



Psychology of Virtual Reality: Presence, Agency, Social

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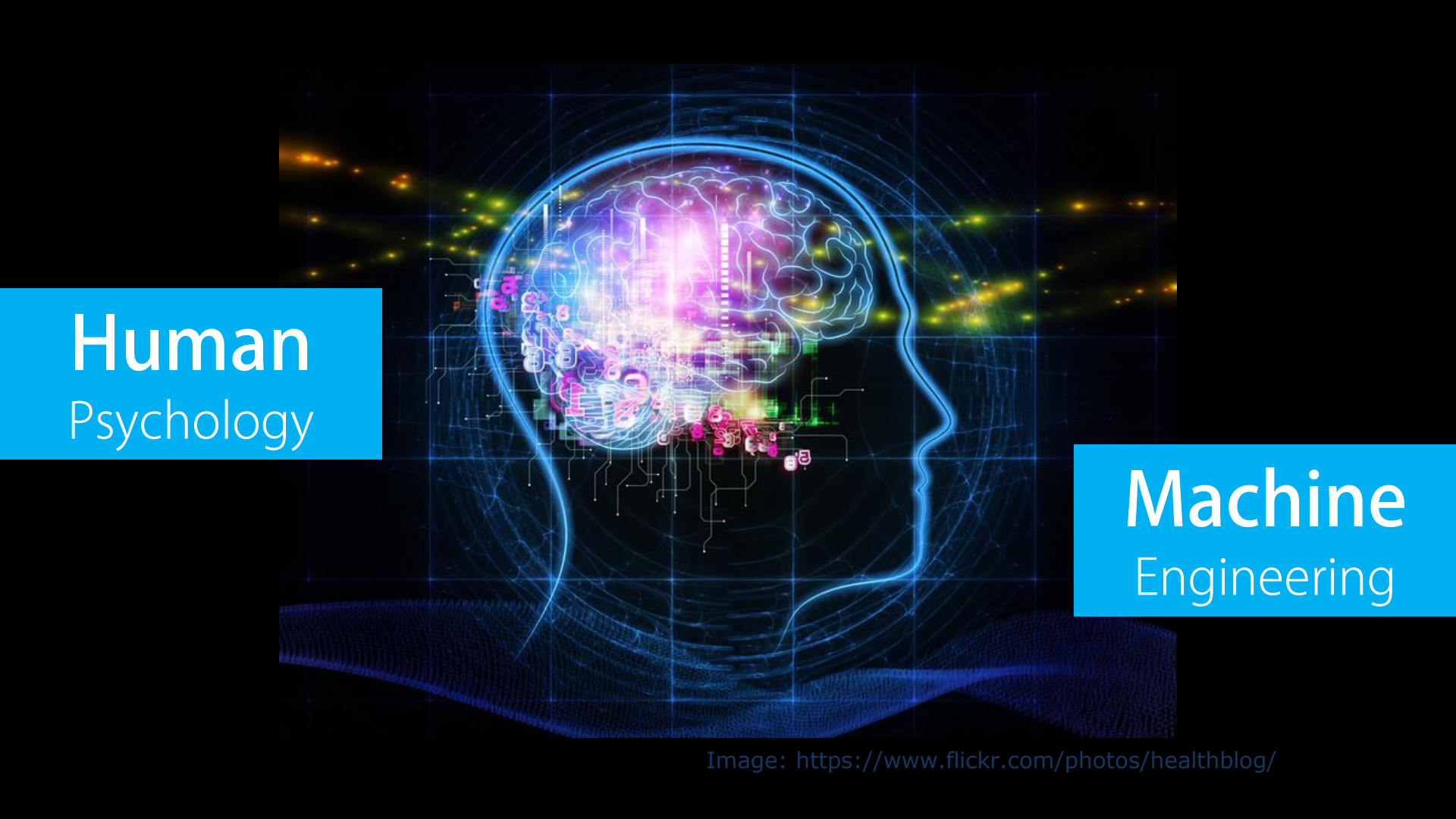
 TCTomm

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Virtual Reality Consultant

Atari 800XL





Human
Psychology

Machine
Engineering

Image: <https://www.flickr.com/photos/healthblog/>

ZEIT²



BRIGHTSIDE
games

XBOX LIVE
arcade

 **STEAM**


UBISOFT

An aerial photograph of an airport tarmac under a clear blue sky. A large, curved hangar with a green and white facade is the central focus. A small white airplane is parked on the tarmac in the lower left. The background shows a city skyline and distant hills.

exozet

— *Agency For Digital Transformation* —



Cognitive Psychology of Virtual Reality: Basics, Problems and Tips

Thomas Bedenk

VR Consultant, Exozet





New Medium





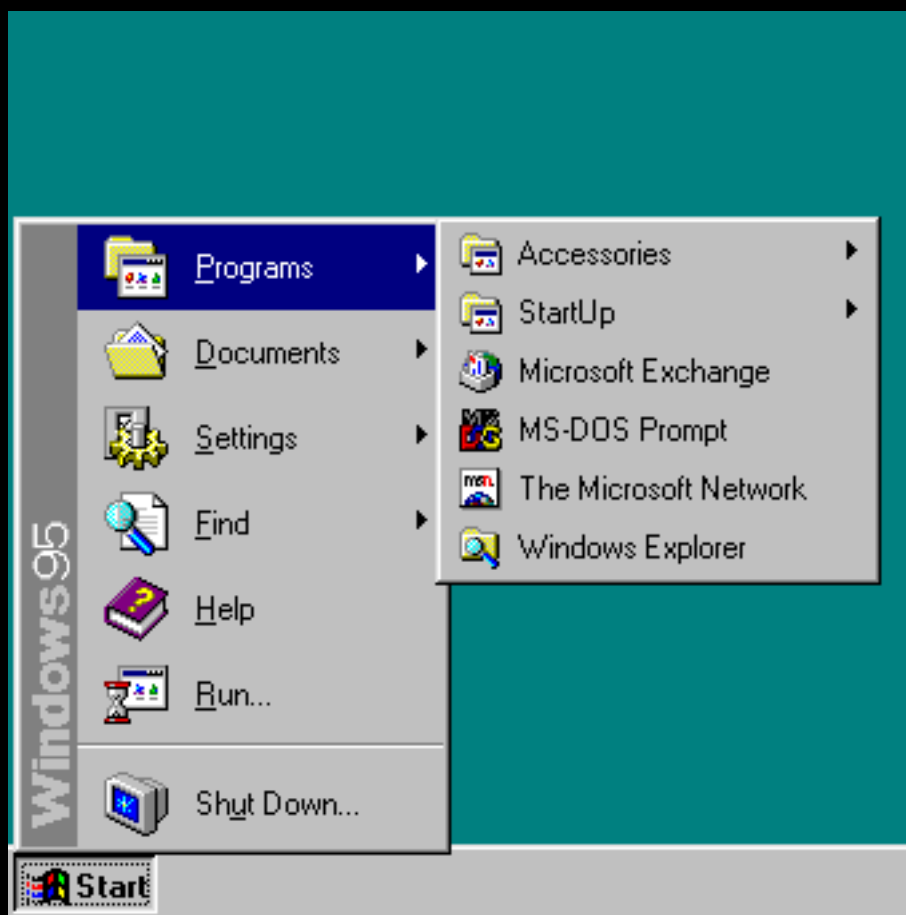
Truely User Centric Medium



Ease of Use

Starting MS-DOS...

C:\>_



Programs



Documents



Settings



Find



Help



Run...



Shut Down...



Accessories



StartUp



Microsoft Exchange



MS-DOS Prompt



The Microsoft Network



Windows Explorer

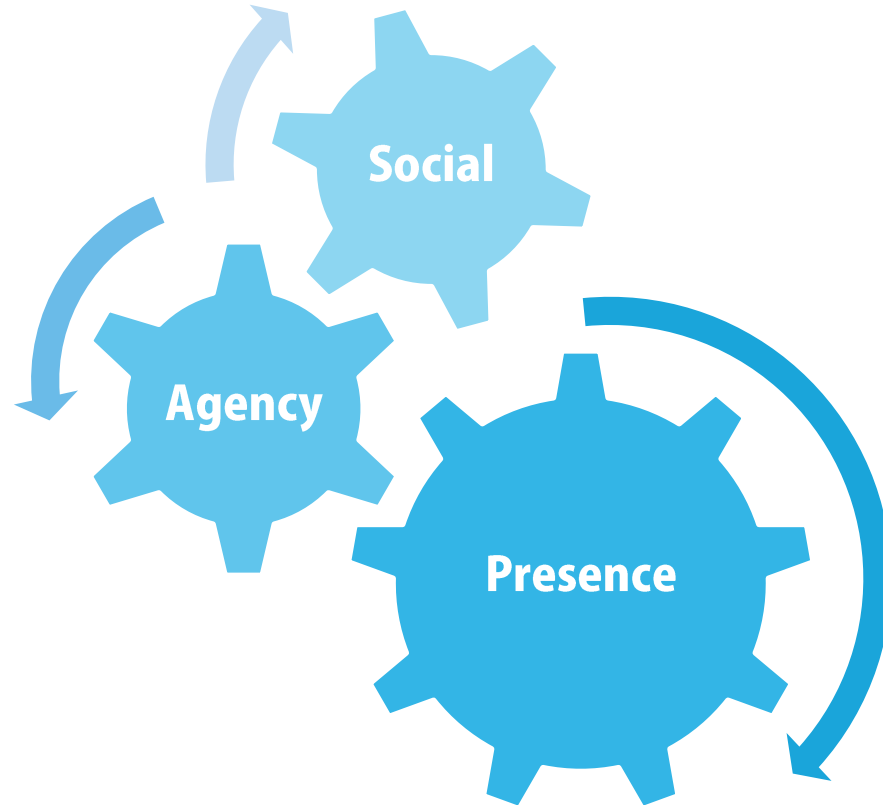




Presence



VR AS A NEW MEDIUM



Hands



Intuitive Controls



Learned & Natural Interaction

Skeuomorphism



Impact



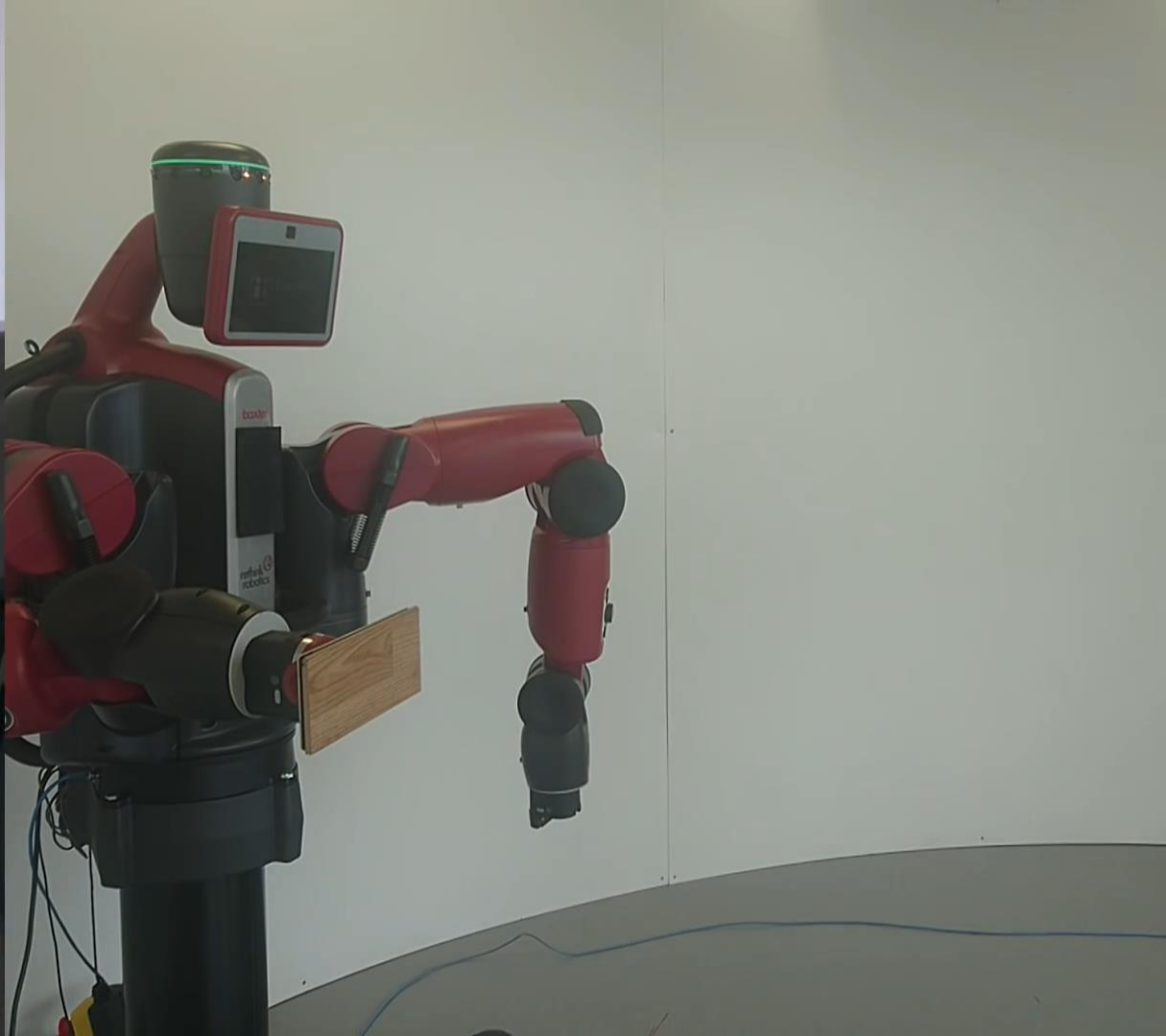
visceral,
behavioral,
reflective,
emotional



Virtual Body Ownership



Elena Kokkianra, Mel Slater (2014) Measuring the effects through time of the influence of visuomotor and visuotactile synchronous stimulation on a virtual body ownership illusion Perception (published online) <http://publicationslist.org/data/melslater/ref-251/paper13.pdf>



Human Haptic Helper



Virtual Body Ownership and Agency



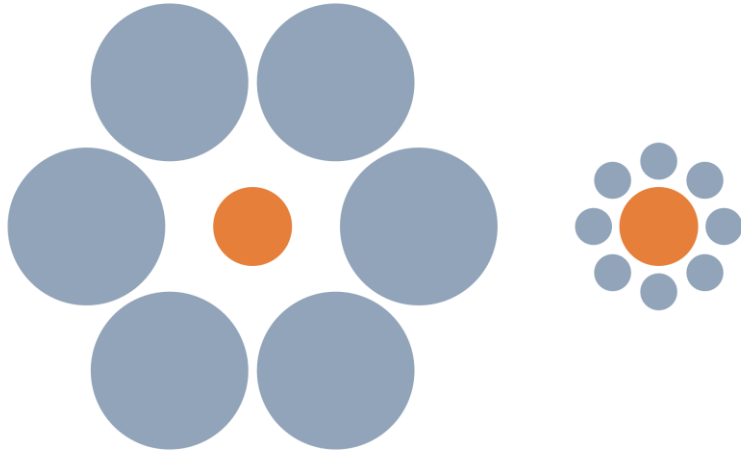
**The avatar's
movements are
synchronized with
the participant's
real body movements**

Domna Banakou & Mel Slater (2014) <http://www.pnas.org/content/111/49/17678.abstract>
Body Ownership Causes Illusory Self-Attribution of Speaking and Influences Subsequent Real Speaking

Acclimatization

Perceptual Constancy

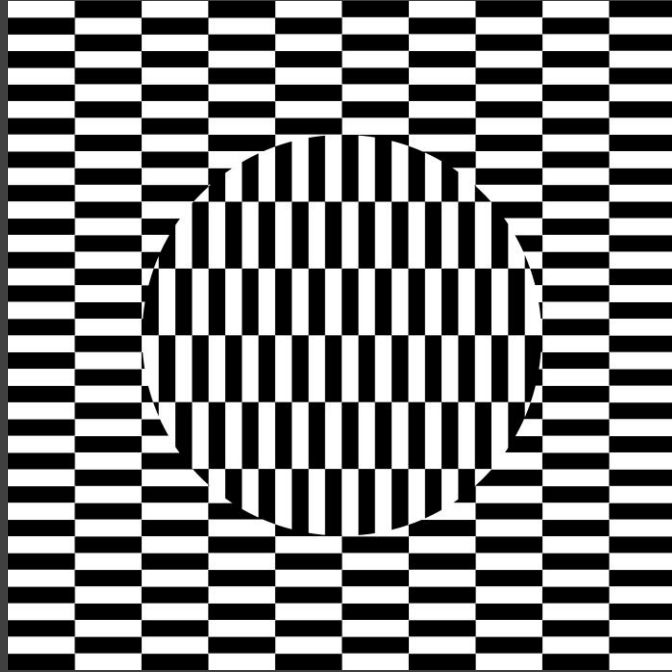
Dynamic Ebbinghaus



Fixate the yellow dot on the central circle.

Constancy	Registered Stimulus (may be unconscious)		Apprehended Stimulus (conscious)	
	Focal Stimulus	Context	Constant	Changes
Size constancy	retinal image size	distance cues	object size	object distance
Shape constancy	retinal image shape	orientation cues	object shape	object orientation
Position constancy	retinal image location	sensed head or eye pose	object position in space	head or eye pose
Lightness constancy	retinal image intensity	illumination cues	surface whiteness intensity	apparent illumination
Color constancy	retinal image color	illumination cues	surface colors	apparent illumination color
Loudness constancy	ear sound intensity	distance cues	loudness of sounds	distance from sound

Ouchi Illusion

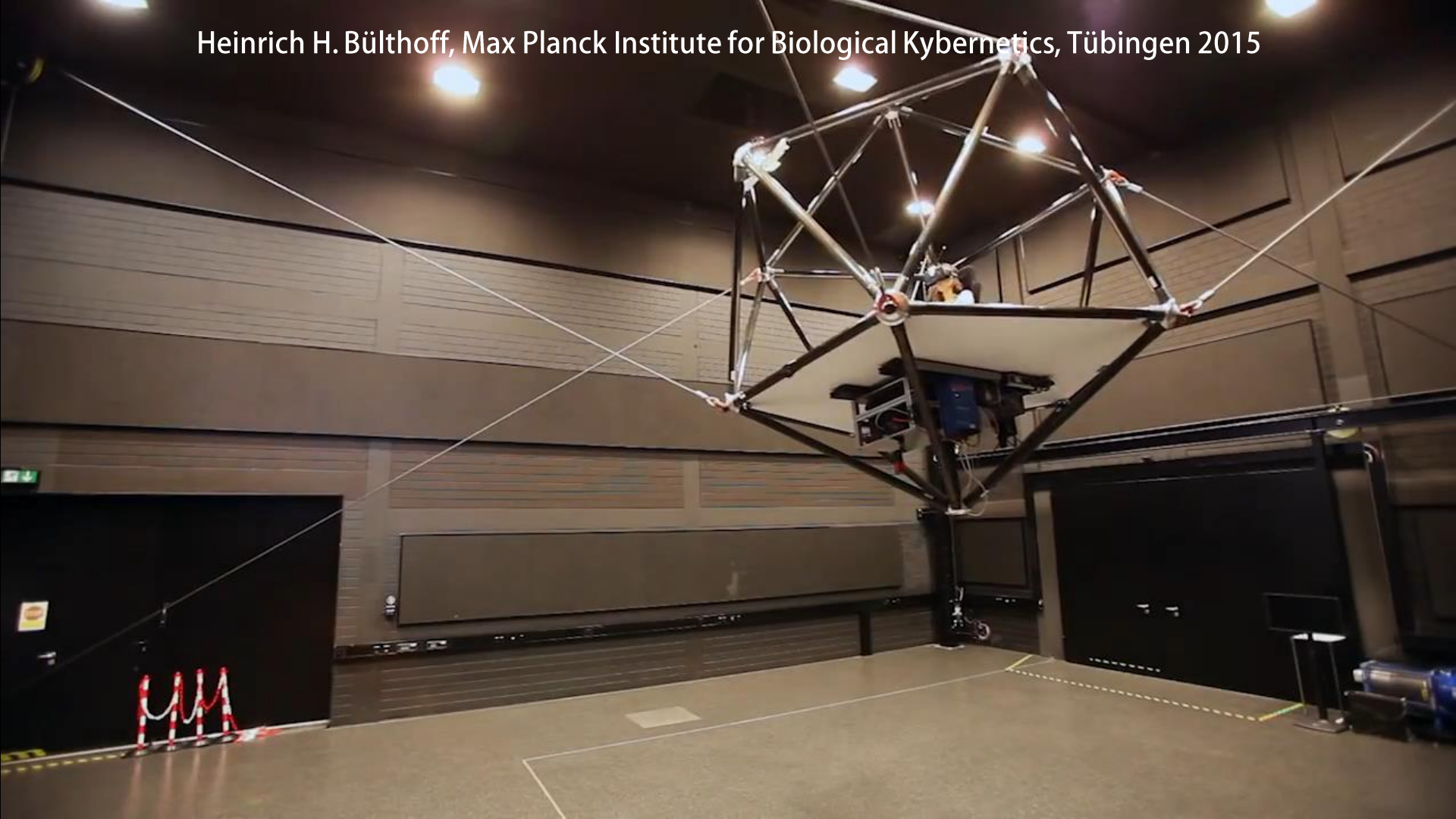


So ... Teleportation

Tool or Experience



realities.io

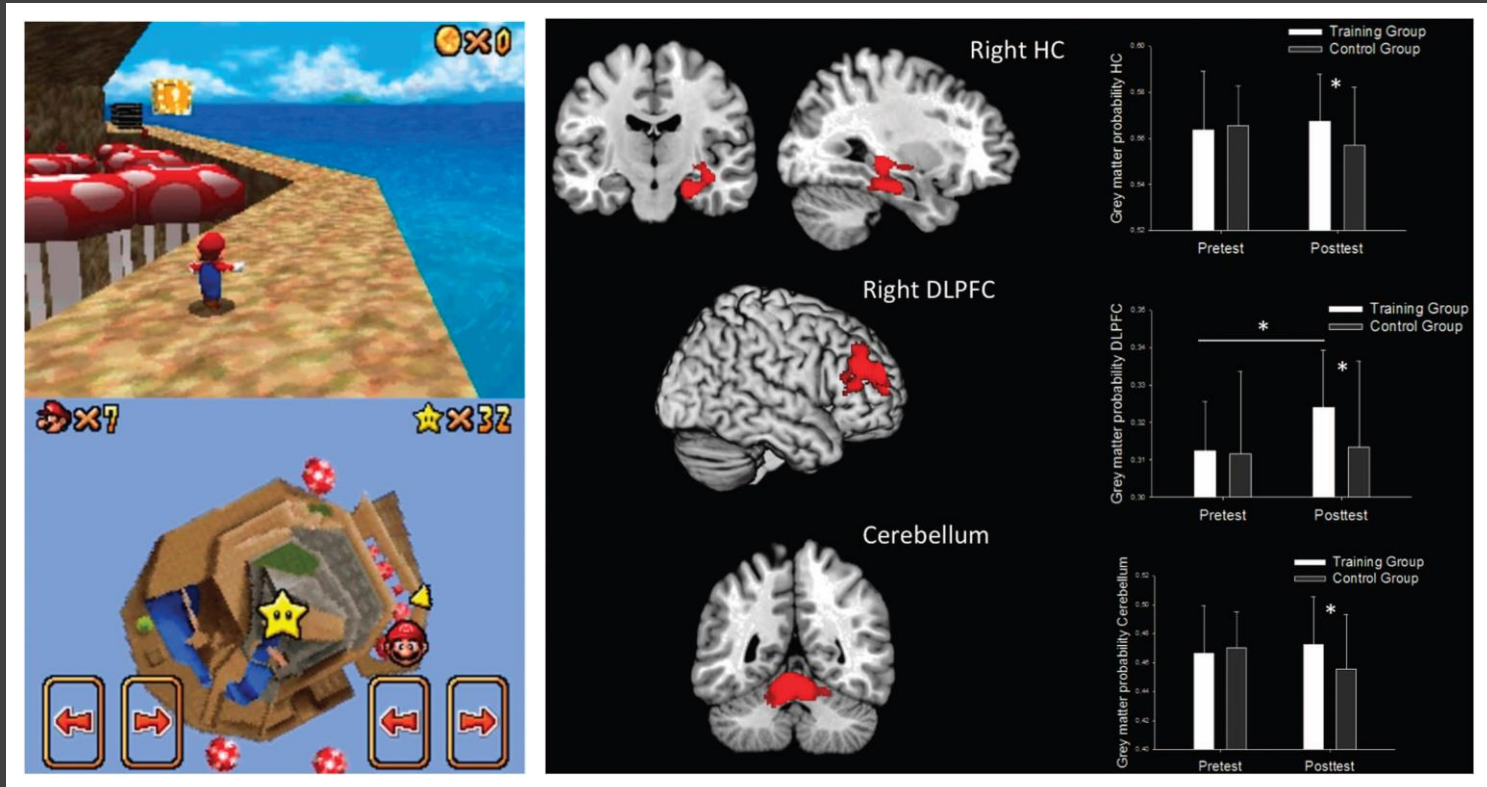


Superpowers

VR will do for space
what movies did for time:
compression, stretching,
manipulation!

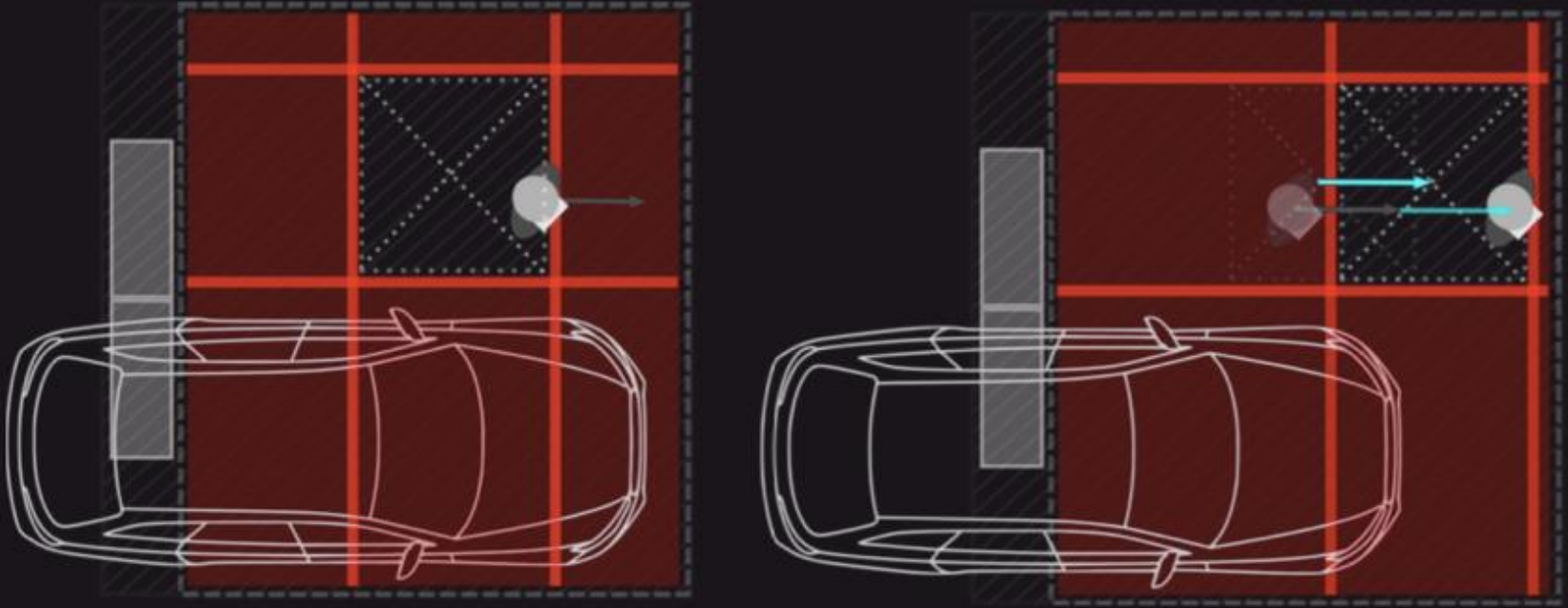
Adaptability

Structural Brain Plasticity



Playing Super Mario induces structural brain plasticity: gray matter changes resulting from training with a commercial video game
Simone Kühn et al., *Molecular Psychiatry* (2013), 1–7

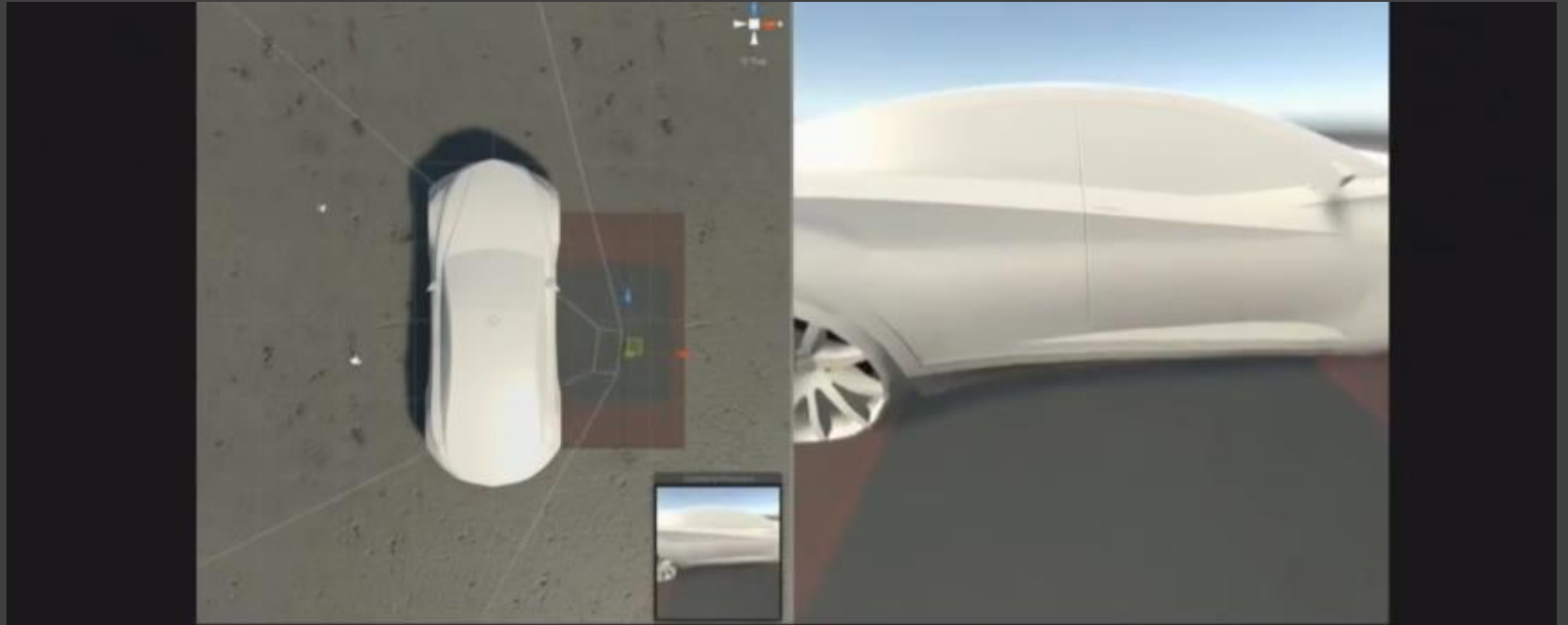
Rectangular Gain



https://www.youtube.com/watch?v=At_Zac4Xezw Vision Summit 2016

Don't just teleport - How to walk around something that is bigger than your tracked space, Re'flect / Audi Experience

Rectangular Gain



https://www.youtube.com/watch?v=At_Zac4Xezw Vision Summit 2016

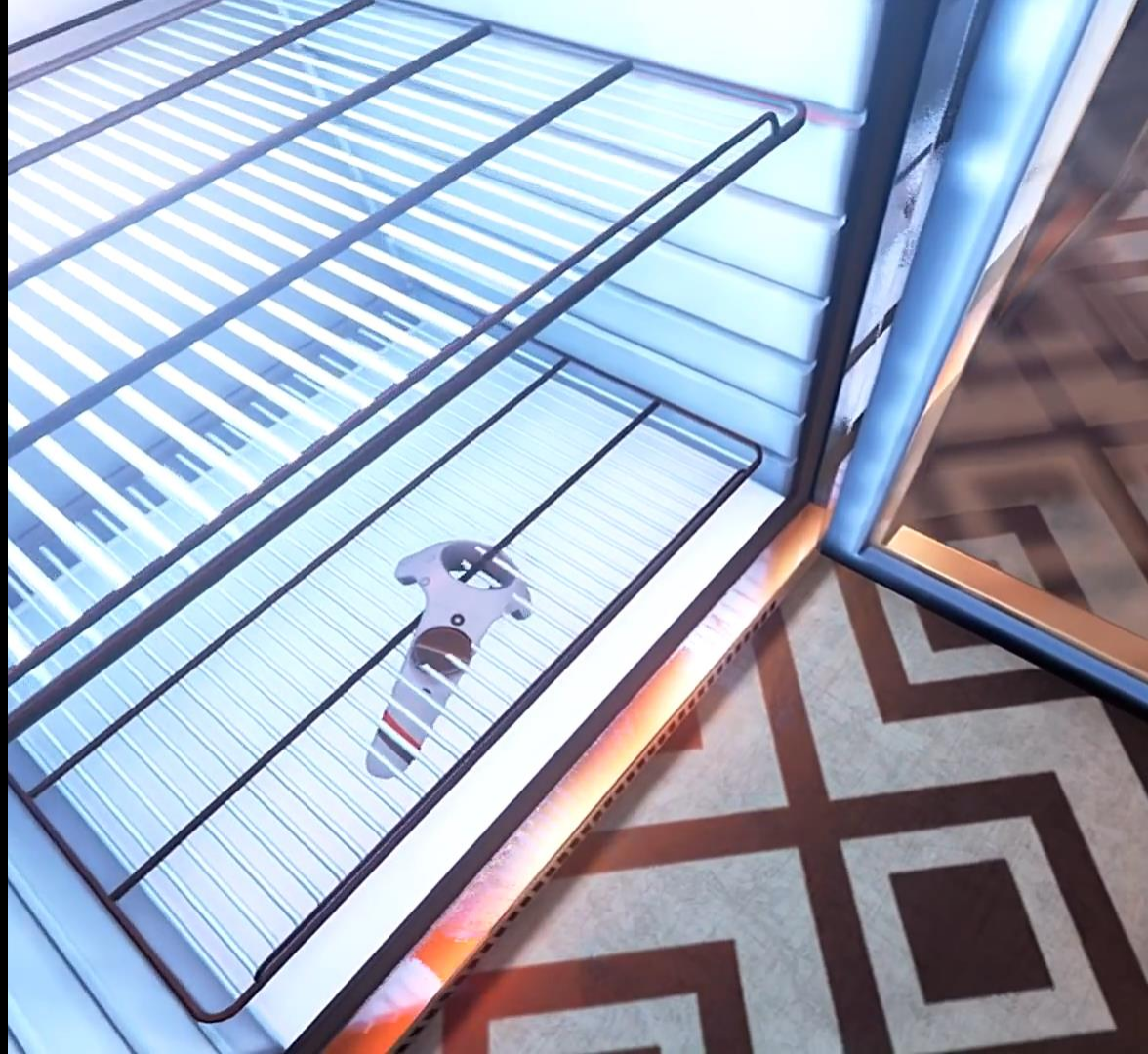
Don't just teleport - How to walk around something that is bigger than your tracked space, Re'flect / Audi Experience

User Error



Room of Possibilities

Presence Agency

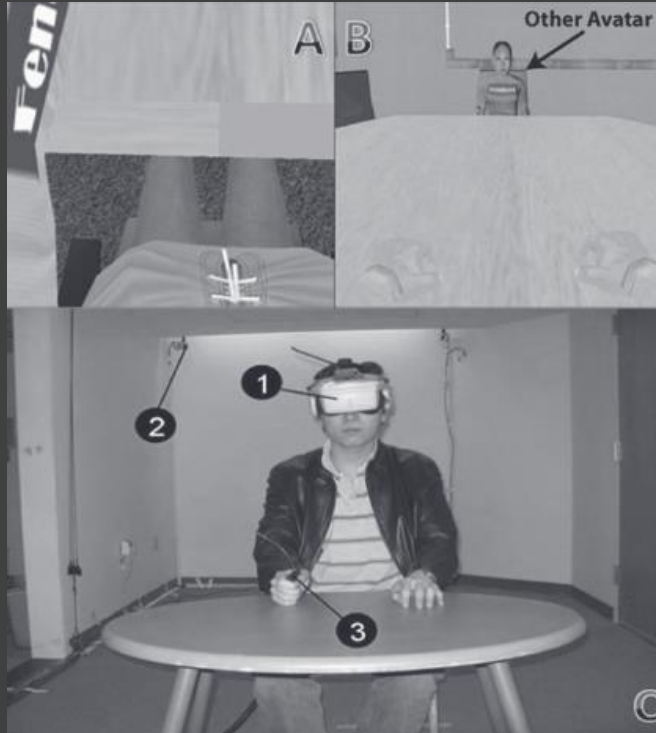


Acting

Role or Self

SELF-ENDORSING

The Effect on Brand Attitude and Purchase Intention





Self-Perception and Identity

- Cognitive
- Social
- Emotional
- Connotative

Identities & Context

- **Father**
- **Basketball player**
- **VR Expert**

Switching Avatars

Redefining The Axiom Of Story

		<u>EXISTENCE</u>	
		OBSERVANT	PARTICIPANT
<u>INFLUENCE</u>	ACTIVE	OBSERVANT ACTIVE	PARTICIPANT ACTIVE
	PASSIVE	OBSERVANT PASSIVE	PARTICIPANT PASSIVE

Chose vs. Change

Magician's Choice

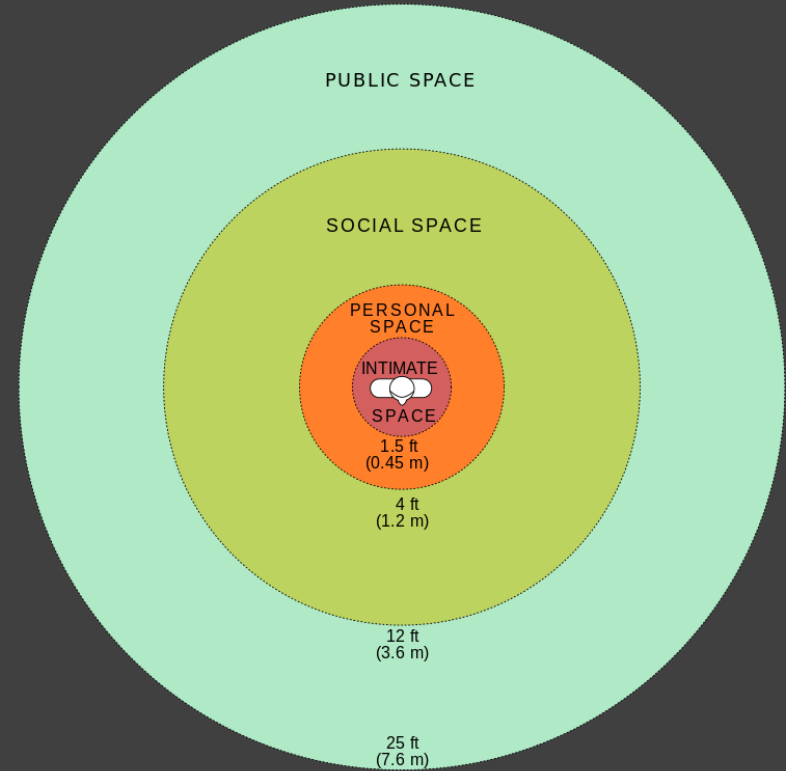


Actors
Agents
Avatars



Proxemics (US)

Public	3.70m +
Social	1.22m - 3.70m
Personal	0.46m - 1.22m
Intimate	0.00m - 0.46m

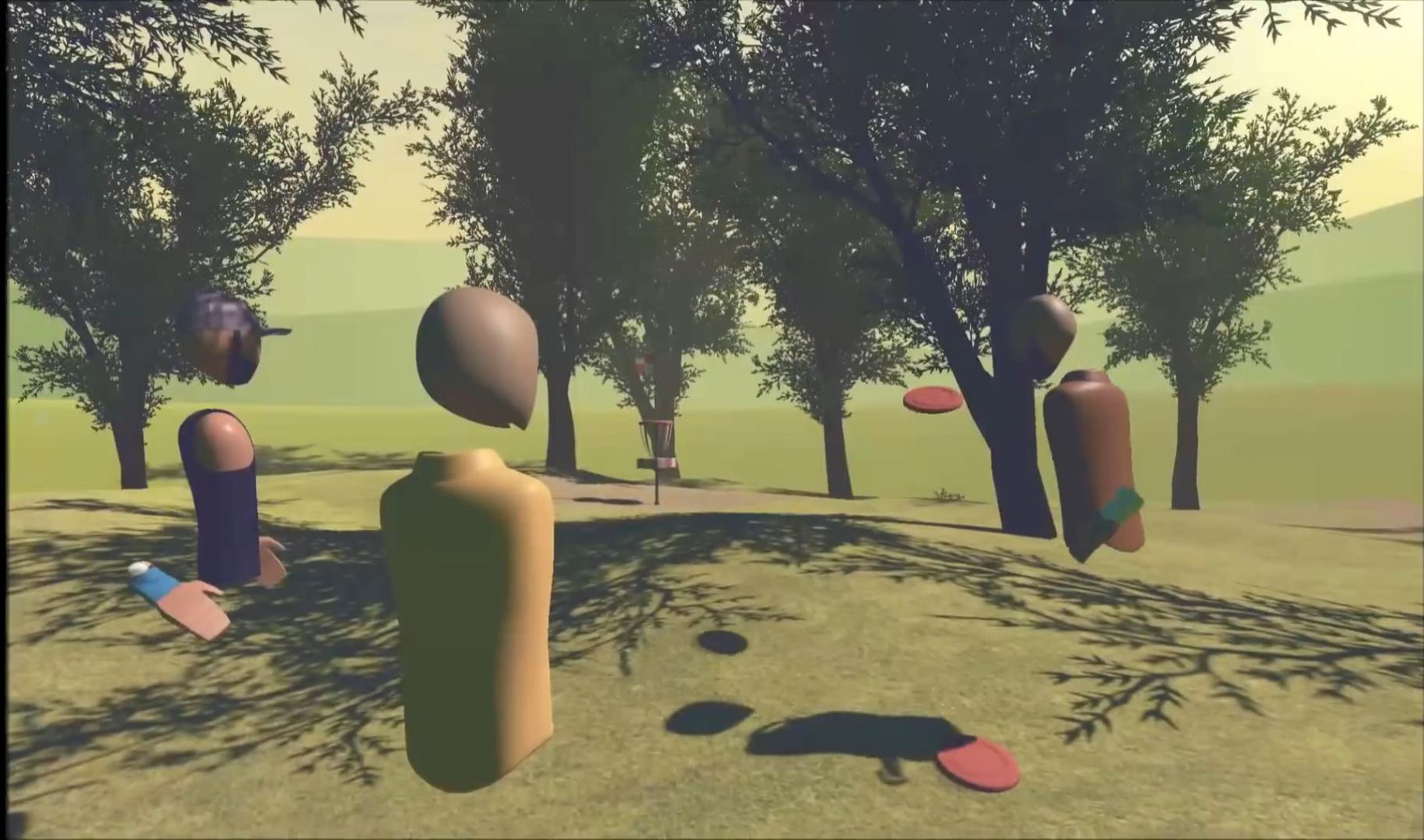


Agents vs. Avatars

- Perceived avatars have stronger responses than perceived agents
- Human controlled virtual representations have more social influence on users
- Amplified effect in competitive and cooperative rather than neutral tasks

Percieved
Humanness?

Presence
Agency
Social



Social Presence



Entrance

Chilly



Harassment



Daydream Labs Lessons Learned from VR Prototyping - Google IO 2016

Waiting for your opponent.

Limit bad behavior by design

Self- Representation

Relevant Variables for Self-Representation

- Publicness
- Kind of Audience
- Kind of Relationship
- Intention
- Content
- Self-Attention
- Self-Efficacy



Adjust your car
to reach the goal.

Psychology

Design

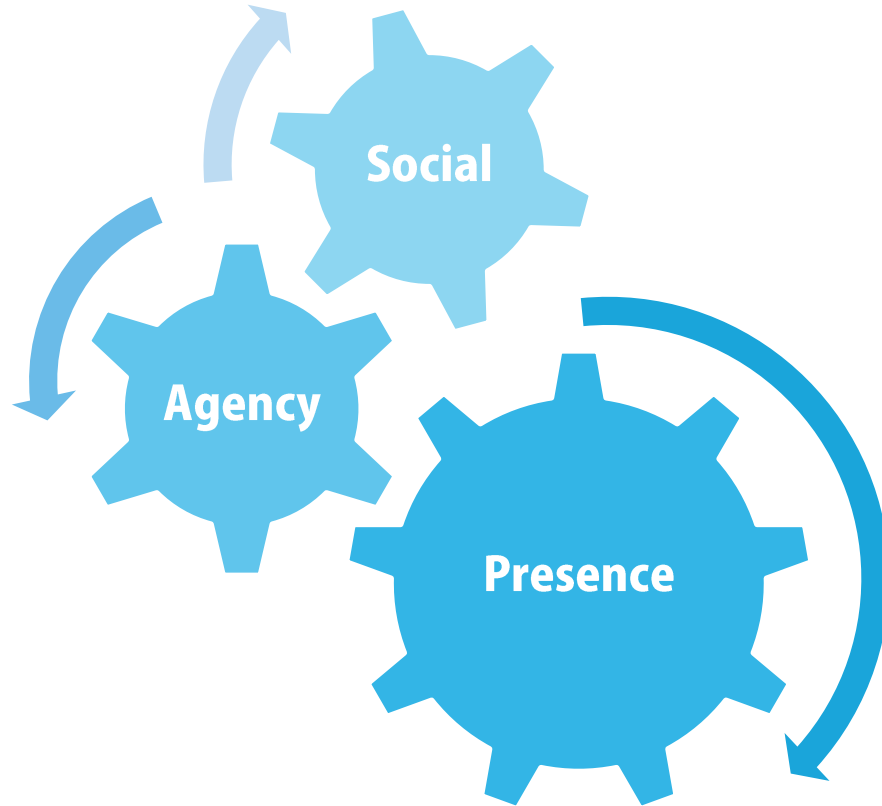
VR

Iterative Approach

Technology

Think Outside the Box

VR AS A NEW MEDIUM



Emotional
Meaningful
Magical

The background of the slide is a photograph of a vast field of golden wheat in the foreground, stretching to a distant horizon. The sky above is a mix of soft pinks, oranges, and blues, suggesting a sunset or sunrise. Overlaid on the center of the image is a white, semi-transparent wireframe geometric shape, resembling a complex polyhedron or a stylized dome, which adds a technological or virtual element to the natural scene.

*“Psychology is the physics of
virtual reality.”*

William Bricken, (1990)



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