

Presence and Immersion



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Part I: Mel Slater

MEASURING PRESENCE

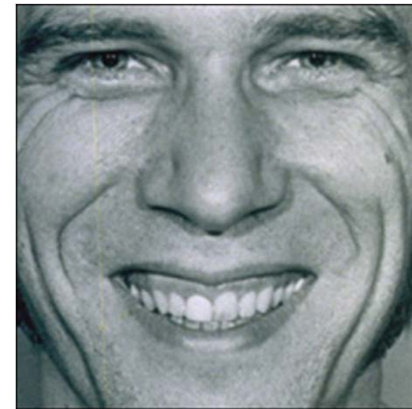
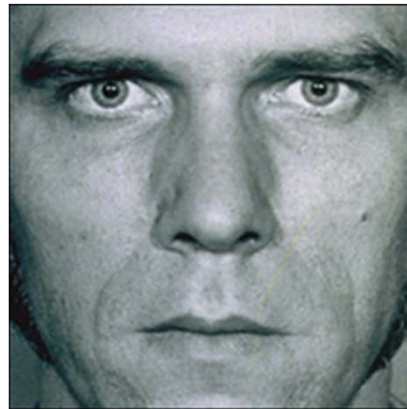
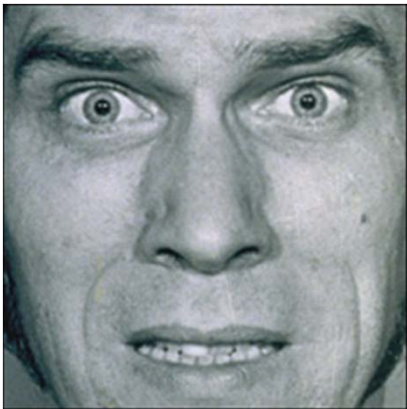
Immersion

- “Simply a description of overall fidelity in relation to physical reality provided by the **display and interaction systems.**” (Mel Slater)



Presence

- “The **human response** to the system, and there are many ways in which the meaning of presence have been formulated” (Mel Slater)



Measuring Presence

- Often we want to know whether some parameter of immersion contributes significantly to presence
 - Why bother with a head-mounted display or stereoscopic 3D if presence is not enhanced?
- We can set up experiments with different immersion configurations and then we **measure the presence...** but how?

Measuring Presence

- Subjective measures
 - Questionnaires
 - Interview
- Behavioral measures
 - Reaction (duck!)
 - Performance (tasks)
- Physiological measures
 - Galvanic Skin Response
 - Electromyographic Signal (EMG)



Measuring Presence

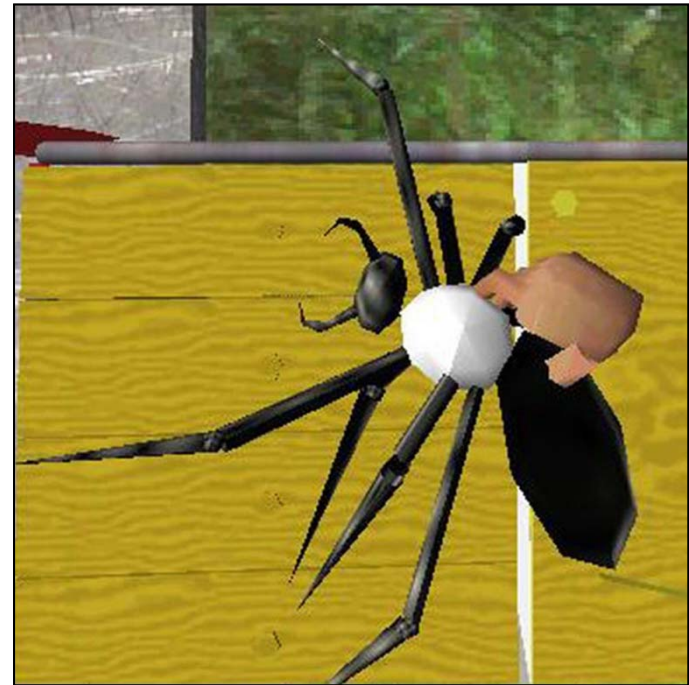
- “Breaks in Presence” (BIPs) Measure
 - Sudden launches of participant’s awareness into the real world
 - Such breaks reported by subjects
 - Could range from bumping into a real wall to noticing a bad texture
 - Correlates with other measures

Some Results

- Display Parameters
 - Bigger and faster is better!
- Visual Realism
 - Not clear (e.g. same task performance)
- Sound
 - (+) Personal HRTF, Spatialized, Non-Spatialized (–)
- Haptics
 - Better than no haptics (e.g. plank in pit-room)

Practical Results

- Adding **haptics** to **spider phobia therapy** greatly improved the results! (Hoffman, 2003)



Part II: Ijsselsteijn and Riva

MEDIATED ENVIRONMENTS

Mediated Environments

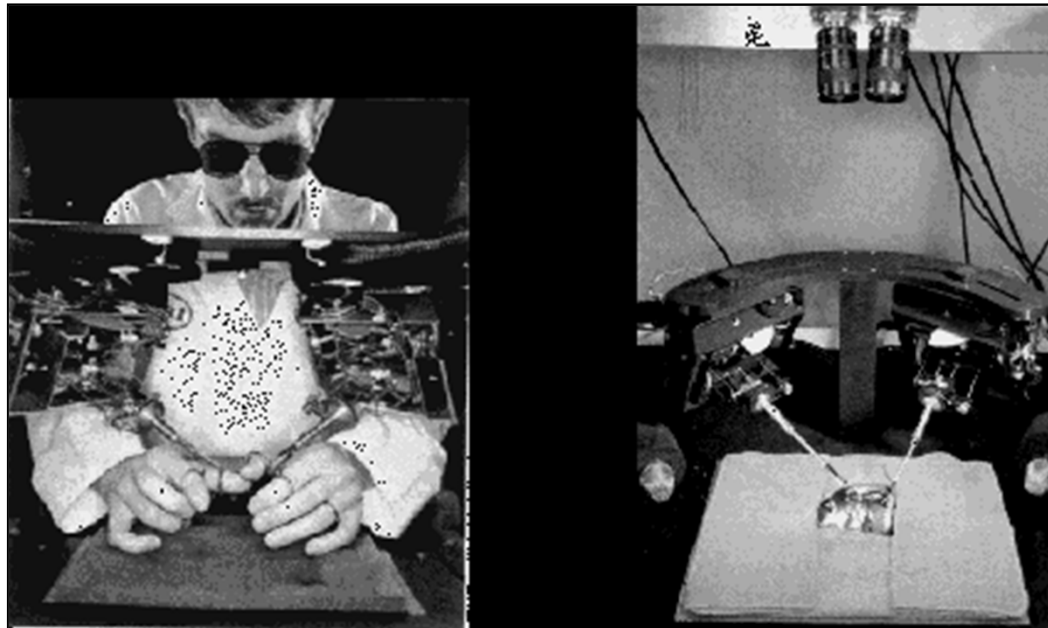
- Escape from reality...

...to be able to do anything one may desire to do,
and go anywhere one wishes – seems to be one
of the basic motivations behind the appeal of
media in general,

and the fascination with virtual environments in
particular.

Mediated Environments

- Illusory shift in point of view
 - Displacement of the participant's self-perception
 - Sense of transparency of the medium



Mediated Environments

- Presence is:
“A perceptual illusion of nonmediation”
(Lombard and Ditton, 1997)



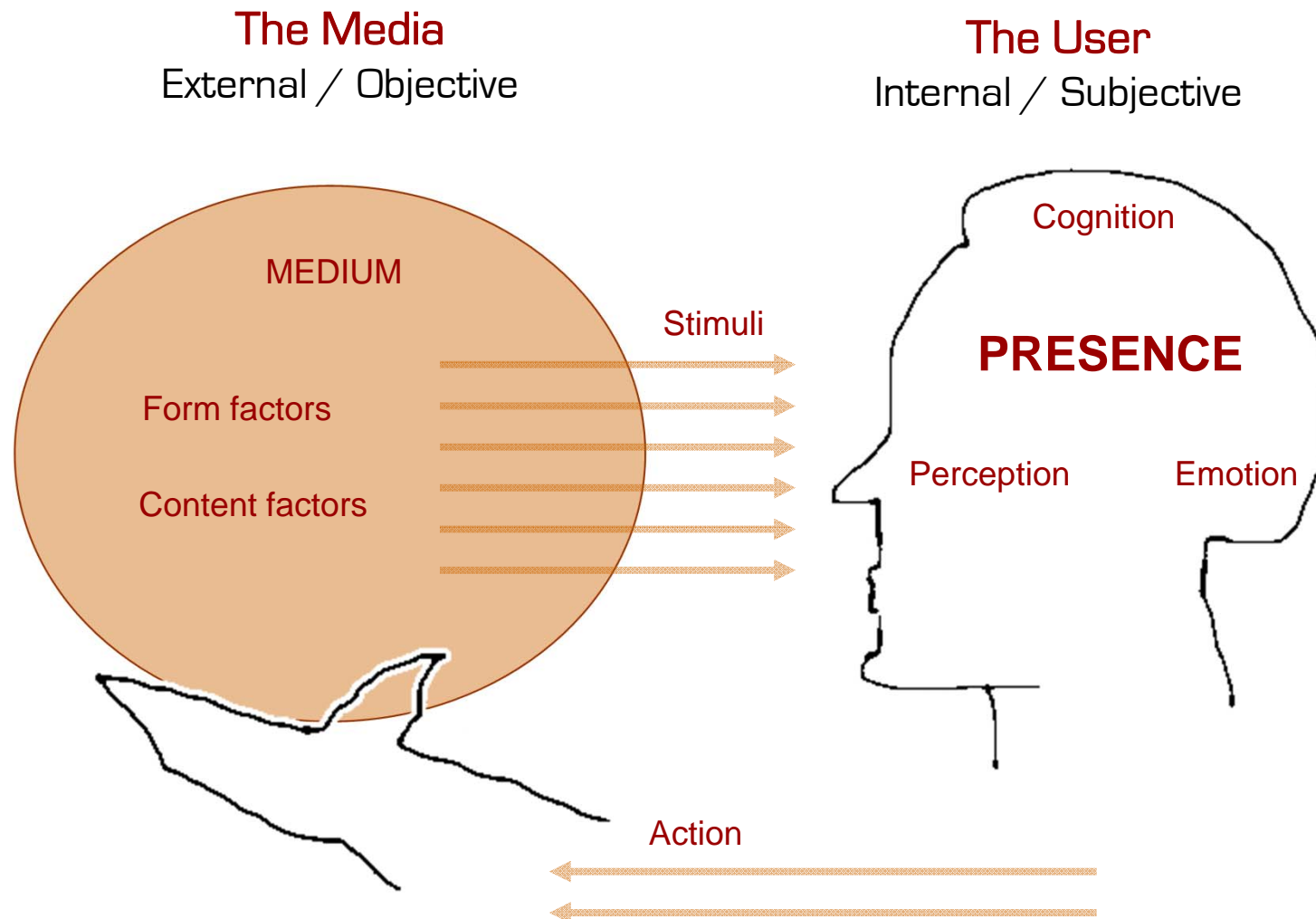
Mediated Environments

- The feeling of “being there”, or “presence”
 - Not intrinsically bound to any specific type of technology.
 - It’s a product of the mind.
 - We are seldom aware of it.
- With Immersive media
 - It becomes relevant.
 - What causes presence, how can it be measured and what’s the effect on users?

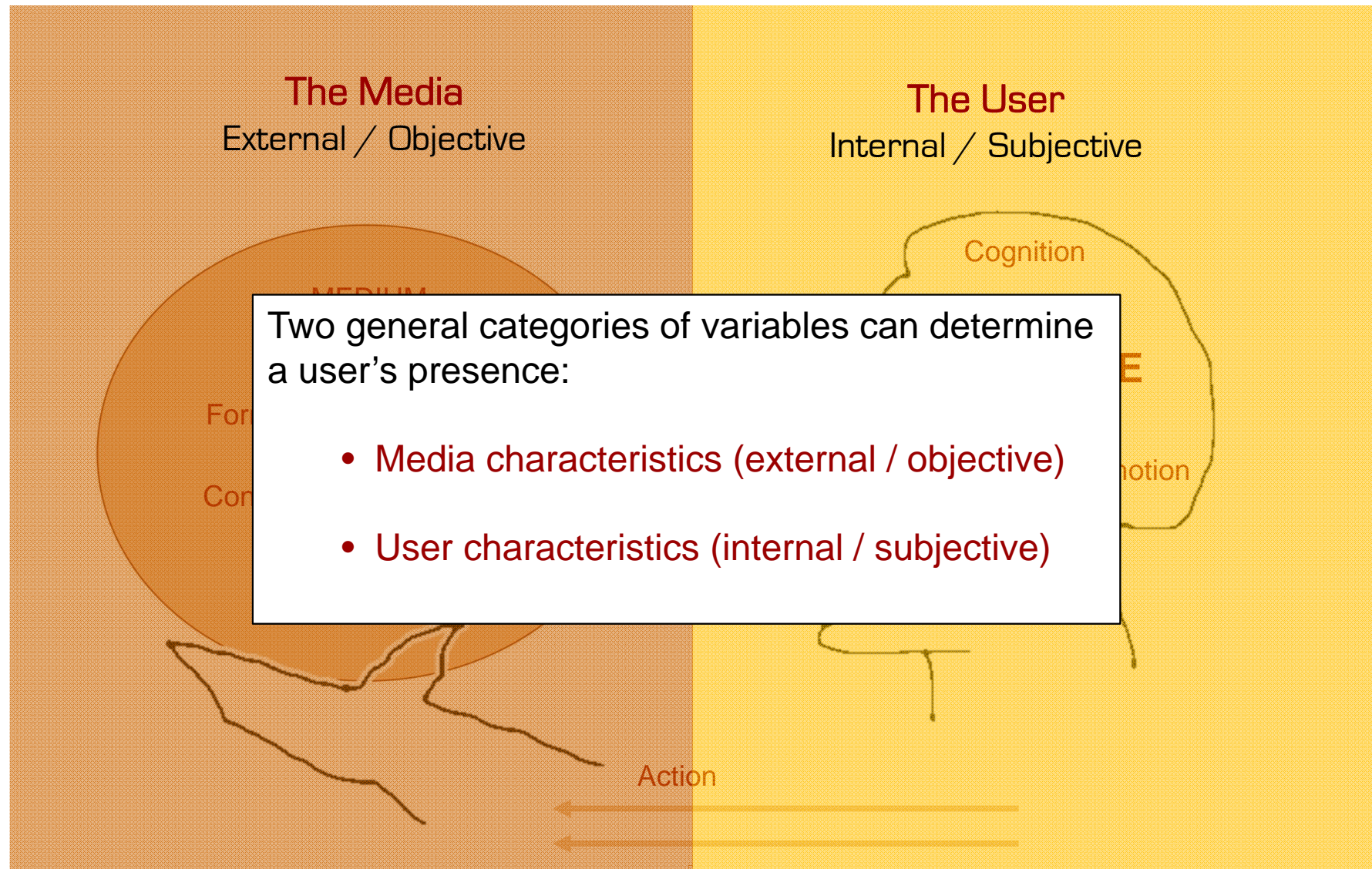
Complexity of Presence

- The consensus about presence
 - It is a complex, multidimensional perception formed through an interplay of raw (multi-) sensory data and various cognitive processes.

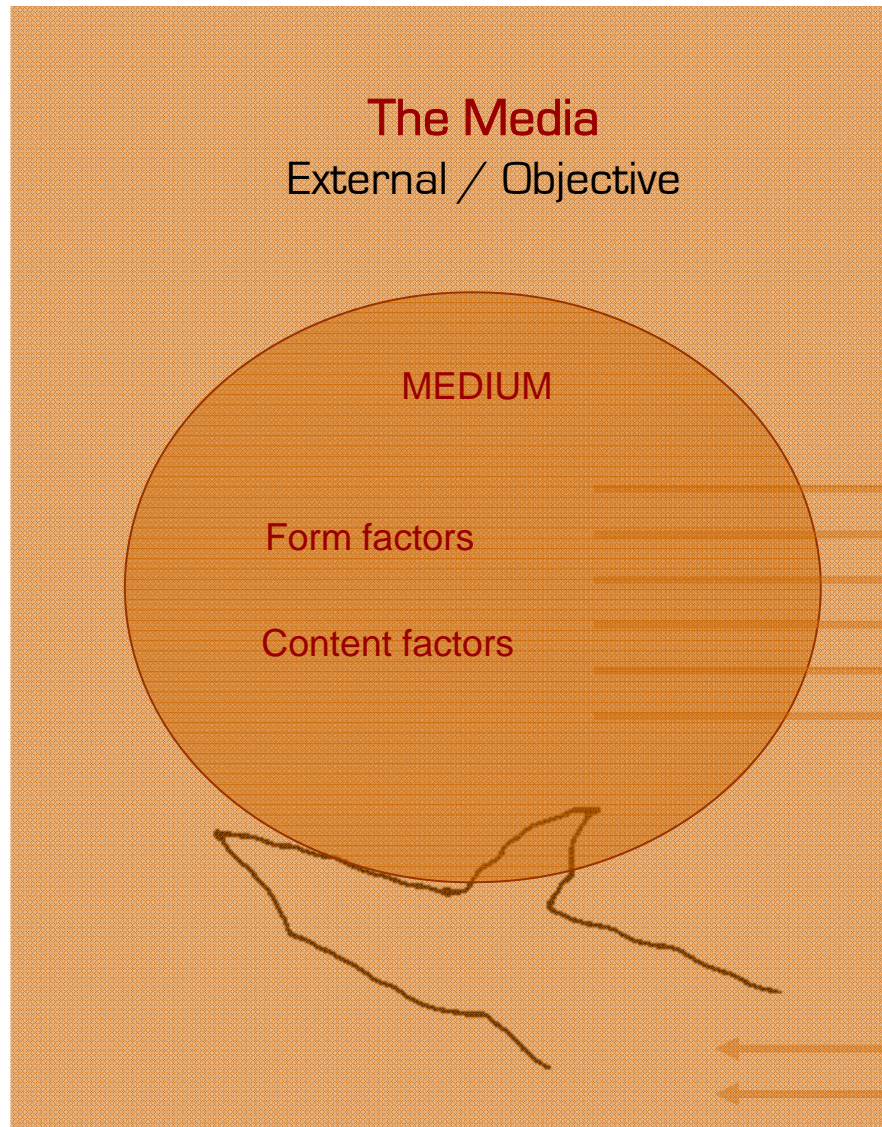
Structure of Presence



Structure of Presence: Media vs. User



Structure of Presence: The Media



- **Form**

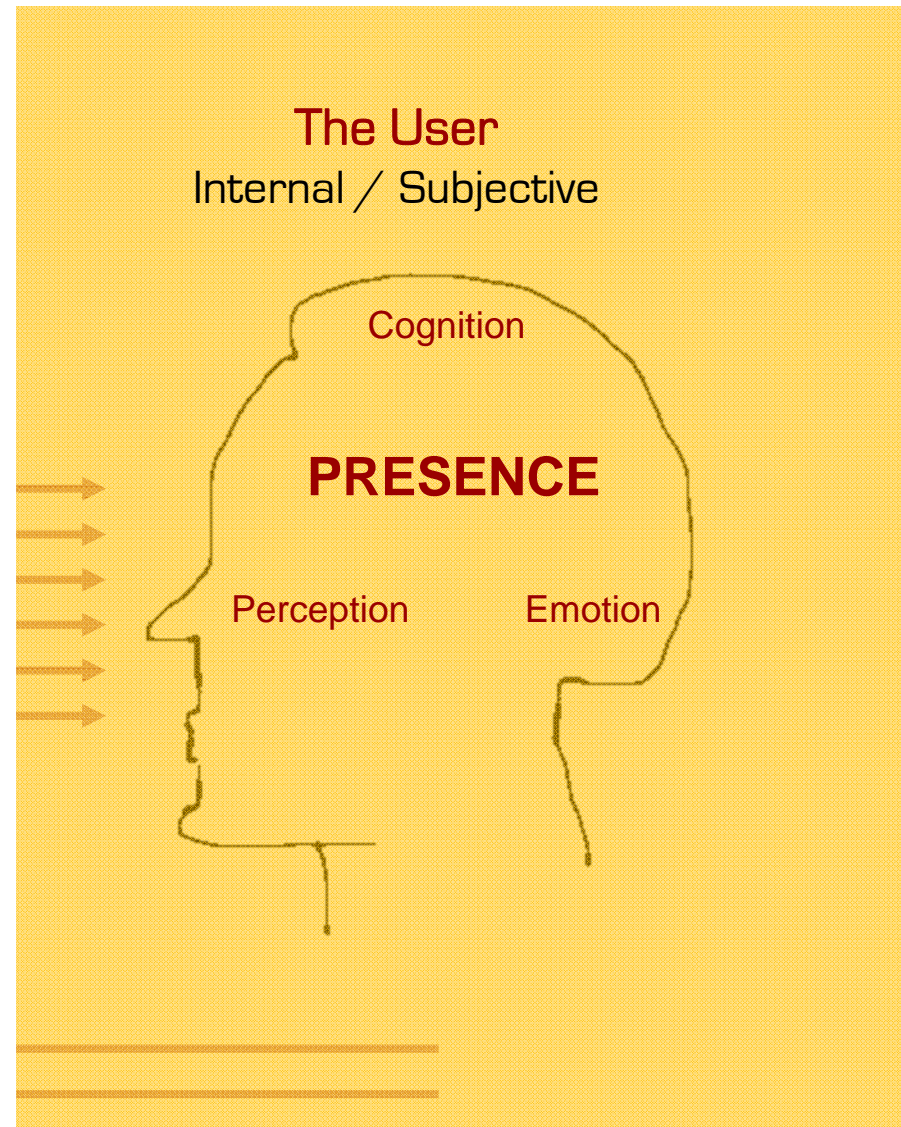
- The extent of sensory information.
- The level of control over sensory mechanisms.
- The ability to modify the environment.

- **Content**

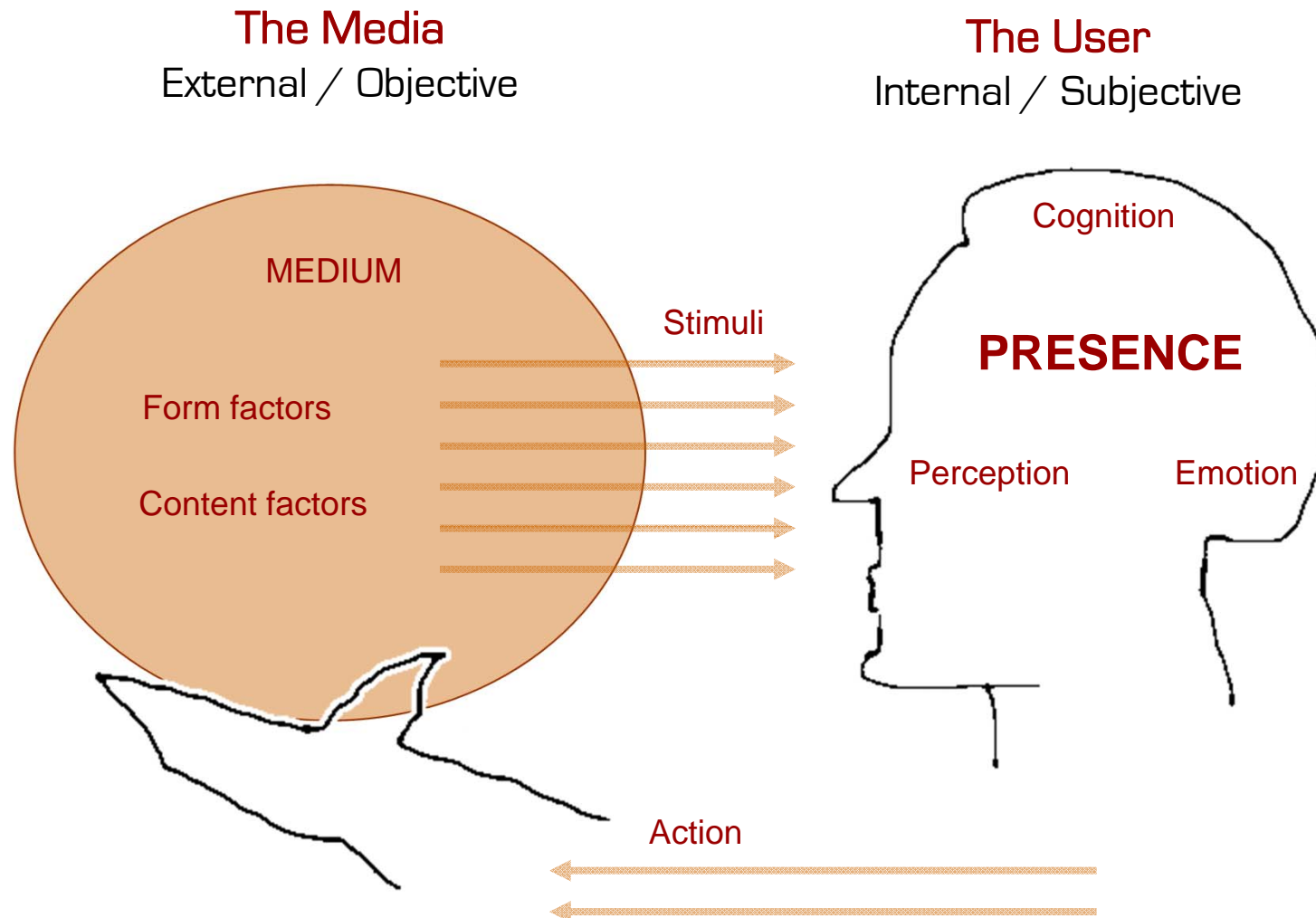
- Objects, actors and environment tied together into a logical flow of events: Narrative or Story.

Structure of Presence: The User

- **Cognition**
 - Goals, Preferences, Memory...
- **Perception**
 - Attention, Expectation, Recognition...
- **Emotion**
 - Feeling, Attitude, Alertness...
- **Personal traits:**
 - Gender, Age, Personality...



Structure of Presence



Complexity of Presence

- Presence is:

“... the continuous responses of sensory, cognitive and affective processing systems to objects and entities in the environment”

(Ijsselstein and Riva, 2003)

Part III: IJsselsteijn and Riva

SOCIAL PRESENCE

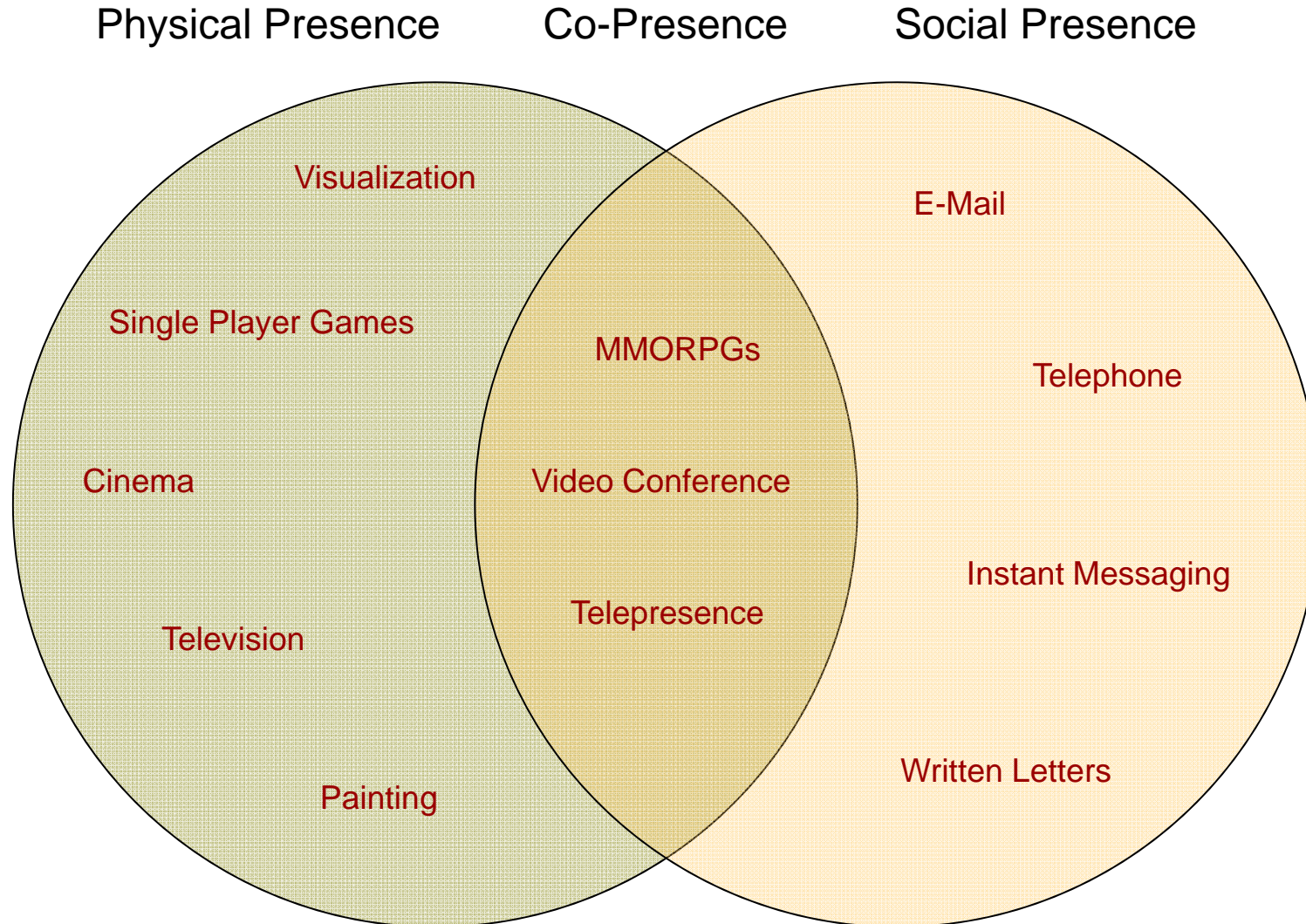
Culture rather than immersion?

- The cultural or social context
 - Shared cultural codes that allow us to interpret our environment.
- The cultural approach to Presence
 - Focuses more on the actions afforded by the environment within a social context.
- The cultural reality of experience
 - Defined relative to functionality, rather than to appearances.
- ~ 70 % of MUD users feel a sense of presence!

Types of Presence

- Physical Presence
 - Physically located in a mediated space.
- Social Presence
 - Being together with a remote partner.
- Co-Presence
 - Being together in a shared space.

Types of Presence



Designing for Presence

- Design to serve a purpose
 - Must be designed with intended users' tasks and goals explicitly considered.
- Must support flow of action
 - During the experience, the knowledge relevant to the goal should be shared, and actions supported and coordinated.

Designing for Presence

- Ultimately about the users' experience
 - And how the users respond.
 - Regardless fidelity of simulation technology (i.e. regardless of *immersion*).

Importance of Presence

- Research into presence is important
 - As is research into other user-centered concepts.
(e.g. usability, flow, affective responses)
 - Moves beyond technology-pushing.
 - Asks about purpose and context of use.

Part IV: David Zeltzer

THE AIP CUBE

[Zeltzer, 1992]

Taxonomy of Graphic Simulation

- **Autonomy**
 - Computational models of objects and processes.
- **Interaction**
 - Means to modify the states of these models.
- **Presence**
 - Mediating channels that allow participants to experience the simulated events.

Autonomy

- Qualitative measure of the ability of a model to act and react to simulated events.
- One extreme
 - Passive geometric data structure with no associated procedures.
- Other extreme
 - Virtual actors capable of reactive planning.

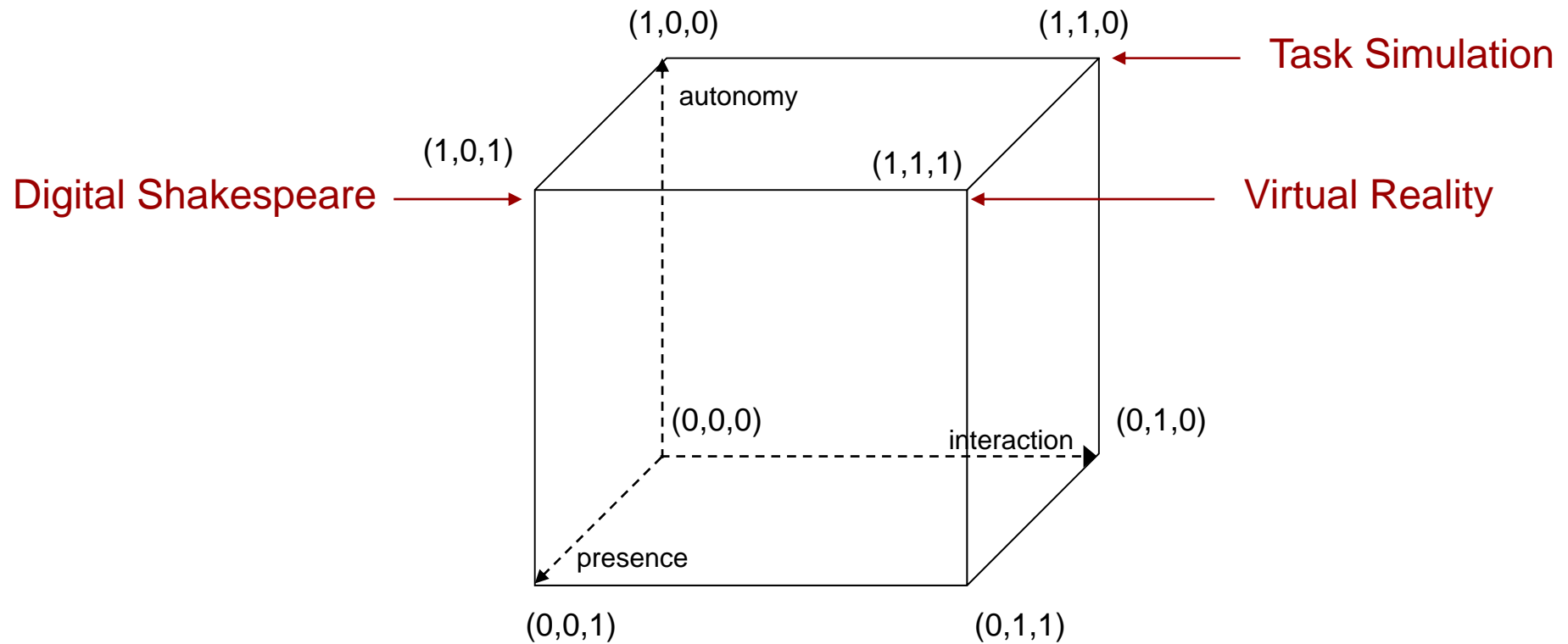
Interaction

- Paradigm varies
 - Depends on at what level of abstraction one accesses the model parameters.
- Direct access
 - Not necessarily productive!
- The right access
 - Degrees of freedom problem.
 - All about understanding the functional relationship among input parameters.

Presence

- Sense of being in and of the world
 - Emerges from a “bath” of sensation.
- Meaningless unless we specify
 - The application domain.
 - The task.
- We need to specify (“selective fidelity”)
 - Present where?
 - For what purpose?

The AIP Cube



The AIP Cube

- Ultimate Virtual Reality (1,1,1)
 - may represent an unattainable node.
- We have pursued it through millennia!
 - New electronic tools are merely transforming the medium.

Part V: Heeter,

DIMENSIONS OF PRESENCE

Dimensions of Presence

Same process as discerning and validating
the existence of self in the natural world.

(Heeter, 1992)

Dimensions of Presence

- **Personal** Presence
 - Why you feel like you're in another world
- **Social** Presence
 - Other beings exist and appear to react
- **Environmental** Presence
 - Environment appears to react

Personal Presence

- In immersion VR, real world perceptions are simulated. Seeing your own hand or body in there helps as well.
- In second person VR, rules have changed and “seeing is believing”. Crucial to see “yourself” in the environment and believe the interaction.
- In both cases, familiarity with the world helps.

Social Presence

- If others ignore you, you begin to question your own existence.
- The “social construction of reality” is strong.
- The “others” may not be other people like you!

Environmental Presence

- The environment confines your movement.
- The environment can actually move you around with it.
- You can modify the your environment.
- Can the VE create an even stronger Environmental Presence than the real world?

References

- Mel Slater: <http://www.lsi.upc.edu/~melslater/>
- Zeltzer, D. (1992) “Autonomy, Interaction, and Presence”, PRESENCE 1(1), MIT Press
- Heeter, C. (1992) “Being There: The Subjective Experience of Presence”, PRESENCE 1(2), MIT Press
- Ijsselstein, W. and Riva, G. (2003) “Being There: The experience of presence in mediated environments”, Being There: Concepts, effects and measurement of user presence in synthetic environments, Riva, Davide, Ijsselstein (Eds.), Ios Press
- Min Lee, K. (2004) “Presence, Explicated”, Communication Theory, 14(1), ICA