Biometrics, Beyond the Hype

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GAME DEVELOPERS CONFERENCE™ EUROPE
CONGRESS-CENTRUM OST KOELNMESSE · COLOGNE, GERMANY
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Gortag

laglgortag

Lagl Gortag

LaglGortag

Gortag42

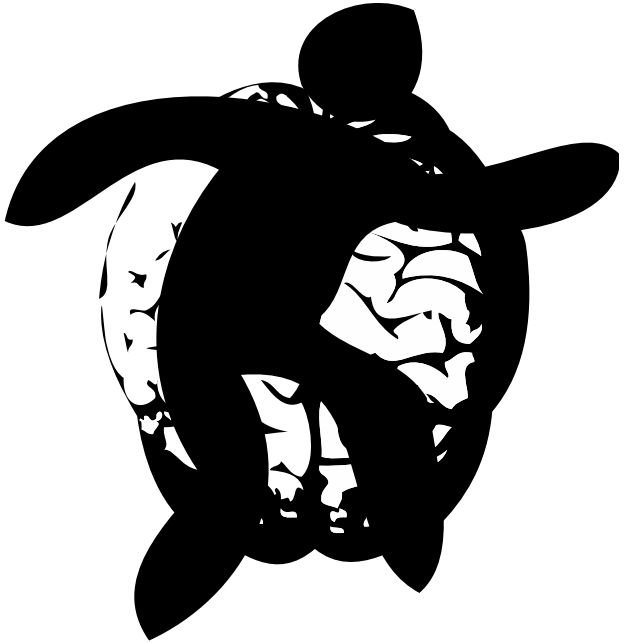
Player Research

Player Research

Player Research

Embodied Cognition

(More than just your brain)



Player Research

Psychophysiology

(Biometrics)

E
S
WARNING
47
12
11:31
Slayer DMRs
5
0
25m
Red Curved Hall

High Activation

Unpleasant

Pleasant

Low Activation

Player Research

“Biometrics…is essentially adding more communication bandwidth between the game & the person playing it, especially in ways the player isn’t necessarily conscious of.

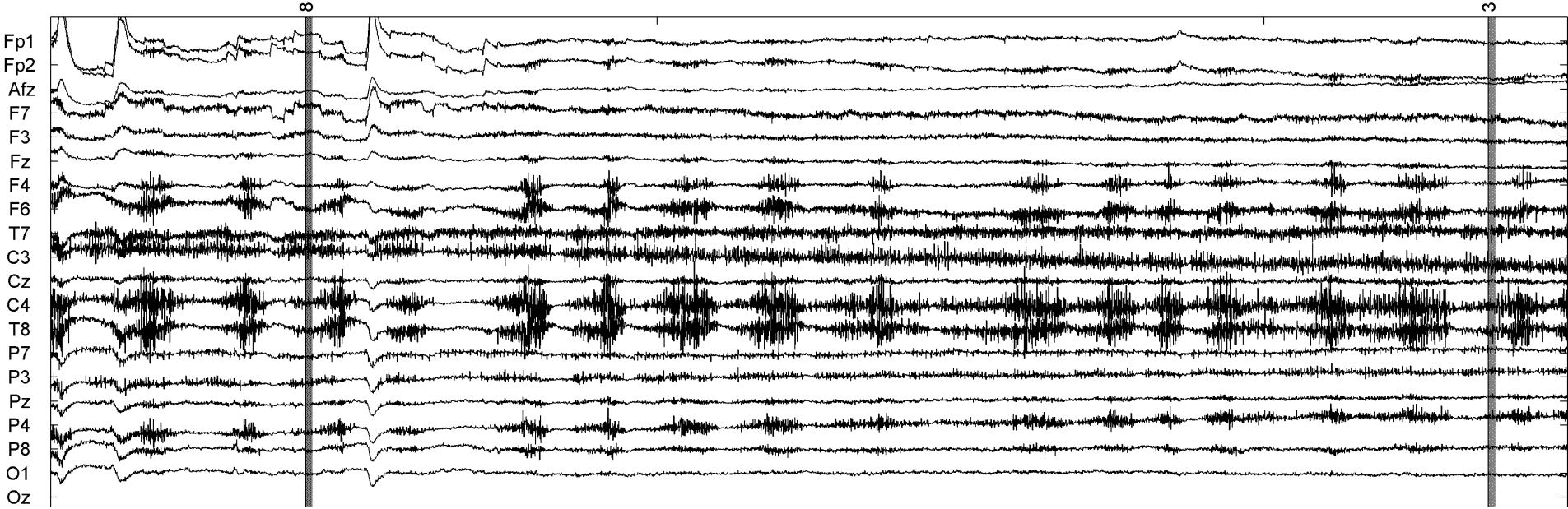
Biometrics gives us more visibility. Also, gaze tracking. We think gaze tracking is going to turn out to be super important.”

http://www.theverge.com/2013/1/8/3852144/gabe-newell-interview-steam-box-future-of-gaming

Player Research

Biometrics look cool & sciency

(But how useful are they?)



Player Research

Advantages

- Definite
  - Objective, always on, countable, novelty, it looks impressive, and can be collected automatically
- Debatable
  - Covert, and produces consistent repeatable results.
  - Unconscious emotions?

Disadvantages

- Definite
  - Expensive, intrusive, difficult and time consuming to analyse and setup
- Debatable
  - Redundant

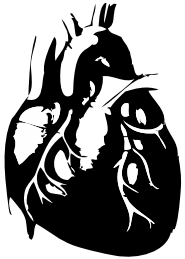
Some GUR Industry Impressions

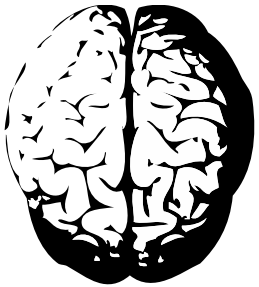
“We don’t use it...because the costs (both in equipment and time) has always seemed to outweigh the benefits. Often we are better served doing "standard" usability/playtests as we can do them quicker, faster, and cheaper. ”

“…we also don't use many of the biometrics due to the potentially invasive nature of some of the measuring instruments. We strive to provide a neutral, low stress environment for our tests”

“…we can imagine the benefits of using biometrics and such in some cases, the imperatives of production usually mean that we wouldn't have time to use them in an efficient manner”

General Biometric Limitations





Specificity and generality

Environment

Person

Task

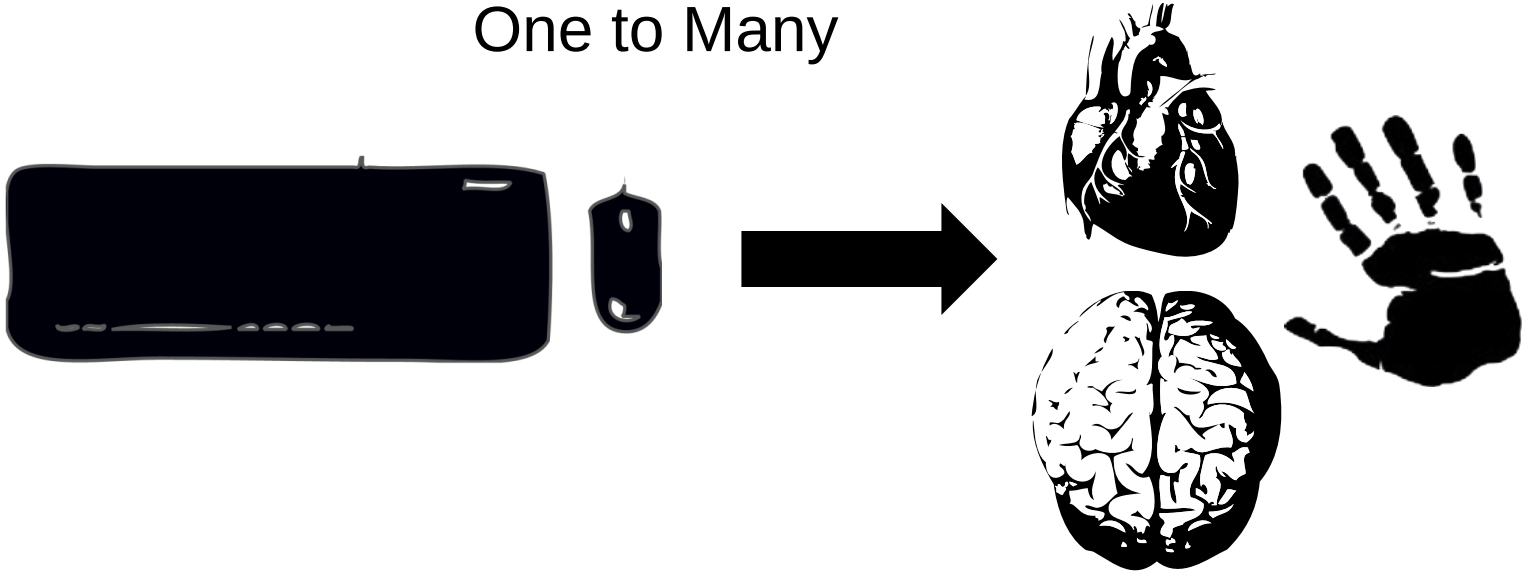
Inference

One to One

Player Research

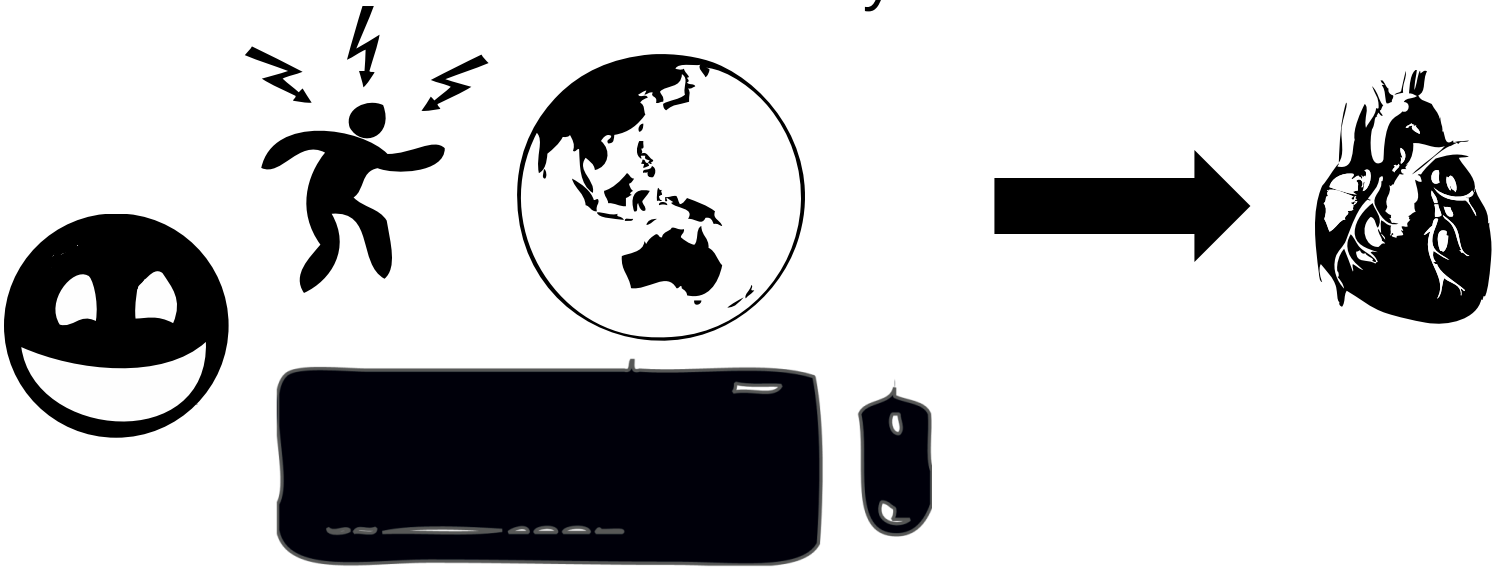
Inference

One to Many



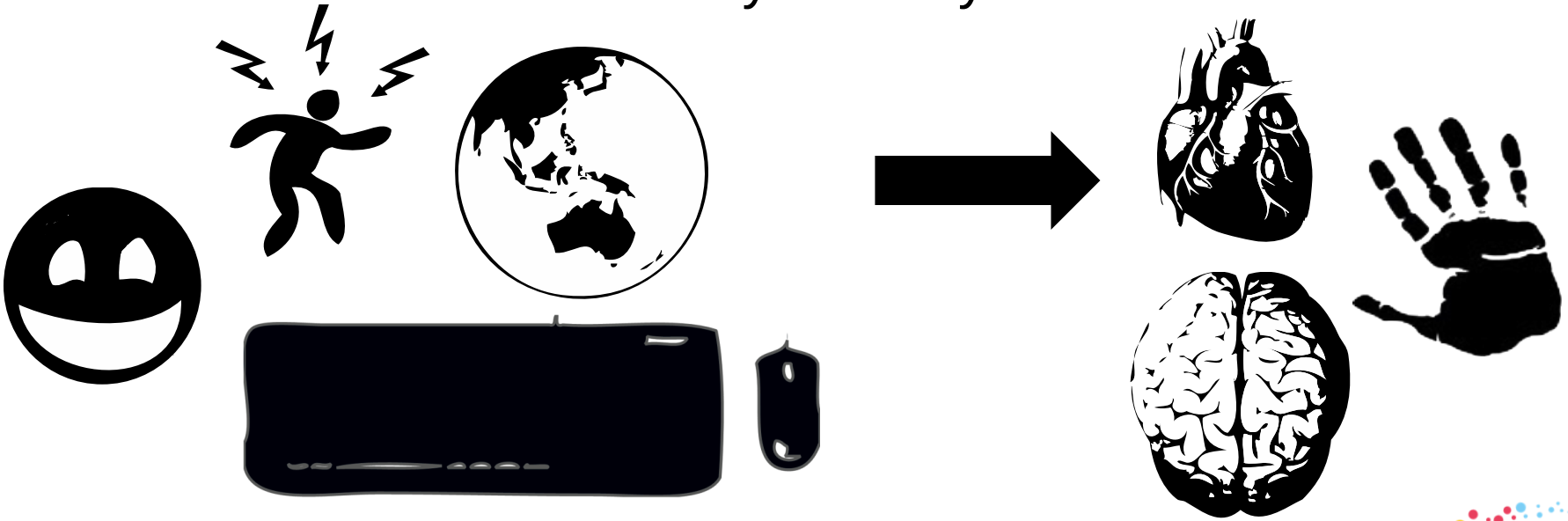
Inference

Many to One



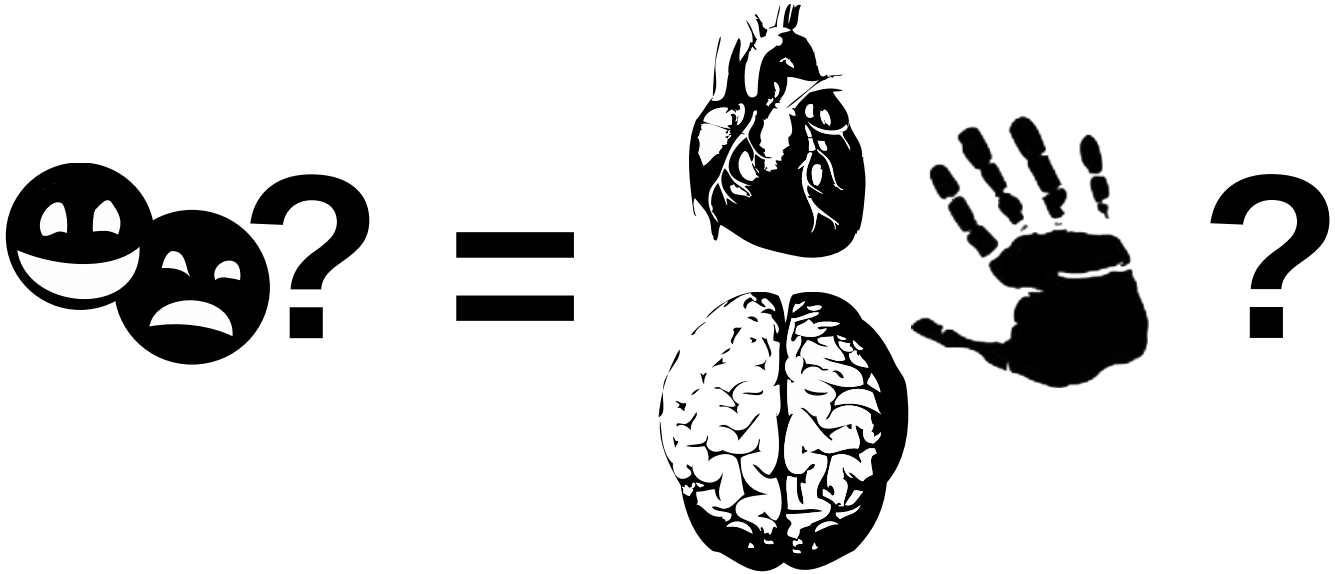
Inference

Many to Many

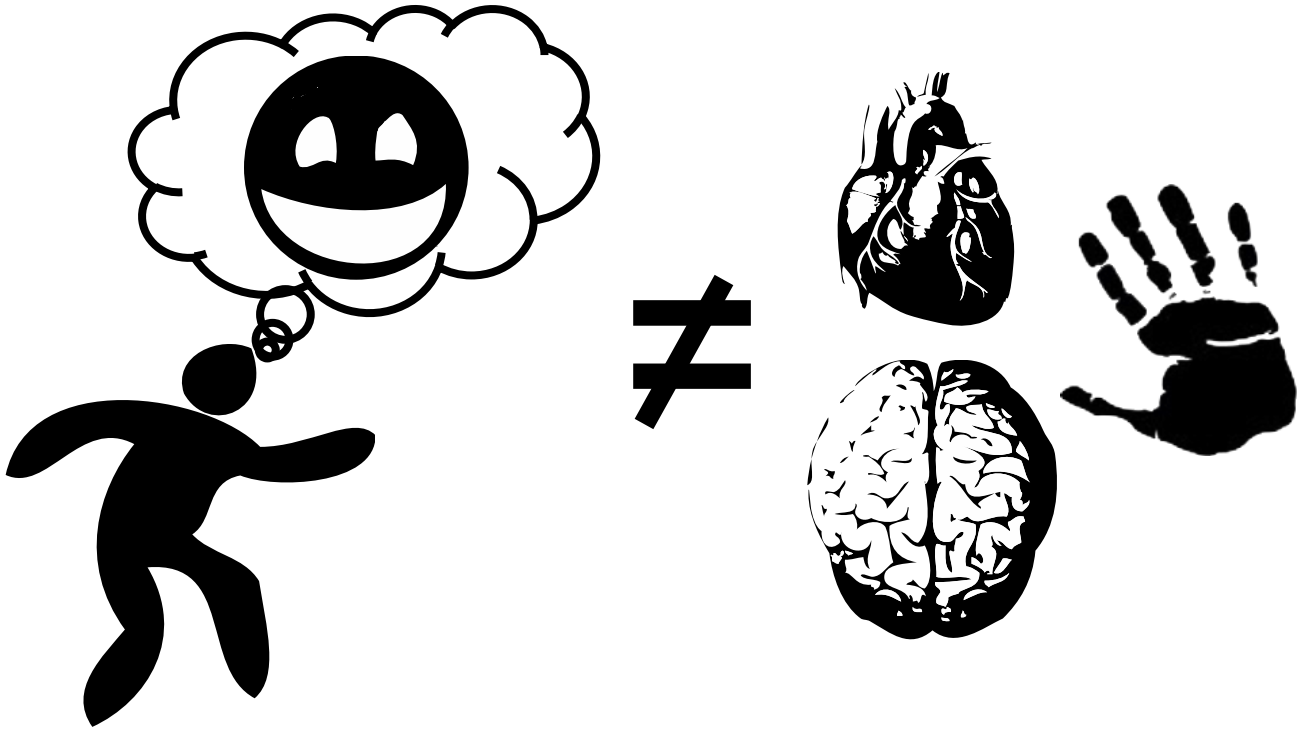


Player Research

Validity



Validity



Contamination

Physical

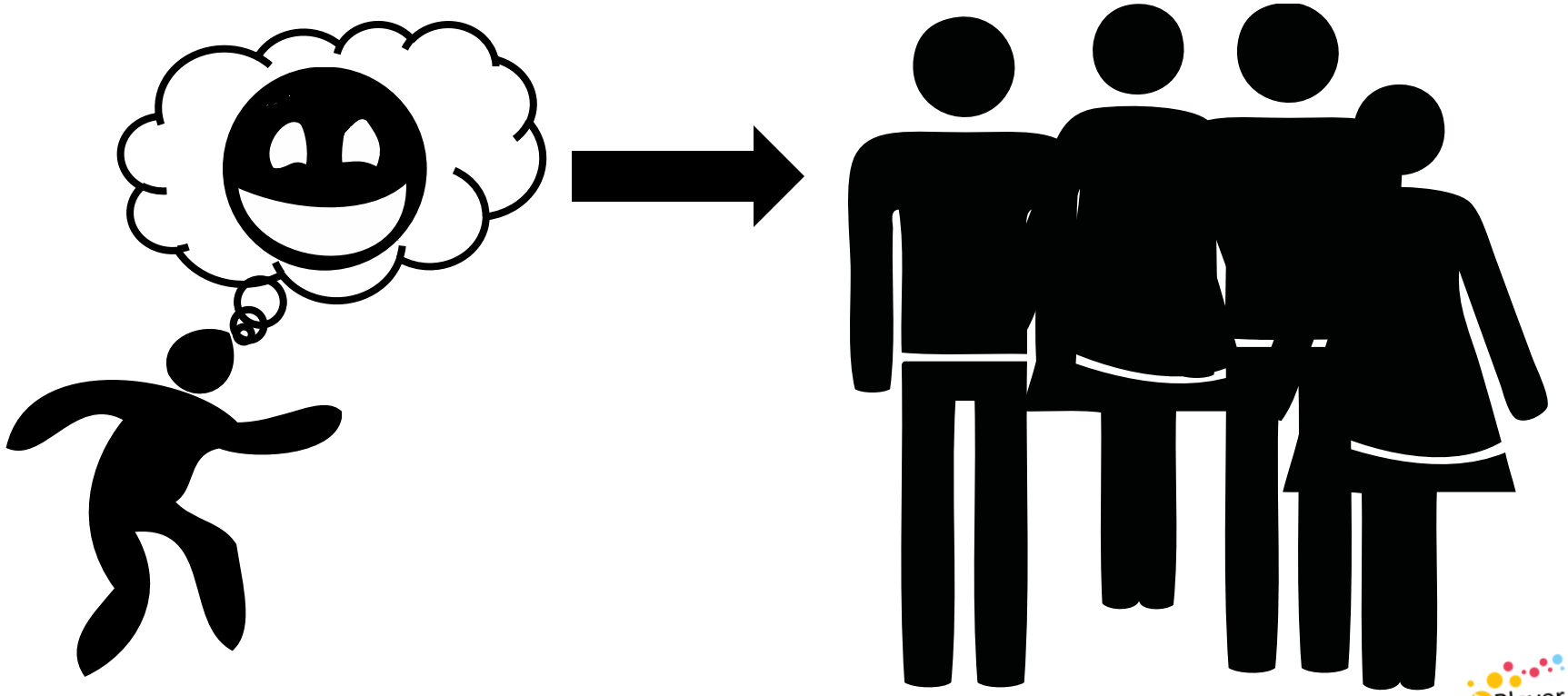
Environmental

Player Research

Privacy

Player Research

Privacy



Player Research

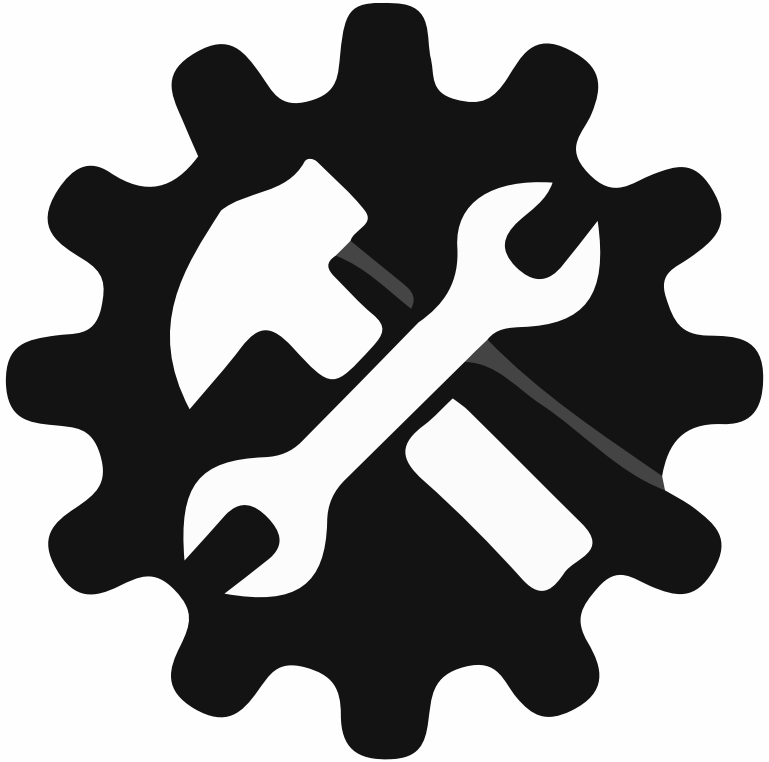
Measurement

Trends or Right now?

Artifact? Or Real?

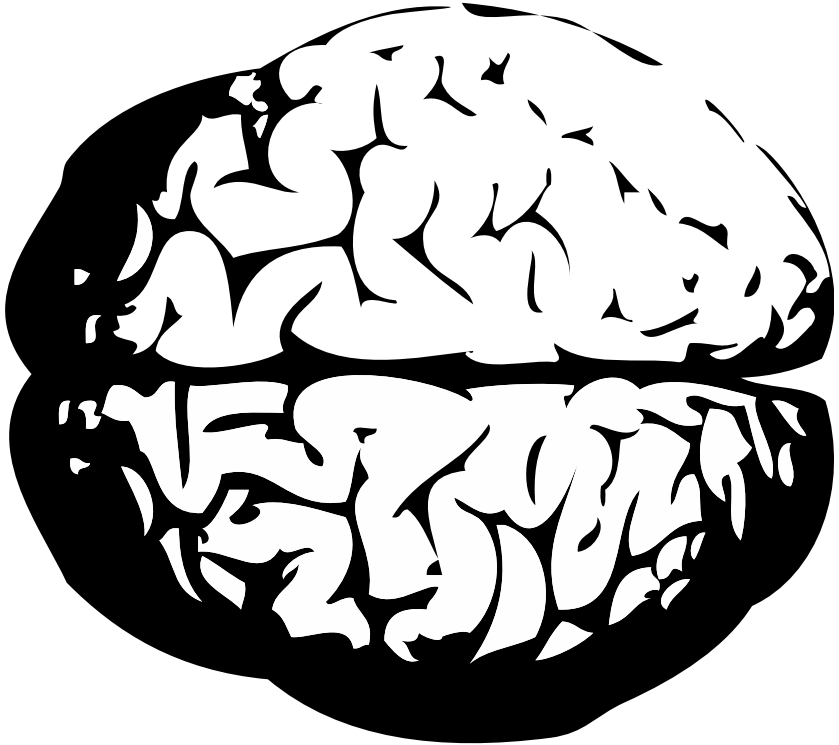
Player Research

METHODS



Player Research

EEG



Player Research

EEG

- **Alpha** 8-14 Hz (calm, mental work)
- **Beta** 14-30 Hz (focused, engaged mental work)
- Delta 1-4 Hz (trance, sleep, fatigue)
- Theta 4-8 Hz (emotions, sensations)
- Gamma 30-50 Hz (Information processing, not often measured)

Mostly arousal/workload

Player Research

Puzzlebox
ORBIT
Brain Controlled Helicopter
With Brain Wave Headset
mindwave
MOBILE

Player Research

Player Research

The Muscle Issue

Player Research

Electromyography (EMG)

Player Research

Measuring Muscles

Player Research

Back to EEG

- Possibilities an input (especially in combination with EMG)

	Measure		Interpret	Player Use		Best For
EEG	MED	HIGH	HIGH	MED	HIGH	Arousal
EMG	HIGH		MED	HIGH		Valence

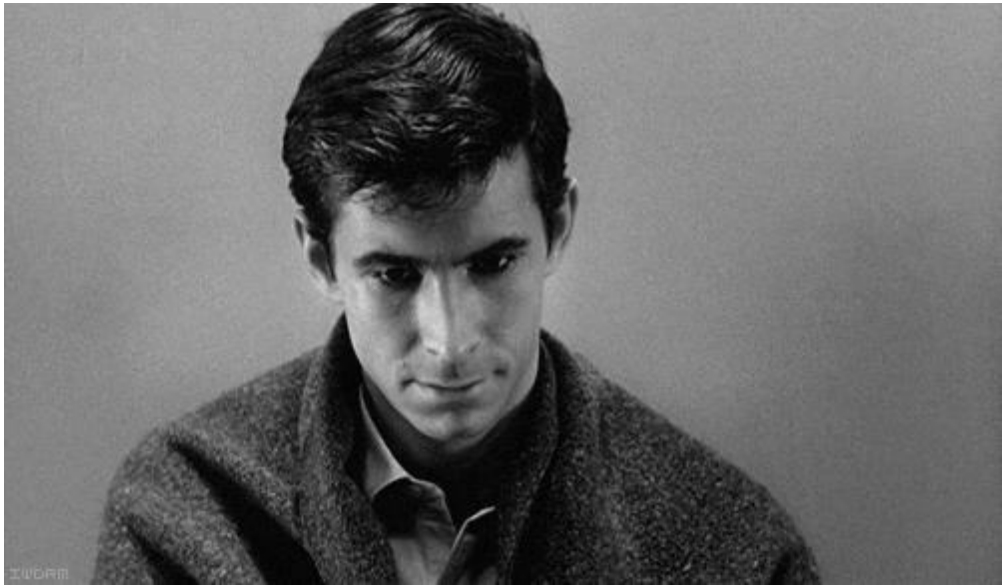
Player Research

Facial Recognition

Player Research

The GAMEFACE Issue

Marketing



Reality

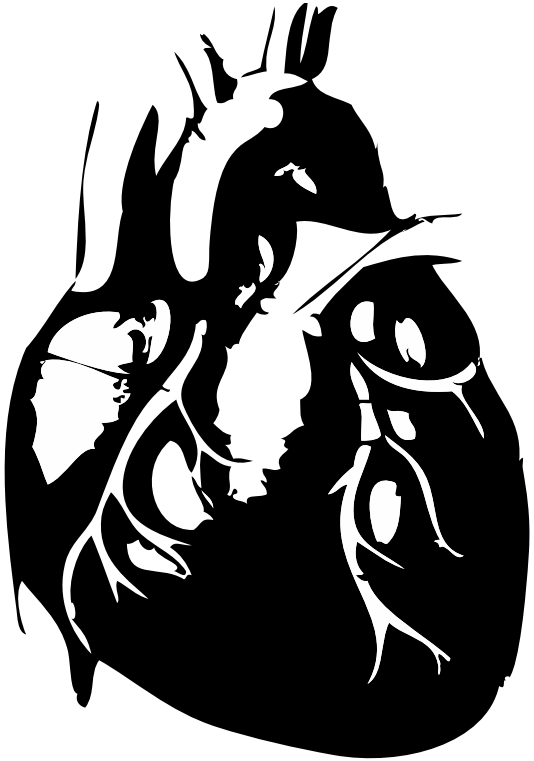
Player Research

Technologically Aided Observation

- Computer vision, tricky but advancing every day
- Kids faces, they change

	Measure		Interpret	Player Use	Best For
Facial Recognition	LOW	MED	MED	LOW	Valence

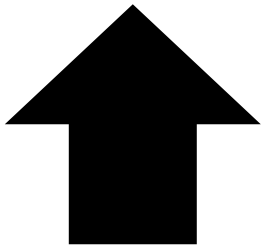
Cardiovascular



Player Research

<3

Arousal



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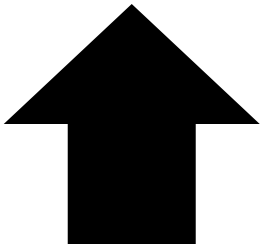
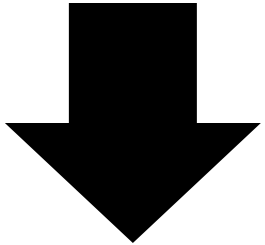
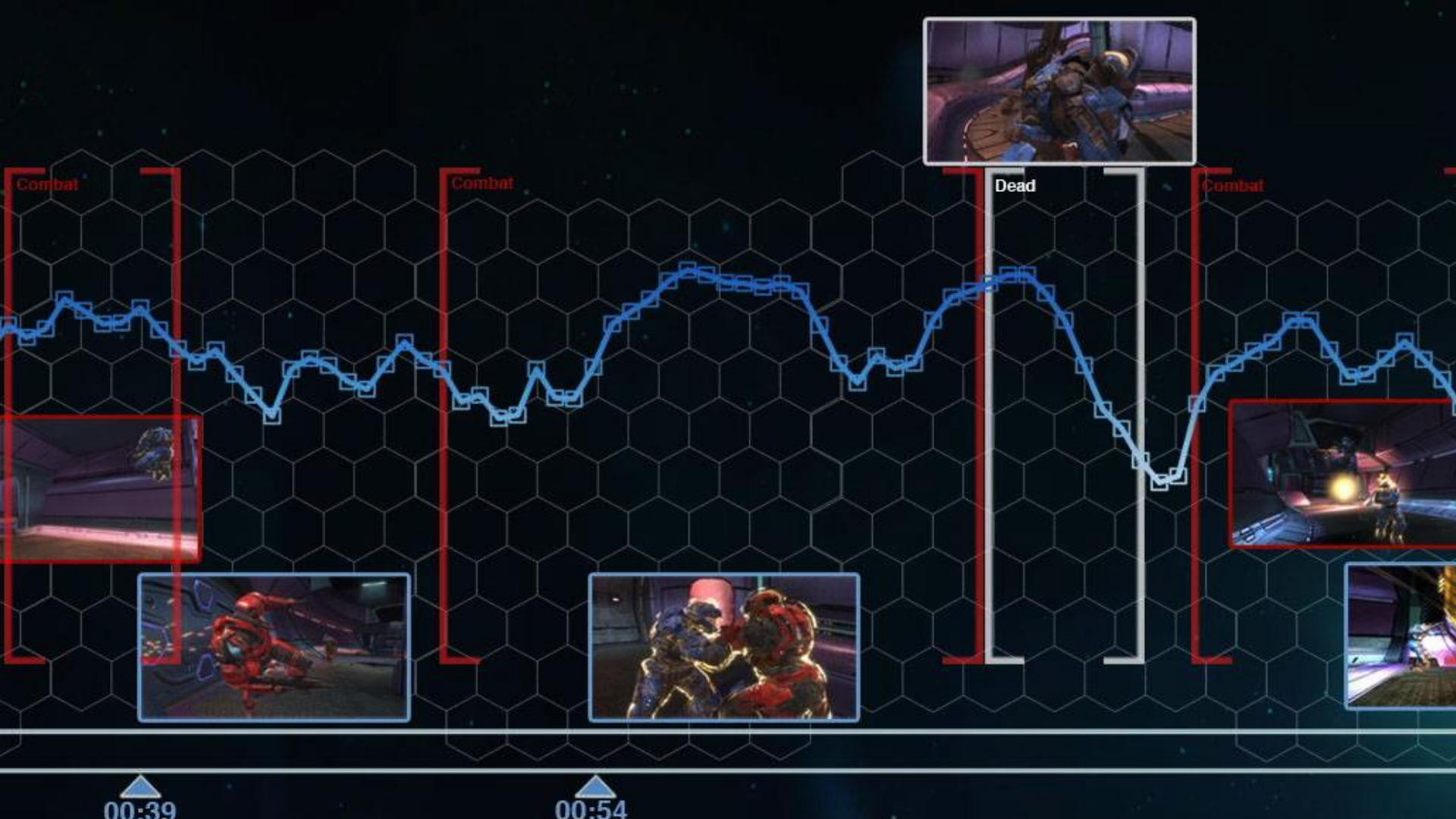
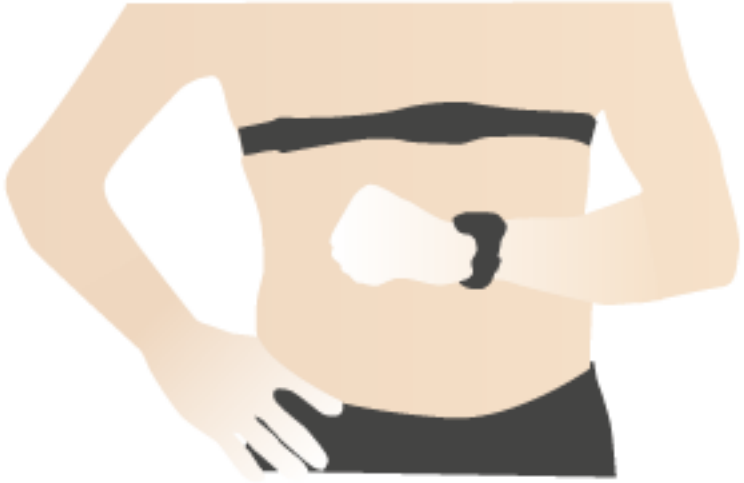
Heart Rate
Blood Pressure

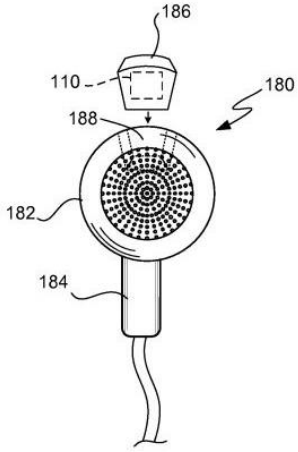




Inter Beat Interval
Heart Rate Variability

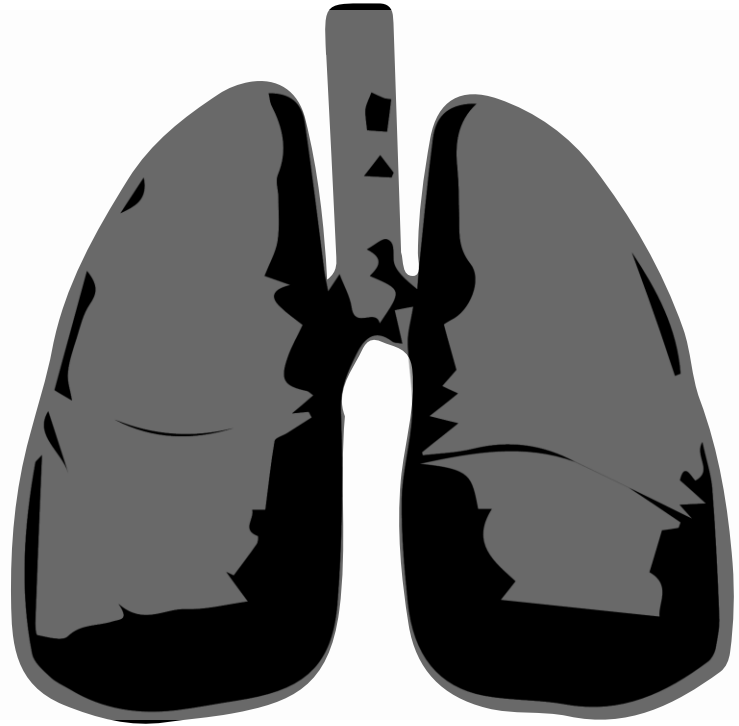

Combat
Combat
Dead
Combat
00:39
00:54





Player Research

Breathing Exercises

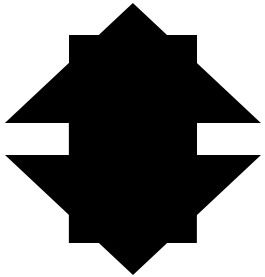


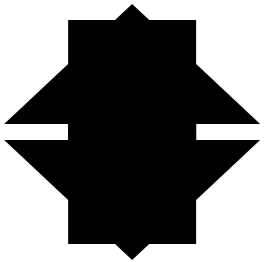
Player Research

The Time Problem

After about 20 minutes…

Heart Rate
Blood Pressure





Inter Beat Interval
Heart Rate Variability

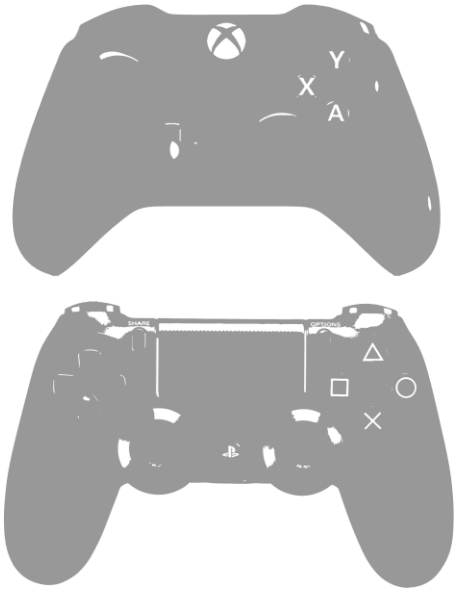
<3 <3 <3

	Measure	Interpret	Player Use		Best For
Cardiovascular	LOW	MED	LOW	MED	Arousal/Mental Workload

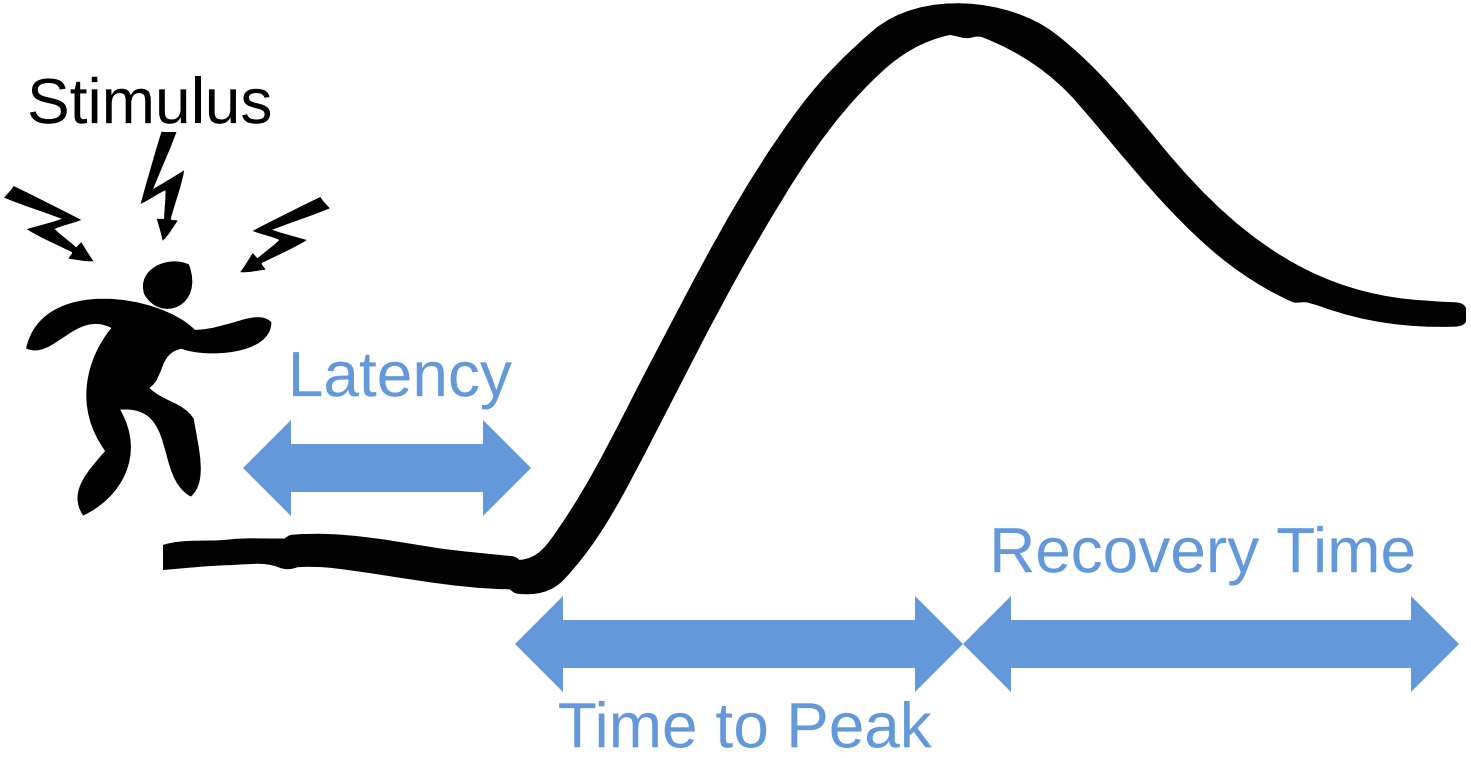
Skin Conductance

Player Research

Fingers and Toes



Waiting Time



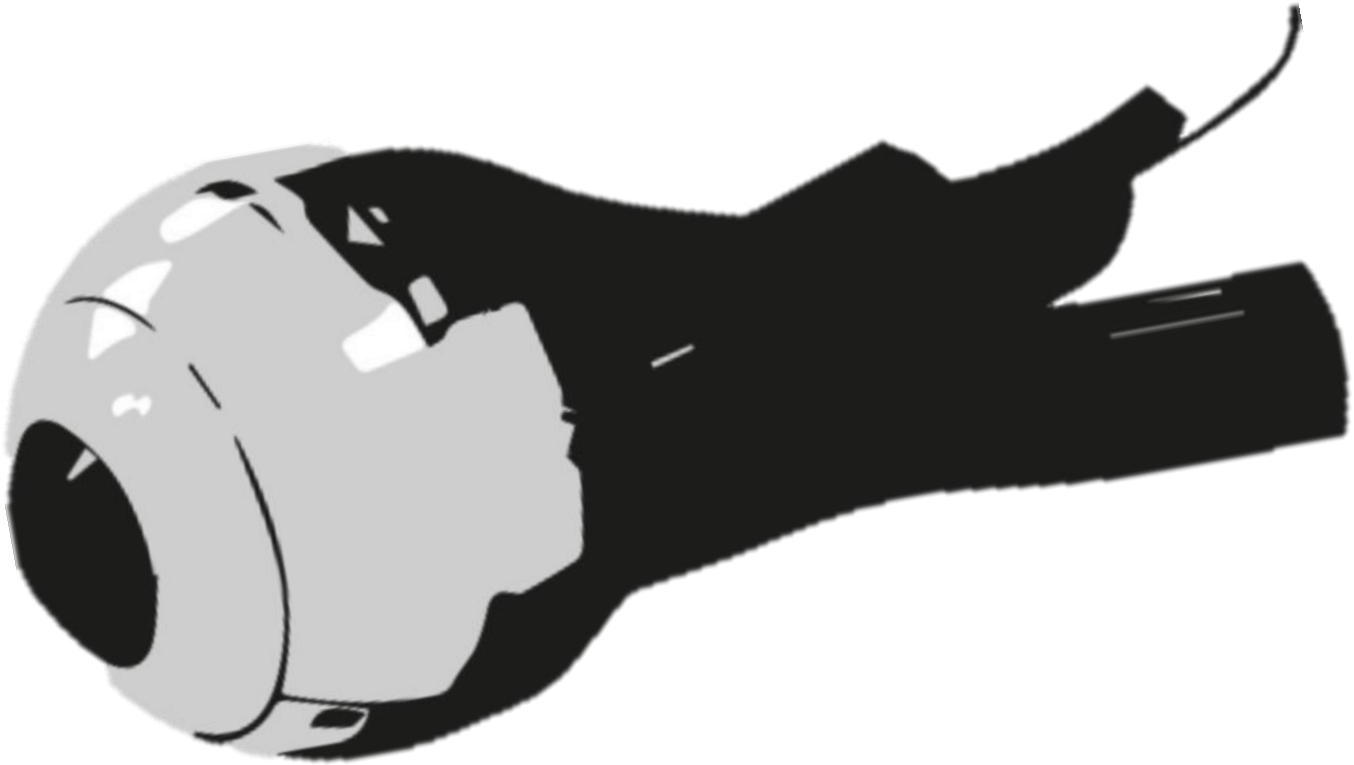
Player Research

Sweaty Skin

- Noisy, artifact prone signal

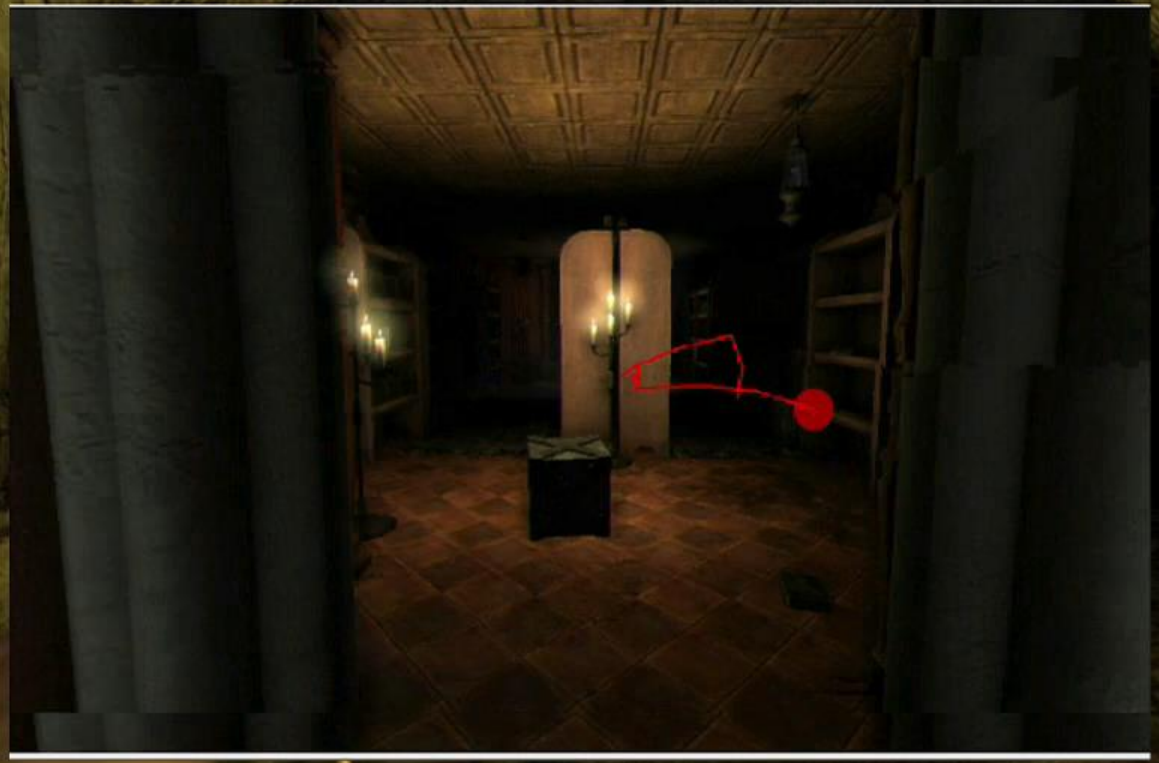
	Measure	Interpret	Player Use	Best For
Skin Conductance	MED	MED	MED	Arousal

Eye-tracking



Player Research

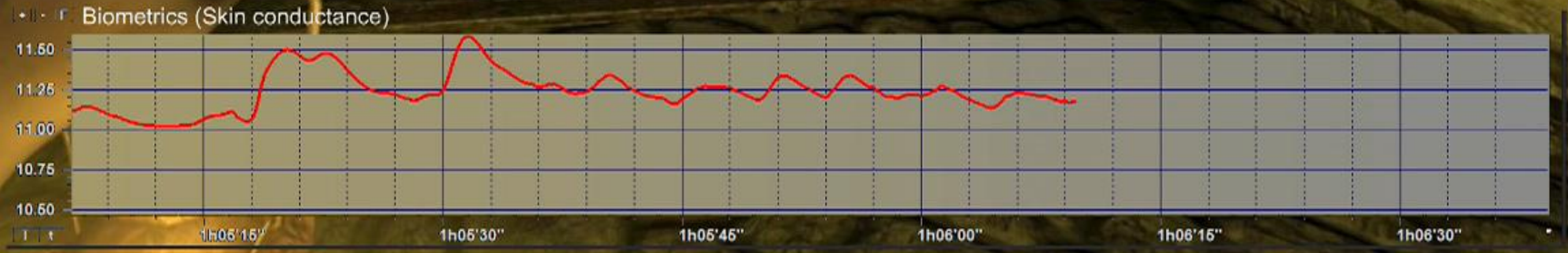
776-5459
©Worth1000.com



13 December 2013 20:24:12

Amnesia

– THE DARK DESCENT –



6
13:13
8
Gortag (Windranger) just purchased Observer Ward!
404 / 815
50 / 559
+1.3
+1.7
71 +9
32+3
26+3
40+3
3
345
110
120
100
102
SHOP
Shift-click shop items to set Quick Buy
K / D / A
LH / D
0 / 0 / 0
20 / 2
775/1200

Fallen Devil Walker
11
20
20
5
oryx-bng
009
9
BUNGiE
DESTINY

20
20

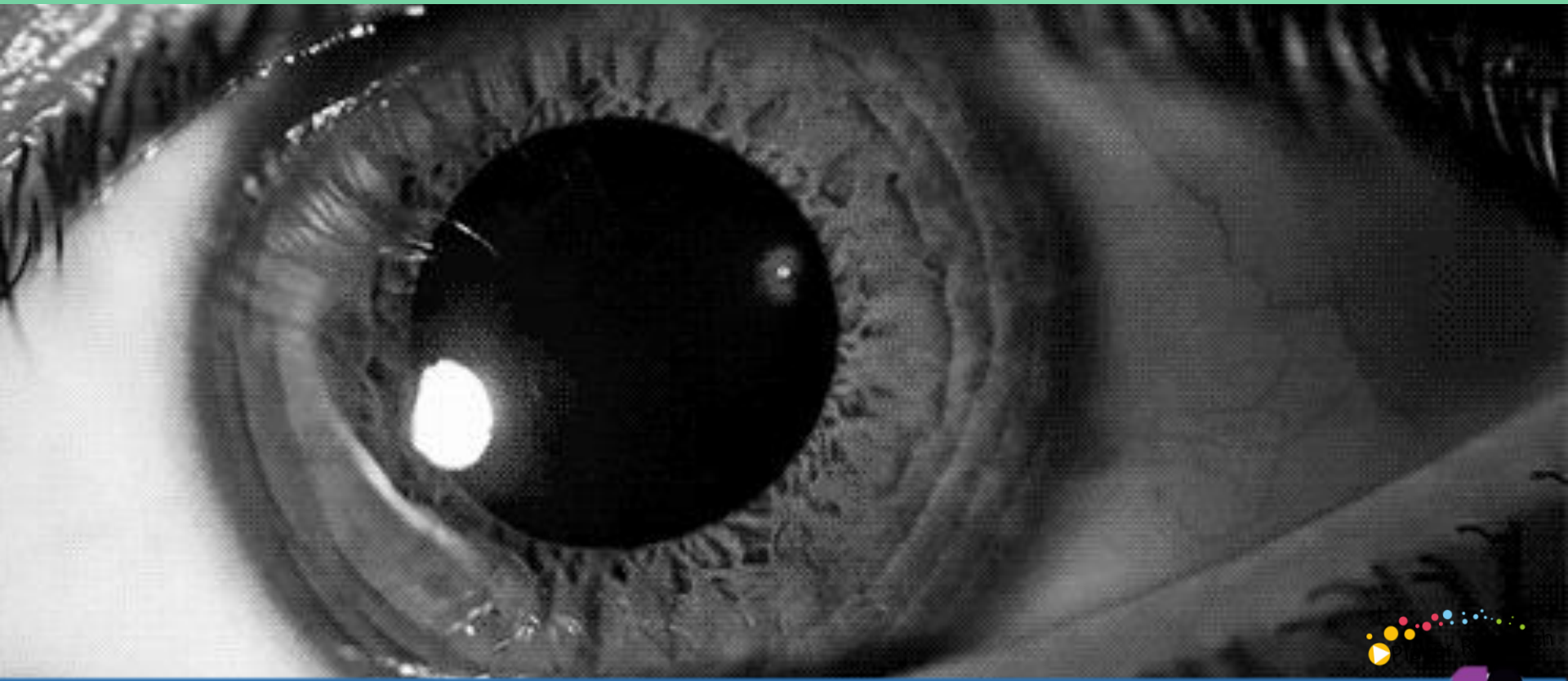
Godzilla
776-5459

EYE TRACKING MEASURES GAZE **NOT** ATTENTION

Player Research

11
20
20
5
oryx-bng
009
9
BUNGiE
DESTINY

Pupil Dilation



Enhanced Observation

	Measure	Interpret	Player Use	Best For
Eye tracking	LOW	MED	LOW	Gaze

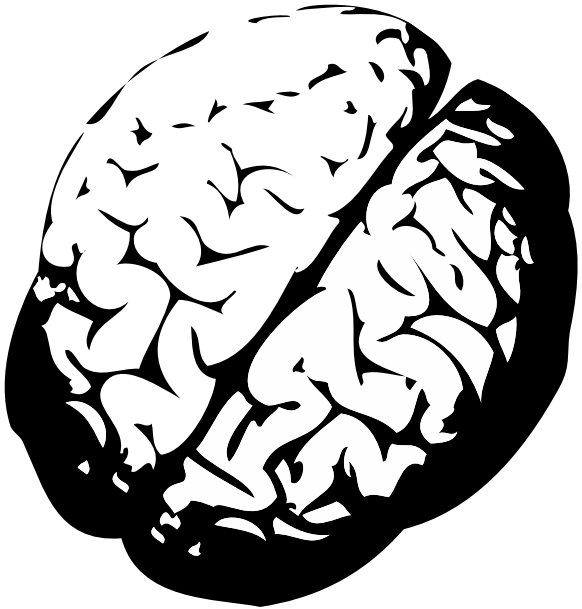
http://www.tobii.com/en/eye-experience/

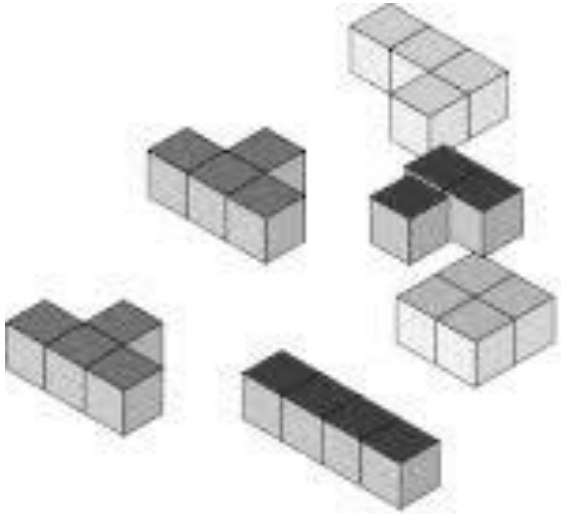
Biometric Methods Summary

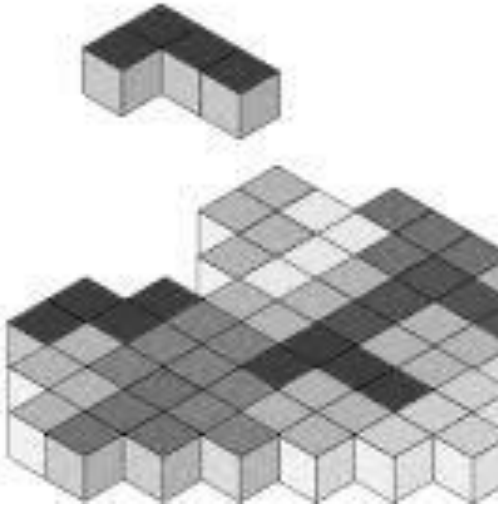
	Measure	Interpret	Player Use	Best For
Eye tracking	LOW	MED	LOW	Gaze
Cardiovascular	LOW	MED	LOW / MED	Arousal/MW
Skin Conductance	MED	MED	MED	Arousal
Facial Recognition	LOW / MED	MED	LOW	Valence
EEG	MED / HIGH	HIGH	MED / HIGH	Arousal
EMG	HIGH	MED	HIGH	Valence

Player Research

Biometric Games







Player Research

Input and Adaptation

- How to deal with False alarms and Misses?

Confirmation
(Not as cool)

Input and Adaptation

- Keep it relatively simple

Player Research

THE KILLER REVEALED

TOBII EYEX BENEFIT: IMPROVED ARTIFICIAL INTELLIGENCE OF THE GAME

Input and Adaptation

- Is there an easier and better way?

Player Research

Input and Adaptation

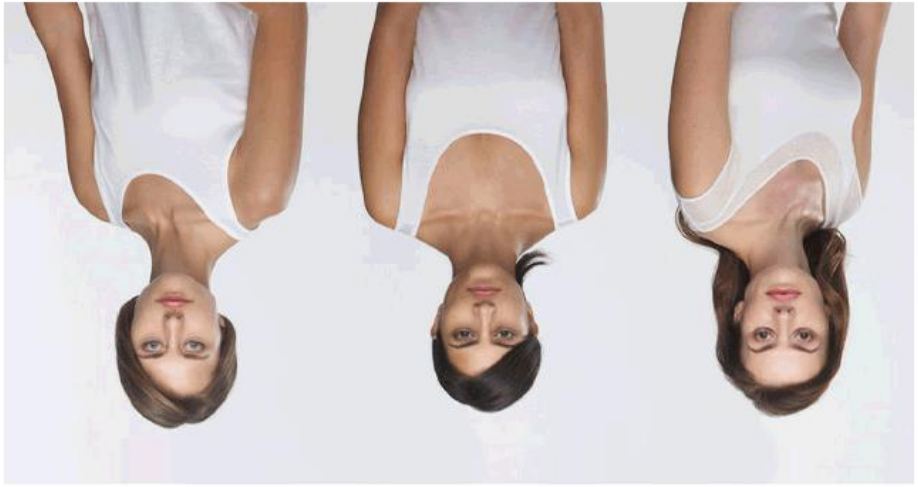
- Cheating
- Challenge is fun, control is important

Problem Statement

Collection/Measurement of biometrics increasingly easy BUT interpretation is HARD

Player Research

Solution? Presentation



People live to interpret, and interpret to live

Player Research

281
Void Ray
Player Research

“[adding biometric readings for players to see was] the most enjoyable thing we have done"
- Valve
AUSTRALIA
Player Research

Disagree?

Make something awesome, that would be great

Player Research

QUESTIONS?

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