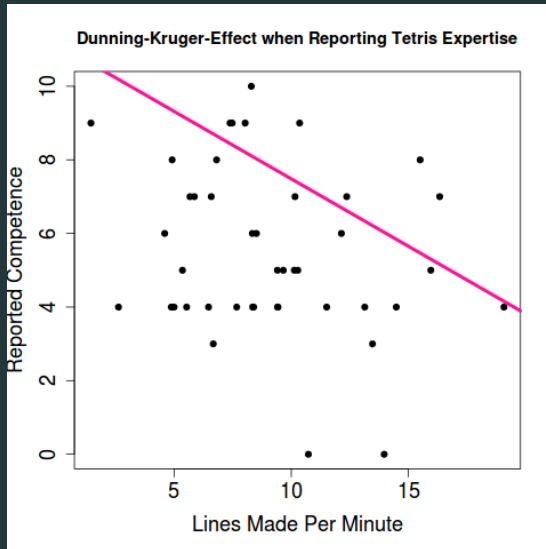
A discussion of results of an extensive user study of systems with and without eye movement based adaption

THANK YOU VERY MUCH FOR YOUR ATTENTION.

FURTHER QUESTIONS?

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APPENDIX – DUNNING KRUGER



APPENDIX – SKILL ACQUISITION

