

“Ice cream is super yummy”

How children and ChatGPT respond to why and how questions

Christine Howes, Erik Lagerstedt, David Pagmar and Ellen Breitholtz
Department of Philosophy, Linguistics and Theory of Science, University of Gothenburg
firstname.surname@gu.se

Claire Prendergast
Department of Philosophy, Classics, History of Art and Ideas, University of Oslo
claire.prendergast@ifikk.uio.no

Abstract

Children learn about the world and how to act and interact in it extremely easily. This involves not just learning words and language but also appropriate inferences or sequences of actions. In this paper we present a study that elicits different types of explanations from children to see what topoi (principles of reasoning) they have learnt, and discuss how these are different from responses produced by ChatGPT.

1 Introduction

As discussed in [Howes et al. \(2023\)](#) children pick up language remarkably easily, requiring much less data than large language models (LLMs) such as ChatGPT. They learn not just meanings coded in words and phrases, but also inferences and associations from linguistic expressions and non-linguistic actions. [Breitholtz \(2020\)](#) discusses how such inferences can draw on globally accepted facts (“the sun sets in the west”), norms (“one loves one’s family”), and other principles of reasoning (“If you can do a and a is more difficult than b you can also do b ”). These are not usually explicit in dialogue, but without having access to such resources (called “topoi” after Aristotle) which underpin the inferences we are able to draw it is impossible to successfully participate in dialogue.

One strategy for eliciting topoi and making them explicit is the asking of ‘why’ questions [Bova and Arcidiacono \(2013\)](#); [Howes et al. \(2023\)](#). These are acquired later by children (at around age 3) ([Bloom et al., 1982](#)), which is thought to be related to the child’s increasing capacity for abstract thought. How questions also elicit topoi, though these are typically of a different, less abstract type, as they often directly address sets of actions required to carry something out, or query the manner in which something should be done.

In this paper, we present a study which elicits topoi in 5 and 7 year old children. We compare

children’s responses to ‘how’ and ‘why’ questions and how these differ from the types of responses generated by ChatGPT.

2 Method

As part of a larger project, we collected data from Norwegian-speaking children aged 5 and 7 years old in spring 2024. They have been participating in an ongoing longitudinal study in Oslo, Norway on pragmatic development with testing once per year since 2022.

First, the children were introduced to a new robot onscreen called Beples. The children are told that Beples needs to find out how or why people do certain things (e.g., how/why do people climb trees, how/why do people eat ice cream). Children are asked to provide verbal answers to the questions.

3 Results

Children offer a wide range of answers to why questions, as illustrated in examples (1)-(5). These can refer to internal motivations, opinions, practical consequences, or normative constraints. Children typically provide only one reason when prompted, which we may think of as drawing on the most salient topos to the child.

- (1) Fordi jeg har lyst
Because I want to
- (2) Gott
Tasty
- (3) För og kjöle seg ned
To cool down
- (4) Fordi det är sukker oppi
Because it has sugar in
- (5) Fordi man spiser det då det er lørdag och man kanskje får det nån annan dag

Because you eat it on Saturdays, and you may get it some other days

In contrast, as shown in (6)-(8) ChatGPT is consistent in its responses, which provide multiple topoi (even when constrained in the number of words of output, or instructed to reply as if a five year old).

- (6) Humans eat ice cream for pleasure. It's a sweet, cold treat that can provide comfort, joy, and a sense of indulgence, often enjoyed for its flavor and texture. (50 words or less)
- (7) People eat ice cream because it's sweet, cold, and enjoyable, often as a treat or to feel happy. (20 words or less)
- (8) Oh, Beeples, ice cream is super yummy! It's cold and sweet, and it makes your tongue feel all happy and tingly. People eat ice cream because it tastes really good and it makes them smile, especially when it's hot outside. It's like a little treat that makes you feel all warm and cozy inside, even though it's cold! (imagine you are a 5 year old child)

Children's responses to how questions (e.g. How does one eat ice-cream) are more consistent (9)-(11). They also typically underspecify the steps required, since they are taken to be self-evident (such as grasping the spoon with your hand, moving the spoon to your mouth etc).

- (9) Du tar skjeen og så tar du skjeen inn i isen og så tar du og spiser den
You take the spoon and then you stick the spoon into the ice cream and then you eat it
- (10) Bruker skje
Use a spoon
- (11) Med en skje
With a spoon

ChatGPT's responses offer more detail (though also underspecify the steps), and also often include topoi that are irrelevant to the procedural question of how one should do something.

- (12) To eat ice cream, hold the cone or bowl, scoop a small amount with a spoon or lick directly if it's a cone. Place it in your mouth, savor the cold, sweet flavor, and swallow. Eat slowly to avoid "brain freeze," a sudden, brief headache. (50 words or less)

- (13) Hold the cone or cup, use a spoon or lick the scoop. Enjoy slowly to avoid brain freeze! (20 words or less)

- (14) Oh! Eating ice cream is super fun! So, first you get a spoon or a cone. If it's in a bowl, you scoop it with the spoon, and then put the spoon in your mouth and go "mmmmm!" If it's in a cone, you lick it with your tongue, like this pretends to lick. But you gotta eat it quick because it can melt and get all drippy! And it's really cold, but yummy! (imagine you are a 5 year old child)

4 Discussion

As can be seen, children respond to how and why questions to a being that has no knowledge about the human world (and is thus presented as not having the necessary topoi to understand the world) by providing an answer that presents a single topos. These vary widely between our participants, particularly in response to why questions. When answering children's why-questions, adults tend to choose causal explanations (Bova, 2011; Howes et al., 2023), since these are more basic topoi that they do not assume the child already has access to. However, they are more likely to provide topoi about motivational factors if the question comes from another adult, who they assume will already have access to the basic topoi so must be asking something more complex. In contrast, the children in our study answer in both ways, suggesting that they are interpreting the question egocentrically based on their personal experiences and opinions and perhaps not taking Beeples lack of background knowledge into account (Epley et al., 2004).

The responses of the children are very grounded in the interpersonal conversation, and interactive, which is unsurprising since children acquire topoi through interaction. In particular, responses to how-questions heavily rely on topoi that are not provided, but could be added if Beeples were to ask, as would be likely in a genuine dialogue.

In contrast, the responses of ChatGPT are more disconnected. Responses to why-questions are general and stated in the third person (unless specifically prompted to respond like a five year old), while responses to how-questions are less like answers to a direct question and more like providing a set of instructions. In all cases ChatGPT provides multiple topoi simultaneously, reflecting the lack of interactivity of its training data.

References

- Lois Bloom, Susan Merkin, and Janet Wootten. 1982. “Wh”-questions: Linguistic factors that contribute to the sequence of acquisition. *Child development*, pages 1084–1092.
- Antonio Bova. 2011. Functions of “why” questions asked by children in family conversations. *Procedia – Social and Behavioral Sciences*, 30:776–782.
- Antonio Bova and Francesco Arcidiacono. 2013. Investigating children’s why-questions: A study comparing argumentative and explanatory function. *Discourse Studies*, 15(6):713–734.
- Ellen Breitholtz. 2020. *Enthymemes and Topoi in Dialogue: The Use of Common Sense Reasoning in Conversation*. Brill, Leiden.
- Nicholas Epley, Carey K Morewedge, and Boaz Keysar. 2004. Perspective taking in children and adults: Equivalent egocentrism but differential correction. *Journal of experimental social psychology*, 40(6):760–768.
- Christine Howes, Ellen Breitholtz, and Vladislav Maraev. 2023. [Because is why: Children’s acquisition of topoi through why questio](#). In *Proceedings of the 2023 CLASP Conference on Learning with Small Data (LSD)*, pages 48–54. ACL.