

Generative AI and Language Understanding: Part 4

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This is the era of Generative AI

Microsoft to Invest \$10 Billion in OpenAI, the Creator of ChatGPT

The tech giant aims to remain at the forefront of generative artificial intelligence with its partnership with OpenAI.

<https://chat.openai.com/chat>

ChatGPT

 Examples	 Capabilities	 Limitations
"Explain quantum computing in simple terms" →	Remembers what user said earlier in the conversation	May occasionally generate incorrect information
"Got any creative ideas for a 10 year old's birthday?" →	Allows user to provide follow-up corrections	May occasionally produce harmful instructions or biased content
"How do I make an HTTP request in Javascript?" →	Trained to decline inappropriate requests	Limited knowledge of world and events after 2021

<https://bard.google.com>



Bard is still in its experimental phase. Chatting with it and rating its responses will help improve the experience.

What's Bard all about?

We've long seen the potential to make information and computing much more accessible through conversational AI. Two years ago, we unveiled [LaMDA \(Language Model for Dialogue Applications\)](#), a conversational AI model capable of fluid, multi-turn dialogue, and last year, we launched


If you're interested in the more technical details, LaMDA is a Transformer-based model, the machine-learning breakthrough [invented by Google in 2017](#). The language model learns by "reading" trillions of words that help it pick up on patterns that make up human language so it's good at predicting what might be reasonable responses.




Tough movement

- There's a difference between the following two sentences with respect to the interpretation of arguments:
 - *John is easy to please*
 - *John is eager to please*
- Do you see it?
 - Hint: what are the arguments of the predicate *please*

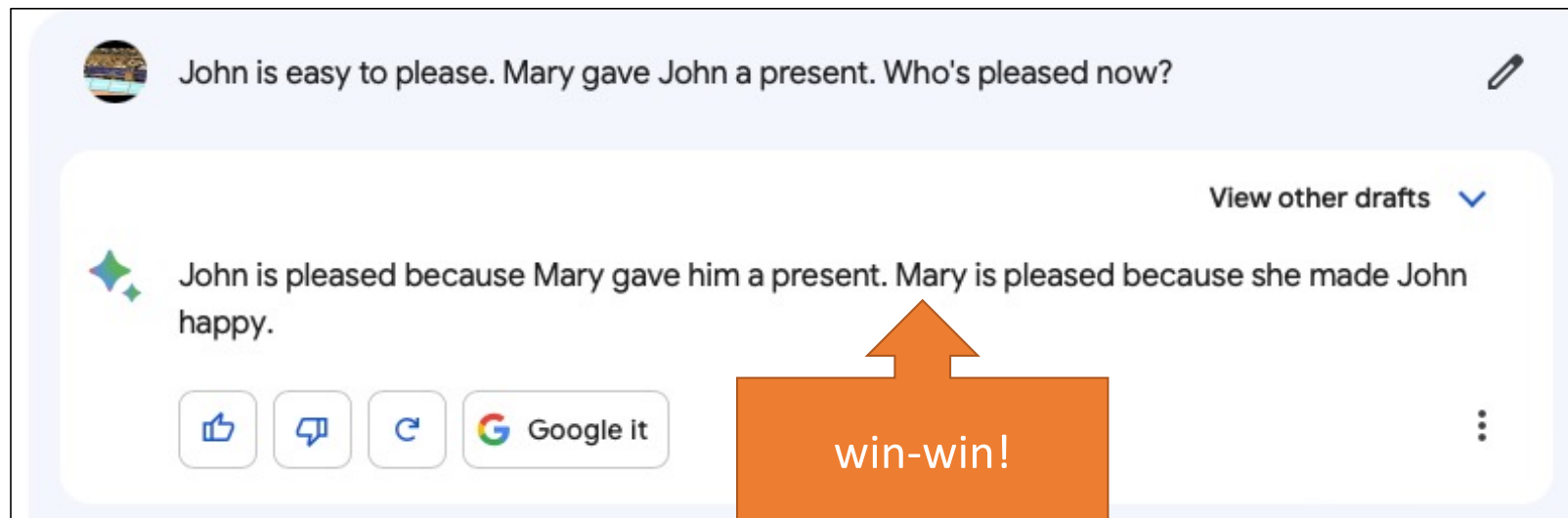
Tough movement

- Let's test ChatGPT on this. <https://chat.openai.com/chat>
- *We'll return to test DNN-based parsers later.*

SA John is easy to please. Mary gave John a present. Who's pleased now? 

 Based on the given information, John is the one who is pleased now. The first sentence indicates that John is easy to please, which implies that he is generally easily satisfied or pleased. The second sentence states that Mary gave John a present, so it can be inferred that John received the present and is now feeling pleased as a result.  

Google Bard



The image shows a screenshot of the Google Bard chat interface. At the top, a user prompt asks, "John is easy to please. Mary gave John a present. Who's pleased now?". Below the prompt, the AI response is: "John is pleased because Mary gave him a present. Mary is pleased because she made John happy." The response is accompanied by a blue star icon. At the bottom of the response area, there are four buttons: a thumbs-up icon, a speech bubble icon, a refresh icon, and a "Google it" button with the Google logo. An orange arrow points from a box labeled "win-win!" to the AI response, indicating a positive outcome for both the user and the AI.

John is easy to please. Mary gave John a present. Who's pleased now?

View other drafts ▾

John is pleased because Mary gave him a present. Mary is pleased because she made John happy.

👍 🗨️ ↻ Google it

win-win!

Tough movement

SA

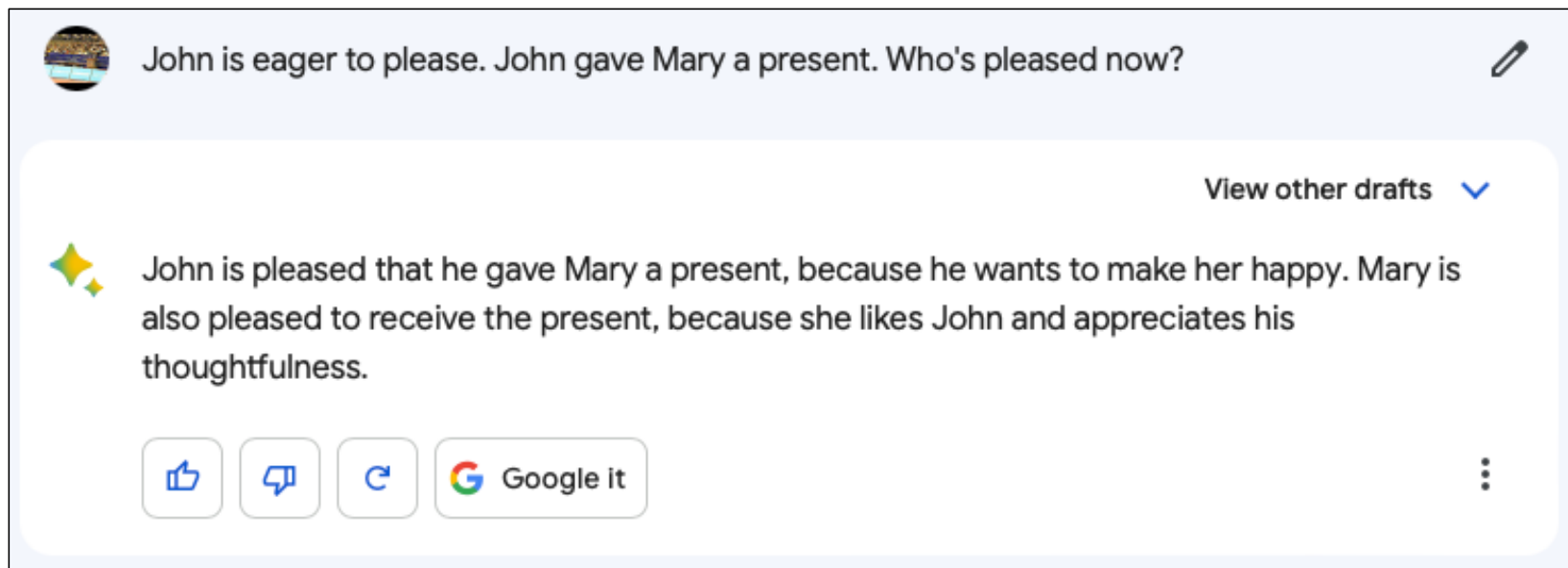
John is eager to please. John gave Mary a present. Who's pleased now?




Based on the given information, it is likely that Mary is pleased now. The first sentence indicates that John is eager to please, which implies that he is motivated to make others happy or satisfied. The second sentence states that John gave Mary a present, so it can be inferred that John was trying to please Mary. Assuming that the gift was appropriate and well-received by Mary, it is likely that she is pleased as a result.





Google Bard







John is eager to please. John gave Mary a present. Who's pleased now?





View other drafts 





John is pleased that he gave Mary a present, because he wants to make her happy. Mary is also pleased to receive the present, because she likes John and appreciates his thoughtfulness.











 Google it

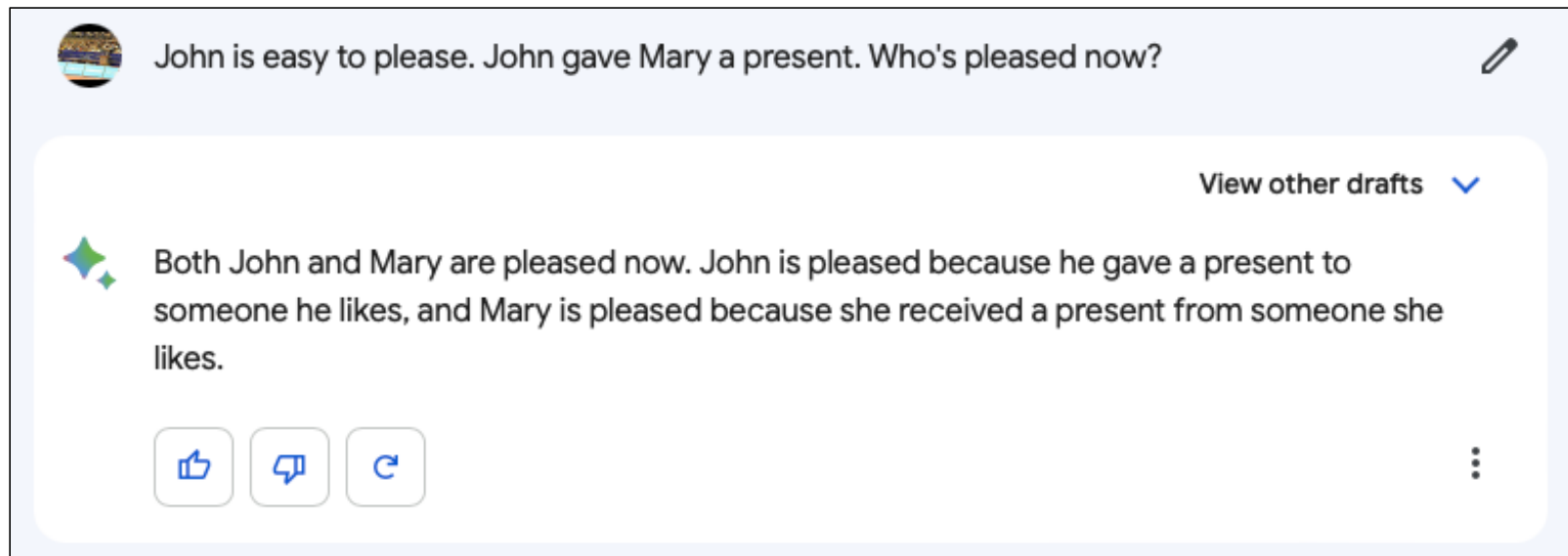


Tough movement



SA John is easy to please. John gave Mary a present. Who's pleased now? 


 Based on the given information, it is uncertain who is pleased now. The first sentence indicates that John is easy to please, which implies that he is generally easily satisfied or pleased. The second sentence states that John gave Mary a present, but it does not provide any information about Mary's reaction to the gift. It is possible that Mary is pleased with the gift, but it is also possible that she is not. Therefore, without additional information, it is impossible to determine who is pleased now.  


Google Bard







The screenshot shows a chat window with a user's question and an AI-generated response. The user's question is "John is easy to please. John gave Mary a present. Who's pleased now?". The AI response is "Both John and Mary are pleased now. John is pleased because he gave a present to someone he likes, and Mary is pleased because she received a present from someone she likes." The interface includes a profile picture, a "View other drafts" link, and interaction buttons for thumbs up, thumbs down, and refresh.


 John is easy to please. John gave Mary a present. Who's pleased now? 


[View other drafts](#) 

 Both John and Mary are pleased now. John is pleased because he gave a present to someone he likes, and Mary is pleased because she received a present from someone she likes.

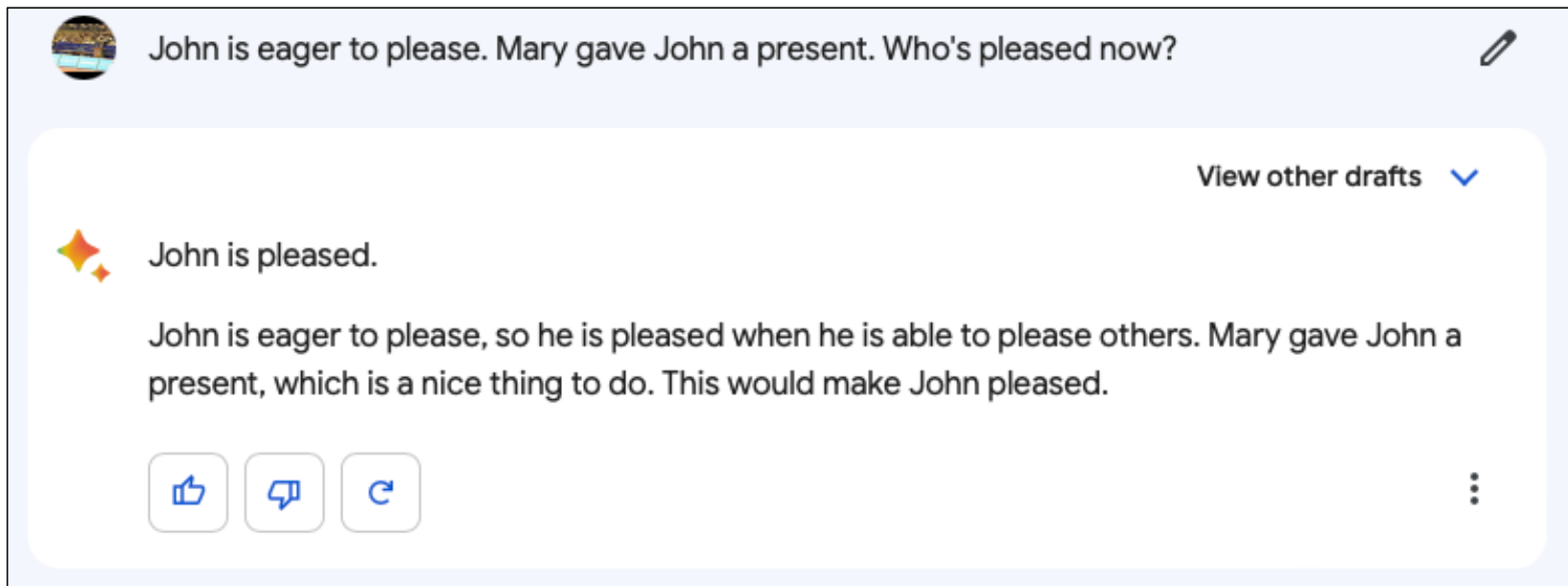
Tough movement


SA John is eager to please. Mary gave John a present. Who's pleased now? 

 Based on the given information, it is likely that John is pleased now. The first sentence indicates that John is eager to please, which implies that he is motivated to make others happy or satisfied. The second sentence states that Mary gave John a present, which suggests that she was trying to please John. Assuming that the gift was appropriate and well-received by John, it is likely that he is pleased as a result.


*A bit suspicious:
why cite 1st sentence?*


Google Bard






John is eager to please. Mary gave John a present. Who's pleased now?






View other drafts 



John is pleased.


John is eager to please, so he is pleased when he is able to please others. Mary gave John a present, which is a nice thing to do. This would make John pleased.




  

⋮

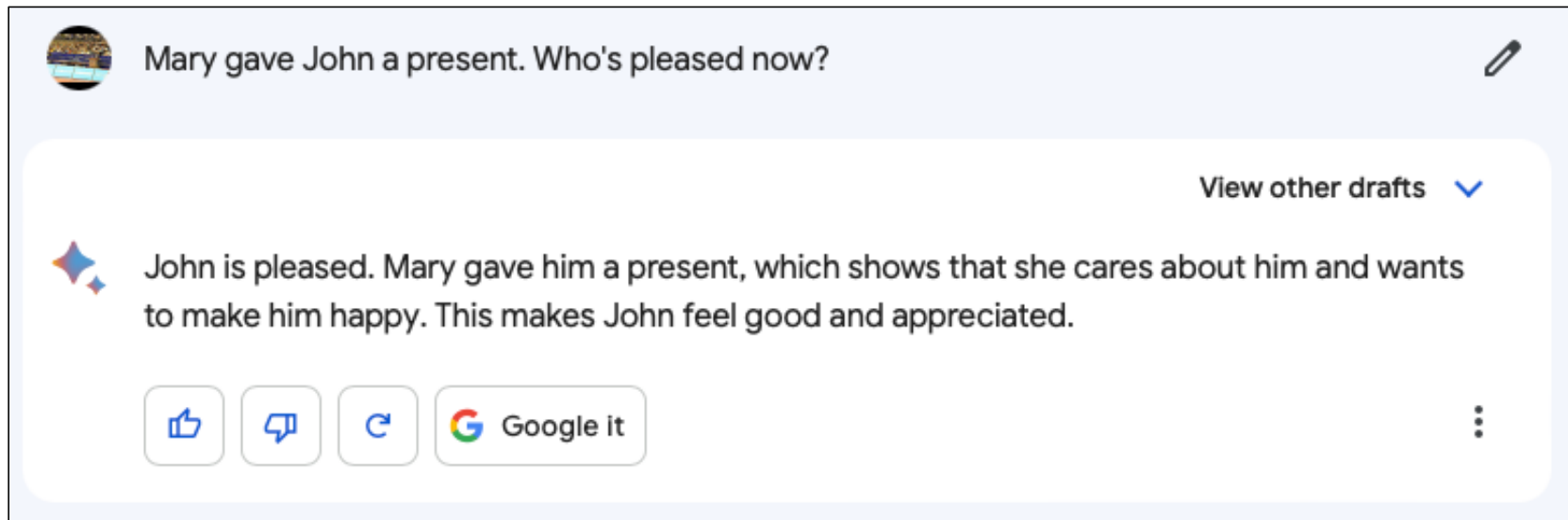
Tough movement


- No prior context.

 SA Mary gave John a present. Who's pleased now?


 It is not clear from the given information who is pleased now. It is possible that both Mary and John are pleased, or only one of them is pleased. Further context or information is needed to determine who is pleased.  


Google Bard










Mary gave John a present. Who's pleased now?




View other drafts 



John is pleased. Mary gave him a present, which shows that she cares about him and wants to make him happy. This makes John feel good and appreciated.



Tough movement

- (1) a. John_i is [_{AP} easy [_{CP} Op_i [_{TP} PRO_{arb} to please t_i]]]
b. John_i is [_{AP} eager [_{CP} [_{TP} PRO_i to please *pro*_{arb}]]]

(Roberts 2019) p17:

- CP follows the head A (rather than preceding it, as in a head-final language);
- English has infinitives, and indeed infinitives of this type;
- arbitrary null pronouns can appear in this context with the properties that we observe them to have;
- the trace is a *wh*-trace (in many languages, including all the Romance languages, this construction features an A-dependency),
- etc.

easy (different from *eager*) has no external argument, e.g. *It is easy to please John*, (**It is eager to please John*)

On Wh-movement (Chomsky, 1977)

The final case I would like to consider is that of the infinitival complements of *easy*, etc. The analysis proposed in Chomsky (1973) was unsatisfactory, as pointed out by Sterba (1972), Lasnik and Fiengo (1974), and Bach and Horn (1976). With regard to such structures as (121) there have been two widely studied proposals:

(121) *John is easy (for us) [to please]*

One proposal assumes that the subject, *John*, is moved from the object position in the embedded complement phrase by a transformational movement rule. The other assumes that the subject is generated in place and that a rule of object-deletion (or interpretation) guarantees that *John* is interpreted as the object of *please* in (121).

If so, then according to our present assumptions, the underlying structure must contain an embedded \bar{S} as complement to *easy*, with an obligatory PRO subject, as in the case of the infinitival complements already mentioned.⁴⁰

On Wh-movement (Chomsky, 1977)

Our assumptions lead us to suppose that each of the competing familiar analyses is in part correct: that is, $X = \text{John}$ —the subject is generated in place—but there is a movement rule applying to Y , namely, *wh*-movement.⁴³ Thus we may take the structure directly underlying (121) to be (126):

(126) *John is easy (for us) [\bar{S} [who for] PRO to please t]*

In (126), *wh*-movement has applied on the inner cycle and we have obligatory deletion of the *wh*-phrase, as in other cases already discussed. We are left, then, with an open embedded proposition; the now familiar predication rule will correctly interpret it as being about the subject John.

On *Wh*-movement (Chomsky, 1977)

Suppose that we formulate the basic rule of *wh*-movement essentially as (43):

(43) move *wh*-phrase into COMP

The rule will apply freely clause-internally, but will not yet move the *wh*-phrase over a bridge.

Modern English is that sequences of the form *wh*-phrase + complementizer are not permitted, as they were in earlier stages of the language. Thus we will have rules such as (47), (48):

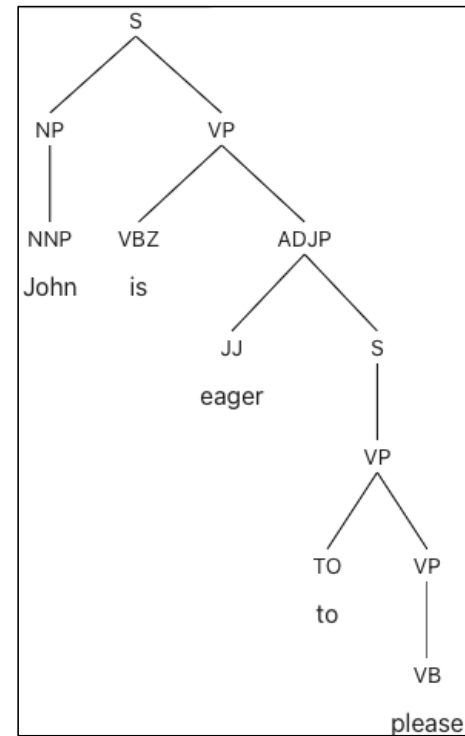
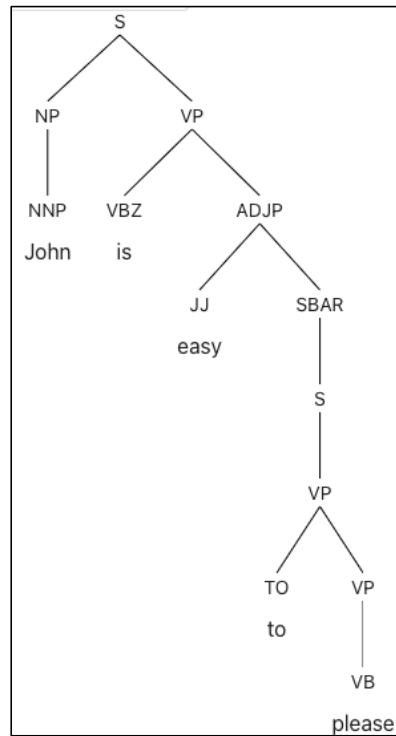
(47) *wh*-phrase becomes null

(48) a. *that* becomes null
b. *for* becomes null

One of the three must apply. By general conditions on recoverability of deletion, which we may assume to exist though they are not understood in detail, (47) will be inapplicable when the *wh*-phrase contains actual lexical content (e.g., prepositions, possessives, etc.). The rules (48) apply more broadly; e.g., *that* can be deleted under certain circumstances in nonrelatives, *for* is deleted immediately following verbs of the *want* category and under certain circumstances before *to*, etc.

Berkeley Neural Parser

<https://parser.kitaev.io>



Google Natural Language

- Representation has a missing dependency
- some dependencies are not explicitly computed, e.g. xcomp

✓ Dependency	✓ Parse label	✓ Part of speech
<i>Parse is wrong anyway: see why?</i>		
nsbj	root	acompl
John	is	easy
NOUN	VERB	ADJ
number=SINGU proper=PROP	be	
	aux	xcomp
	to	please
	PRT	VERB

✓ Dependency	✓ Parse label	✓ Part of speech
nsbj	root	acompl
John	is	eager
NOUN	VERB	ADJ
	be	
	aux	xcomp
	to	please
	PRT	VERB

xcomp: open clausal complement
 An open clausal complement (*xcomp*) of a verb or an adjective is a predicative or clausal complement without its own subject. The reference of the subject is necessarily determined by an argument external to the xcomp (normally by the object of the next higher clause, if there is one, or else by the subject of the

acompl: adjectival complement
 An adjectival complement of a verb is an adjectival phrase which functions as the complement (like an object of the verb).