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:

- **motor command** (to muscle)
- **sensory consequences** (visual and proprioceptive).

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

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**Sense of Agency**

**Command**

Expected feedback

Monitoring

Observed feedback

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
  - auditory
  - 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.

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Presence: not precised enough to take into account 3rd person

Results of schz related to confusion?
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 expresses 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…