

# The Sense of Agency and the Sense of Presence: the Example of Schizophrenia

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## Presence and agency

- **Definitions:**

- « Sense of presence: psychological state of being in one place, or environment, even when one is physically situated in another. » (Witmer, 1998)

Important in VR, purpose : better understanding

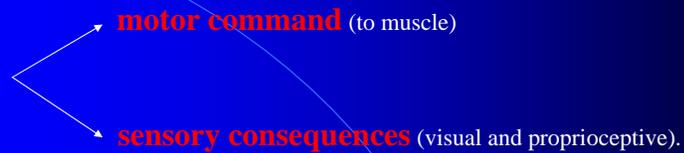
We would like to show the importance of agency in presence; the concept of agency makes a revision of the measurement of presence necessary.

- « The sense of agency: the ability to recognize oneself as the agent of a behaviour, the sense that he is causing an action. » (Jeannerod, 2003).

- Which type of relationship do those concepts have with each other?
- Example of schizophrenia.

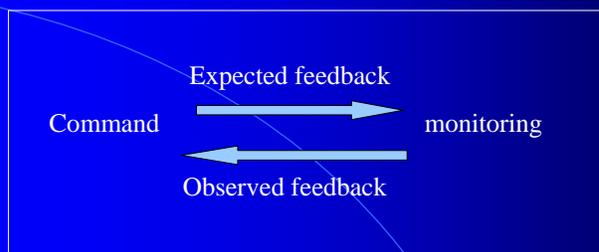
# Sense of Agency

In action, 2 types of signals:



Feedback is sent back to the center of the command: allows a **monitoring** and to verify that the **action is taking place correctly**.

# Sense of Agency



Ex: reach a glass

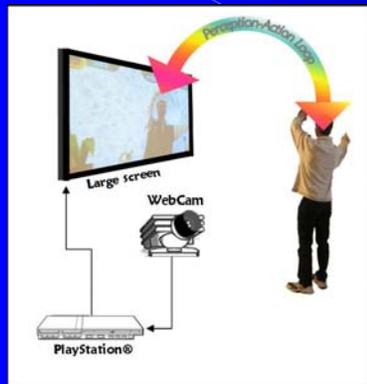


**Sense of agency**: matching between the observed feedback and the predicted one.  
(Campbell, 1999).

## Agency deficit in schizophrenia

- Clinical observation
    - negative symptoms: avolition (loss of motivation)
    - positive symptoms: delusion of influence, hallucination (Shergill, 2004)
  - 1st-3rd person confusion.
- => I move therefore I am. Sense of self.

## Action, Presence and the virtual world



- Positive association between the **body movements and presence**
- -> Whole-body mvt is associated with a higher sense of presence (Slater, 2000).

Reality is **grounded in action** rather than in mental filters and sensations. This approach concentrates on action rather than how things look and sound. « **Being there is actually the ability to do here** » (Zahoric, 1998).

## Hypothesis

- Agency and presence are related.
- If agency deficit in schz, then lower sense of presence in VE?

## Study

- Subjects:
  - 8 HC
  - 8 paranoid schizophrenic patients (DSM-IV)
- 1) Task: in order to compare presence to a motor task involving self
- 2) Questionnaire of presence (Schubert, 2001)
  - Subscales: realism
    - possibility to act
    - quality of interface
    - possibility to examine
    - self-evaluation
    - auditive
    - haptic

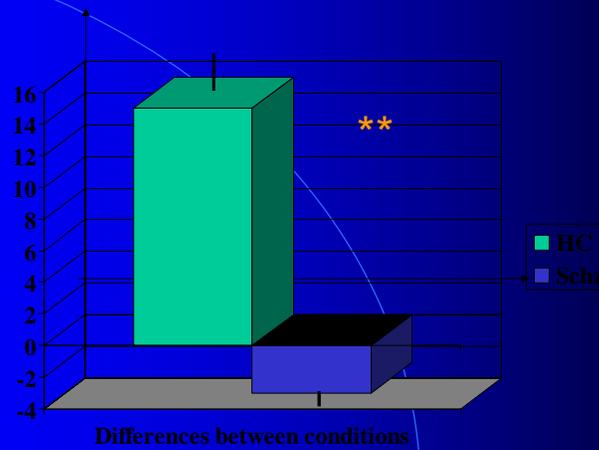
## 1. Control condition



## 2. Mask condition



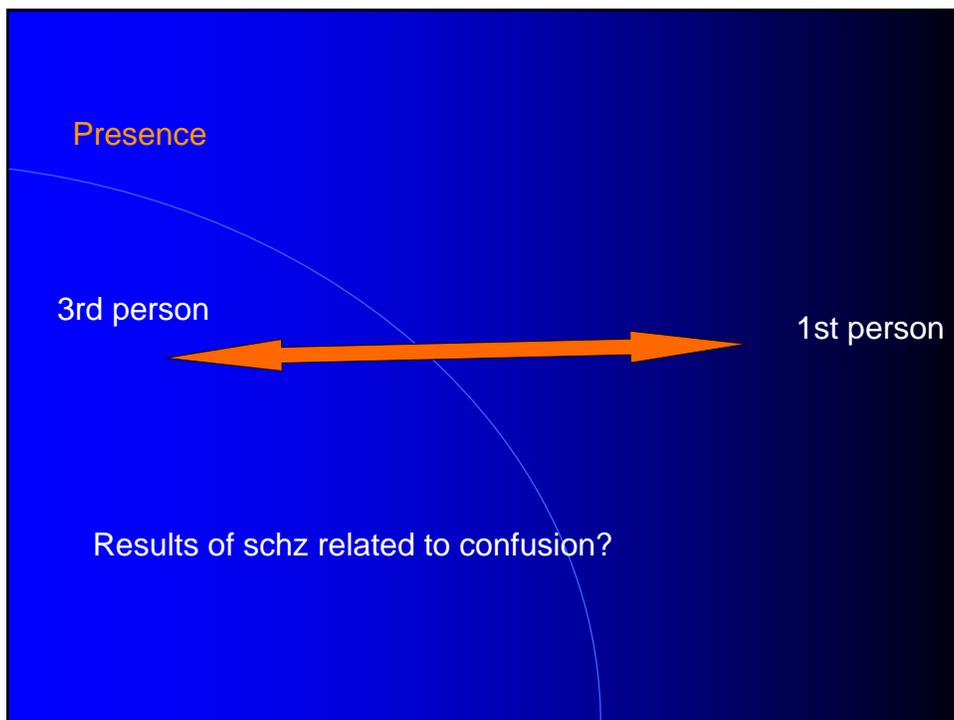
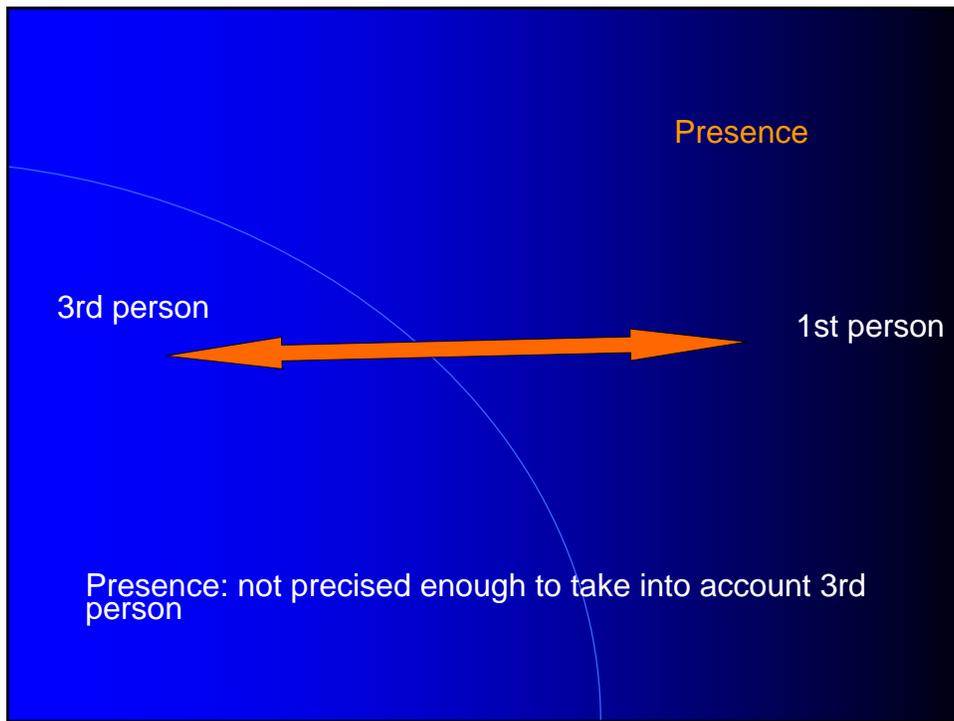
## Results: the Effect of the mask on the performances



## Presence

- Same results.
- Only Examination subscale differs significantly : Schz think to pay less attention.

	Realism	Action	Interface	Examination	Perf	Auditif	haptic
HC	32,9 3,6	23,5 3	6,5 3	14 3,6	11,6 2,5	12,5 3,66	5,7 4,5
SCH	32,8 5,4	36 18	14 14	10,0 2,3	9,5 3,1	14,8 4,8	6,2 2,4



## Conclusion

- - Agency contributes to a better understanding of the sense of presence.  
ex schz: rises question of relevance of presence
- - Presence = concept of normality ; not adapted to pathology  
i.e: opposition between ego/allo-centred, which is the first step towards 1st-3rd person distinction.
- - Rehabilitation (in process)

## Comments of a schz patient on the tests

MB

- « It bothers me when I see myself in the mirror because I look like a wire. I don't recognize that the image I see is myself. Well, it is me and it is not at the same time. It influences my mood because the image reflects a negative image of myself.
- What is difficult is that I have to use **one hand after the other**; it is more difficult to use both at the same time (...).
- I notice that my **right arm is longer**; it is probably because of my shoulder. I recognize my body but the face I see does not express any emotions.
- About the mask: « It is as if I were playing with puppets, except that **I am passive**, part of the audience and an **acting agent** at the same time. »
- Test 2: « This test helps to have a **better consciousness of the positions of my arms** in space and it is a positive thing. Actually one **has to anticipate**, just like a cat before it jumps on its prey. It anticipates the consequences. **I have problems to correct my errors**, as if my psychomotor system was already programmed. » (monitoring of action; therapy)



Thank you for your  
attention...