

# Is presence in a physical environment influenced by arousal and attention?

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# The difficulty of defining presence

- The most « common » definition is the illusion of being *there* in the virtual environment. (*Sadowski & Stanney, 2002*)
- There is much less agreement about every other aspects of presence...
- Emotions appear to contribute to physical presence.

# Anxiety and physical presence are correlated

- $r = .74$  ( $p < .01$ )
  - Robillard et al., 2003
- $r = .28$  ( $p < .05$ )
  - Renaud et al., 2002
- $r = .45$  ( $p < .05$ )
  - Schumie et al., 2000
- $r = .25$  (*ns*)
  - Regenbrecht et al.

*Renaud et al., 2002.* --->

- Head tracking of fearful and non-fearful subjects.
- Significant differences in behavior when looking at a spider.

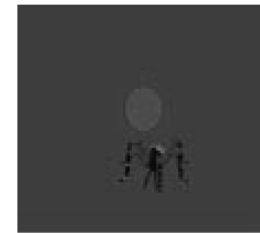


Fig. 1. Virtual spider and sighting as they appeared in the virtual environment.

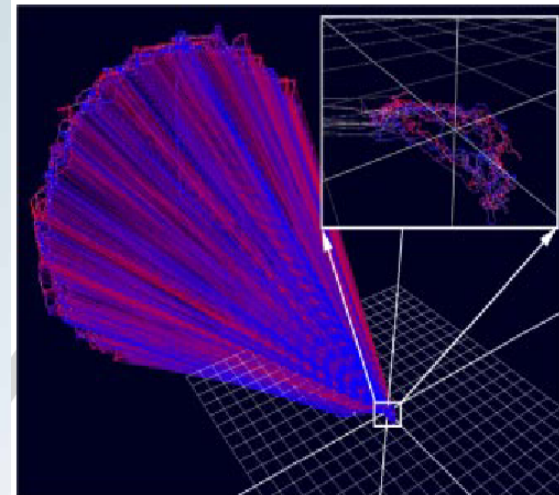


Fig. 2. Representative tracking projections in Eulerian rotations when the trajectory of the target was random (2A). Tracking projections start from each new head position and reach the delimiting spherical zone. Translation changes (in  $x$ ,  $y$ , and  $z$  Cartesian coordinates) are illustrated in 2B.

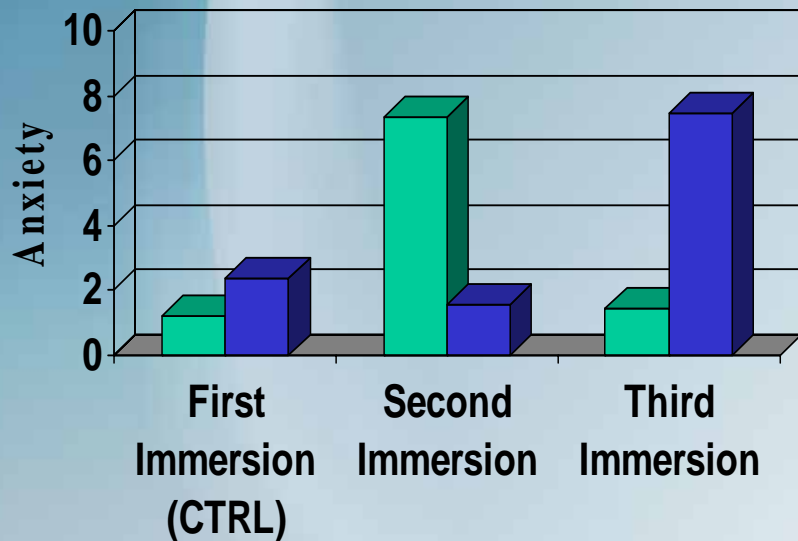


# Assessing the relationship between emotions and presence

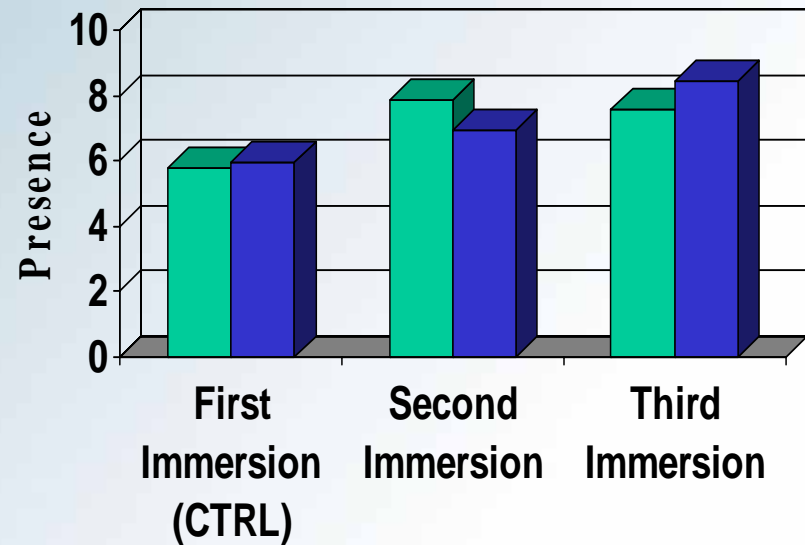


- Snake phobics were led to believe that some environments were filled with hidden snakes. *Bouchard et al. (next issue of Presence)*.

Measured at post immersion



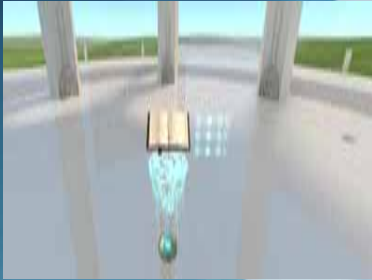
Measured at post immersion



■ CTRL - ANX - NOANX ■ CTRL - NOANX - ANX

■ CTRL - ANX - NOANX ■ CTRL - NOANX - ANX

# Similar results were found for negative mood by Baños et al. (2007)



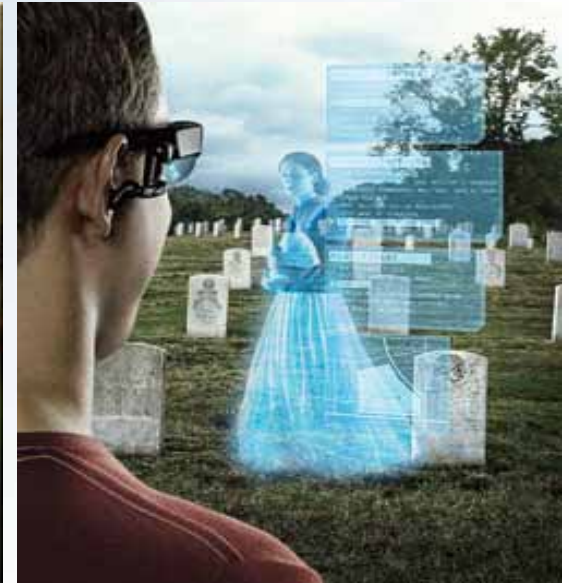
- Tested if presence can be enhanced by using emotional content.
  - HMD vs video wall vs PC monitor.
  - Induced sadness of no mood (ctrl) using the content of the VR environment.
  - N = 60.
- Significant effects of negative mood on presence were found on the ITC-Sense of Presence Inventory ( $p < .05$ ) and the Reality Judgment and Presence Questionnaire (from  $p < .05$  to  $.001$ ).
- Interestingly, the emotional induction was able to induce presence even in the PC monitor condition...

# Why would emotions influence physical presence?

- Increasing arousal and attention towards emotionally relevant cues may increase the salience of the virtual stimuli.
- A variation on Descartes « I think, therefore I am » (*cogito, ergo sum*) : « I feel something, therefore I must be there for real ».
  - A cognitive labeling of emotional states (e.g., Schacter & Singer, 1962).
- A problem in defining the concept.

# Second thoughts about defining the concept.

- The problem of defining presence becomes more obvious with augmented reality: Where are we, really...



Is presence in a physical environment  
influenced by arousal and attention? **A  
study conducted on researchers in  
cyberpsychology.**

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# Aim

- Document the impact on physical presence of an increased in arousal and attention among researchers in cyberpsychology.
- Based on the assessment of being present in the physical environment.
  - You can hardly be more here than you actually are.
  - Did the fact that I answered the phone abruptly during this talk have an impact on your feeling of presence ?

# Method

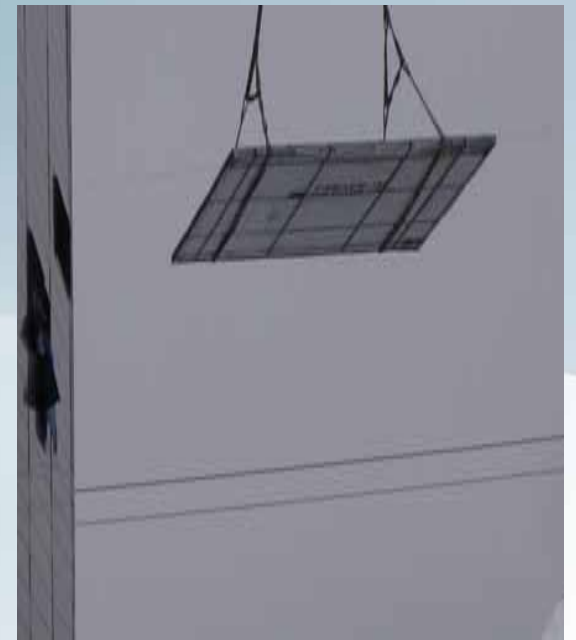
- You know it, you've participated in the study.
  - Three mock calls occurred during the previous days in order to set the stage that the presenter is the kind of person to receive calls at inappropriate times.
  - A baseline assessment at the start of the symposium (see the documents at the addendum).
  - A control assessment before this talk.
  - An assessment after the mocked phone call during this talk.
  - Debriefing post-experiment (and post-symposium).

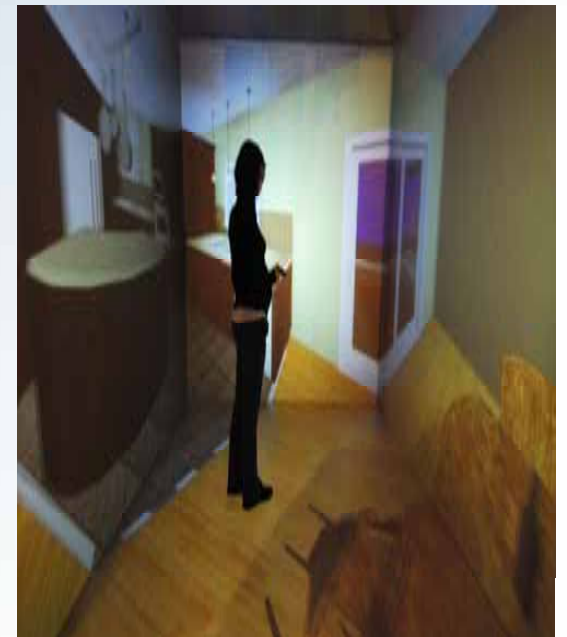
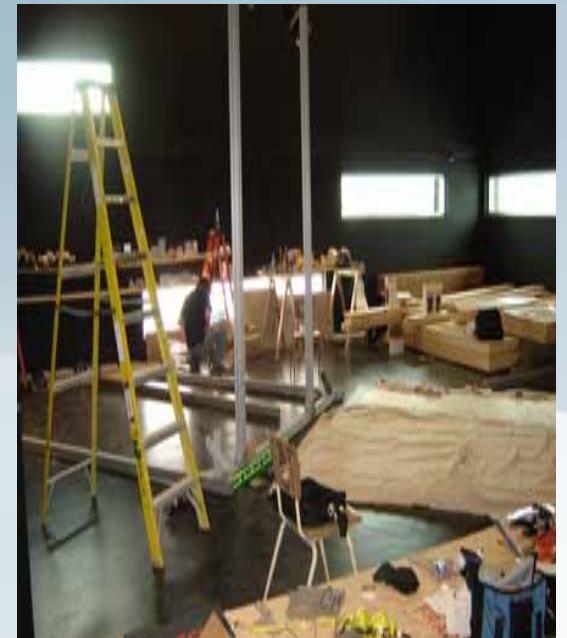
# While the assistant are compiling the results (*time filler*)

- The building of Psyche, a six-wall rear projection system (CAVE-like), in collaboration with VizTek and Intersense.

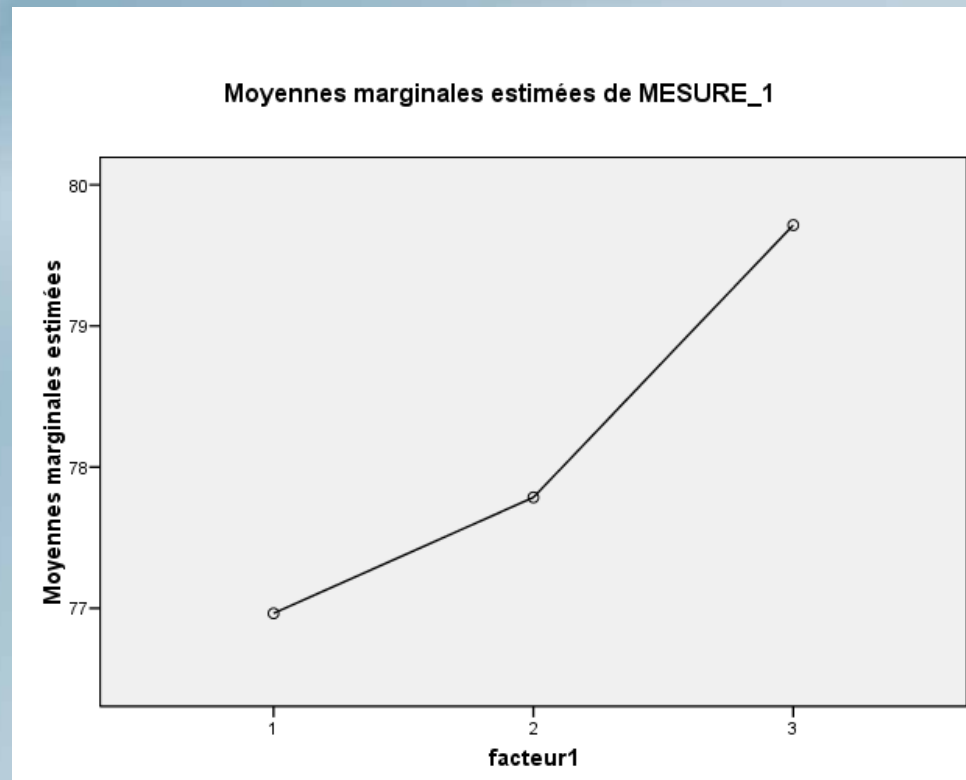








# Results



- Repeated measures ANOVA:  $N = 28$
- Time  $F = .684$  *ns*
- Contrast T2 vs T3:  $F = 1.056$  *ns*

# Presence remained stable !

- First, let's acknowledge some methodological limitations:
  - Statistical power, lack of control condition, use of a cell phone, the ringtone of the cell phone was not loud enough and could not be heard by the audience, no manipulation check, the question about presence does not relate to a VR immersion, etc.
- Second, it is intriguing to note that you are not entirely here (average around 80 here)... This may well be the most important finding of this study...
- This study suggest that we agree that presence is independent from emotions (if the manipulation had a real impact).
  - This is contrary to Salter's position (2004).
- Several measures of presence include items addressing attention and arousal (also referred to as engagement, involvement, etc.) and that is a problem.
  - e.g., Baños et al., Lessiter et al., Schubert et al.,

# Conclusion

- Our measurement tools of presence are often blurred by the inclusion of factors independent from being there....
- It is possible that emotions have an impact on presence through cognitive labeling of emotional states (*I felt something, therefore I must have been be there*) or because they provide additional cues that enhance the virtual experience.
- It may be time to consider other definitions, such as the illusion of non-mediation (*Lombard and Ditton, 1997*).

*Thank you for being research participants...*

# Addendum

- The following three pages were distributed to the participants.
- The first page was blue, the second green and the third yellow.
- They are copied here and could be enlarged and reprinted.

### Measuring presence live during a conference

We would like to conduct an experiment over the course of this symposium and you are invited to contribute as research participants. In this experiment you will be asked three times to rate your feeling of presence.

Your participation is anonymous, confidential and you must feel absolutely free to participate or not. By participating you will help us better understand the contribution of some factors associated with the feeling of presence. Results from the data gathered today will be presented this morning during our symposium.

In this experiment, **feeling present** means the subjective impression of being *here*, in the conference room.

If you agree to participate, please answer the four questions on that page and wait until you are prompted to complete the other questions. If you do not agree, please don't answer the questions and keep these sheets of paper with you.

First set of questions, to be completed right now:

Q1. What is your gender (please check the appropriate box):

- Female
- Male

Q2. How many years of experience would you say you have with virtual reality?

- Less than one
- Between 1 and 2
- Between 2 and 5
- More than 5

Q3. Do you already know the details of what will happen in the current study?

- Yes (if that is the case, you can still participate, we will analyze your data accordingly).
- No (don't worry, that's how it should be).

Q4 (baseline). Please rate, on a zero (not present at all) to 100 (totally present) scale "To what extent did you feel present in this conference room in the last 20 seconds?".  
\_\_\_\_\_ %

The first phase of this study is complete.

Please **WAIT** until you are invited to complete the questions on the following pages.



Second prompt by the symposium co-chair.  
You can now answer the following question.

Q5 (control). Please rate, on a zero (not present at all) to 100 (totally present) scale "To what extent did you feel present in this conference room in the last 20 seconds?".

\_\_\_\_\_ %

The second phase of this study is complete.

Please **WAIT** until you are invited to complete the rest of this experiment.



**Third prompt by the symposium co-chair.  
You can now answer the following question.**

Q6 (post-experiment). Please rate, on a zero (not present at all) to 100 (totally present) scale "To what extent did you feel present in this conference room in the last 20 seconds?"

\_\_\_\_\_ %

That was it.

Please give your copies to one of our research assistant who will enter and analyze the data.

Thank you very much.

