COG250H1: Introduction to Cognitive Science **Fall 2018**

Lecture 3: Categorization II (Classical Theory, and Prototype Theory)

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Key Idea: Everytime you hear "All x are y" be very critical of it.

You can treat everything in your environment as an instance of a type. However, there is problems with this

However, things have an infinte amount of feature complexity that can form categories in our world.

Categorical Problems: Uniqueness of a chair violating your categorical assumption

Main Ideas: - Tversky's formula for similarity - Salience

Some people play with the idea that categories are innate and that humans discover them as they mature.

1. Salience

3.1 Categorization

Naive model - We look at things and decide based off similarity whether things belong in the same category. One of these things belong together and on of these things do not. Rely on your perception and judgement to form categories.

This naive model (common sense assumption) holds up at first glance. One of the problems with this is that (as nelson goodman points out) if we are treating similarity as a question of partial identity of terms, then things have an infinite amount of similarity of dissimilarity. This is not very plausible since humans have a limited amount of cognitive power.

3.1.1 The Resemblance Theory

Name coined by Lance Ribs

criticsms: if similarity judgments are supposed to drive similarity judgements Purpose: Set the stage for providing visions of cognitive sceince, introduce sub disciplines, briefly describe key events in cognitive science.

3.1.2 Geometric Notion - Tversky's Formula

$$Sim(I, J) = af(I, J) + bf(I, J) + cf(I, J)$$

where:

f is a function that measures the salience of each set of features.

a, b, and c are parameters that determine the relative contribution of the three feature sets.

Problems: Falls prey to homuncular fallacy

3.1.3 Classical Theory

Motivation: Smith: Categorization is running on some feature of the world. Categorization is in some sense a bottom up process.

Response: Categorization is rather a top down process. It is more plausible that we use concepts to categorize objects. We are imposing a concept into cateogries.

Aristotle championed the classical theory of concepts.

Somehow we are using concepts to do categorization.

Theory:

Evidence:

Criticsms:

3.1.4 Prototpye Theory

Theory:

Evidence:

Criticsms: