

## Presence and Immersion

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Part I: Mel Slater

## MEASURING PRESENCE

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## Immersion

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



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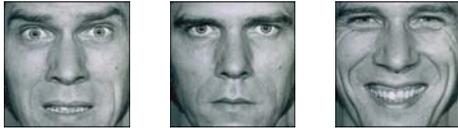
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## Presence

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



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## 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?

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## Measuring Presence

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



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## 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

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## 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)

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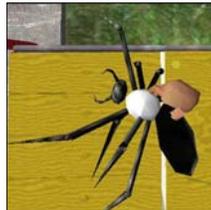
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## Practical Results

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



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Part II: Ijsselstein and Riva

## MEDIATED ENVIRONMENTS

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### 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.

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### Mediated Environments

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



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## Mediated Environments

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



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## 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?

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## 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**.

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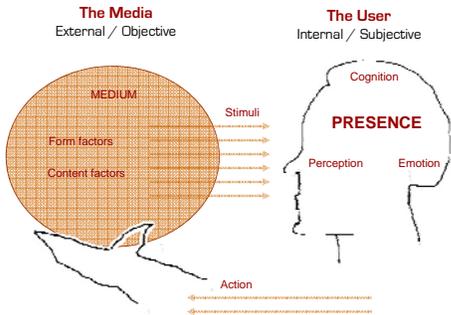
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## Structure of Presence




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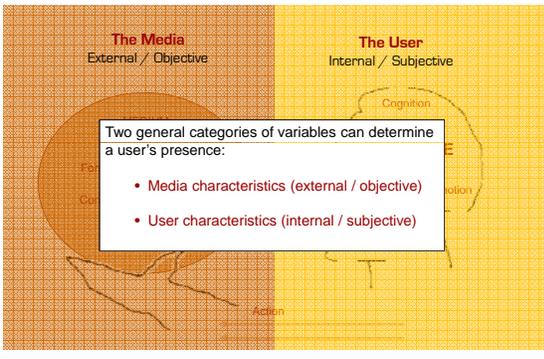
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## Structure of Presence: Media vs. User




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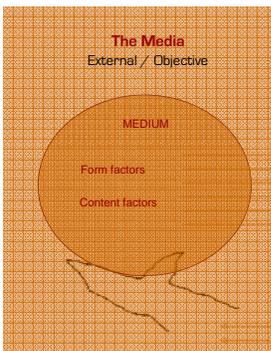
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## Structure of Presence: The Media



- **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.

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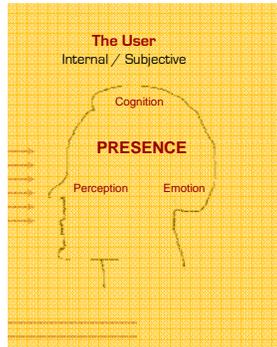
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## Structure of Presence: The User

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



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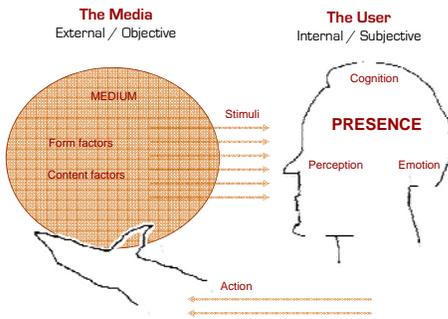
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## Structure of Presence



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## 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)

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Part III: Ijsselsteijn and Riva

## SOCIAL PRESENCE

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### 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!

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### 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.

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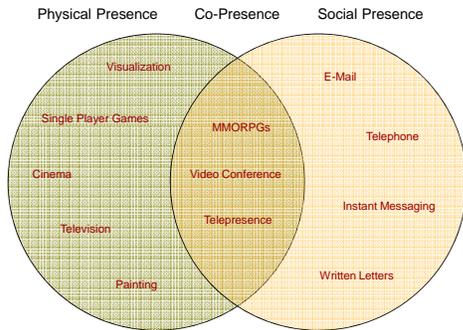
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## Types of Presence



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## 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.

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## Designing for Presence

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

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## 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.

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Part IV: David Zeltzer

## THE AIP CUBE

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[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.

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## 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.

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## 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.

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## 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?

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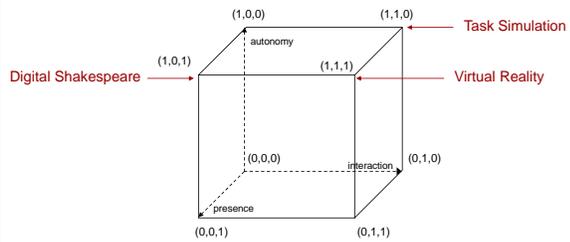
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## The AIP Cube



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## 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.

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Part V: Heeter,

## **DIMENSIONS OF PRESENCE**

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## Dimensions of Presence

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

(Heeter, 1992)

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## 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

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## 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.

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## 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!

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## 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?

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## 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

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