

Investigation of VR Social Skill Training: Social Cue Perception & Social Problem Solving for Schizophrenia

Investigation of Social Cue Perception in Schizophrenia using Virtual Reality

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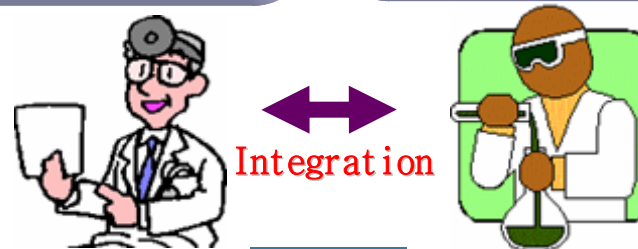
Virtual Reality Social Skill Training

Social Skill Training

- Definition of Social Skill
- Necessities of SST for SPR
- Learning Principles of SST
- Evaluation of Social Skill Training

Virtual Reality

- Definition of Virtual Reality
- Virtual Reality applications
- Medical applications of VR
- Advantages of Virtual Reality



Social Skill Training using Virtual Reality

Virtual Reality

Virtual Reality has a great potential to mediate a computer and human.

In particular, it would be useful for assessing and training people with mental disease in that VR could provide a safe, well controlled, and interesting environments.

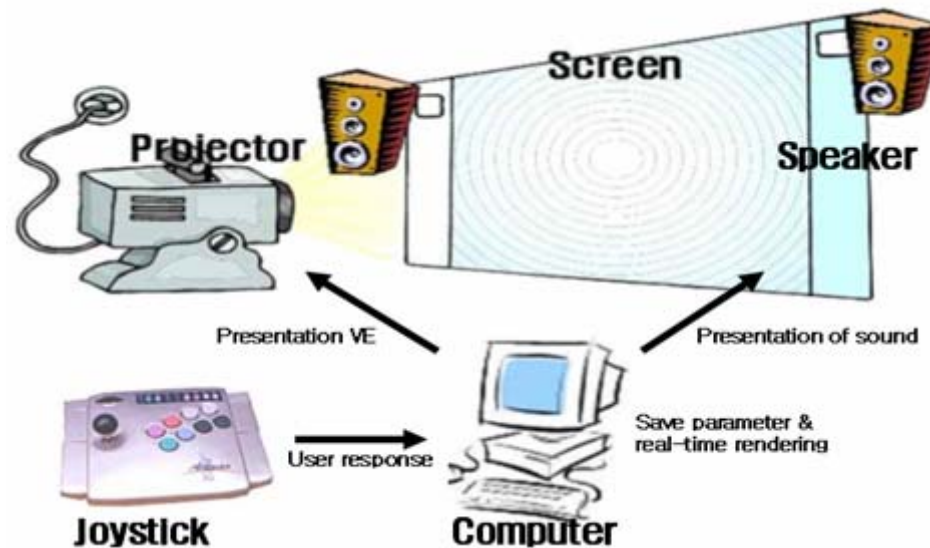
Development of Virtual SST Program

Three process model of Social Skill Training (Liberman 1986)

- ☐ Receiving social information: Social perception
- ☐ Processing the information: Social Problem Solving
- ☐ Sending a response: Verbal or Non-Verbal Skills

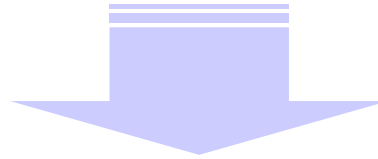
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System



Virtual Reality Behavior Facial Data Base

Need various virtual reality situation

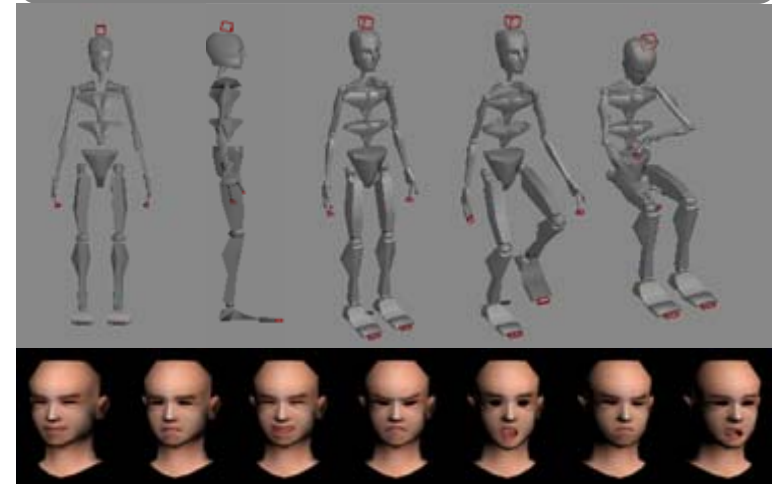


avatar DB



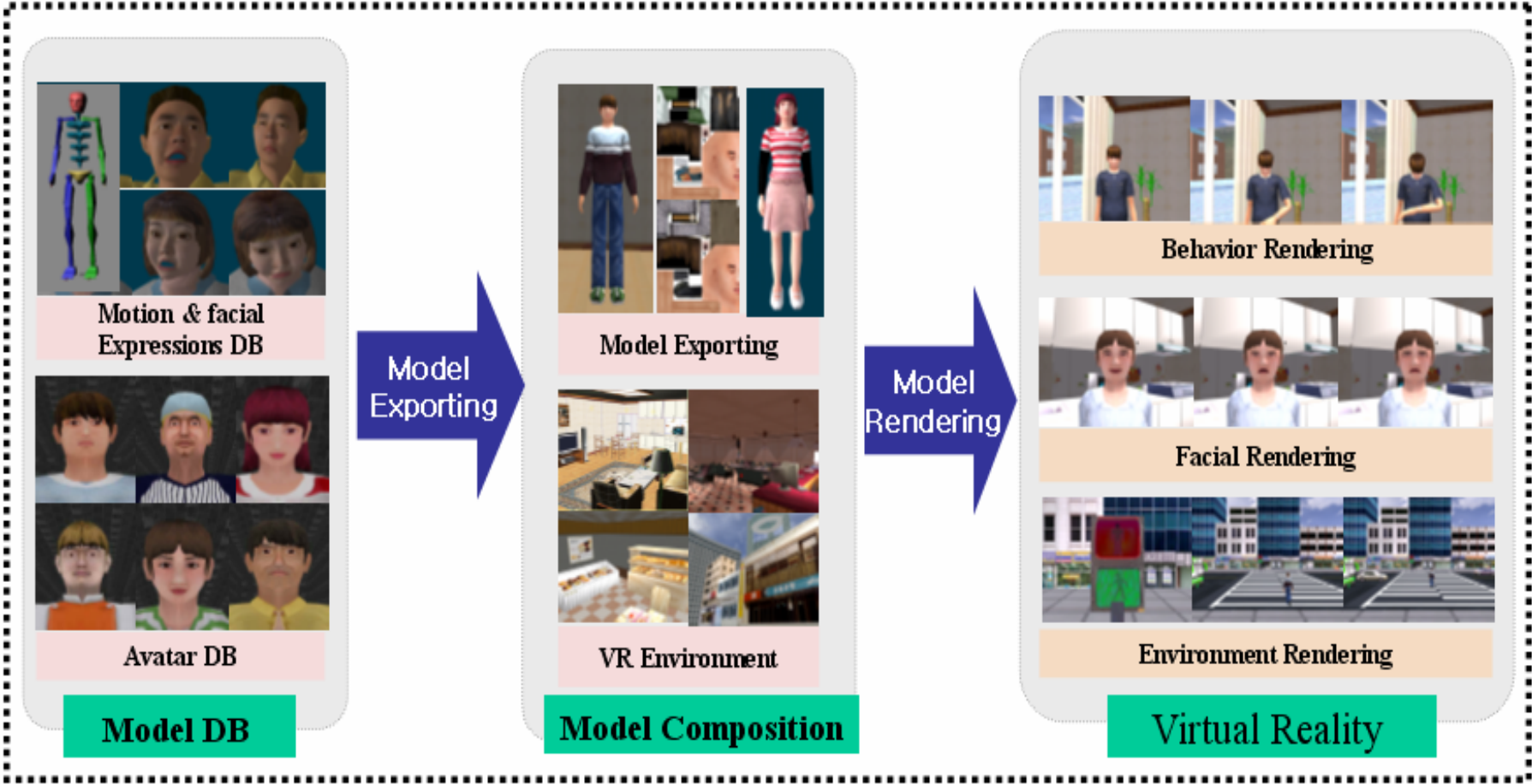
- ➔ 14 avatars (9 males & 5 females)
- ➔ One avatar have several textures (clothes)

motion & facial DB



- ➔ 93 behaviors data base
- ➔ 7 facial expressions data base

VR Composition Diagram



Contents of VR social perception tool

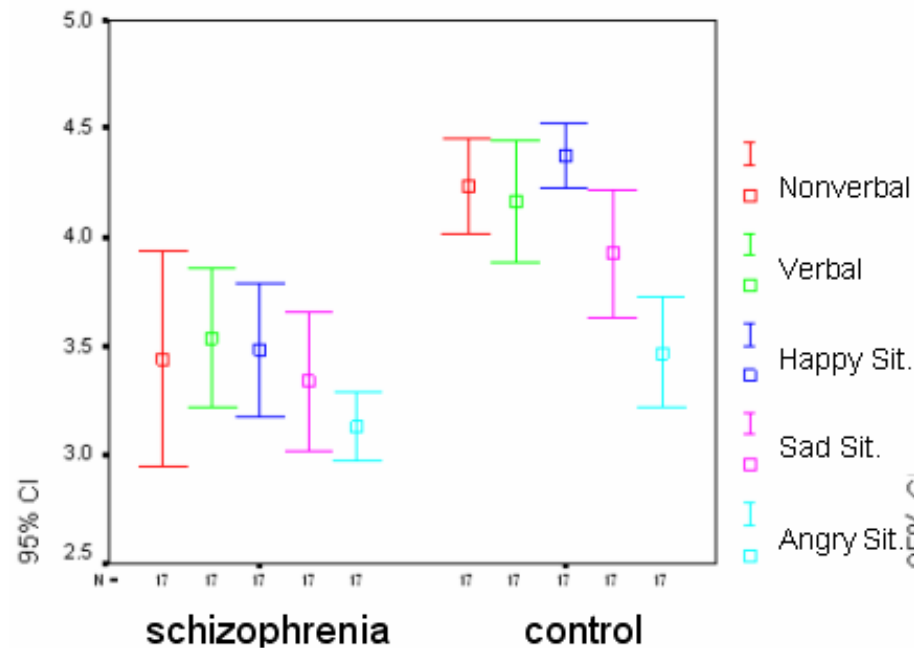
Interpretation of relevant cue	Nonverbal social cue (8) <ul style="list-style-type: none">- Recognize avatar's physical gesture- Recognize traffic signal- Unusual street situation- Suitable/Unsuitable behavior according to situation
	Verbal social cue (6) <ul style="list-style-type: none">- Polite/rude dialog- Suitable/Unsuitable greeting
Emotional Recognition	Happy situation (6) <ul style="list-style-type: none">- Recognize happy facial expression- Recognize happy situation
	Sad situation (4) <ul style="list-style-type: none">- Recognize sad facial expression- Recognize sad situation
	Angry situation (6) <ul style="list-style-type: none">- Recognize angry facial expression- Recognize angry situation



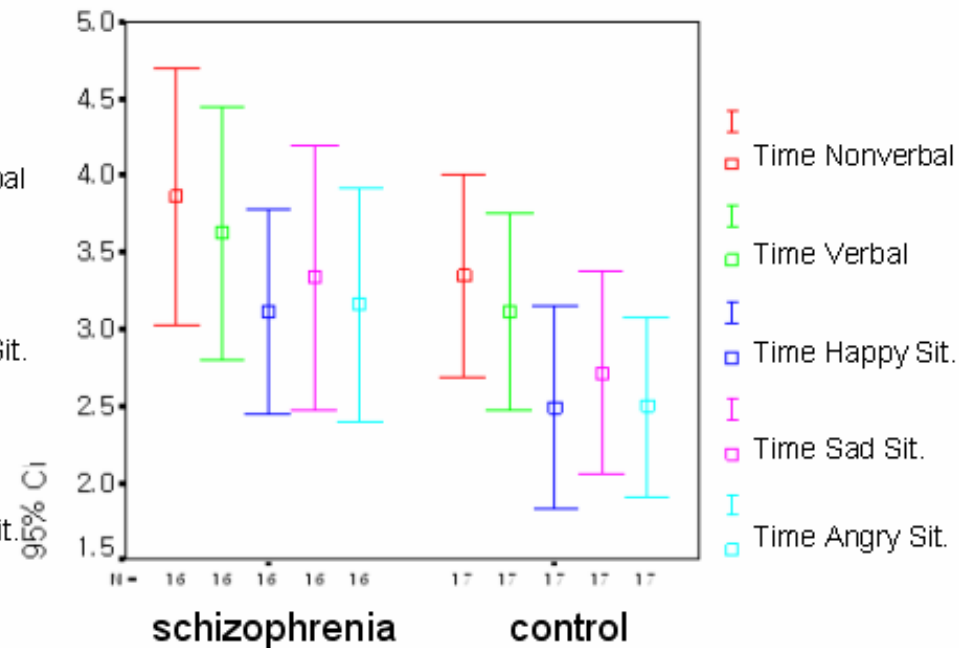
Results between SPR & Control

Results between SPR & control

Response performance



Response time



Correlation Analysis

Correlation analysis

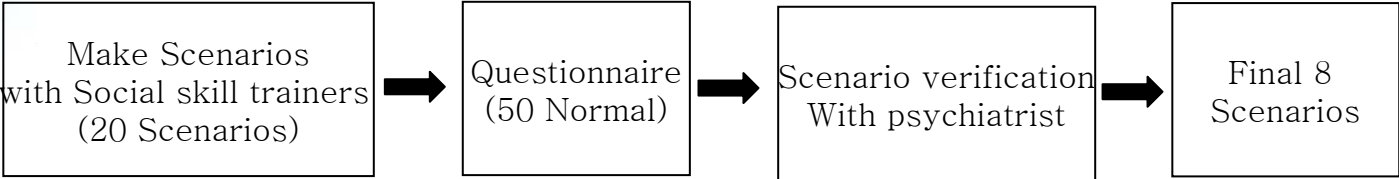
PANSS (Positive and Negative Syndrome Scale)

	PANSS (Positive and Negative Syndrome Scale)			
	Delusions	Conceptual Disorganization	Suspiciousness /Persecution	Stereotyped thinking
Behavior Cue perception	.107 (.684)	-.010(.968)	.504*(.039)	-.028(.914)
Verbal Cue perception (Auditory)	-.659**(.004)	-.497*(.042)	.113(.665)	-.166(.525)
Recognize happy facial	-.388(.124)	-.638**(.006)	.253(.327)	-.435(.081)
Recognize sad facial	-.008(.976)	-.574*(.016)	.092(.727)	-.400(.111)
Recognize angry facial	-.293(.254)	-.602*(.011)	.021(.935)	-.634**(.006)

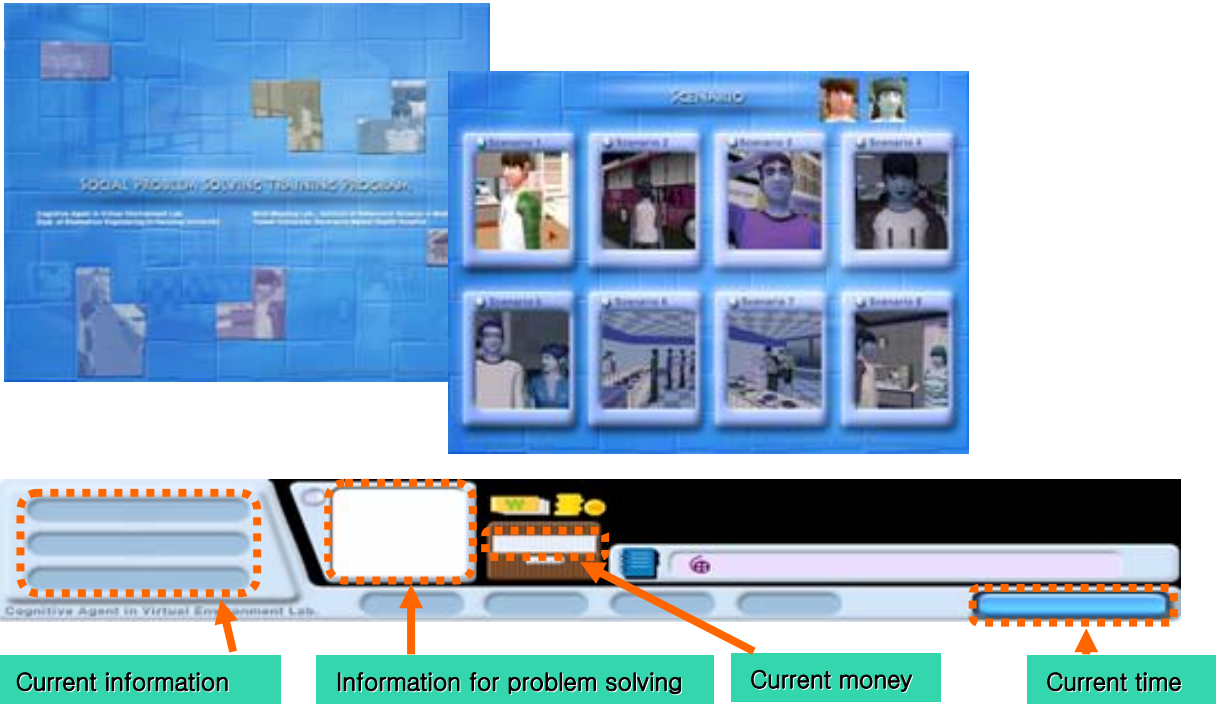
* Correlation is significant at the .05 level
** Correlation is significant at the .01 level

Social Problem Solving

Contents



GUI



VR SPS Contents



scenario1



scenario2



scenario3



scenario4



scenario5



scenario6



scenario7



scenario8

Virtual Reality

scenario1 (bus stop)



scenario4 (cafe)

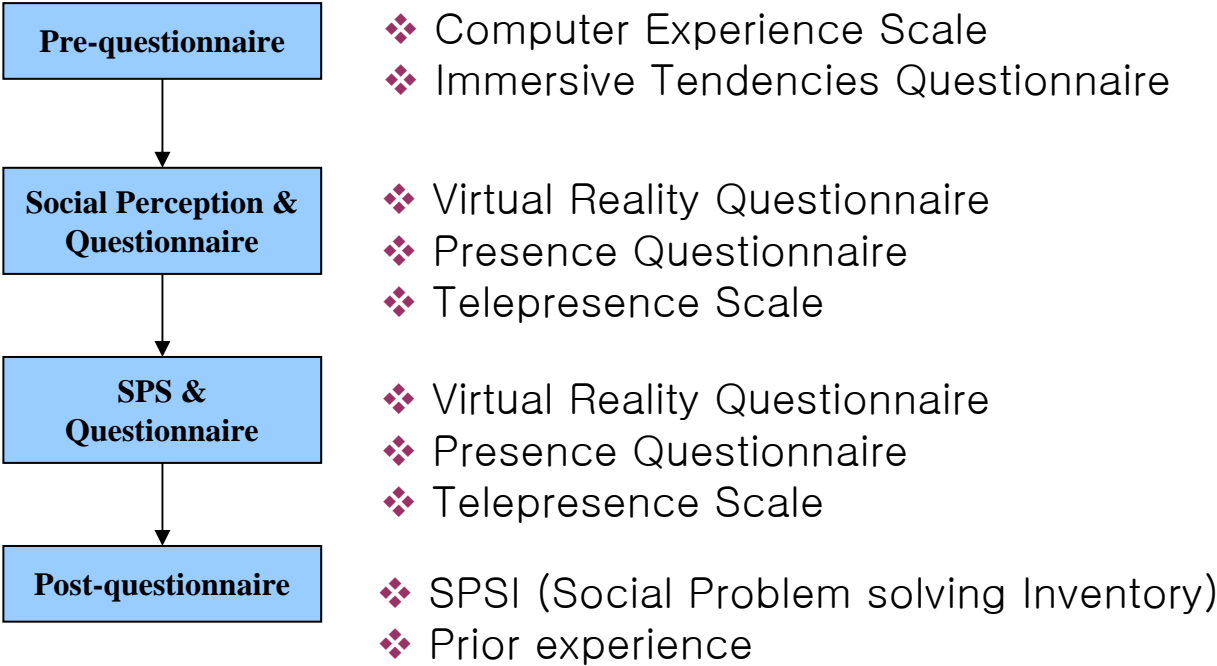


Subject & Procedure

Subject

Patients: 30 persons 16Male, 21~38years (29.5) 14Female, 23~37years (30.5)	Control: 30 persons 16Male, 20~39years (29.7) 14Female, 23~36years (29.3)
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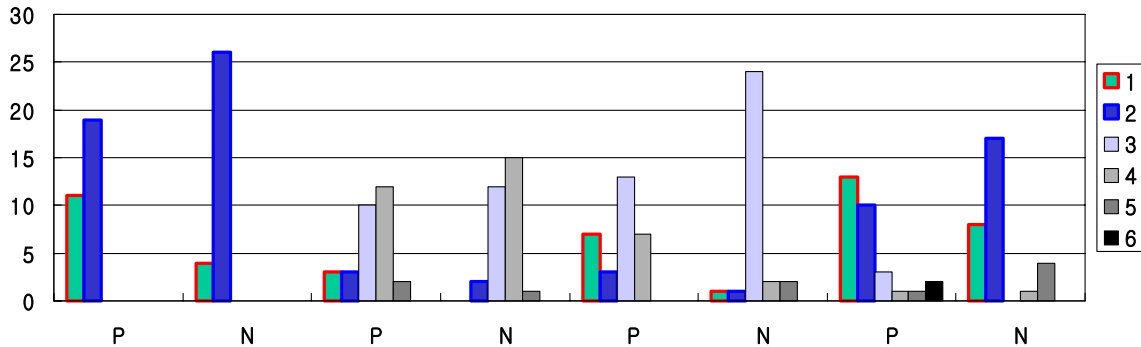
Procedure



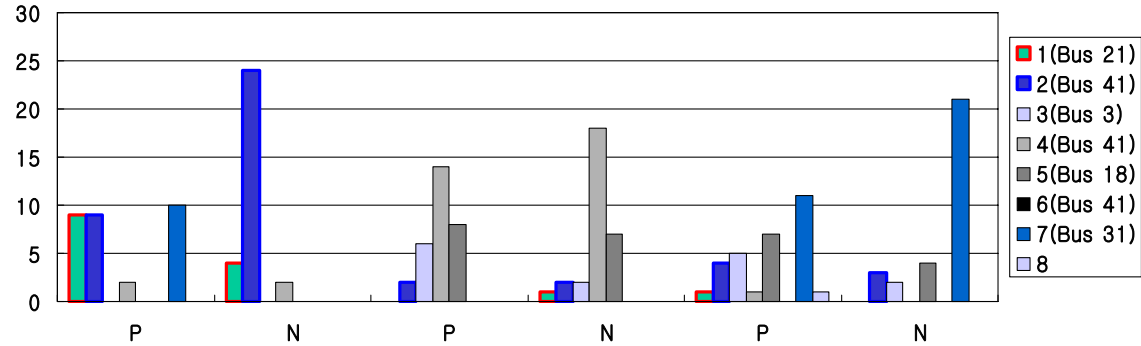
Result

Response result in virtual reality

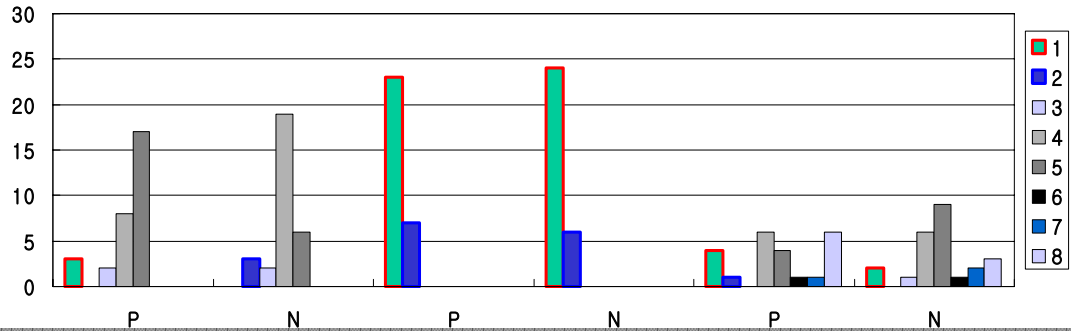
scenario1



scenario2,3



scenario4



Result

T-test result between normal and patient

Independent Samples Test									
		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
VR Performance	Equal variances assumed	.001	.970	-5.867	58	.000	-82.2600	14.02028	-110.32463 -54.19537
	Equal variances not assumed			-5.867	57.991	.000	-82.2600	14.02028	-110.32472 -54.19528

Correlation analysis

	SPSI (Social Problem Solving Inventory)				
	Problem Definition & Formulation Subscale: PDFS	Generation of Alternative Social Subscale: GASS	Decision Making Subscale: DMS	Solution Implementation & Verification Subscale: SIVS	Problem Solving Skill Scale:PSSS
VR Performance	.384* (.036)	.461* (.010)	.431* (.017)	.494** (.006)	.502** (.005)

* Correlation is significant at the .05 level
** Correlation is significant at the .01 level

Comments from Patients

Relation with patient's syptoms

Group 1

• Bus 7 (Concrete thinking)

	PANSS (Positive And Negative Syndrome Scale)				
	Grandiosity	Difficulty in abstract thinking	Stereotyped thinking	Poor impulse control	Preoccupation
VR Performance	-.157 (.665)	.038 (.916)	-.870** (.001)	-.820** (.004)	-.403 (.248)

Group 2

• The others (Bus)

	PANSS (Positive And Negative Syndrome Scale)				
	Grandiosity	Difficulty in abstract thinking	Stereotyped thinking	Poor impulse control	Preoccupation
VR Performance	-.004 (.985)	-.184 (.438)	-.128 (.590)	-.122 (.609)	-.322 (.167)

* Correlation is significant at the .05 level ** Correlation is significant at the .01 level

Future work

Positive/Negative emotion expression

Sending a response (Liberman 1996)

Non-immersive VR → Immersive VR



Family, Friend & Vocational relationship

VR experience → Role-play →
Modeling → Shaping → Overlearning

Virtual Reality

Thank you !!!



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