**1) Data collection.** Have any data been collected for this study already?

* Yes, we already collected the data.
* No, no data have been collected for this study yet.
* It's complicated. We have already collected some data but explain in Question 8 why readers may consider this a valid pre-registration nevertheless.

(Note: "Yes" is not an accepted answer.)

**2) Hypothesis**. What's the main question being asked or hypothesis being tested in this study?

Though much of the natural word is dynamic, humans are well-equipped to make sound inferences in static scenes. Seeing someone standing in line at a clothing store with a single piece of bright clothing, we can immediately reconstruct several potential paths they took to get there: perhaps they entered, knew what they were looking for and walked straight there, and then browsed for a bit in that section before picking something out. How are people able to infer the desires and previous actions of agents in static images?

Participants will be presented with an introduction that outlines the general layout of the stimuli and other features of the task. Each stimulus is embedded within a “gridworld” and contains some cookie crumbs an agent left behind, three labeled corners (i.e., the goals), and up to three labeled doors (i.e., the entrances). Agents can only move horizontally or vertically, but not diagonally, and a subset of the stimuli contain walls that also impede agents’ movements. Lastly, the introduction mentions that agents do not choose which door they walk through and explains that participants must infer, from a single image: (1) the goal people infer the agent wants and (2) the entrance people infer the agent took to get there (see Q3 for details on how these are collected). After the introduction, participants will be given a brief, six-question quiz (see Q6 for our inclusion criteria). Upon passing the quiz, participants will be presented with the 23 trials in random order (see Q4 for design).

**3) Dependent variable**. Describe the key dependent variable(s) specifying how they will be measured.

We will have two dependent measures: (1) the goal people infer the agent wants and (2) the entrance people infer the agent took to get there. Both of these measures will be collected using three sliders for the goals and up to three sliders for the entrances (for trials with more than one entrance; see Q4 for more details on trial design) both ranging from “definitely not” to “definitely”.

**4) Conditions.** How many and which conditions will participants be assigned to?

All participants will see an identical introduction and quiz. Across participants, the same 23 trials will be randomly permuted. Within participants, the trials will vary in the number of entrances, the agent’s distance to the intended or an unintended goal, and the openness of the map (i.e., whether or not the map contains any walls that affect the agent’s pathing). Participants will also have to correctly answer an objective question (*Which corner is farthest from Door 1 (there may be more than one)?*) on each trial in order to continue.

The stimuli are varied parametrically along the model’s goal inference and entrance inference. For the goals, the model can endorse a goal X in the following ways: certainly (i.e., “definitely X” or **DX**), probably (i.e., “probably X” or **PX**), not (i.e., “definitely not X” or **NX**), or unsure (i.e., a uniformly-distributed prediction or **UN**). For the entrance, the model can endorse an entrance X in the same ways as above (for stimuli that only have one entrance, they are marked as **ND**).

**5) Analyses.** Specify exactly which analyses you will conduct to examine the main question/hypothesis.

Our first analysis will consist of correlating all participant responses with all responses predicted by our computational model. Our second analysis is similar to the first except we will bisect the data by the type of inference participants are making (goal vs. entrance). (see Q4). In all of our analyses, we will compute 95% bootstrapped confidence intervals for participant judgments. We will also perform some post-hoc model adjustment by varying choice tau to see if the differences between participant responses and model predictions can be attributed to this parameter, or if another parameter is at play.

**6) Outliers and Exclusions.** Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.

Our inclusion criterion consists of a brief, six-question quiz. Participants that fail the quiz twice will not be included in the study. The questions are listed below, with the answers in bold:

1. How many corners are people walking to?

**1** 2 3 Not sure

1. Do people always drop their cookie crumbs on their path to/from a corner?

**Yes** No Not Sure

1. Do people get to choose which door they walk through?

Yes **No** Not sure

1. Do people leave the room out of the same door they entered or the door closest to them?

**Same door** Closest Door Not sure

1. Can people move diagonally?

Yes **No** Not sure

1. What color are the walls?

White **Gray** Red Not sure

**7) Sample Size.** How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

We will recruit 40 participants. This sample size was determined by the sample sizes in our previous experiments.

**8) Other.** Anything else you would like to pre-register?

(e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)

See the computational model and experiment materials at:

<https://osf.io/q3ct5/?view_only=4b9b2c68443e4d91b2fb6cf7544055e5>

**9) Name.** Give a title for this AsPredicted pre-registration.

Suggestion: use the name of the project, followed by study description.

Image Inference – Inferring actions and desires from static scenes