

COMP-SCI 5542 (SP17) - Big Data Analytics and Applications

Paper 12 Presentation (Team 9 and Team 15)

Virtual Body Swap: A New Feasible Tool to be Explored in Health and Education

Part IV - Methods

Speaker: Dayu Wang (45) (From Team 9)

- **Part IV - Methods**
- **Design of the Present Study - 2 Different Procedures**



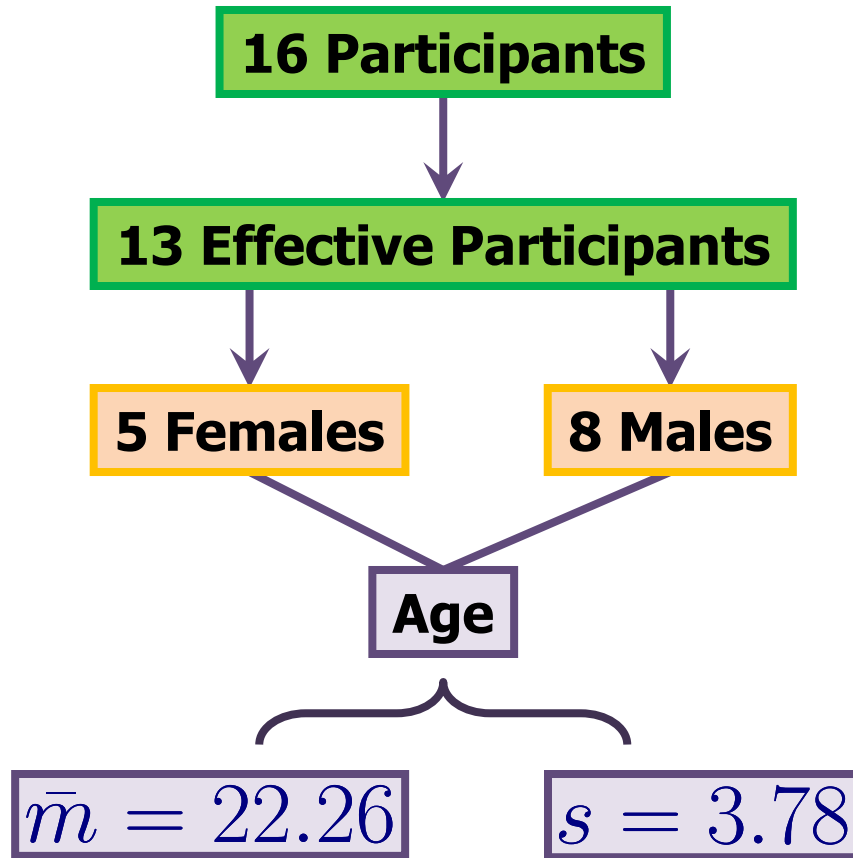
A person is immersed in another virtual environment, captured from the real world through a video camera.

| Head-Controlled Illusion | Full Body Swap Illusion |
|--|--|
| Provides immersion (P in VE). | Experiences full body control. |
| Head-mounted display (HMD). | Contains the same HMD. |
| Performer's body available. | Performer's body not available. |
| Real person <i>vs.</i> virtual avatar. | Freely moving the head. |

• Experiment Set-up

| | Experiment 1 | Experiment 2 |
|---------------|--|--|
| Aim | <ol style="list-style-type: none">1. Show that it is possible that immersion in another person's body.2. Evaluate subject impact. | <ol style="list-style-type: none">1. Examine the effects of body image.2. Examine the effects of body agency. |
| Consideration | With head and body agencies, see other person's body from my perspective. | In a 3D virtual world environment, performers can freely move head, but no body agency, no seeing of virtual body. |
| Participants | Same group of people. | Same group of people. |
| Order | First | Second |
| Questionnaire | Subtle adaption to the context. | Same questionnaire. |

• Experiment Procedure - Participants and Illusions Page 3



Body Swap Illusion

Exploration

- 2 min
- Slow move
- See their own body

Explore Touch

- 2 min
- 2 assistants
- Touch hand palm

Narrative with Object

- 3 min
- Held an orange
- Move the object freely

Face-to-Face Handshake

- 3 min
- Performer vs. user
- Immediate interview

~~Under 18~~

~~Pregnant~~

~~Nausea~~

~~Laboratory~~

~~Heart disease~~

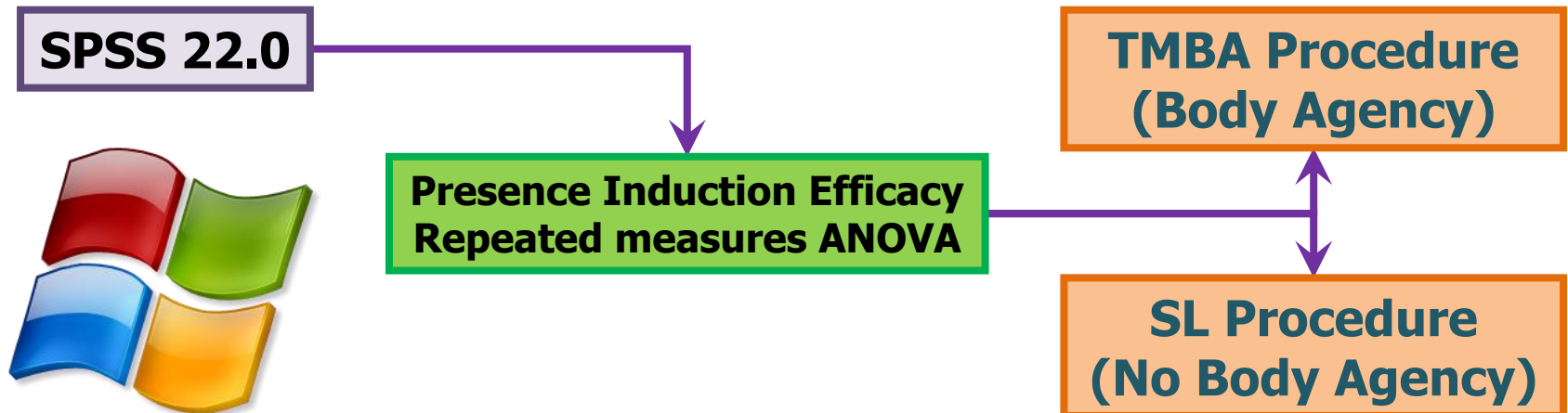
• Experiment Procedure - Question are and Statistics

Questionnaire Items

| Questions | Body Agency | No Body Agency |
|-----------|---|--|
| 1 | I had a sense of acting in the other person's body, rather than operate something from outside. | I had a sense of acting in the other body, rather than operate something from outside. |
| 2 | I was not aware of my own body. | I was not aware of my own body. |
| 3 | I was completely captivated by the body swapping. | I was completely captivated by the virtual tour. |
| 4 | How real did the body swap seem to you? | How real did the virtual tour seem to you? |

Qualitative Method **Taken immediately after the experiment**

Statistical Data Analysis



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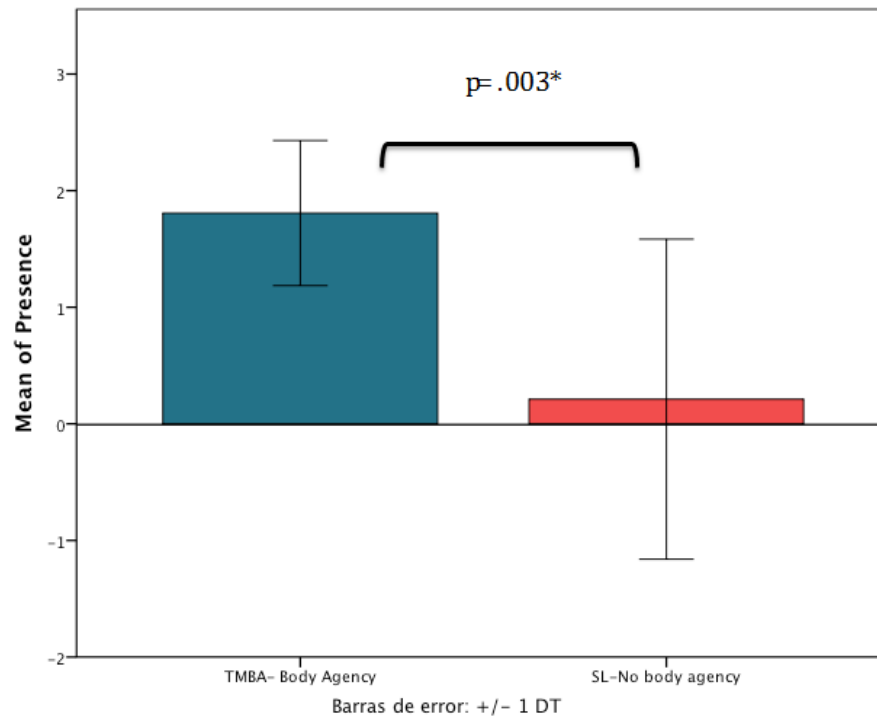
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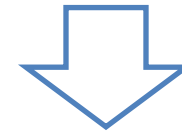
Part V - Results

Speaker: Chen Wang (44) (From Team 9)

Result - Mean of Presence (M)



| Procedure | M |
|-----------|------|
| TMBA | 1.80 |
| SL | 0.62 |



TMBA procedure has higher performance than SL procedure

Interview about the TMBA:

Answer

Whole experience

"It was very interesting to experience a body different from my own body!"

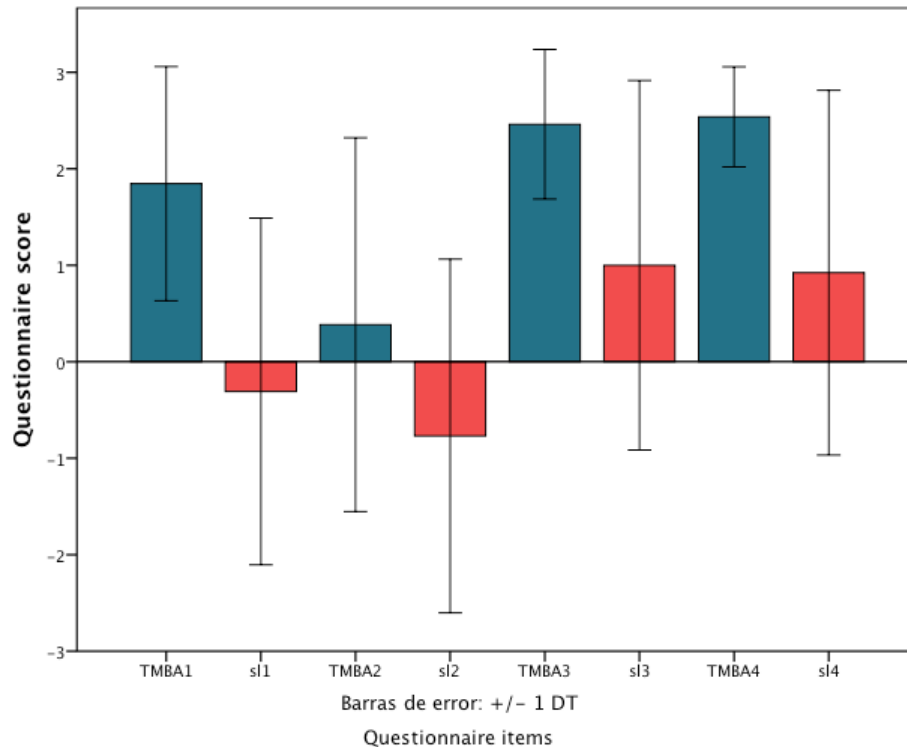
Feeling about the performer

"I would like to be her friend!"

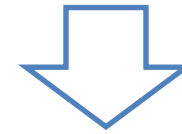
Experience about the last step

"I'm shaking hands with myself!"

Result - Standard Deviation (SD)



| Procedure | SD |
|-----------|------|
| TMBA | 0.21 |
| SL | 1.37 |



Deviation of SL is larger than TMBA.

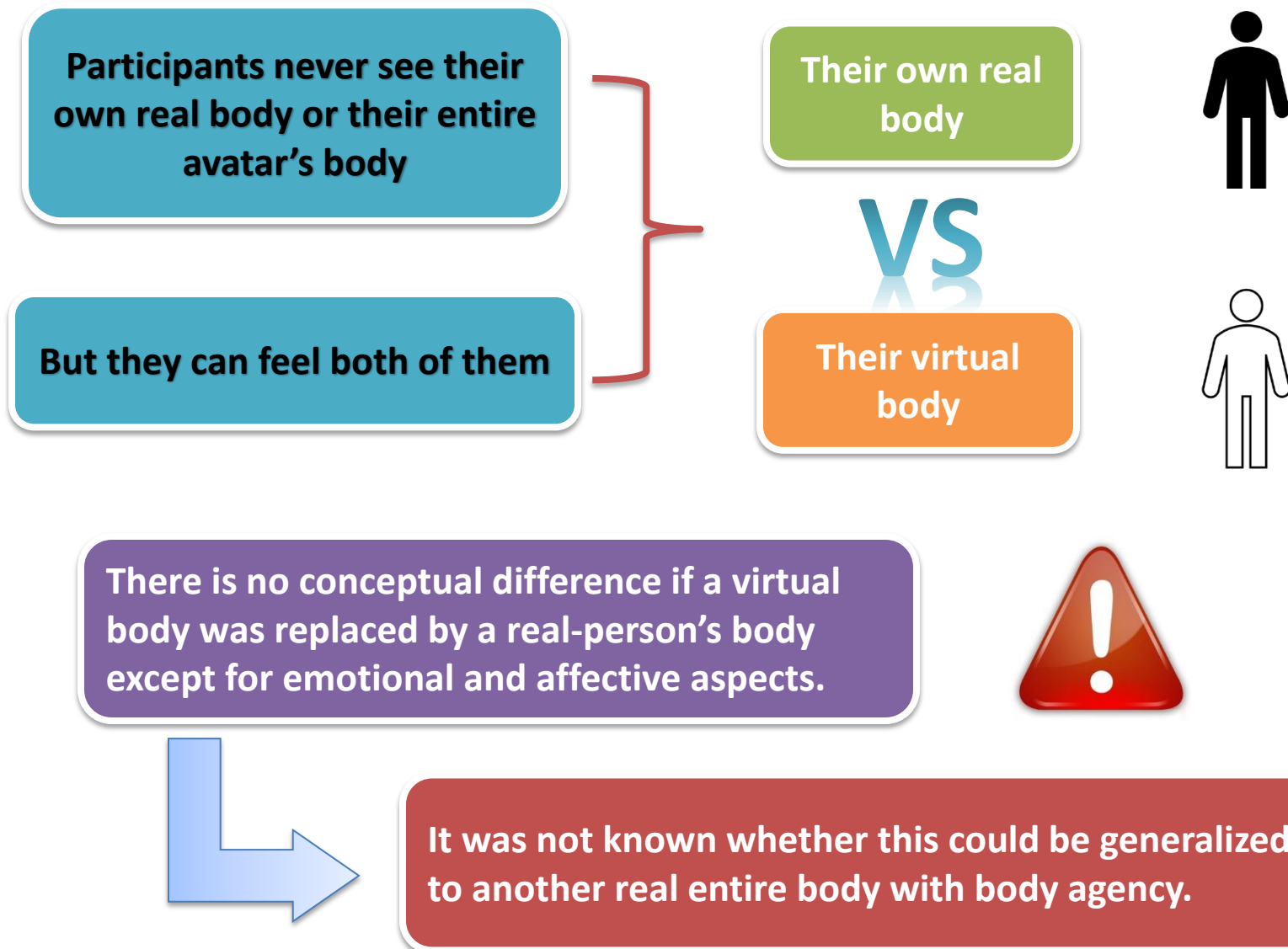
Influenced factor

Fatigue of the participants.

Misinterpretation of the questions.

Diversity in the expectations of the participants that arouse after they experienced the body swap illusion.

Result - Existing Ethic Problem



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Part VI - Conclusion

Speaker: Yunlong Liu (22) (From Team 9)

Conclusion

Significance: 1. Show an effective and low cost way to induce body swap illusion with body agency.

2. The participant can face his or her own real body without noticing of the technological mediation.

3. Experience of controlling another body, having a real person as our avatar.

Comparison

| | This Experiment | Other Studies |
|-------------|---|---|
| Hardware | 1. Head mounted display 2. Camera 3. Motion capture | 1. Rraditional rubber hand illusion 2. Invisible body 3. Full mannequin's body and an entire real body illusion |
| Body Agency | With | Without |
| Cost | Low cost | Might be high |

Table: Comparison with other studies related to body ownership illusion present

Future work

Future work: 1. Develop better localization of standard questionnaires

2. Increasing the number of participants and reducing the time spent by each during the experiment.

3. Improve the hardware part of the system: replacing the moving mechanical part of the system with two 180 degrees cameras graphics processing software.

Possibilities area:

- neuroscience
- psychology
- education
- social science.

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This is the END of the presentation.

Thank you!