

# Therapeutic Use of Life Simulation Games for People with Cognitive Impairments

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# Cognitive Skills Enhancement Program

- Fifteen week post-secondary, pre-vocational cognitive skills training program
- University of Pittsburgh contract with Pennsylvania Office of Vocational Rehabilitation
- Based at Hiram G. Andrews Center, Johnstown, PA

# Cognitive Skills Enhancement Program

- Variety of cognitive impairments
  - Learning Disability
  - ASD
  - Traumatic Brain Injury
- Support cognitive skills
  - Self-awareness
  - Executive functions
  - Social skills



# The Sims

- Video game that simulates everyday life
- Characters maintain a household, hold jobs, manage social relations
- Based on Maslow's hierarchy of needs, characters have basic needs and higher aspirations
- Non-immersive virtual reality

# Related Work

- Use of virtual reality environments to teach functional skills (Brooks et al. 2002, Strickland et al. 2007) and social skills (Bernard-Opitz & Nakhoda-Sapuan 2001, Hetzroni and Tannous 2004, Parsons et al. 2006)
- The Sims has been used by school-age children with cognitive impairments to create narratives of their characters' lives (de Craene & Cuthell 2006) and to address issues such as anger management, socialization, and pattern discovery in low-income youth (Tsikalas 2001).
- Importance of a mediated experience to support generalization (Kerr et al. 2002, Mitchell et al. 2007)

# Clinical Application

- Used with 191 clients with cognitive impairments since spring 2007
- Clients each create a character that represents him- or herself
  - Physical characteristics
  - Personality traits
  - Preferences



# Sims Personality Traits: Sims 2

- Five Dyads
  - Sloppy/Neat
  - Shy/Outgoing
  - Lazy/Active
  - Serious/Playful
  - Grouchy/Nice

# Sims 3 Personality Traits

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> <b>Absent-Minded</b> | <input type="checkbox"/> Family-Oriented      | <input type="checkbox"/> Loves the Outdoors       |
| <input type="checkbox"/> Ambitious            | <input type="checkbox"/> Flirty               | <input type="checkbox"/> <b>Mean Spirited</b>     |
| <input type="checkbox"/> Artistic             | <input type="checkbox"/> Friendly             | <input type="checkbox"/> Mooch                    |
| <input type="checkbox"/> Athletic             | <input type="checkbox"/> Frugal               | <input type="checkbox"/> Natural Cook             |
| <input type="checkbox"/> Bookworm             | <input type="checkbox"/> Genius               | <input type="checkbox"/> Neat                     |
| <input type="checkbox"/> Brave                | <input type="checkbox"/> Good                 | <input type="checkbox"/> <b>Neurotic</b>          |
| <input type="checkbox"/> Charismatic          | <input type="checkbox"/> Good Sense of Humor  | <input type="checkbox"/> <b>No Sense of Humor</b> |
| <input type="checkbox"/> <b>Childish</b>      | <input type="checkbox"/> Green Thumb          | <input type="checkbox"/> <b>Over-Emotional</b>    |
| <input type="checkbox"/> Clumsy               | <input type="checkbox"/> <b>Grumpy</b>        | <input type="checkbox"/> Party Animal             |
| <input type="checkbox"/> Commitment Issues    | <input type="checkbox"/> Handy                | <input type="checkbox"/> Perfectionist            |
| <input type="checkbox"/> Computer Whiz        | <input type="checkbox"/> Hates the Outdoors   | <input type="checkbox"/> Schmoozer                |
| <input type="checkbox"/> <b>Couch Potato</b>  | <input type="checkbox"/> <b>Heavy Sleeper</b> | <input type="checkbox"/> <b>Slob</b>              |
| <input type="checkbox"/> Coward               | <input type="checkbox"/> Hopeless Romantic    | <input type="checkbox"/> Snob                     |
| <input type="checkbox"/> Daredevil            | <input type="checkbox"/> <b>Hot-Headed</b>    | <input type="checkbox"/> Technophobe              |
| <input type="checkbox"/> Dislikes Children    | <input type="checkbox"/> <b>Inappropriate</b> | <input type="checkbox"/> Vegetarian               |
| <input type="checkbox"/> Easily Impressed     | <input type="checkbox"/> Light Sleeper        | <input type="checkbox"/> Virtuoso                 |
| <input type="checkbox"/> Excitable            | <input type="checkbox"/> <b>Loner</b>         | <input type="checkbox"/> Workaholic               |
|   | <input type="checkbox"/> Loser                |   |



# Clinical Application

- Clients play game for 8-14 weeks,
  - Independently during unstructured time
  - With staff observation and feedback once every 1-2 weeks
- Staff follow up with client to support generalization

# Proactive, Reactive, and Passive Play

- Characters in the Sims act under a combination of computer control and player control
- Character behavior under computer control is determined by personality traits

# Goals

- Self-awareness
- Planning and problem solving
- Vocational awareness
- Social awareness



# Self Awareness

- See how selected personality traits effect the character's behavior
- Real-life issues reflected in the game due to the character's personality or the client's playing style
- Exploring strategies
  - Trying to maintain a schedule
  - Experimenting with less rigid behavior

# Planning and Problem Solving



budget

wants

mood

basic needs

# Vocational Awareness



getting to work

job requirements



# Social Awareness

- Forming friendships
- Practicing social engagement
- Exploring other character's reactions to various interactions
- Repairing damaged relationships

# Social Awareness





# Social Awareness





# Evaluation: Client Surveys

## ■ Surveys completed by 57 clients

- Do you have a better understanding of yourself after playing the Sims?
  1. Definitely
  2. Maybe
  3. Probably not
  4. Definitely not
- Did playing the Sims allow you to practice real-world skills or strategies?
  1. Definitely
  2. Maybe
  3. Probably not
  4. Definitely not
- How did the Sims resemble real life?
- How might your experience with the Sims help you in real life?

# Results: Client Surveys

- Do you have a better understanding of yourself after playing the Sims?
  1. Definitely (25/57)
  2. Maybe (25/57)
  3. Probably not (5/57)
  4. Definitely not (2/57)95% Confidence Interval: (1.5,1.9)
  
- Did playing the Sims allow you to practice real-world skills or strategies?
  1. Definitely (27/57)
  2. Maybe (28/57)
  3. Probably not (1/57)
  4. Definitely not (1/57)95% Confidence Interval: (1.4,1.7)

# Evaluation: Staff Surveys

- Surveys completed by 10 staff (3 certified rehabilitation counselors and 7 graduate students in rehabilitation counseling) based on interaction with 68 clients



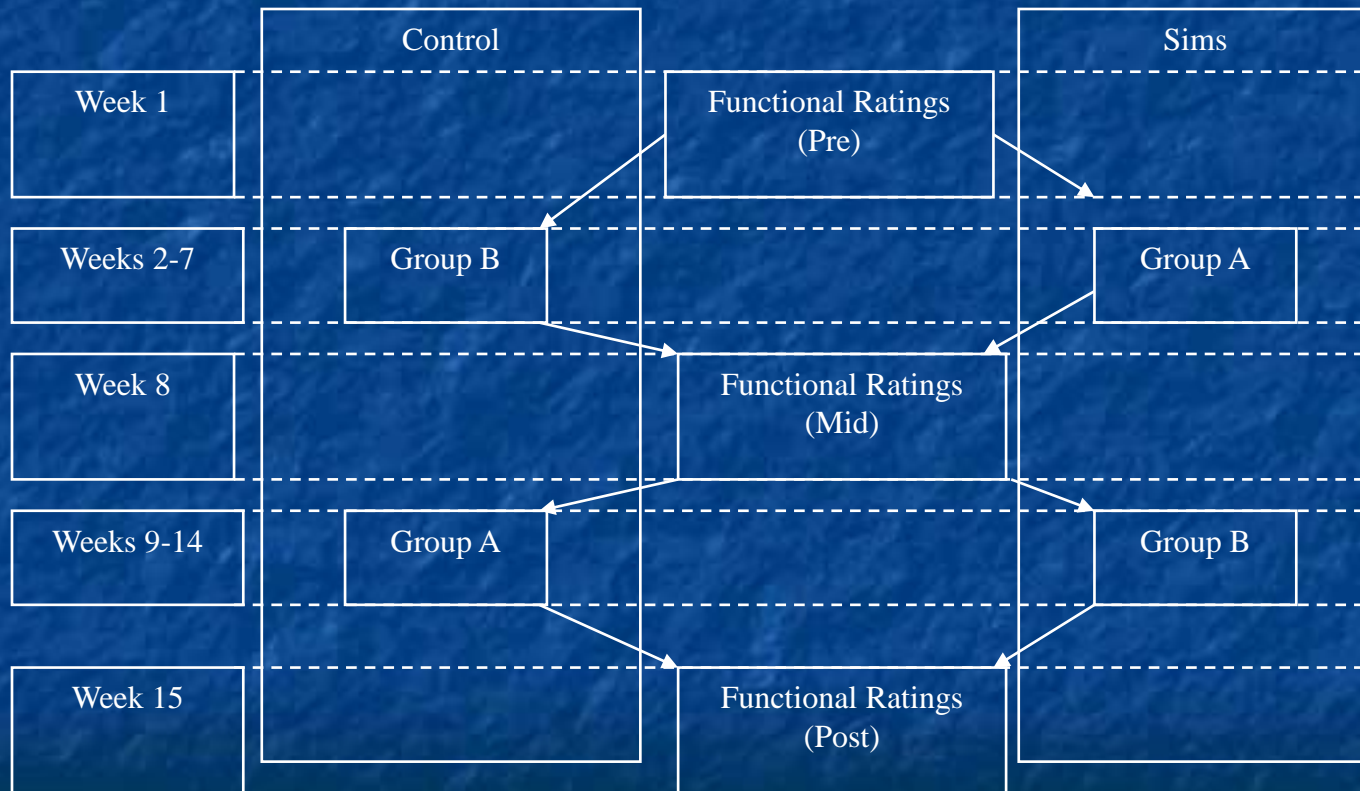
# Evaluation: Staff Surveys

- Has playing the Sims had an impact on your client(s) real-world strategies related to problem solving, social skills, or other cognitive skills?
  1. Definite positive impact
  2. Likely positive impact
  3. No impact
  4. Likely negative impact
  5. Definite negative impact
- Has playing the Sims had an impact on your client(s) self-awareness?
  1. Major improvement in self-awareness
  2. Some improvement in self-awareness
  3. No impact
  4. Some reduction in self-awareness
  5. Major reduction in self-awareness (e.g. unrealistic expectations)
- In what specific ways has playing the Sims helped your client(s)?
- In what specific ways has playing the Sims been detrimental for your client(s)?
- What might improve the process of using the Sims in a clinical setting?

# Results: Staff Surveys

- Has playing the Sims had an impact on your client(s) real-world strategies related to problem solving, social skills, or other cognitive skills?
  1. Definite positive impact (9/68)
  2. Likely positive impact (48/68)
  3. No impact (11/68)
  4. Likely negative impact (0/68)
  5. Definite negative impact (0/68)Confidence Interval: (1/9,2.1)
  
- Has playing the Sims had an impact on your client(s) self-awareness?
  1. Major improvement in self-awareness (6/68)
  2. Some improvement in self-awareness (53/68)
  3. No impact (9/68)
  4. Some reduction in self-awareness (0/68)
  5. Major reduction in self-awareness (0/68)Confidence Interval: (1.9,2.1)

# Evaluation: Cross-over Design





# Evaluation: Cross-over Design

- Group A

- 3 clients

- 1 male, 2 female
    - mean age 21.6 years, SdDev 1.1 years
    - multiple diagnoses: 2 with ASD, 2 with learning disabilities, 2 with ADHD, and 1 with anxiety disorders

- Group B

- 6 clients

- 5 male, 1 female
    - mean age 20.4 years, SdDev 1.8 years
    - multiple diagnoses: 3 with ASD, 1 with BIF, 2 with learning disabilities, and 2 with ADHD

# Evaluation: Cross-over Design

## ■ Functional Ratings

- During weeks 1, 8, and 15, clinicians rated each client using a 7-point Likert scale on 14 areas
- self-awareness, judgment and problem solving, communication, attendance/punctuality, mood, behavior, social skills, organization, participation, and strategy and assistive technology use.
- 7 indicates that the client is effective at the given skill 90-100% of the time, and 1 indicates that the client is effective at the given skill 0-15% of the time.

# Results: Cross-Over Design

- Greater improvement in functional ratings during Sims half-term for 11 of 14 measures
  - Intellectual self-awareness, emergent self-awareness, judgement/problem solving, communication, mood, behavior, social skills, organizing things, organizing thoughts, organizing time, participation
- Only significant for Mood and Social Skills



# Anecdotal Results

- Players who identified themselves as sloppy and/or lazy in real life, and created characters accordingly, have observed how their characters refuse to clean their homes or go to work on time, resulting in negative consequences. One client expressed interest in using the game to recreate past problems and exploring what could be done differently. Clients expressed observations such as the character needing a regular routine like the client has, or alternatively wanting the character to be less anxious and dependent on routine than the client is in real life.

# Anecdotal Results

- In open-ended survey responses, some clients made statements such as “The Sims resemble real life because I do the same things,” “it acts like me, and does what I do”, “It would do the same things I would do in real life”; sometimes giving specific examples that they observed such as “emotional outbursts,” “being shy around others”, or being “easily distracted”.



# Anecdotal Results

- Some clients stated in open-ended survey questions that they believed that The Sims had helped show to “expect unexpected” events, “understanding prioritizing time to I can have time to myself”, “being proactive”, “better time management skills”.



# Anecdotal Results

- Staff have reported observing situations in the game that match the sorts of situations that clients face in real life

# Future Work

- Better support generalization to real life
- Better measure generalization to real life



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