

# Young Children's Gender-based Inductive Generalizations: The Influence of Stereotyping and Categorization

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## Background

From an early age, children's awareness of social categories and stereotypes influences children's social reasoning. For example, young children may use gender information to infer another child's toy preferences or biological properties, and to predict an infant's future traits and behaviors (Gelman, Collman & Maccoby, 1986; Martin, 1989; Taylor, 1996). The present study examined the influence of gender category information, gender stereotypes, and gender salience on young children's reasoning about other people.

Specifically, we assessed the influence of children's own stereotyping and categorization activities on children's subsequent inductive reasoning.

## Previous Research

- Gelman, Collman, & Maccoby (1986) found that 4-year-old children attributed novel biological properties and familiar behaviors on the basis of gender category membership more than similarity in appearance.

- Pillow, Pearson, and Allen (2015) found that 3- to 5-year-olds did not necessarily generalize either novel biological properties or gender-neutral behaviors on the basis of gender more than appearance. However, reasoning about familiar gender-stereotyped behaviors appeared to increase children's tendency to make gender-based inductions concerning novel biological properties.

- Pillow, Allen, Low, & Vilma (2019) presented children with stories in which a teacher either endorsed gender stereotypes by assigning girls to play with stereotypically feminine toys and boys to play with stereotypically masculine toys (Stereotype condition), grouped children according to gender by telling boys and girls to play in different locations (Salience condition), or grouped children in a gender-neutral manner by instructing mixed-gender groups to play with gender neutral toys (Neutral condition). Children under 4.5 years of age made gender-based inductions at above chance levels only in the Stereotype condition, children 4.5 to 5.5 years of age made gender-based inductions at above chance levels in the Neutral condition and for behavioral traits in the Salience condition.

## Aims & Hypotheses

### Aims

The present study sought to replicate and extend Pillow et al.'s (2019) findings using a different set of stereotype and salience manipulations. Our goal was to examine whether children's own stereotyping and categorization activities influence children's inductive generalizations. Therefore, we induced children themselves to engage in stereotyping, gender categorization, or gender-neutral categorization.

### Overview

- Stereotype Condition:** Children sorted pictures of boys and girls into two groups defined by stereotype toy and activity preferences. This task encouraged participant children to think about the children in the pictures in a gender stereotyped manner.

- Salience Condition:** Children sorted pictures of boys and girls into two groups according to gender. In the absence of gender stereotypes, this task encouraged participant children to distinguish the children in the pictures in terms of gender.

- Neutral Condition:** Children sorted pictures of boys and girls into two groups according to shirt color. Because there were equal numbers of boys and girls with each shirt color, this task did not encourage participant children to attend to gender.

- Inductive Generalization:** Children performed an inductive generalization task included both novel biological items and novel behavioral items.

### Predictions

For the Stereotype and Neutral conditions we made two predictions:

- Children would generalize both biological and behavioral characteristics on the basis on gender more frequently in the Stereotype condition than in the Neutral condition.

- Children would respond on the basis of gender at above chance levels in the Stereotype condition but not in the Neutral condition.

For the Salience condition we examined two possible patterns of reasoning:

- If stereotyping is necessary for gender-based induction on the triad task, then (a) children should generalize on the basis of gender more often in the Stereotype condition than in the Salience condition, and (b) performance in the Salience condition should not differ from the Neutral condition.

- If merely focusing children's attention on gender is sufficient, then children should make gender-based inductions in Salience condition more often than they do in the Neutral condition.

## Method

### Participants

Ninety-six preschool children participated. Children were divided into a younger group (mean age 4 years; age range 3 years, 3 months to 4 years, 6 months; 23 boys and 25 girls) and an older group (mean age 5 years, 3 months; age range 4 years, 7 months to 5 years, 11 months; 23 boys and 25 girls), with equal numbers of younger and older children participating in each of three between-subjects conditions (Stereotype, Salience, and Neutral).

### Procedure

#### Overview

Each child participated in one of three conditions: Stereotype, Salience, or Neutral. In each condition, children began with a sorting task. On each of two trials children were asked to sort pictures of children into two groups. Then children engaged in eight trials of an inductive generalization task. On four trials children were asked to make generalizations about novel biological characteristics, and on four trials children were asked to make generalizations about novel behavioral characteristics.

#### Sorting Tasks

Children were given a set of four computer generated pictures (e.g., 2 boys and 2 girls, with one child of each gender wearing a green shirt and one wearing a red shirt), and were asked to sort the pictures into two groups.



- Stereotype condition:** Photographs of a stereotypically masculine object (e.g., truck) and a stereotypically feminine object (e.g., doll) were placed on a table in front of the child. The child was given a set of four computer generated pictures and asked to sort them according to the pictured child's play preference, e.g., "Here's a toy truck and here's a doll. Here are some children. Put the children who like toy trucks here and put the children who like dolls here." For the second trial another set of four pictures (e.g., children with blue or yellow shirts) was sorted into two categories (e.g., like princess costume vs. like football).



- Salience condition:** The four computer-generated pictures of children were sorted by gender. On each sorting trial, participants were shown a photograph of a boy and a photograph of a girl, and asked to put pictures of boys next to the photograph of a boy and pictures of girls next to the photograph of a girl.



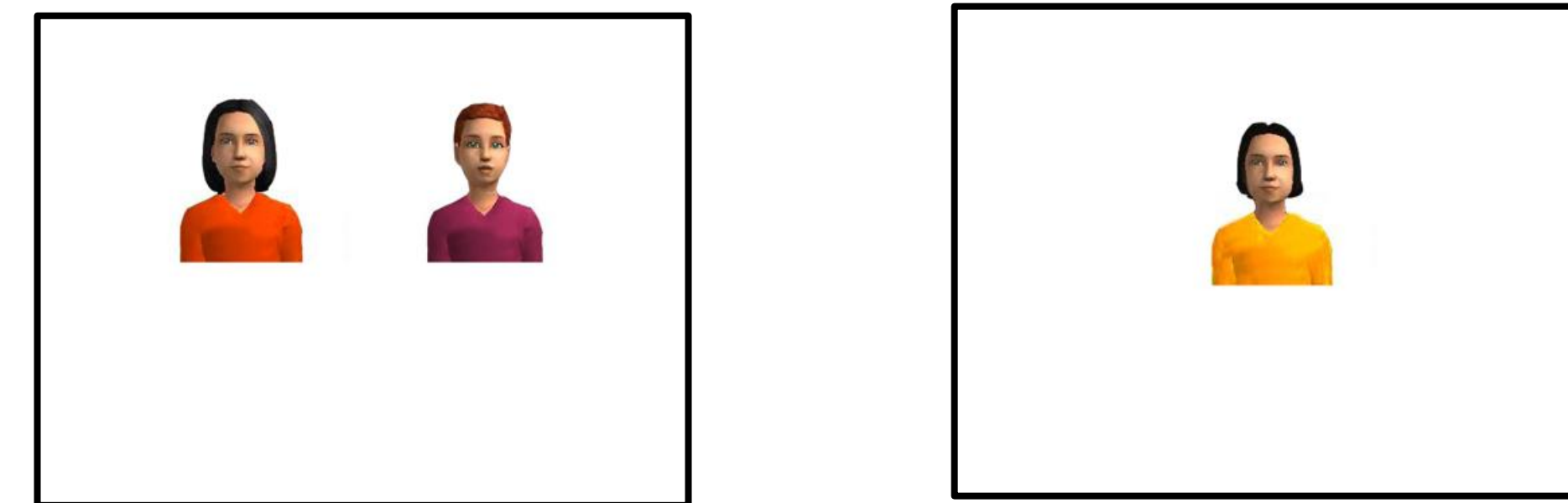
- Neutral condition:** Participants were asked to sort the pictures of children according to shirt color. Participants were shown pictures of colored squares (e.g., a red square and a green square) and asked to place the pictures of children next to the square that matched the shirt color. In each condition, two sets of four pictures were sorted.



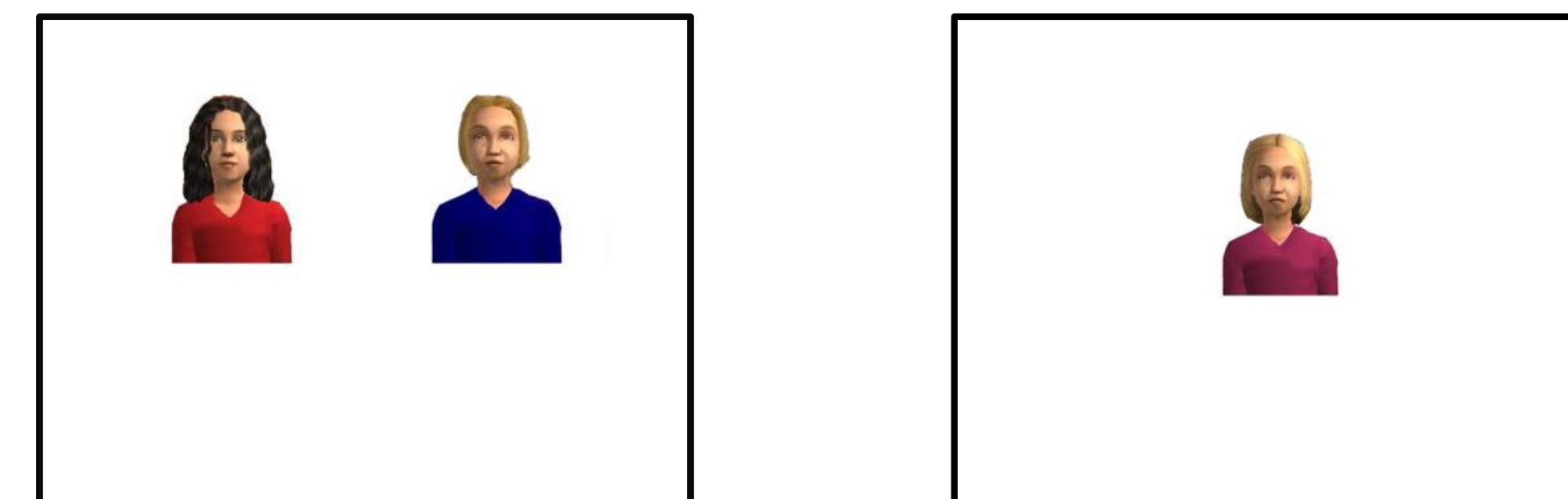
### Inductive Generalization Task

A triad inductive generalization task pitted gender against visual similarity. Children were asked to make generalizations about 4 novel biological and 4 novel behavioral characteristics.

- Biological trial:** "This boy has fibro in his blood. This girl has neutros in her blood. Now here's another boy. What does this boy have in his blood? Does he have fibro in his blood like this boy? Or does he have neutro in his blood like this girl?"



- Behavioral trial:** "This girl plays with samas. This boy plays with noyas. Now here's another girl. What does this girl like to play with? Does she play with samas like this girl? Or does she play with noyas like this boy?"



## Results

### Sorting Task

Each child was given a score from 0-8 corresponding to the number of pictures that were sorted according gender stereotype in the stereotype condition, gender in the gender salience condition, or shirt color in the neutral condition

Performance was near ceiling in all three conditions (Stereotype: M = 7.94, Salience: M = 7.97, Neutral: M = 7.94).

### Inductive Generalization task

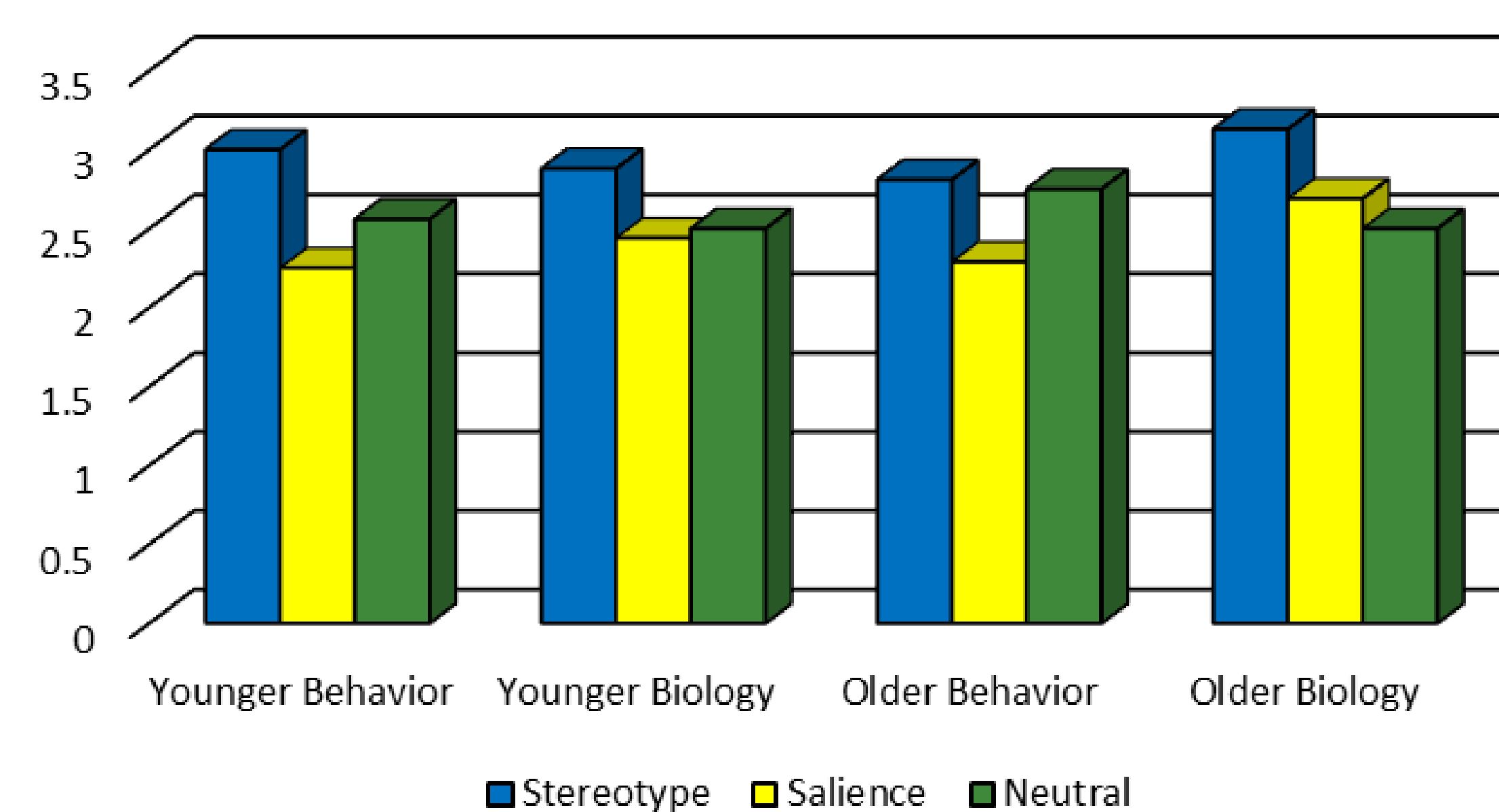
#### Scoring

Each child was given a score from 0-4 for biological trials and a score from 0-4 for behavioral trials, corresponding to the number of gender-based responses made for each type of trait.

#### Comparison of Means

A 2 x 3 x 2 x 2 (Age Group x Condition x Gender x Trait) ANOVA with Trait as a repeated measures factor yielded no significant main effects or interactions.

### Mean Gender-Based Responses



### Comparisons with Chance

- Stereotype condition:**

Both age groups made gender-based attributions for both biological and behavioral traits significantly more often than would be expected by chance:

- Younger children: biology:  $t(15) = 5.65$ ,  $p < .001$ , behavior:  $t(15) = 4.47$ ,  $p < .001$
- Older children: biology:  $t(15) = 4.14$ ,  $p < .001$ , behavior:  $t(15) = 3.57$ ,  $p = .003$

- Salience condition:**

Younger children did not perform significantly different from chance for either biological or behavioral traits.

Older children attributed biological traits on the basis of gender significantly more often than would be expected by chance,  $t(15) = 2.71$ ,  $p = .016$ , but did not perform differently from chance for behavioral traits.

- Neutral condition:**

Younger children attributed biological traits on the basis of gender significantly more often than would be expected by chance,  $t(15) = 2.24$ ,  $p = .041$ , but did not perform differently from chance for behavioral traits.

Older children attributed both biological,  $t(11) = 3.08$ ,  $p = .01$ , and behavioral traits,  $t(11) = 2.97$ ,  $p = .013$ , on the basis of gender more frequently than would be expected by chance.

### Summary of Results:

Both age groups consistently used gender as a basis for generalization in the stereotype condition, but neither age group used gender consistently in the salience or neutral conditions.

## Conclusions

We expected that children would generalize both biological and behavioral characteristics on the basis on gender following the stereotyped sorting task, but would not generalize on the basis of gender following the gender-neutral task. The results were only partly consistent with our predictions.

### Gender Stereotyping

- Stereotyping seemed to increase the consistency of gender-based reasoning, but did not appear to be necessary. Both age groups sometimes made gender-based attributions even in the neutral condition.

- The effect of stereotyping on children's reasoning is consistent with the findings reported by Pillow et al. (2015, 2019), as well as with Developmental Intergroup Theory (Bigler & Liben, 2007).

### Gender Salience

- The gender salience manipulation did not influence younger children's reasoning, but sometimes did appear to influence older children's responses.

### Category-based Induction

- Both age groups sometimes made gender-based inductions even in the neutral condition, but neither age groups consistently used gender for reasoning about both biological and behavioral traits. Accumulating gender knowledge during the preschool years may lead the gender categories to become more firmly entrenched in children's thought.

Along with the results of previous studies, the present results that there is variability in children's use of gender as a basis for induction. However, Stereotyping may contribute to the tendency to use gender as a basis for generalization, and in turn gender-based induction may contribute the further development of stereotyped beliefs.

## References

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