Cross-classification and Inductive Selectivity in Young Children

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Outline
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II. Experiments
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   b. Cross-classification
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I. Theoretical background

“Without concepts, mental life would be chaotic. If we perceived each entity as unique, we would be overwhelmed by the sheer diversity of what we experience and unable to remember more than a minute fraction of what we encounter…” (Smith & Medin, 1981)

“Concepts are the glue that holds our mental world together.” (Murphy, 2002)

Functions of concepts

1. identify items that belong to a category
2. draw inferences about items

Shift view

• Preschool-aged children: simple
• School-aged children: complex

>young children’s thinking is rigid & concrete

(Inhelder & Piaget, 1964; Vygotsky, 1962)
**Taxonomic categories**
- items have common properties
- different levels of abstraction
  - e.g., black lab & golden retriever as “dogs”
- require abstract thinking, achievable only by school-age children

(Inhelder & Piaget, 1964; Vygotsky, 1962)

**Script categories**
- derived from schemas for routine events
- items play the same role in an event
  - e.g., cake and balloon or cake and cupcake
- can violate taxonomic boundaries

(e.g., Nelson, 1986, 1988)

**Evaluative categories**
- share the same value-laden cognitive assessment
  - e.g., unhealthy foods, good personality traits
- can violate taxonomic boundaries and are not constrained to a script
  - e.g., dangerous items (snake, poison)

**Conflict triad**

Does the bone or cat go best with the dog?

(Smiley & Brown, 1979)

**Single form of categorization**

Conflict Triad

Target

Script Taxonomic

**Multiple forms of categorization**

Nonconflict Triad

Target

Category choice Noncategory choice
II. Experiments

Do children have multiple category systems? Taxonomic? Script? Evaluative?

(Nguyen & Murphy, 2003)
Participants

- 4-year-olds
- 7-year-olds
- adults

The Domain of Food
1. Taxonomic
e.g., fruits, meat, dairy products

2. Script
e.g., breakfast, lunch, birthday

3. Evaluative
e.g., healthy, junky

Taxonomic triad
Is cheese or a potato the same kind of food as a bean?

Script triad
Is jello or bacon the same kind of food as a pancake?

Evaluative triad
Is spinach or cheetos the same kind of food as a banana?

Results
Percentage of category matches by age
b. Cross-classification

Can children cross-classify a single item into both taxonomic and script categories?

(Nguyen & Murphy, 2003)

The Domain of Food
1. Taxonomic
   e.g., fruits, meat, dairy products

2. Script
   e.g., breakfast, lunch, birthday

These results have been recently extended to other domains:
- people
- clothing
- toys
- furniture

Participants
- 4-year-olds
- 7-year-olds
- adults

Taxonomic triad
Is a watermelon or turkey the same kind of food as an apple?
Script triad

Is an egg or sandwich the same kind of food as an apple?

Results

Percentage of category matches by age

These results have also been recently extended to other domains:
- people
- clothing
- toys
- furniture

“Animal” → Blood and bones inside
“Toy” → Cotton inside

Inductive selectivity
- requires that children are sensitive to which properties should be induced for different categories

(Deák, 2000; Kalish & Gelman, 1992)

Inductive Selectivity within the Domain of Food

1. taxonomic → biochemical inferences
2. script → situational inferences
3. evaluative → bodily inferences

(Nguyen & Murphy, 2003; Nguyen, 2005)
Participants

• 4-year-olds
• 7-year-olds
• adults

Biochemical: Tiony is special stuff inside ice cream. Does milk or cake also have tiony inside too?

Situational: Ice cream is eaten during a special time called tiony. Is milk or cake also eaten during tiony too?

Results

Percentage of taxonomic matches by age

Bodily Inference: Cookies have made Jake’s body tiony. Would pasta or potato chips also make Jake’s body tiony?

Arbitrary Inference: There was dirt on the cookies. Would there also be dirt on the pasta or potato chips?

Results

Percentage of evaluative matches by age

Inductive Selectivity within A Variety of Domains

- food
- people
- clothing
- toys
- furniture
Participants

- 3-year-olds
- 4-year-olds
- 5-year-olds
- Adults

Biochemical: “Tiony is special stuff inside of a cat. Do you think a monkey or pumpkin also has the same special stuff inside?”

Situational: “A cat is for a special time called tiony. Do you think a monkey or pumpkin is also for the same special time?”

Results

Percentage of taxonomic matches by age

- Follow-up with 3-year-olds
  - basic level taxonomic choices

Participants

- 3-year-olds

Biochemical: A cat has stuff called blood inside. Do you think a kitten or pumpkin also has blood inside?

Situational: A cat is for a time called fete. Do you think a kitten or pumpkin is also for fete?”
Summary of results

- By an early age children….  
  -multiple categorization systems  
  -cross-classification  
  -inductive selectivity

Implications for the shift view

1. Gradual developments  
   -lack of a dramatic shift in children’s concepts during the school years

2. Children’s thinking is flexible  
   -not concrete and rigid