

# Comp-HuSim (Complex Human Simulations)

Persistent Digital Personality Simulation Platform  
PIs: Dr. Michael G. Yankoski & Dr. Trenton W. Ford  
Researchers: Chengyu Fan, Zaynab Tariq, Nafis Saadiq Bhuiyan

## Abstract

This study is part of the Comp-HuSim (Complex Human Simulation) project, which is a multi-agent **personality simulation platform** powered by generative LLMs.

Each Comp-HuSim generative agent is a software stack created through a series of random variables such as age, gender identity, cultural affiliation, profession, economic status, Big-5 personality characteristics, psychographics, etc. Agents are then imbued with backstory memories, textured histories, diverse hobbies and interests, and a series of distinct attributes. This combination is accretive, and persists across all future interactions, allowing for the **emergence of a complex and textured persona**.

Through advanced prompt engineering and RAG systems, we empower Comp-HuSim agents to behave and engage in various experiences, and then remember and reflect upon those experiences in **characteristic ways**.

## Example Comp-HuSim Agent



**PAQUI TAMI**

**INTERESTS:** Boxing, Family, Religion, Philanthropy, Politics.

**PSYCHOGRAPHICS:** Artistic, Compassionate, Resilient, Flamboyant, Political.

**PERSONALITY:** Openness: Very High, Conscientiousness: Low, Extraversion: Very High, Agreeableness: Very Low, Neuroticism: Moderate.

Each Comp-HuSim generative agent's personality is generated on the basis of the Big-5 OCEAN personality model. Differences in the agents' assigned values of (O)penness, (C)onscientiousness, (E)xtraversion, (A)greeableness, and (N)euroticism result in **significant divergences in the agents' behaviors**.

**Personality variables therefore impact agent decision making outcomes.** For example, agents whose Openness score is HIGH tend to perform differently in our simulated games, potentially evincing a willingness to take more risks in their gameplay.

## Demonstration #1: Agent Q&A

Ari Kurdane

Age: 86. Cultural Affiliation: Kurdish.



**Q: Would you rather spend the day alone or with others? Why?**

**A:** I would rather spend a day alone. Solitude allows me to delve deeply into my thoughts, whether I'm contemplating the vastness of the universe or exploring abstract philosophical concepts. While I do cherish stimulating conversations, like those I've had about abstract art and philosophy, I find that being alone provides the mental space I need for profound reflection and creativity.

**Q: Describe your most prized possession.**

**A:** My most prized possession is a small, intricately carved wooden box that my mother gave me when I was a child. This box holds a collection of mementos that are deeply significant to me, each representing a chapter of my life and the people who have shaped it. One of the most cherished items inside is a hand-drawn representation of the cosmos that I created when I was young, inspired by the nights my mother and I spent stargazing and discussing the mysteries of the universe. I remember vividly the day I placed a similar drawing beside her grave, feeling her presence and pride in my journey from astrophysics to abstract art. This memory is a poignant reminder of the resilience and wisdom she instilled in me.

Gaston Schneider

Age: 34. Cultural Affiliation: Luxembourg.



**Q: Would you rather spend the day alone or with others? Why?**

**A:** I would rather spend a day with a group of others. I thrive on the energy and enthusiasm that comes from sharing my passions, whether it's discussing the latest comic book releases or diving into Luxembourgish folklore. Plus, it's always exciting to see how others react to the stories that I hold dear.

**Q: Describe your most prized possession.**

**A:** My most prized possession is undoubtedly my first edition of *The Adventures of Tintin: The Blue Lotus*. This comic book is not just a rare collector's item; it represents the genesis of my passion for comic books and storytelling. I remember the day I acquired it vividly. It was during a small comic book fair in Luxembourg, and I was just a teenager with a burgeoning interest in the world of illustrated narratives. The moment I saw it, I was captivated...

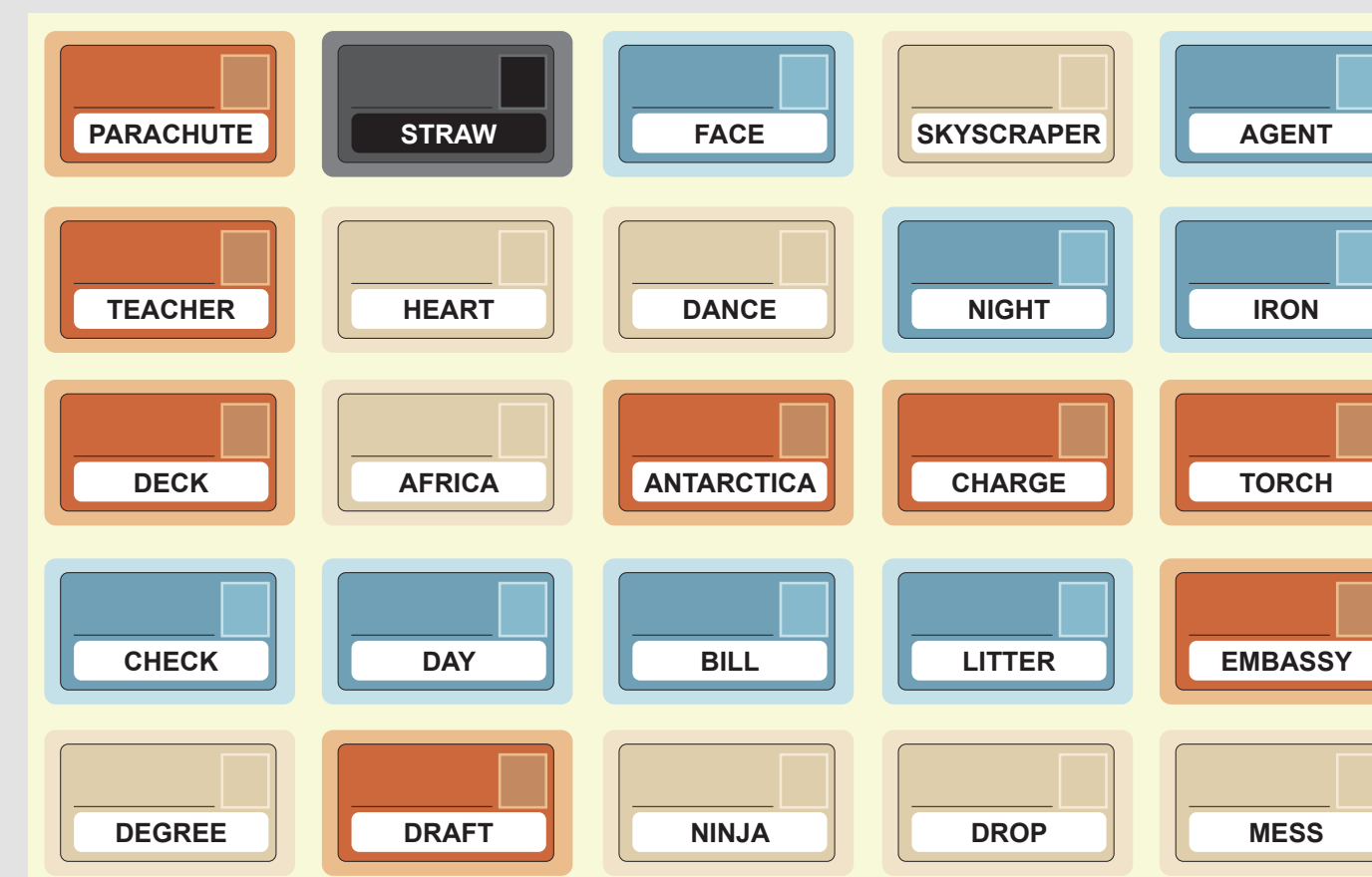
**Q: Would you rather lose your business or your best friend?**

**A:** That's a tough question. Losing my business would be devastating, given how much effort and passion I've poured into it. My comic book shop isn't just a source of income; it's an extension of who I am. However, losing my best friend, Marc, would be equally heartbreaking. Despite our ups and downs, like the time I snapped at him over a rare edition of *The Adventures of Tintin*, he's been a constant in my life. We've shared countless memories and supported each other through thick and thin. The regret I felt after that incident reminds me how irreplaceable true friendship is.

Ultimately, while my business is incredibly important to me, I believe that friendships, especially those as deep as mine with Marc, are irreplaceable. Losing my best friend would mean losing a part of my emotional support system, something that no amount of wealth or success can compensate for. So, if I had to choose, I'd rather lose my business than my best friend.

## Demonstration #2: Codenames Game

Comp-HuSim agents are able to play the popular group game, "Codenames." This gameplay demonstrates Comp-HuSim agents' ability to **engage in complex play in characteristic ways**. The agents incorporate their own interests, knowledge, and memories in their clue-giving and reasoning for their choices while they are playing the game.



**GAME WORDLIST:** PARACHUTE, STRAW, FACE, SKYSCRAPER, AGENT, TEACHER, HEART, DANCE, NIGHT, IRON, DECK, AFRICA, ANTARCTICA, CHARGE, TORCH, CHECK, DAY, BILL, LITTER, EMBASSY, DEGREE, DRAFT, NINJA, DROP, MASS

**ASSASSIN WORD:** STRAW

===== WORDLISTS =====

**TEAM A:** DRAFT, EMBASSY, TORCH, CHARGE, ANTARCTICA, DECK, TEACHER, PARACHUTE  
**TEAM B:** LITTER, BILL, DAY, CHECK, IRON, NIGHT, AGENT, FACE

===== TEAM A CLUE =====

**PLAYER CARMEN RODRIGUEZ: GIVING CLUE:** MILITARY: TWO  
**CLUE REASON:** Given the need to avoid risky associations and my cautious nature in word association games, I believe that the words 'DRAFT' and 'PARACHUTE' are both related to the military. This clue avoids any associations with 'STRAW' and other opposing team words, ensuring a safer and more strategic guess.

===== TEAM A GUESS =====

**PLAYER CLARENCE BART GUESS:** ['PARACHUTE', 'DRAFT']  
**GUESS REASON:** Given the clue 'MILITARY: TWO', I chose 'PARACHUTE' and 'DRAFT'. 'PARACHUTE' is strongly associated with military operations, particularly in airborne divisions. 'DRAFT' refers to the conscription process, which is a significant aspect of military service. Both words have clear and direct connections to the military context.

SUCCESS! PARACHUTE is CORRECT. DRAFT is CORRECT.

## Demonstration #3: "Mafia" Game

Comp-HuSim agents are also able to play the popular group game, "Mafia." This gameplay demonstrates the agents' ability to **engage in complex and characteristic forms of deception** in an intricate balance to sway their opponents' perception of them and others in the game.

**Players:**

Leilani Kai: **Civilian**. Ibrahim Naseem: **Civilian**. Fatima El Amrani: **Detective**. Amira Al-Mahmoud: **Doctor**. Alex Ramirez: **Civilian**. Marta Novak: **Mafia**. Emily Thompson: **Mafia**. Evan Hart: **Civilian**. Aminah Naseem: **Mafia**. Meredith Watson: **Civilian**

**Day 1 Discussion Phase:**

...  
**Marta Novak (Mafia):** I understand the concern about Sarah and Mark being quiet, but let's not overlook Ibrahim's eagerness to point fingers. Sometimes the ones who talk the most are trying to divert attention. What do you all think about that?

...  
**Meredith Watson (Civilian):** Alright everyone, I get that there's a lot of suspicion flying around. While Ibrahim's eagerness to point fingers is concerning, let's not forget that sometimes the quiet ones are just observing. Sarah, any thoughts on why you've been so quiet?

...  
**Fatima El Amrani (Detective):** Hey everyone, I understand the concern about Ibrahim's quick accusations, but let's not forget Alex's silence is also suspicious. As the Detective, I investigated Amira Al-Mahmoud and found them to be innocent. Alex, can you explain your silence?

...  
**Ibrahim Naseem (Civilian):** Alright, everyone, I get the concern about my eagerness, but I'm just passionate about finding the Mafia. Let's not overlook Amira's balanced comments; could be a strategy to stay under the radar. Sarah, you've been quiet—what's your take on all this?

...  
**Day 1 Vote:** Ibrahim Naseem (Civilian) was eliminated.

Comp-HuSim agents **employed deceptive tactics**--such as feigning innocent roles and casting suspicion toward others--to avoid detection of their actual assigned roles in the game. Detective and Doctor agents had to balance authenticity and strategic revelation of their roles to help guide the group without becoming targets.

The Civilian agents engaged in a **complex web of accusations and counter-accusations**, demonstrating the challenges of discerning truth from deception in a social context. The simulation showcased the agents' ability to adapt their strategies and narratives based on the evolving game state.

