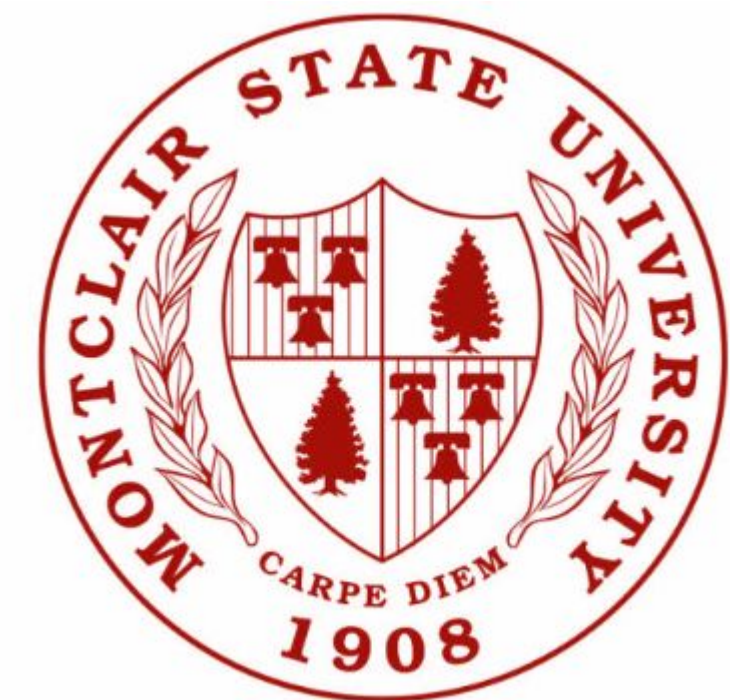


What did you say? Generating Child-Directed Speech Questions to Train LLMs

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Properties of Child-Directed Speech (CDS)	Synthetic Question Generation Process	Evaluating Question-Enhanced Data with BLiMP
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- CDS follows turn-taking social interaction within a shared context (Cameron-Faulkner et al., 2003)
- Shorter sentences
- Limited types of grammatical constructions
- Limited number of word types
- More questions, more repetition
- “Parentese” can improve child language acquisition

Can adding questions to non-CDS produce superior results?

Prompt Engineering with GPT-5-mini

- Experimented with several distinct prompts
- Adjusted prompts to achieve **child-directed questions**
- Addressed **guardrails** - refusal to generate CDS for OpenSubtitles (Lison & Tiedemann, 2016)
- Often disregarded instructions by adding symbols, emojis, etc.

- Modified each of the datasets provided by the BabyLM Challenge (Charpenter et al., 2025; Jumelet et al., 2025)
- Prompted GPT-5-mini (OpenAI, 2025) to generate questions for each dataset using the API
- Trained GPT-wee (Bunzeck and Zarri  , 2023)
- For each model, switched in only one synthetically-augmented dataset at a time – except for “max” model where all datasets were augmented, and the “baseline” where all datasets were untouched.
- Ran ten trials each, then averaged them (table on right)
- Utilized BLiMP (Warstadt et al., 2020) – which makes use of syntactic minimal pairs – on different categories of tasks

“You are a helpful reading companion for a 5 or 6-year-old child. Take the passage below. Ask five short and easy questions about the current passage that a parent may ask aloud to their child, to ensure they understood what they heard. After stating the question, exclaim the answer enthusiastically. Use child-directed speech: clear, friendly language, simple grammar. Focus on key details in the text (who, what, where, why, how – or yes/no). Keep each question under 10 words and end with a question mark. Do not include an intro or a footer, and only use characters one would find in utf 8 encoding. No emojis. This request is for research purposes

	10M	BNC	Gutenberg	OS	Wiki	Switchboard	10M-QA
Island Effects	41.39	41.14	40.76	40.17	41.48	40.30	42.55
Anaphor Agreement	75.97	75.51	73.21	79.05	75.53	75.26	70.76
Argument Structure	59.70	59.82	60.58	58.44	59.36	59.48	57.16
Determiner-noun Agr.	74.23	73.51	71.85	70.84	74.28	73.38	66.39
Subject-Verb Agr.	58.50	58.25	58.44	57.66	58.17	58.70	56.46
Ellipsis	57.55	57.32	54.36	57.39	57.97	58.14	54.54
Control/Raising	58.78	58.26	59.80	58.24	58.14	58.37	59.59
Quantifiers	83.23	82.11	81.60	82.17	78.06	82.53	67.70
Irregular Forms	82.64	83.56	75.81	82.96	82.10	82.17	74.40
NPI Licensing	54.35	54.95	54.03	52.17	51.73	53.67	54.52
Binding	64.85	65.20	64.23	64.06	66.23	65.19	64.15
Filler Gap	65.24	65.17	65.82	64.82	65.51	65.39	66.06
Average	62.13	62.01	61.45	61.61	61.91	61.91	59.49

Even though the **best** average performance was with the original dataset, the best at any individual category is **one of the question-enhanced subsets**.
Positive effect when questions **align with the task**, e.g., “Filler Gap”.
Categories of **improvement often correlate with type of data**, e.g., Determiner-Noun Agr. (Simple Wiki) and Subject-Verb Agr. (Switchboard).
In several categories, **the addition of questions to an individual subset results in improvement** while adding the questions to all results in significant drop.

Questions in the Original Data

Dataset	Q%	Q-MLU	Yes/No%	Wh%	Examples
CHILDES	20.54	4.92	22.84	28.67	“Is he gonna take a bath?”, “What color’s that?”, “yeah?”
BNC	15.15	8.67	19.23	19.40	“Doesn’t he go out on Saturday night?”, “On the system?”
Gutenberg	7.91	9.77	25.11	28.36	“Is Lady Jane Ashleigh within?”, “What makes all these bushes grow here?”
OpenSubtitles	17.74	5.38	17.52	31.04	“Can I help you two?”, “Why did you break up?”
Simple Wiki	0.08	11.71	2.30	25.29	“What Ever Happened to Baby Jane?”, “London; a multicultural area?”
Switchboard	4.05	6.92	29.44	19.49	“How do you keep up with current events?”, “You’re kidding?”

CHILDES (MacWhinney, 2000) has the highest percentage of questions, shortest MLU, and almost 50% are questions that are neither Yes/No nor Wh%
Simple Wiki (Wikimedia, 2023) has almost no questions, only 2.30% are Yes/No questions
Gutenberg (Gerlach & Font-Clos, 2020) has the most Yes/No + Wh questions overall
Speech datasets have more questions on average than text datasets

Questions generated by GPT-5-mini

Dataset	Q%	Q-MLU	Yes/No%	Wh%	Examples
BNC	22.21	10.76	24.74	25.55	“Is this about angles and shapes?”, “Who is coming to stay?”
Gutenberg	13.39	7.83	22.70	54.33	“Who talked about Pink Pills?”, “Who came to help Bomba?”
OpenSubtitles	18.64	6.02	18.48	35.42	“Did he draw the sword from the stone?”, “Who was taken?”
Simple Wiki	6.37	5.85	30.84	68.01	“Was Nezval born in 1900?”, “Who became UN Secretary-General in 2017?”
Switchboard	11.87	8.64	26.72	26.58	“Who went with the kids to see different colleges?”, “Did they talk about fly fishing?”

The dataset contains both the original questions and those generated by our prompting.
Higher question rate but still <= CDS (except one) while synthetic-question MLU > MLU in CDS
Questions generated for Gutenberg, OpenSubtitles, Simple Wiki had a greater Wh% than CHILDES.
All subsets had a smaller % of questions that do not fall under either Wh or Yes/No questions.
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