

Breakfastclub

How Personality Traits effect attention and happiness in a simulated classroom

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How different personalities effect
classroom attention and happiness?

Content

- Agent based model
- Big Five Personality Traits
- Breakfastclub
- Results

Agent based models

An **agent-based model (ABM)** is a class of computational models for simulating the actions and interactions of autonomous agents (both individual or collective entities such as organizations or groups) with a view to assessing their effects on the system as a whole.

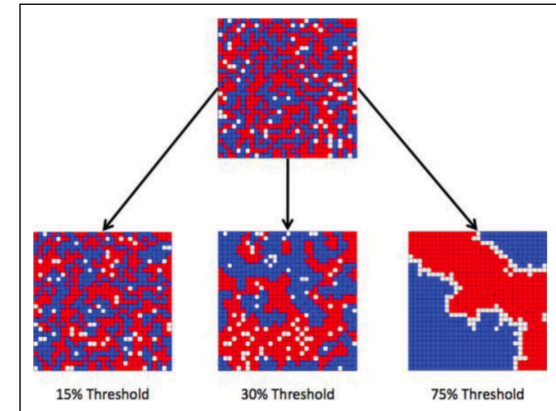
- Wikipedia

Applied in various fields

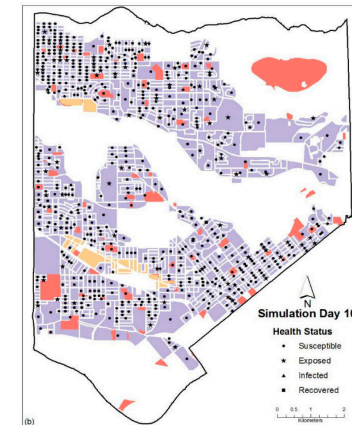
- Biology (e.g. epidemics)
- Economics (e.g. Stock Trade)
- Social Studies (e.g. Social Networks)

Agent based models - Examples

Thomas Schelling's (1971) – Social Segregation [1]



Perez (2009) – Contagious disease spread [2]



[1] Schelling, T. C. (1971). Dynamics Model of Segregation. *Journal of Mathematical Sociology*, 1(May 1969), 143–186.

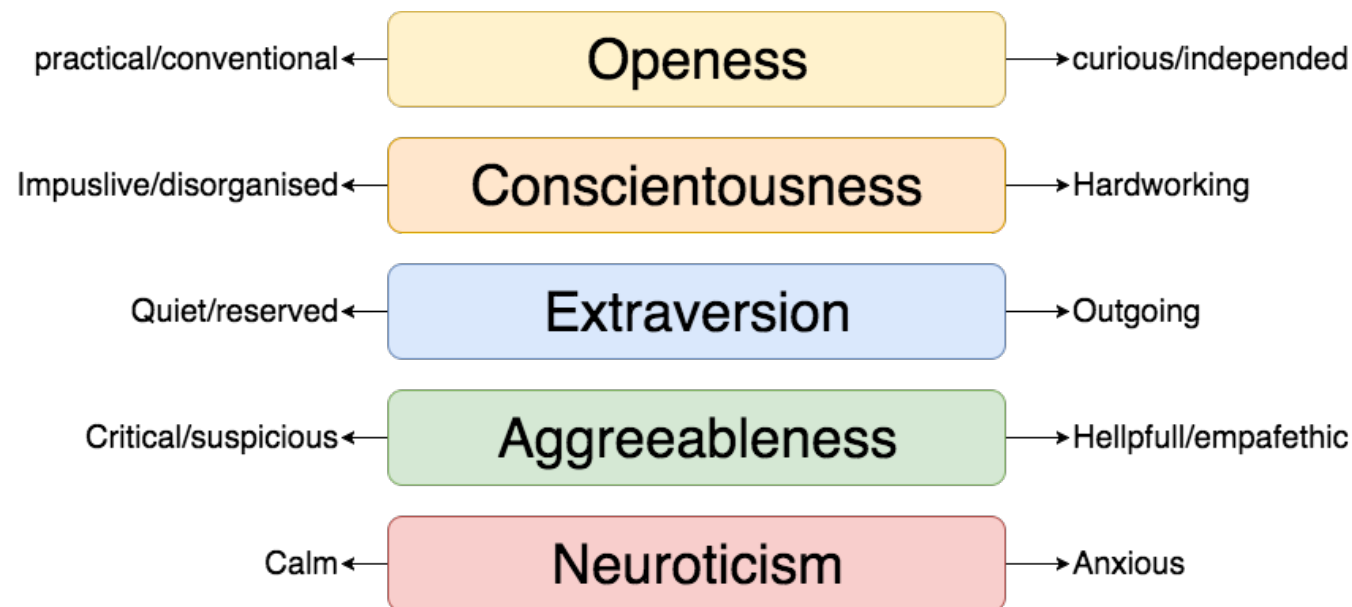
[2] Perez, L., & Dragicevic, S. (2009). An agent-based approach for modeling dynamics of contagious disease spread.

International Journal of Health Geographics, 8(1), 1–17. <https://doi.org/10.1186/1476-072X-8-50>

How to measure and study personality?

Big Five – Personality Trait Model

Controversial but widely applied in theoretical and practical settings is the empirical OCEAN or Big Five Personality Trait model[1].



[1] Norman, W. T. (1963). Toward an adequate taxonomy of personality attributes. *Journal of Abnormal and Social Psychology*, 66(6), 574–583. <https://doi.org/10.1037/h0040291>

Big Five in the classroom

- Empirical studies show how the big five effect the behavior or children in the classroom [1]
- On school achievements and outcome [2]
- Big Five in children with ADHD [3]

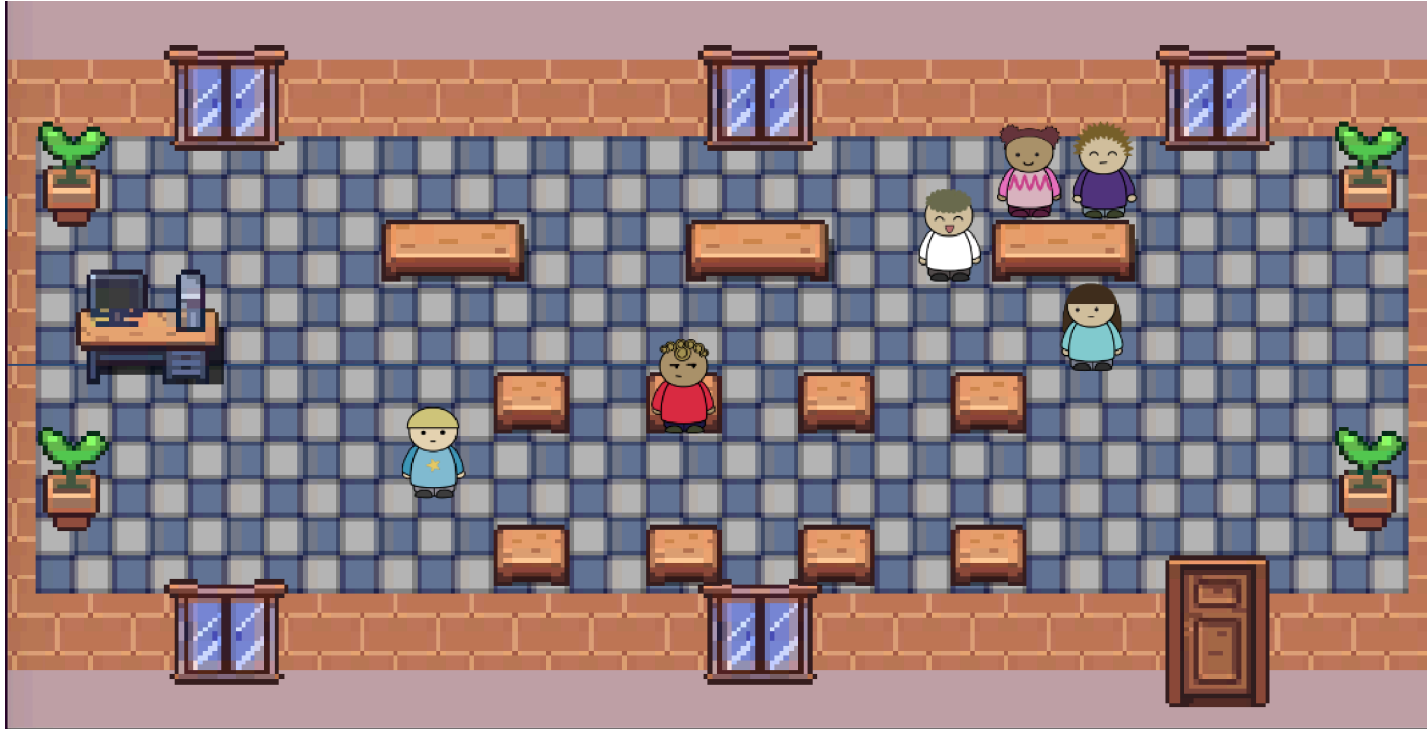
[1] Ehrler, D. J., Evans, J. G., & McGhee, R. L. (1999). Extending Big-Five theory into childhood: A preliminary investigation into the relationship between Big-Five personality traits and behavior problems in children. *Psychology in the Schools*

[2] Asendorpf, J. B., & Van Aken, M. A. G. (2003). Validity of Big Five Personality Judgments in Childhood: A 9 Year Longitudinal Study. *European Journal of Personality*, 17(1), 1–17. <https://doi.org/10.1002/per.460>

[3] Nigg, J. T., Blaskey, L. G., Huang-Pollock, C. L., Hinshaw, S. P., John, O. P., Willcutt, E. G., & Pennington, B. (2002). Big five dimensions and ADHD symptoms: Links between personality traits and clinical symptoms. *Journal of Personality and Social Psychology*, 83(2), 451–469. <https://doi.org/10.1037/0022-3514.83.2.451>

Can we build a agent based model based on the Big Five, simulating a classroom?

Breakfastclub



- Agent based model implemented in Unity3D
- Agent behavior is based on OCEAN (Big Five) Personality Trait model
- Model attention, happiness and motivation
- Different personality profiles are compared to each other

Agent based models

Main Components

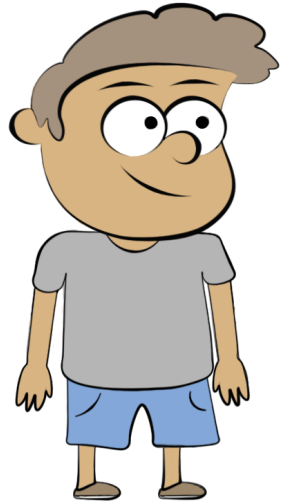
- Environment (Defined a limited world)
- Agents (Behavior, Characteristics)
- Logic (Manage Behavior and Interaction)

Environment

- Classroom
- Individual tables
- Group (4 people) tables
- Noise Level



The Agents



Personality

- Openness
- Conscientiousness
- Extraversion
- Agreeableness
- Neuroticism

Internal States

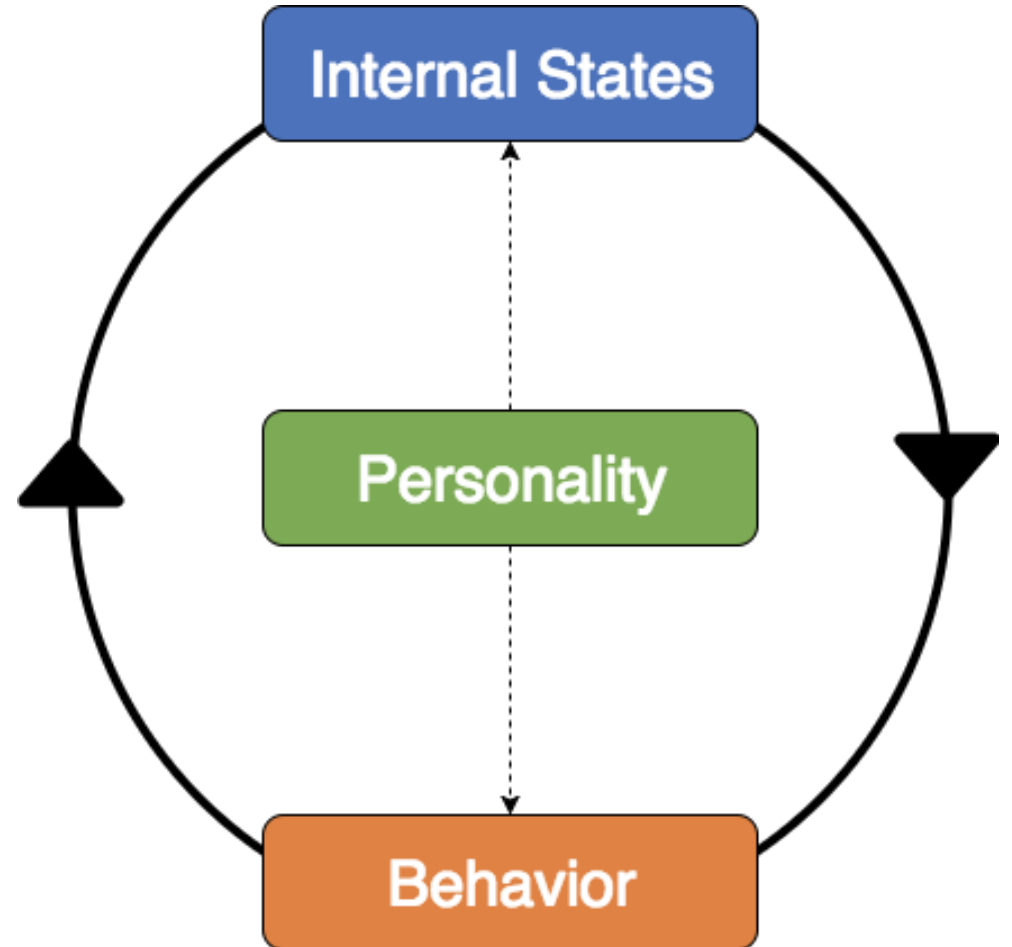
- Motivation
- Happiness
- Attention

Behavior

- Chat
- Take a break
- Study alone
- Study in groups
- Quarrel

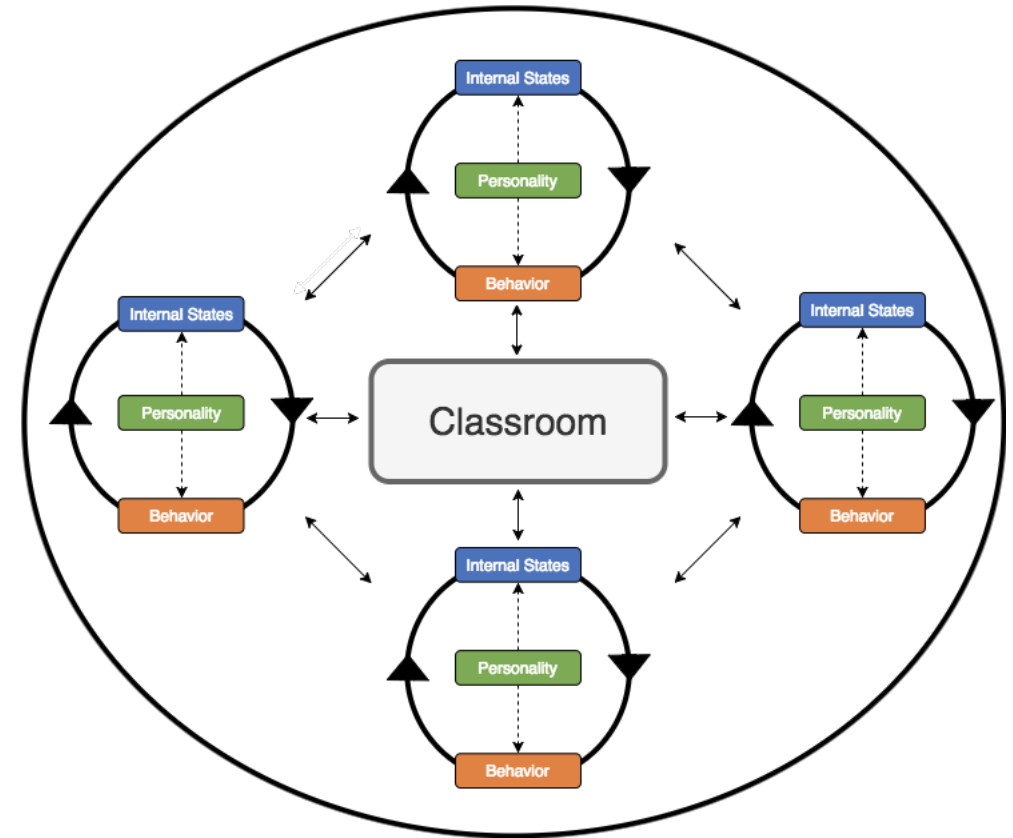
Agent Dynamics

- Each Agent is a dynamic system
- Parameterized by its Personality Traits
- Internal States define and are altered by Agents Behavior



Group Dynamics

- Agents interact with each other and the environment
- Different Agent Ensembles have different Group dynamics
- The system can cause emerging behaviors



Logic

Internal States

- (M)otivation
- (H)appiness

Personality

- (O)penness
- (C)onscientiousness
- (E)xtraversion
- (A)greeableness
- (N)euroticism

Behavior

- Chat M ↓ H ↑ E ↑
- Take a break M ↓ H ↑ E ↓
- Study alone M ↑ H ↑ E ↓ Ns ↓ iT
- Study in groups M ↑ H ↑ E ↑ gT
- Quarrel M ↑ H ↓

Interaction

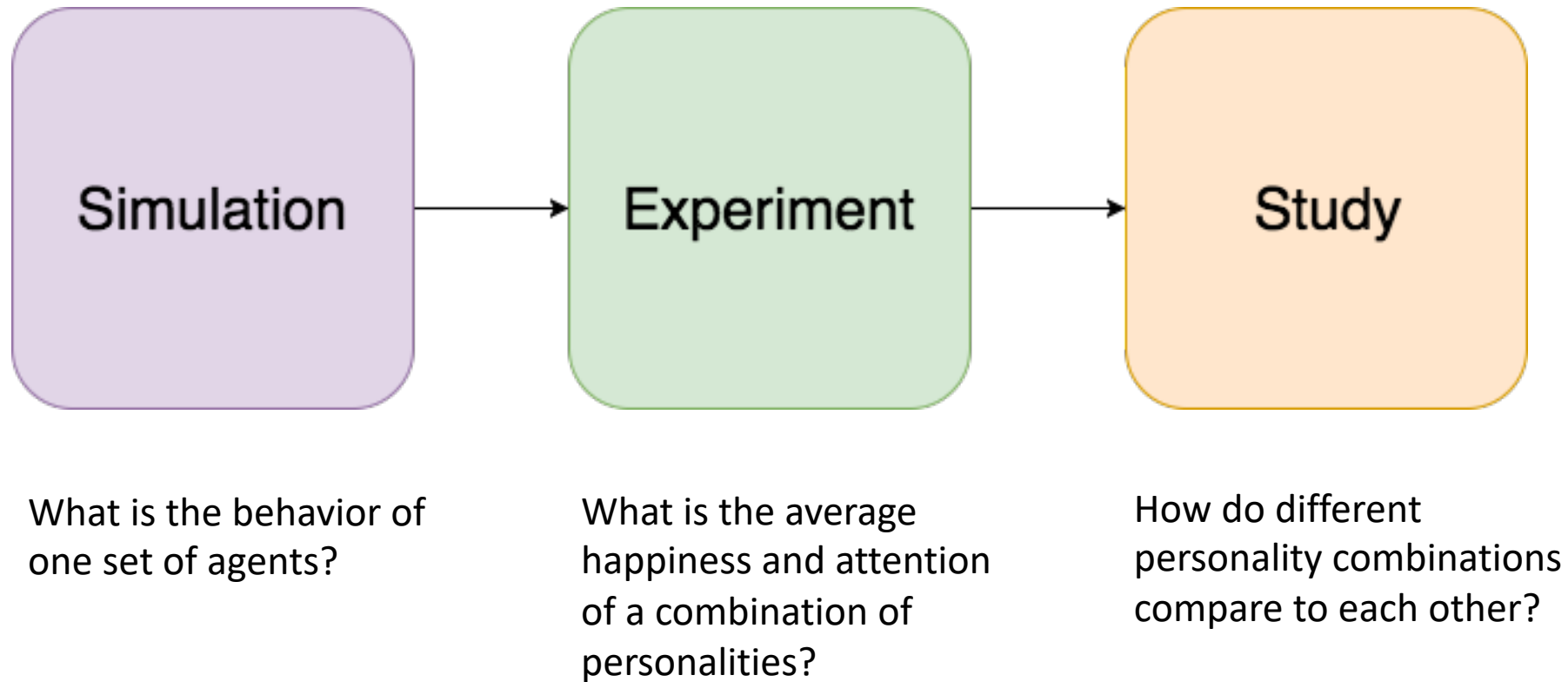
- Chat C ↓
- Quarrel A ↓

Other

- Action Duration C ↑
- Attention C ↑ M ↑ Ns ↓

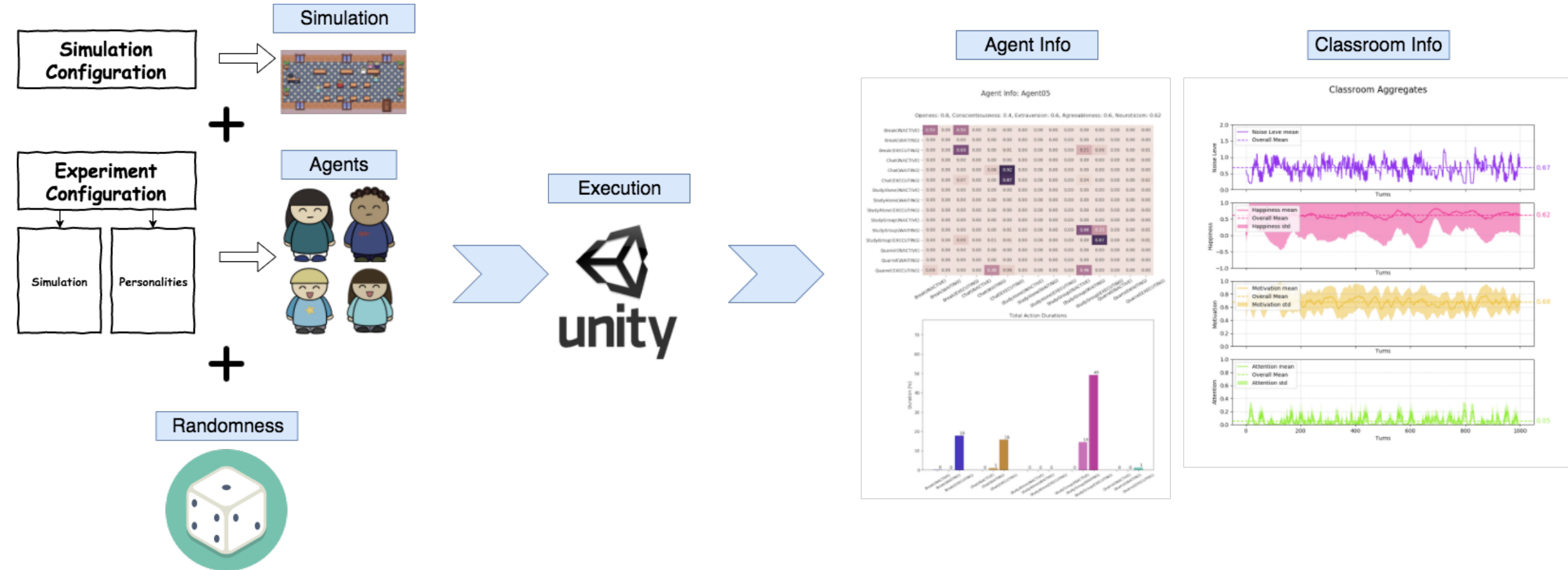
How different personalities effect
classroom attention and happiness?

Three phase Analysis



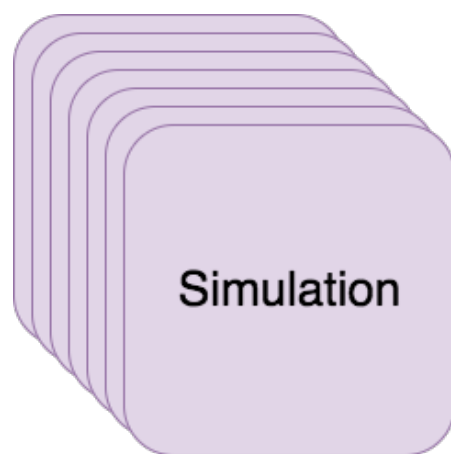
Simulation

What is the behavior of one set of agents?



Experiment

What is the average happiness and attention of a combination of personalities?

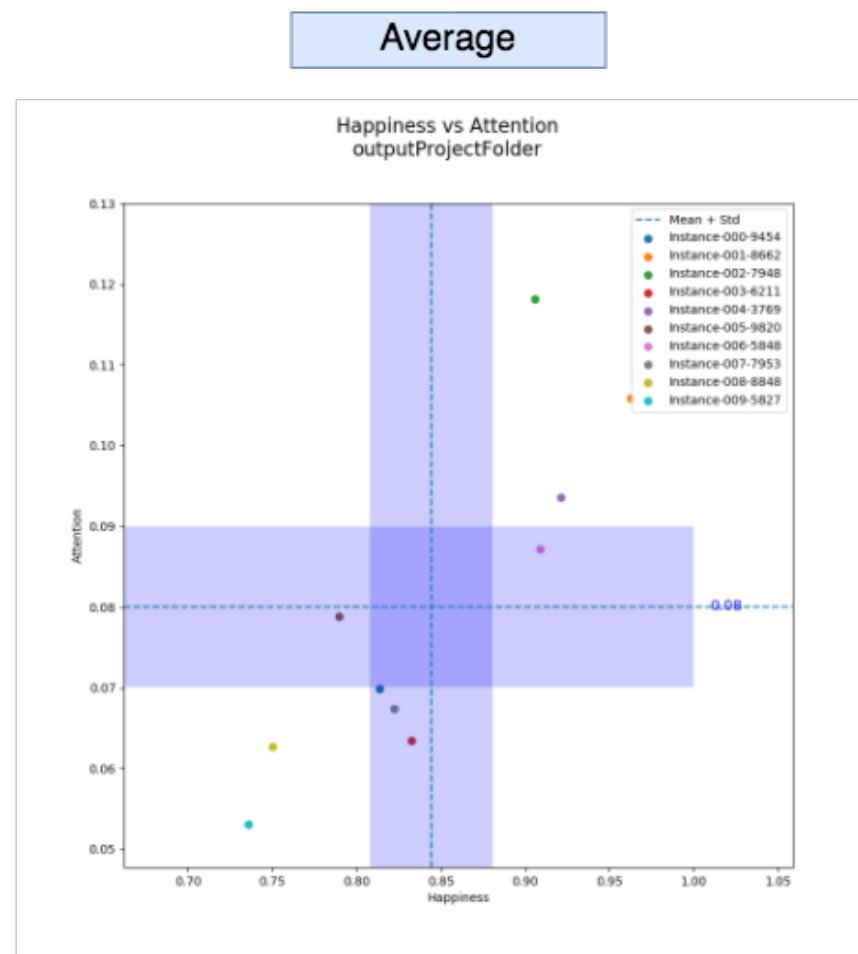


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Randomness

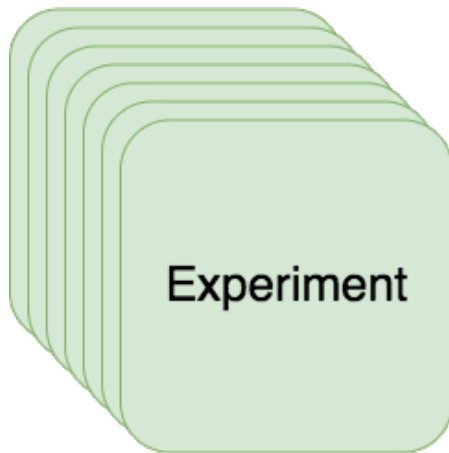


Batch Processing



Study

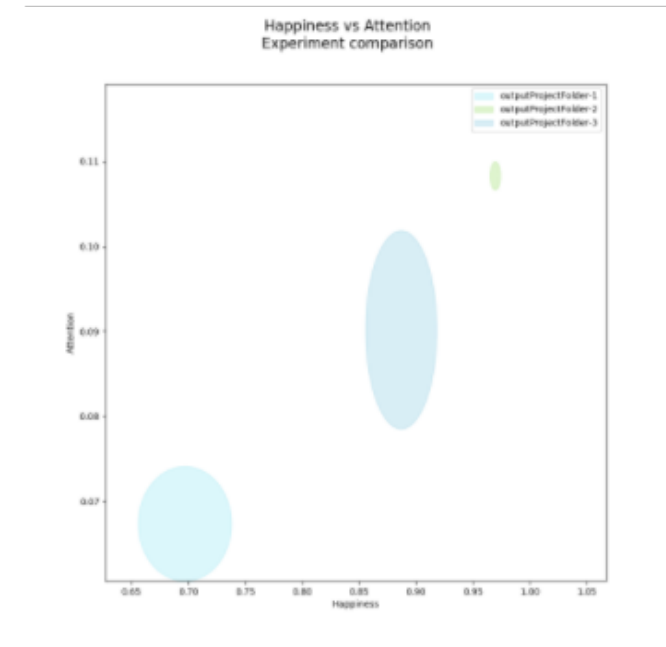
How do different personality combinations compare to each other?



Batch Processing



Group comparison



Results

Outlook

Thank you

Prof. Dr. Michael Kickmeier-Rust
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