

Children see Rabbit, not Peter:

Young Children's Responses to an Anthropomorphic Picture Scale

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Abstract

Previous research suggests that character realism influences children's responses to stories. This study explored 3- to 7-year-old children's ratings of thought, feeling, self-knowledge and intention for humans, real animals and anthropomorphised animal characters. Ratings were similar for real and anthropomorphised animals and significantly lower than those for humans. These findings may relate to the observed poorer outcomes following stories depicting anthropomorphic animals, relative to human characters. Individual differences in internal state attribution and corresponding responses to anthropomorphised narratives might be usefully explored with this scale.

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Anthropomorphic characters are prevalent in children's fiction (Kotaman & Balci, 2017b; Marriott, 2002). In these stories, animals are anthropomorphised by the endowment of patently human thoughts, feelings, goals and behaviours (Epley, Waytz, & Cacioppo, 2007; Severson & Lemm, 2016; Waytz, Cacioppo, & Epley, 2010). Recent work suggests that character realism influences children's responses to otherwise identical narratives. Relative to books with human characters, stories with anthropomorphised characters are associated with poorer plot recall and reduced understanding of character reasoning (Kotaman & Balci, 2017b), lower rates of solution transfer from stories to real-world tasks (e.g. Ganea, Canfield, Simons-ghafari, & Chou, 2014; Richert, Shawber, Hoffman, & Taylor, 2009) and they do not benefit altruistic behaviour (Larsen, Lee, & Ganea, 2017).

The propensity for anthropomorphic thinking varies amongst adults (Waytz et al., 2010) and might underlie the findings outlined above. Indeed, differences in the extent to which 5- to 9-year-olds attribute thoughts, feelings, self-knowledge and intention to animals, natural objects and technology is evident (Severson & Lemm, 2016). To date, children's attributions for real and anthropomorphised animals relative to humans has not been examined. To fill this gap, we developed an Anthropomorphic Picture Scale to measure 3- to 7-year old children's internal state attributions for humans, real animals, and anthropomorphised animals. Notably we used pictures alongside verbal statements, to support assessment of children under 5 years, for whom picture books with anthropomorphised animals are prevalent.

Method

A 16-item scale was developed to explore children's ratings of the capacity for thought, feeling, self-knowledge and intention for items in four categories; animals, humans, anthropomorphised animals, and inanimate natural objects (4 items for each). The latter category was included as a benchmark for which we predicted very low ratings (see Severson & Lemm, 2016). Two versions of the scale were produced; animal exemplars in one version (e.g. mouse) were presented in anthropomorphised form in the other (i.e. mouse wearing clothes). The human and natural object items were identical in both versions. For each item, there was a picture paired with a question. For example, a photograph of a mouse with the question, 'Does a mouse think?' was an item in the animal subscale.

Typically developing children ($n=184$) aged between 3 and 7 years ($Mage = 66.55$ months, $SD = 14.15$) completed the scale individually, with items presented in random order. If children responded 'yes' to the question, they were invited to indicate 'How much?' on a 3-point visual scale. Responses were scored 0 ('no' responses) to 3 points. Training items were used first to familiarise children with the visual scale. Full details of items and instructions are provided in supplementary materials.

Results

Table 1

Mean APS Score and Standard Deviations for each Category and Question

| Variable | <i>M</i> | <i>SD</i> |
|----------|----------|-----------|
| Category | | |
| Animal | 1.11 | 0.76 |
| Human | 2.40 | 0.49 |

| | | |
|-----------------|------|------|
| Anthropomorphic | 1.06 | 0.75 |
| Natural Object | 0.38 | 0.59 |
| Question | | |
| Feelings | 1.44 | 0.60 |
| Think | 1.31 | 0.60 |
| Self-Knowledge | 1.43 | 0.77 |
| Intention | 0.77 | 0.64 |

See Table 1 for the mean and standard deviation of ratings for each category and question. A mixed ANOVA on the ratings examined the effect of category (animal, human, anthropomorphic, natural object) and question (feel, think, self-knowledge, intention), with age (4 age groups) as a between participants factor (degrees of freedom corrected using Greenhouse-Geisser estimates).

Significant main effects of category, $F(2.53, 455.06) = 398.66, p < .001, \eta^2 = .69$, question, $F(2.73, 455.06) = 54.49, p < .001, \eta^2 = .23$ and age group, $F(3, 180) = 6.06, p = .001, \eta^2 = .09$ were qualified by two significant interactions. The category x question interaction is shown in Figure 1: $F(7.92, 1425.46) = 22.79, p < .001, \eta^2 = .11$. The interaction (tested with one-way ANOVAs by question and t-tests) arose because ratings for the intention question were different for human relative to the other categories. The category x age group interaction is shown in Figure 2: $F(7.58, 455.06) = 8.77, p < .001, \eta^2 = .13$. The interaction (tested with one-way ANOVAs by age and t-tests) and arose because the youngest age group provided higher ratings than the other age groups for natural objects.

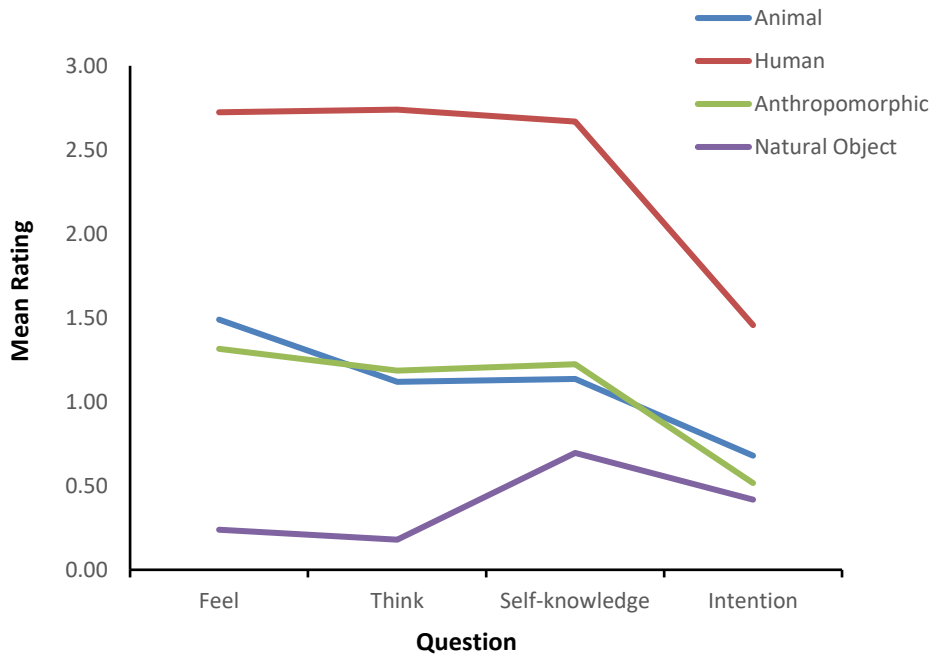


Figure 1. Mean ratings as a function of question and category.

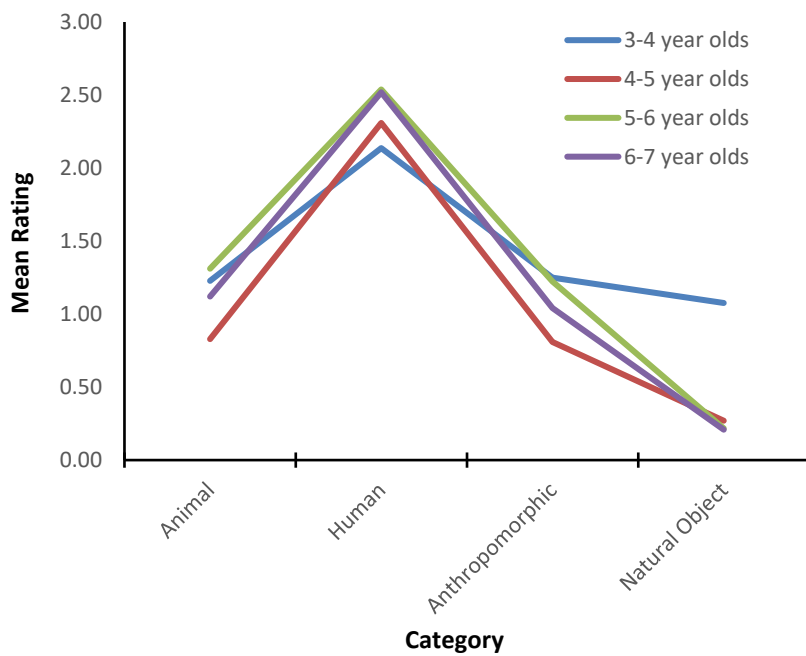


Figure 2. Mean ratings as a function of category and age.

Exploratory Principal Component Analysis of the 3 animate categories revealed a four-factor orthogonal structure (see Table 2). There were two separable factors for real and anthropomorphic animals; one for thought and feeling, the other for self-knowledge. In addition, responses to the intention question for all 3 categories loaded together. All human items loaded together and with one cross-loading on the intention factor.

Table 2

Varimax-Rotated PCA loadings

| | Component | | | |
|--------------------------------|-----------|-------|-------|------|
| | 1 | 2 | 3 | 4 |
| Animal Thought | .73 | | | |
| Animal Feeling | .68 | | | |
| Anthropomorphic Thought | .68 | | | |
| Anthropomorphic Feeling | .56 | | | |
| Anthropomorphic Self-knowledge | | .86 | | |
| Animal Self-knowledge | | .84 | | |
| Animal Intention | | | .79 | |
| Anthropomorphic Intention | | | .77 | |
| Human Intention | | | .46 | .45 |
| Human Self-knowledge | | | | .73 |
| Human Thought | | | | .70 |
| Human Feeling | | | | .47 |
| Eigenvalues | 2.73 | 1.56 | 1.35 | 1.17 |
| Percentage Variance explained | 22.71 | 13.03 | 11.27 | 9.77 |

Note. Coefficients > .3 reported

Discussion

Children in each age group provided significantly higher internal state ratings for human items than they did for either real or anthropomorphised animal items and ratings for the two animal categories were comparable. This pattern suggests that: (1) 3- to 7-year-

olds consider that people have higher capacity for thought, feeling, self-knowledge and intention than animals, and (2), that young children view anthropomorphised animals as animals, rather than imagining that they have similar capacities for mental and emotional states as humans. These differences in attributions may contribute to the poorer outcomes for stories depicting anthropomorphic animals relative to humans, outlined in the Introduction (e.g. Kotaman & Balci, 2017a; Larsen et al., 2017). The three older age groups gave low internal state ratings to natural objects, but the youngest group did not. This suggests that 3-year-olds are less able to differentiate between non-human categories.

A clear limitation was the validity of the question to tap intentionality. We used the phrasing included by Severson and Lemm (2016) for their Canadian sample: 'Does [item] do things on purpose?'. We found ratings were far lower than for the other questions. Post-test follow-ups suggested that UK children interpret 'on purpose' as 'doing something bad', rather than general agency. This indicates that the use of such scales may not generalise across different cultures.

Supplementary Material

Refer to [Insert location] for supplementary material.

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References

- Epley, N., Waytz, A., & Cacioppo, J. T. (2007). On seeing human: A three-factor theory of anthropomorphism. *Psychological Review*, *114*(4), 864–886.
<https://doi.org/10.1037/0033-295X.114.4.864>
- Ganea, P. A., Canfield, C. F., Simons-ghafari, K., & Chou, T. (2014). Do cavies talk ? The effect of anthropomorphic picture books on children ' s knowledge about animals. *Frontiers in Psychology*, *5*(April), 1–9. <https://doi.org/10.3389/fpsyg.2014.00283>
- Geerds, M. S. (2016). (Un)Real Animals: Anthropomorphism and Early Learning About Animals. *Child Development Perspectives*, *10*(1), 10–14.
<https://doi.org/10.1111/cdep.12153>
- Kotaman, H., & Balci, A. (2017a). Impact of realistic and non-realistic storybook characters on young children's book listening comprehension. *Early Child Development and Care*, *4430*, 1–13. <https://doi.org/10.1080/03004430.2017.1325882>
- Kotaman, H., & Balci, A. (2017b). Impact of storybook type on kindergarteners' storybook comprehension. *Early Child Development and Care*, *187*(11), 1771–1781.
<https://doi.org/10.1080/03004430.2016.1188297>
- Larsen, N. E., Lee, K., & Ganea, P. A. (2017). Do storybooks with anthropomorphized animal characters promote prosocial behaviors in young children? *Developmental Science*, (April). <https://doi.org/10.1111/desc.12590>
- Marriott, S. (2002). Red in Tooth and Claw ? Images of Nature in Modern Picture Books. *Children's Literature in Education*, *33*(3), 175–183.
<https://doi.org/10.1023/A:1019677931406>
- Richert, R. A., Shawber, A. B., Hoffman, R. E., & Taylor, M. (2009). Learning From Fantasy and Real Characters in Preschool and Kindergarten. *Journal of Cognition and*

Development, 10(1–2), 41–66. <https://doi.org/10.1080/15248370902966594>

Severson, R. L., & Lemm, K. M. (2016). Kids See Human Too: Adapting an Individual

Differences Measure of Anthropomorphism for a Child Sample. *Journal of Cognition*

and Development, 17(1), 122–141. <https://doi.org/10.1080/15248372.2014.989445>

Waytz, A., Cacioppo, J., & Epley, N. (2010). Who Sees Human? *Perspectives on Psychological*

Science, 5(3), 219–232. <https://doi.org/10.1177/1745691610369336>