ABM narrative summary (Milk Consumption)

Thank you so much for taking the time to help us! Please before proceeding any further, kindly read the following instructions to maximize your answer quality.

Given an Agent Based Model (ABM), we want you to produce a human-readable summary that captures the essential dynamics of the ABM which will then be used as a reference for evaluating LLM-generated summaries.

This ground truth is a narrative summary describing:

1. What the ABM is and does

2. What trends appear in the simulation outputs

3. Key numeric values and time points

We expect your summary to be 3 to 4 paragraphs long. We suggest keeping it concise and structured as followed:

Paragraph 1 focuses on the ABM purpose and parameters. It is describing what the model investigates, its goal, and key parameters with exact numeric values. We suggest to include which agents are involved as well as their role, the key initial parameters of the simulation setup and their exact value with units when applicable. We request you to please not paraphrase parameter names incorrectly and to not add parameters not present in the source.

Paragraph 2 focuses on key trends (initial/early phase). It is describing what happens early in the simulation including initial values, early dynamics, key time points.

Paragraph 3 focuses on key trends (middle phase), if applicable. It is describing intermediate trends, secondary metrics, or continuing dynamics.

Finally paragraph 4 focuses also on key trends (later/final phase). It is describing what happens over time, final outcomes, stabilization, long-term patterns.

While describing trends, we recommend the following guidelines:

What to include:

- Initial values: What the metrics start at (e.g., "starts at 100,000 units")

- Direction of change: Increase, decrease, stable, fluctuating

- Key time points: Specific time steps where changes occur (e.g., "by time step 10", "at step 40")

- Numeric values: Exact or approximate values at key points (e.g., "drops to 6", "stabilizes at 500")

- Patterns: Cyclical, linear, sigmoidal, plateau, etc.

What NOT to include:

- Don't interpret causation (e.g., "because of X, Y happens"), just describe what happens

- Don't add explanations not in the data

- Don't use vague terms like "significant" without numbers

- Don't mention the plot itself (no "as shown in the figure")

In addition, here is a small collection of bad and good examples:

❌ Bad

"The number of agents goes down a lot"

✅ Good

"The number of agents declines from 80 to 10 by time step 5"

❌ Bad

"The biomass fluctuates"

✅ Good

"Reserve biomass starts at 300,000 units, drops by step 10, then stabilizes around 400,000 by step 500"

You will be provided simulation outputs using a plot format (one plot for each variable). Each plot represents the evolution of this variable over time. You will also be provided with the ABM documentation as well as the the simulation parameters.

Here is a quality checklist for you to quickly verify the summary you write. This quality checklist only includes some important aspects but is non exhaustive:

- Goal sentence: Clear one-liner explaining model purpose
- All key parameters: Numeric values from source included
- Initial values: Starting point for each metric mentioned
- Time points: Specific steps where changes occur
- Numeric accuracy: Values match source data
- Trend direction: Clear increase/decrease/stabilize
- Final outcomes: How the simulation ends
- No interpretation: Only describe, don't explain why
- No visual references: Don't mention "figure", "plot", "graph"

* Indicates required question

Below is the documentation of the ABM:
The overall objective of the agent-based model is to reproduce adoption behaviours of milk consumption by the British public (1974-2005), by replicating individual preferences and decision factors. Specifically, the goal of the model is to explore the influence of perception, habits and social influence in an individual's decision-making process of milk choice. The model looks to replicate the substitution of whole milk for skimmed and semi-skimmed milk from the 1970s onwards. The main outcome reported here is the average weekly consumption of each milk type per person. The simulation uses both a theoretical grounding and empirical data to inform the ABM, with calibration performed against observed macro level data.

In particular, the study conducts an experiment to compare the performance of two model variants in reproducing overserved milk consumption trends. These variants present different mechanisms for how agents become disposed to consider their choices, representing a threshold based, and a probability-based approach.
Decision-making follows a basic structure of: agent perception of choice characteristics, the triggering, or not, of disposition to consider alternatives, a set of scored choice functions made up of the perceived characteristics and modulated by habit and social influence, and finally, choice evaluation where agents consider the impact of their choices and may adjust their future decisions.

The agents in the model represent adult consumers who occupy a random position in an information environment. Each agent has a disposition to consider alternative milk choices. Two disposition mechanisms are tested in the model, a threshold-based approach, and a probability-based approach. Each agent makes a choice of milk selection based on a function for each alternative, made up of the perceived health and environmental characterises of each choice. These are computed at the initialisation of the simulation and then calculated at each time step. An agent's milk choice function is modified by habit, social influence, and evaluation of previous choices. Agents ascribe different relative importance to each constituent part of the choice function (health factors and environmental factors). If the disposition requirement has been met, consumption of each milk type is split proportionately by the size of each choice function, modulated by the other influences. If not, agents keep their existing choice.

Agents (n=1,000) start with an existing choice based on the dominant position of whole milk versus skimmed varieties in 1974 (start year of the data). All agents are part of a social network. Each agent in the network can sense and be influenced by the choice function of each milk alternative for other agents in their network. Links between agents are unidirectional, and influence occurs as a function of interaction probability, with the degree of influence characterised by agent susceptibility. Social norms are globally perceived by agents and impact the weightings of the choice function
Setup and Go.

Monitors:

Two monitors track the number of turtles that have consume mostly whole-milk (incumbent initial choice) or skimmed/semi-skimmed milk (alternative initial choice).

Plots:

One plot shows the percentage of majority whole milk or skimmed/semi-skimmed milk consumers.

The second plots the average consumption of each milk type over time. This is the data that the calibration exercise uses to try and replicate observed consmption data.

Parameters:

12 paraemters that governs whether an agent will consider changing its milk type, and how much of each milk type an agent will consume. We refer viewers to the manuscript based on this model for further details.
The appearance of a crossover in the types of milk consumed and the shape of the curves over time.

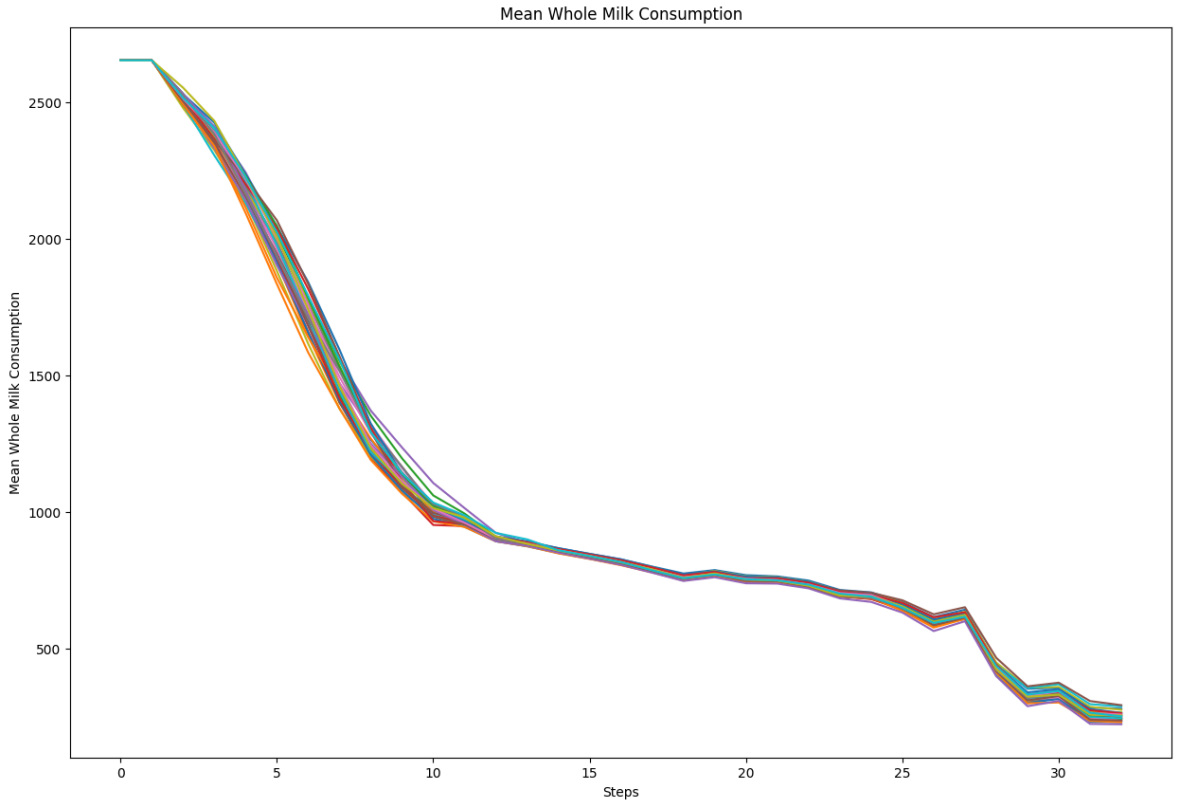
Below are the parameters used for our simulation run:

We have 16 parameters:

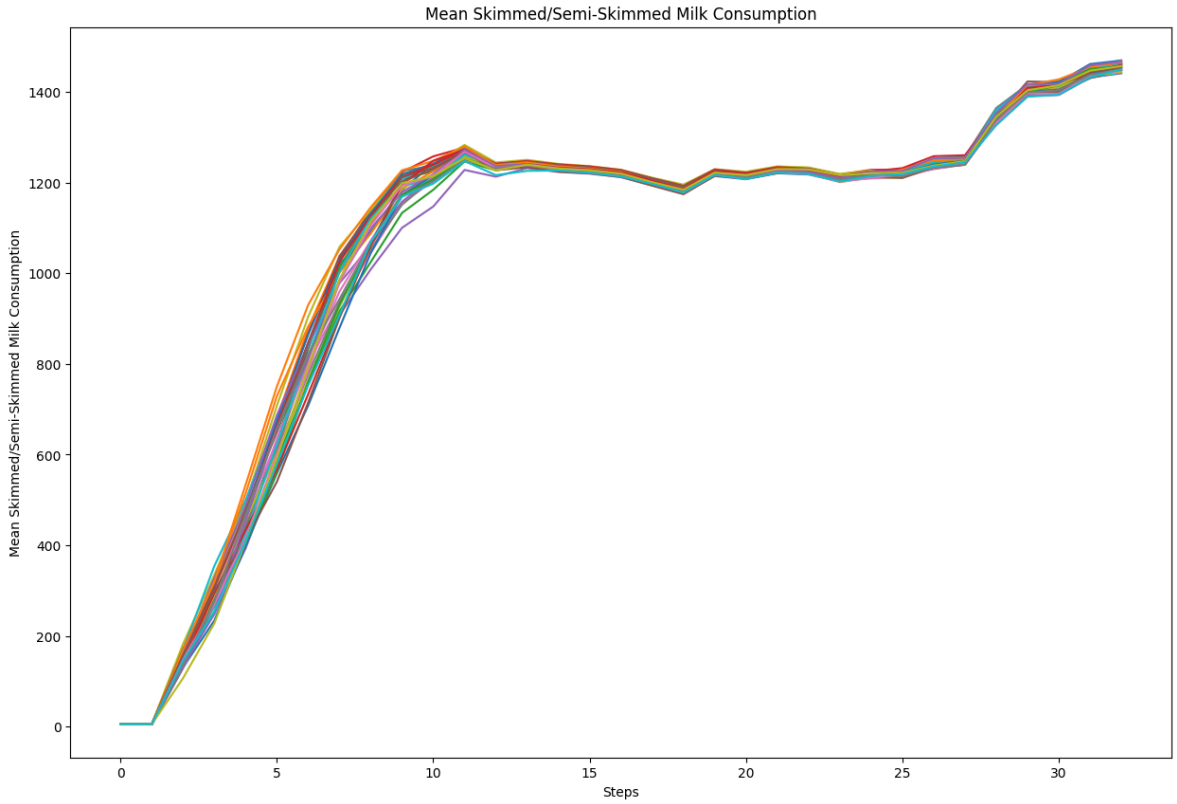
- memory-lifetime, from 1.0 to 10.0. We set it to 5.
- alt-health-mean-initial, from 1.0 to 3.0. We set it to 1.69.
- habit-threshold, from 1.0 to 10.0. We set it to 2.
- p-interact, from 0.0 to 1.0. We set it to 0.3.
- social-susceptibility, from 0.0 to 1.0. We set it to 0.2.
- incumbent-initial-habit, from 0.0 to 10.0. We set it to 10.
- alt-env-mean-initial, from 0.0 to 3.0. We set it to 1.12.
- social-blindness, from 0.0 to 1.0. We set it to 0.51.
- justification, from 0.0 to 1.0. We set it to 0.61.
- cognitive-dissonance-threshold, from 0.0 to 1.0. We set it to 0.15.
- network-parameter, from 2.0 to 10.0. We set it to 8.
- number-of-agents. We set it to 1000.
- habit-on?. We set it to True.
- network-type. We set it to "watts-strogatz".
- norms. We set it to True.
- social-conformity. We set it to 0.28.

Below are the plots representing the simulation outputs

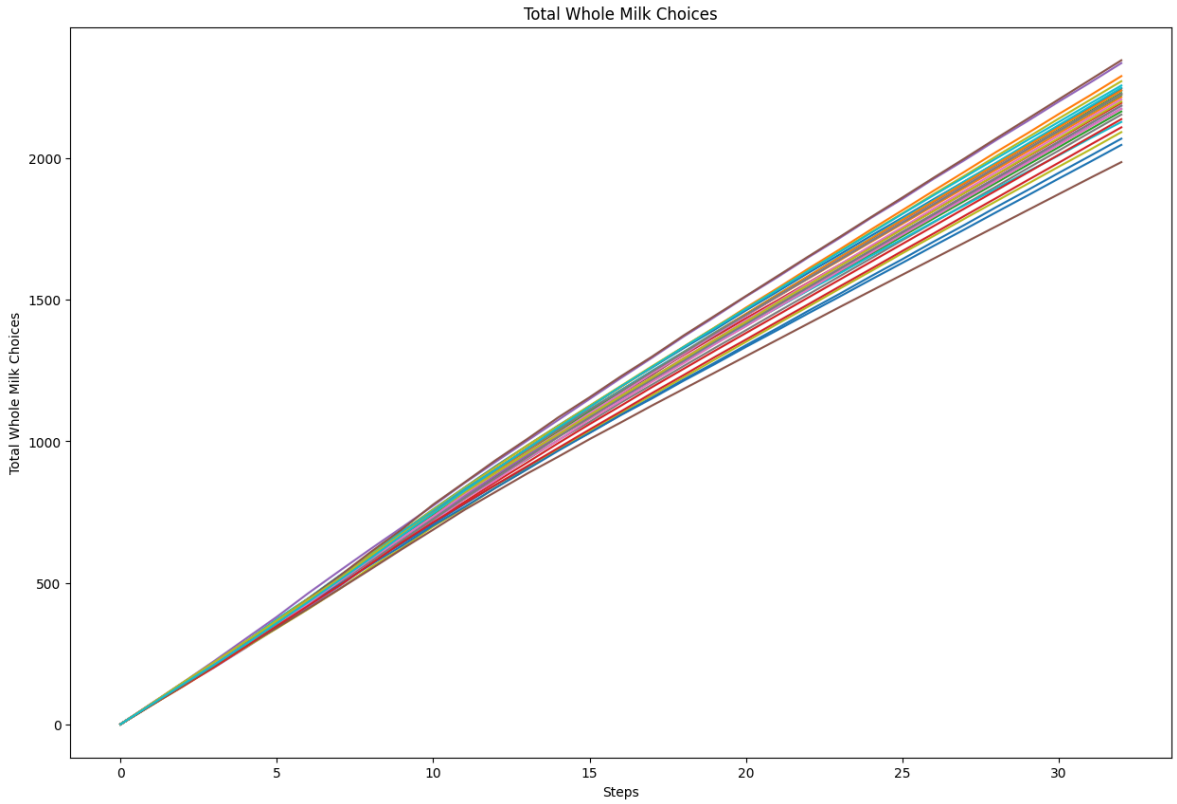
1) Mean whole milk consumption



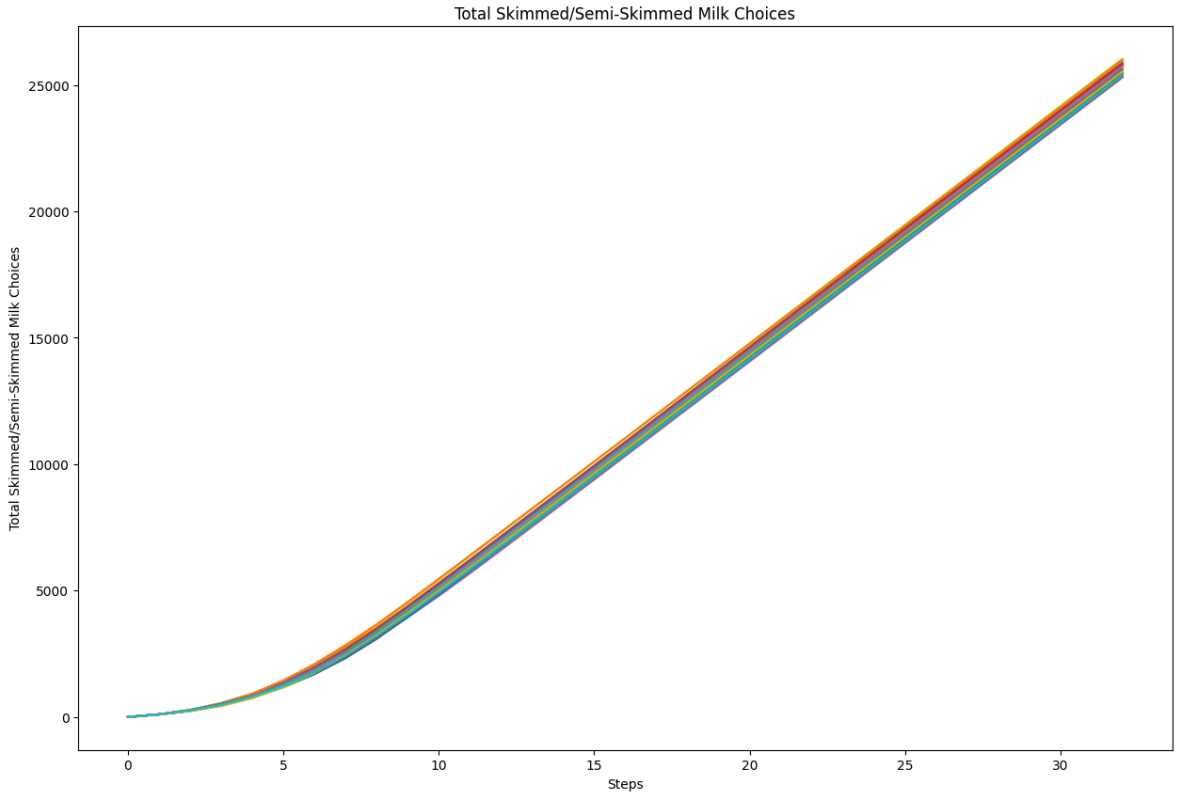
2) Mean skimmed/semi-skimmed milk consumption



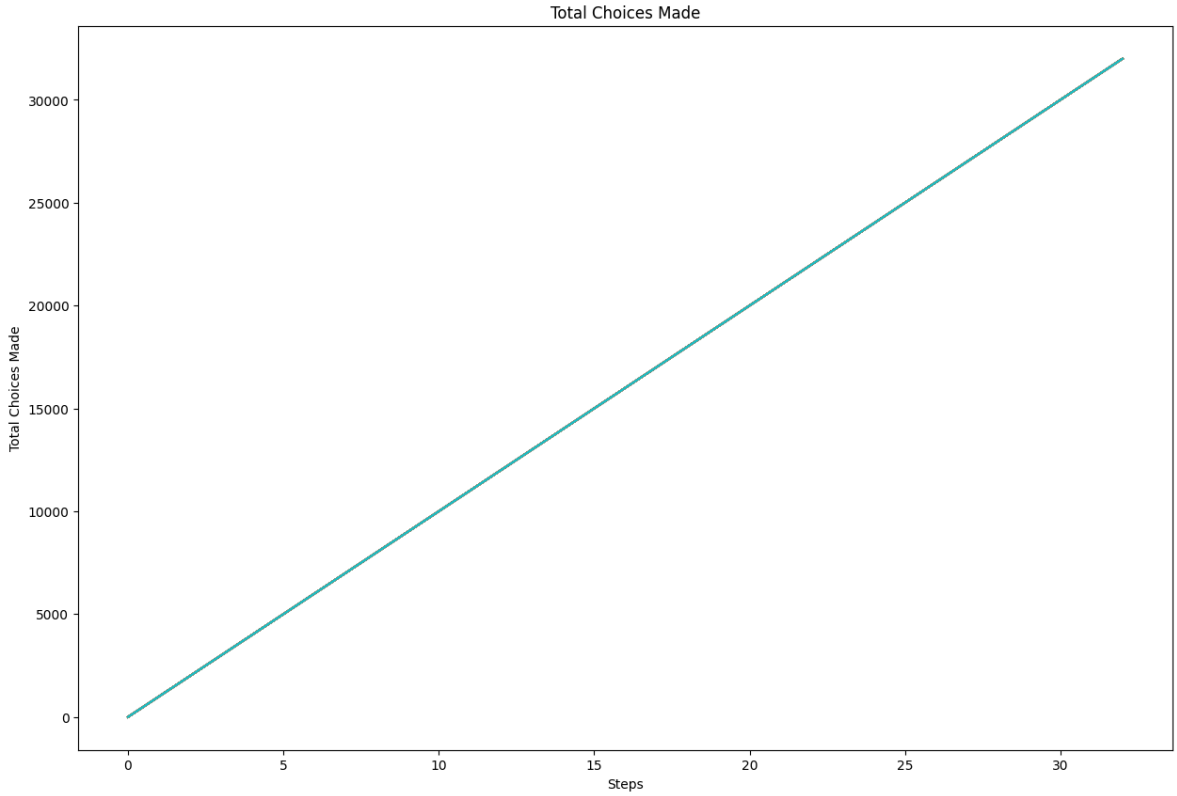
3) Total whole milk choices



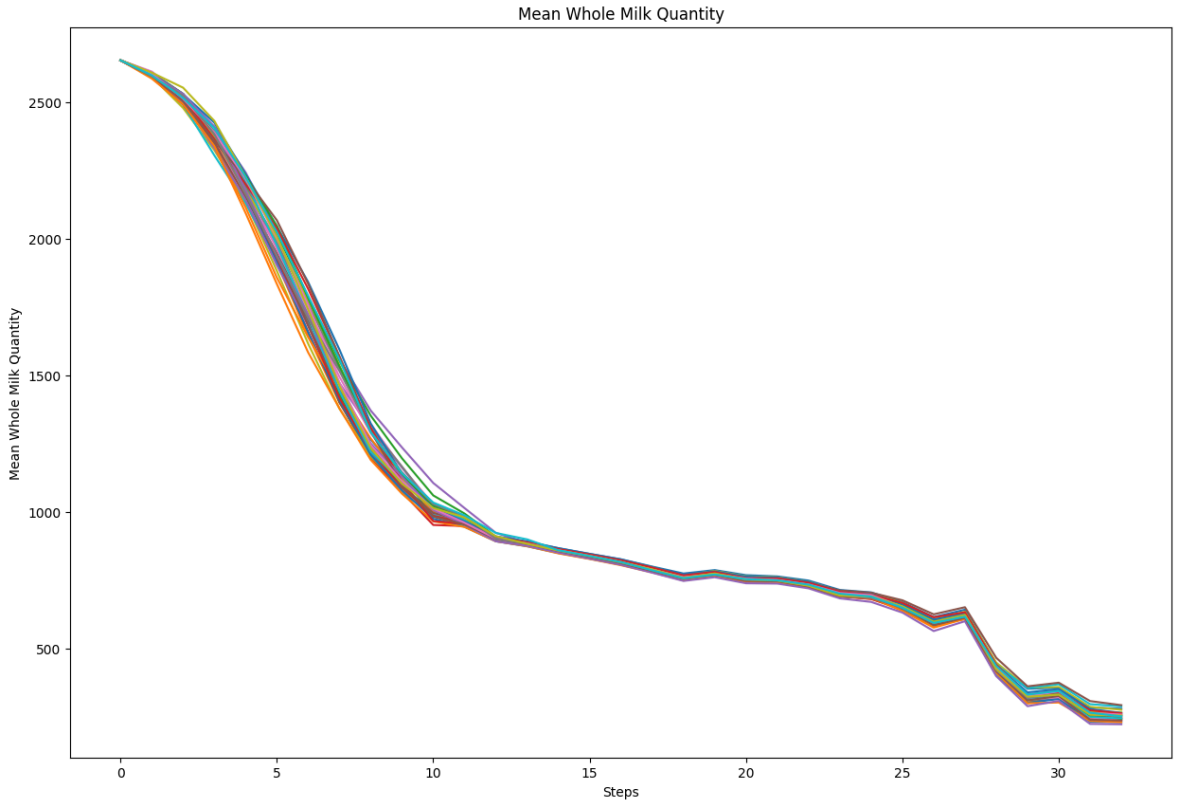
4) Total skimmed/semi-skimmed milk choices



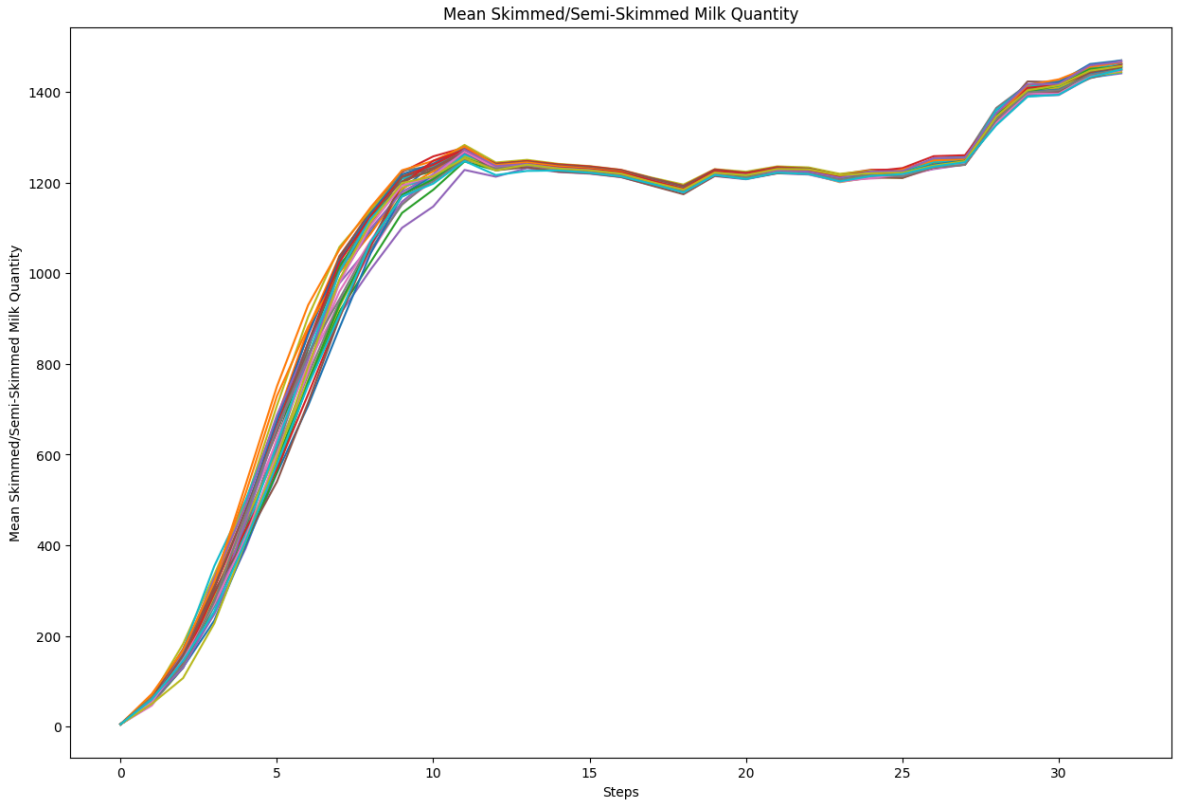
5) Total choices made



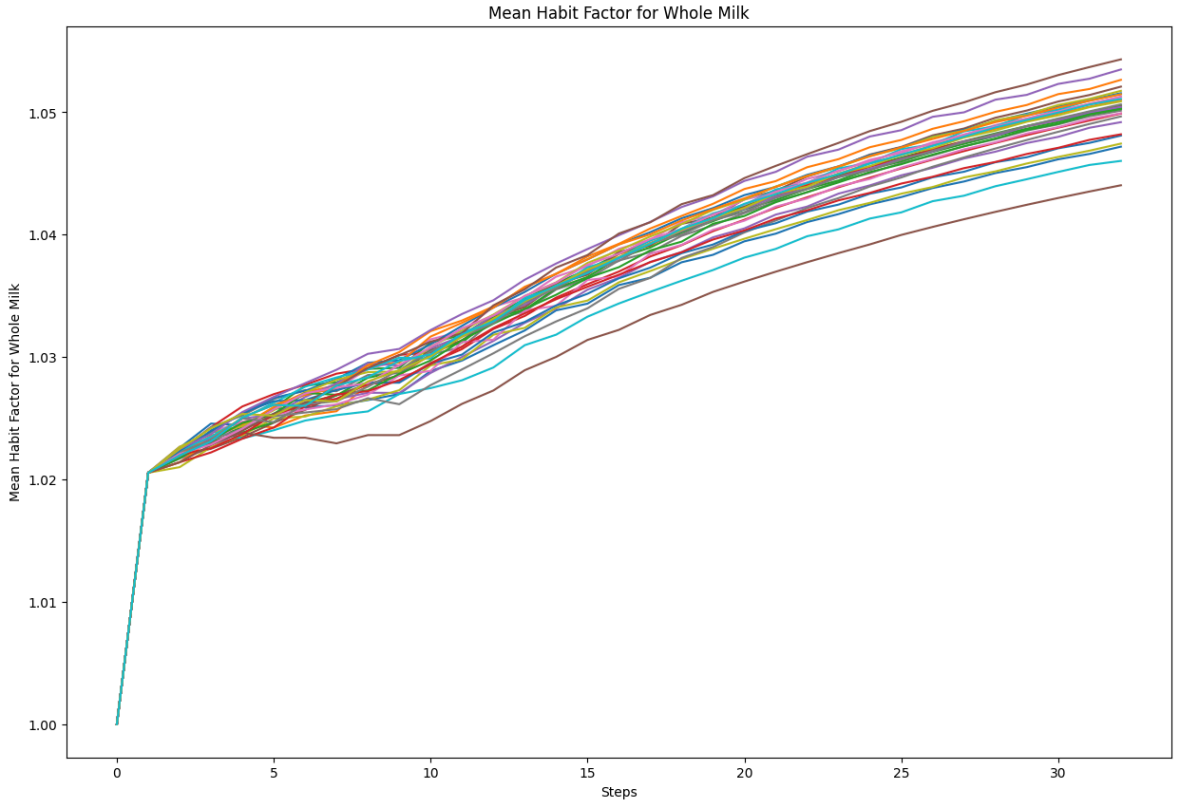
6) Mean whole milk quantity



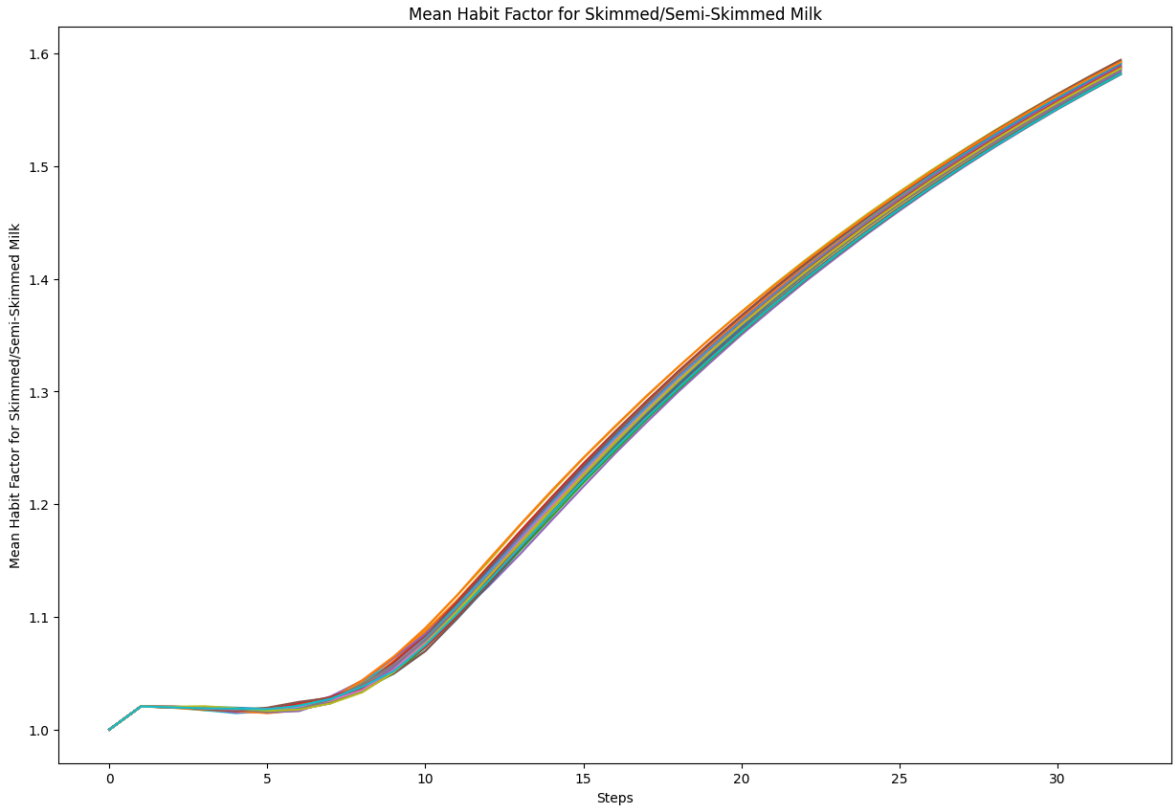
7) Mean skimmed/semi-skimmed milk quantity



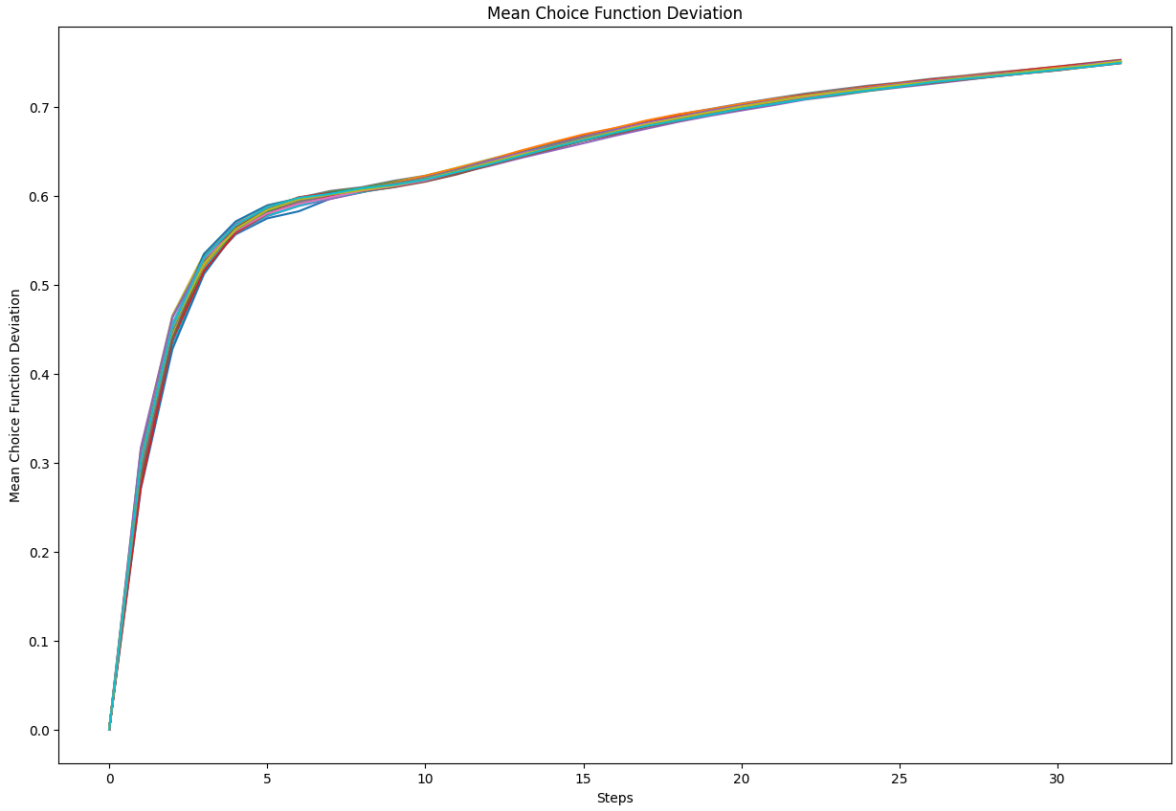
8) Mean habit factor for whole milk



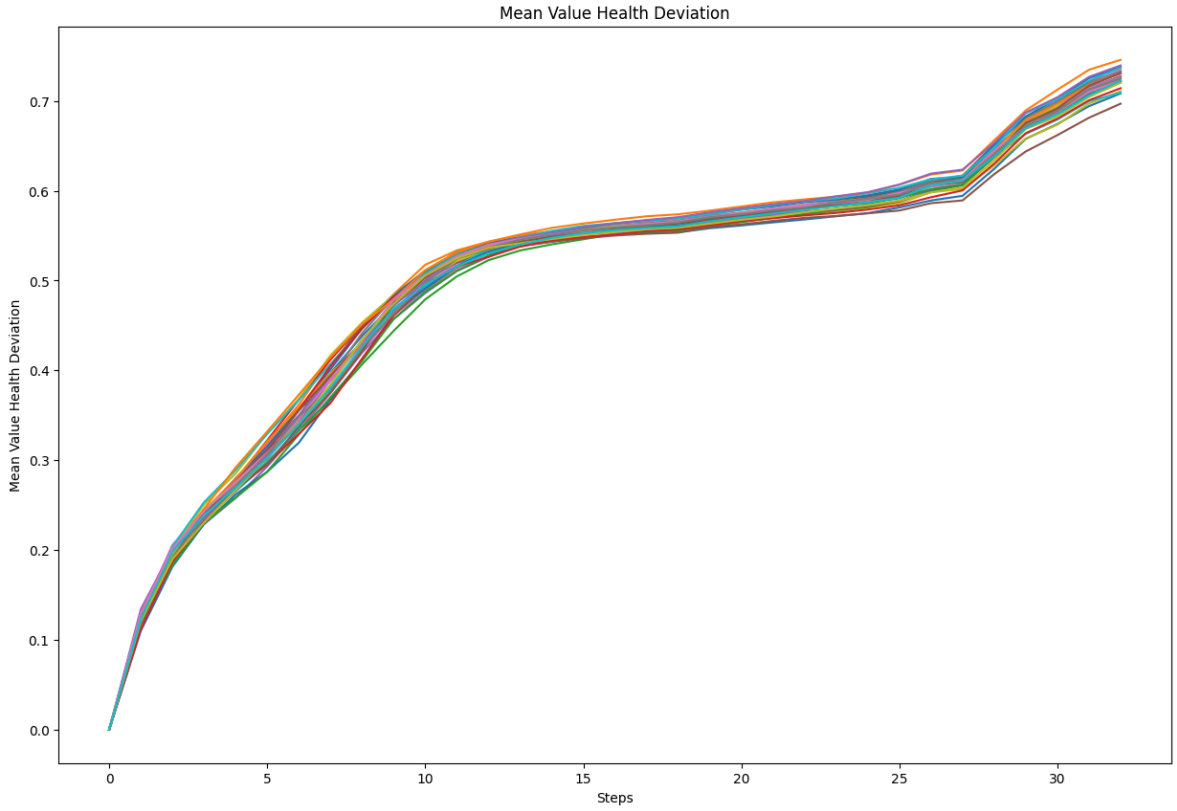
9) Mea habit factor for skimmed/semi-skimmed milk



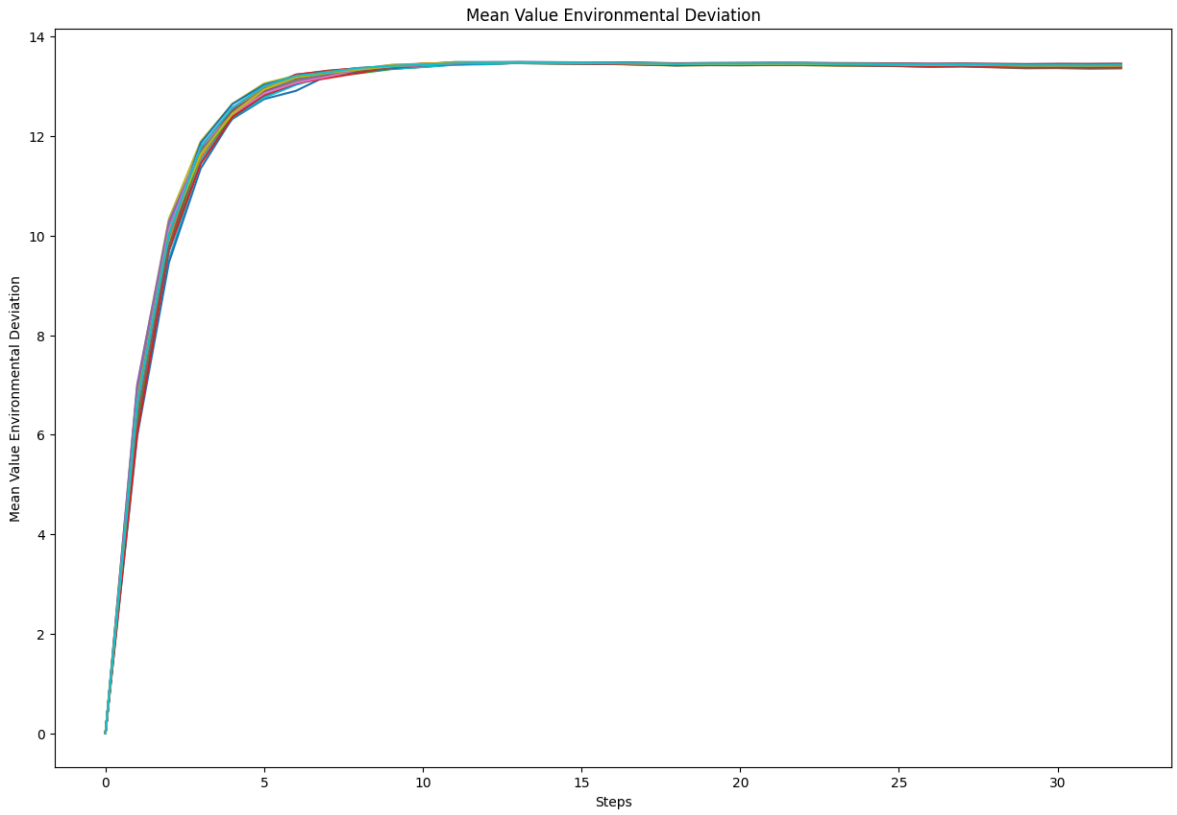
10) Mean choice function deviation



11) Mean value health deviation



12) Mean value environmental deviation



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Your answer

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