Principle B Delays as a processing problem: Evidence from task effects

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Delay of Principle B Effect

Children often allow pronouns to corefer with local c-commanding antecedents (Chien & Wexler 1990).

(1) a. The boy touched him   50% correct

b. The boy touched himself   100% correct

Delay of Principle B Effect

It has been claimed that these errors are not due to any problem with Principle B, but with a principle that constrains local coreference to special contexts (Chien & Wexler 1990; Grodzinsky & Reinhart 1993):

(2) Everybody hates Oscar. John hates him, Mary hates him, even **Ocar** hates **him**.

Delay of Principle B Effect: explanations

Three kinds of accounts:

1. Incomplete acquisition
2. Experimental artifact
3. Limited processing resources

Delay of Principle B Effect: explanations

Incomplete acquisition

Children accept local coreference because they have not yet acquired a pragmatic principle, *Principle P*, that contextually constrains local coreference (Chien & Wexler 1990).

Delay of Principle B Effect: explanations

Incomplete acquisition

- The DPBE does not show up in production (Bloom et al. 1994).

- The DPBE is not limited to children; it shows up in aphasia too (Reinhart & Grodzinsky 1993; Ruigendijk et. al 2006; Baauw & Cuetos 2003).

Delay of Principle B Effect: explanations

Experimental artifact

Children often allow local coreference because of deficiencies in the experimental set up (Conroy, Takahashi, Lidz & Phillips 2006).

Delay of Principle B Effect: explanations

Experimental artifact

Experiments using the Truth Value Judgment Task (TVJ) typically present stories to the child in which both a potential sentence internal and external antecedent appears for the pronoun.

Delay of Principle B Effect: explanations

Experimental artifact

However, according to Conroy at al., many
experiments failed to make the sentence
external antecedent as prominent as the
sentence internal antecedent.

→ Do not *really* comply with *plausible dissent*
(Crain & Thornton 1998).

Delay of Principle B Effect: explanations

Experimental artifact

Example TVJ (Thornton & Wexler 1999).

Bert and 3 reindeer friends have a snowball fight and they all get covered in snow. When they go inside Bert is shivering, so he asks the reindeer to brush the snow off him. Two of the reindeer separately refuse, saying that they have too much snow to deal with, and they brush themselves. The third reindeer helps Bert a little bit, but then brushes the snow off himself. Bert thanks the helpful reindeer for starting to brush him. He says he's sorry he can't reciprocate by helping brush the reindeer; he needs finish brushing all the snow off himself because he's still very cold.

Delay of Principle B Effect: explanations

Experimental artifact

Example TVJ (Thornton & Wexler 1999).

    Test sentence:

    I think Bert brushed him.

Delay of Principle B Effect: explanations

Experimental artifact

Comments Conroy et al:

- Children will try to access "referential" reading (him = 3rd reindeer).

- However, story is about Bert, trying to get brushed; posibility of reindeer being brushed by Bert is not a likely outcome anywhere in the story.

Delay of Principle B Effect: explanations

Experimental artifact

In sum: sentence internal antecedent (him = Bert) is better accessible than sentence external antecedent (him = reindeer), which need to be accessed in order to justify a "no"-answer.

This leads children to accept local coreference interpretation; 58% "yes"-responses.

Delay of Principle B Effect: explanations

Experimental artifact

Prediction: DPBE will disappear when sentence external and internal antecedent are made equally accessible/prominent.

Delay of Principle B Effect: explanations

Experimental artifact

General story line:

Hiking Smurf, Tennis Smurf, Tennis Smurf and three dwarfs are invited at a painting contest at a party. All participants discuss the color of paint to use to get painted. Hiking Smurf has no paint and asks first Happy, then Dopey and finally Grumpy (dwarfs) to paint him. The first two do (after the painted themselves), but Grumpy refuses even to go to the party, so he doensn't need to get painted. After the other dwarfs convinced him to get painted, ans finishes all the paint. Hiking Smurf asks Grumpy for some paint, but he Grumpy apologizes that he cannot. Then he asks Tennis Smurf for some paint, and he obliges.

Delay of Principle B Effect: explanations

Experimental artifact

Test sentence: Ok, this was a story about painting. Hiking Smurf didn't have any paint, and Grumpy almost didn't go to the party. Let me see…*I think Grumpy painted him*.

Delay of Principle B Effect: explanations

Experimental artifact

Advantage improved TVJ:

- Deictic reading of pronoun can easily be construed: Hiking Smurf is highly accessible, since he was the one being painted by most dwarfs, but not by Grumpy.

- Anaphoric reading also available: each character draws attention to this need to paint himself, drama around Grumpy's refusal

Delay of Principle B Effect: explanations

Experimental artifact

Results: 11% "yes"-responses.

Delay of Principle B Effect: explanations

Unexpected if DPBE were an artifact

1. The DPBE is subject to cross-linguistic variation. It does not show up in Spanish (2), neither in children, nor in aphasics (Baauw & Escobar 1997; Baauw & Cuetos 2003).

(2) La niña la señala   90% correct

   the girl her points-at

Delay of Principle B Effect: explanations

Unexpected if DPBE were an artifact

2. It is structure sensitive. The DPBE is much stronger in ECM contexts (Philip & Coopmans 1996).

(3) **Jan** ziet **hem** dansen   20% correct rejections of the reflexive reading

'John sees him dance'

Delay of Principle B Effect: explanations

Unexpected if DPBE were an artifact

3. Also, in ECM contexts the DPBE even shows up in languages such as Spanish, both in children and in aphasics (Baauw & Escobar 1997; Baauw & Cuetos 2003).

(4) La niña la ve   bailar   50% correct
     the girl her sees dance

Delay of Principle B Effect: explanations

DPBE is due to processing limitations

- Children respect Principle B, rejecting local binding of pronouns.

- Children have problems with the *application* of a syntax-discourse principle regulating local coreference, *Rule I* (Grodzinsky & Reinhart 1993).

- This rule is invoked whenever local coreference is an option.

Delay of Principle B Effect: explanations

DPBE is due to processing limitations

- Syntactic clitics do not easily allow local coreference, hence Rule I will not be invoked.

- Since local binding is blocked by Principle B, Romance children (and aphasics) will reject a reflexive interpretation of (5).

Delay of Principle B Effect: explanations

DPBE is due to processing limitations

(5) La niña la señala   90% correct

    the girl her points-at

    'The girl is pointing at her.'

<div align="right">(Baauw & Escobar 1997; Baauw & Cuetos 2003)</div>

Delay of Principle B Effect: explanations

DPBE is due to processing limitations

ECM constructions lead to additional errors, since "reflexivity" Principle B does not play a role in ruling out local binding (Reinhart & Reuland 1993).

(6) John saw [him dance]

→ him and John belong to different predicates

Delay of Principle B Effect: explanations

DPBE is due to processing limitations

Local binding ruled out by condition on A-Chains: *Chain formation* between underspecified SE and *Jan* (narrow syntax) is a cheaper way of establishing a referential dependency than a *bound variable* relation between *him* and *John* (Reuland 1998).

Delay of Principle B Effect: explanations

DPBE is due to processing limitations

So (6) blocks (7).

(6) Jan zag [zich dansen] 'John saw SE dance'
|_____|
A-Chain

(7) **Jan** zag [**hem** dansen] 'John saw him dance'

Delay of Principle B Effect: explanations

DPBE is due to processing limitations

In young children, and agrammatics narrow syntax is not always the cheapest option (Avrutin 2001), hence a bound-variable reading of (8) will often be accepted, even in languages with clitics (Baauw & Escobar 1997):

(8)   La niña la ve bailar

the girl her sees dance

Delay of Principle B Effect: explanations

DPBE is due to processing limitations

If limited processing resources are the source of the DPBE, children (and agrammatics) are expected to perform better with experimental methods that impose *low processing load*, such as Picture **Selection Task (PS)**, than experimental methods imposing *high processing load*, such as **Truth Value Judgment Task (TVJ)**.

Delay of Principle B Effect: explanations

DPBE is due to processing limitations

PS: child sees 3 pictures and has to choose the one that best depicts the test sentence. One of the pictures represented a "reflexive" action, another one a "transitive" action (a third one represented an unrelated action).

Delay of Principle B Effect: explanations

DPBE is due to processing limitations

TVJ: child sees a single picture and has to judge whether an accompanied sentence correctly describes this picture

Delay of Principle B Effect: Experiments

Experiment 1

Aim: compare Spanish children's performance in PS on simple pronominal and ECM sentences, with earlier TVJ studies: TVJ-1 (Baauw & Escobar 1997; Baauw & Cuetos 2003), TVJ-2 (Baauw 2000) and TVJ-3 (Baauw & Alija 2005).

Subjects PS study: 32 5-year old Spanish speaking children

Items: 62 items, 4 sentence types (reflexives, pronouns in transitive sentences and ECM constructions, fillers)

Delay of Principle B Effect: Example PS

Primero la niña y la mujer bailaron, y luego la niña la pinta. [First the girl and the mother danced and then the girl painted her]

Delay of Principle B Effect: Example PS
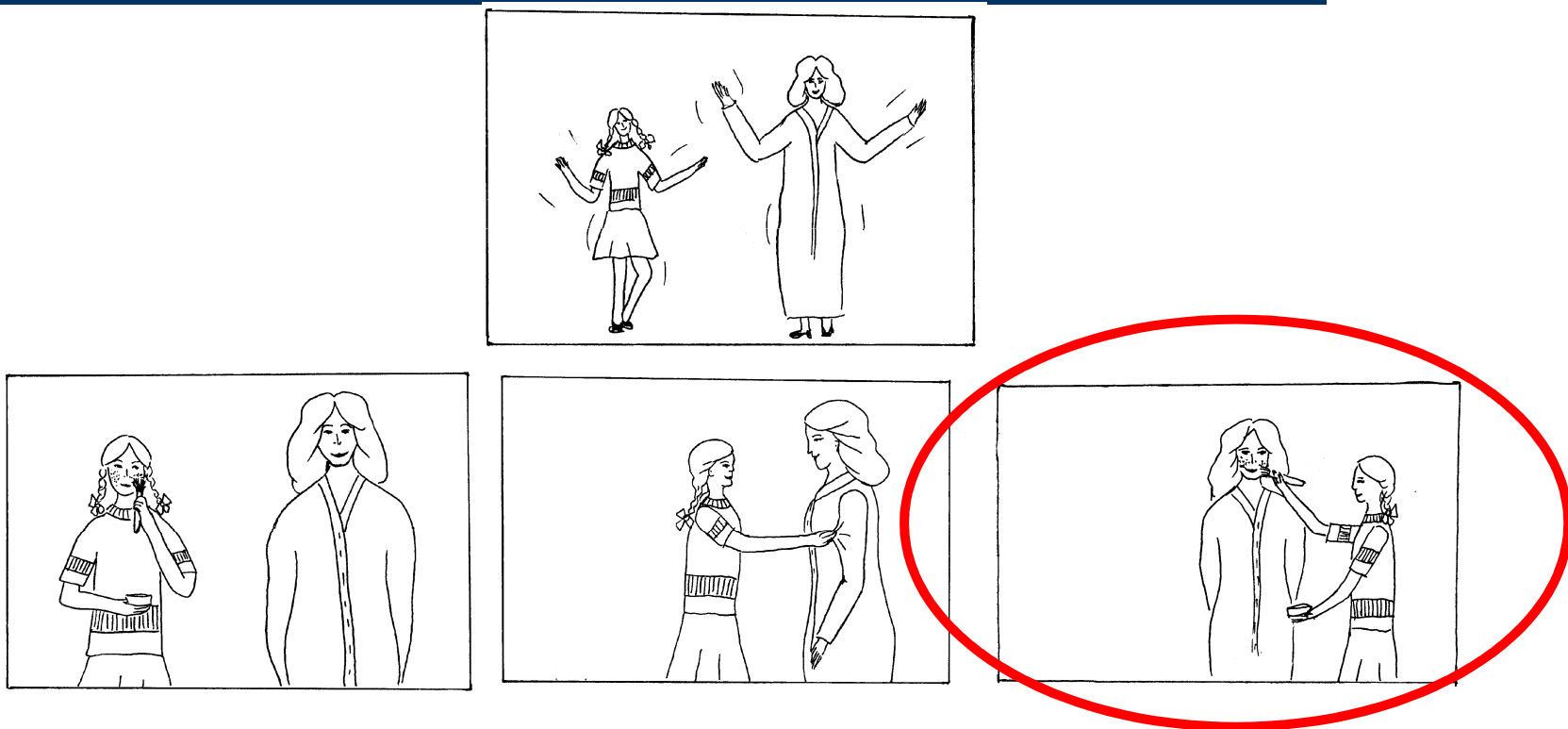
Primero la niña y la mujer bailaron, y luego la niña la pinta. [First the girl and the mother danced, and then the girl painted her]
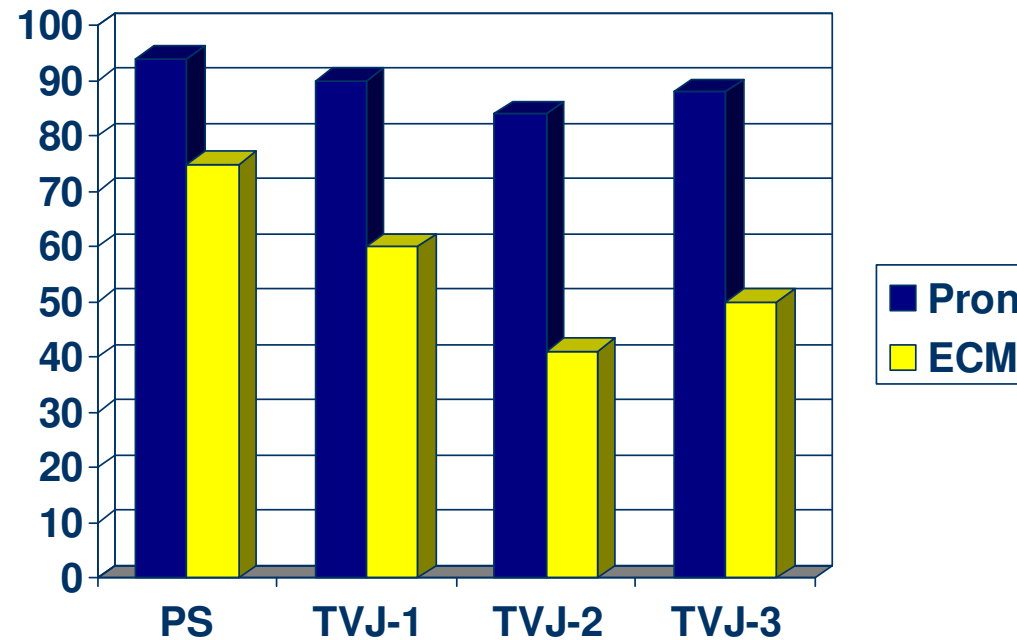
Delay of Principle B Effect: Example TVJ
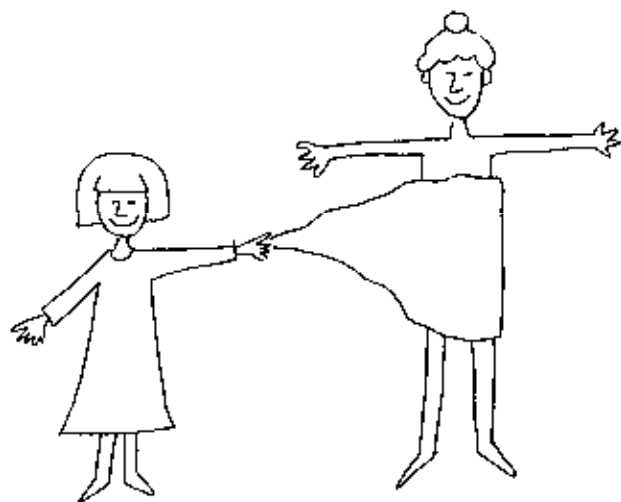
Mmm…una niña y una madre. La niña la seca? [Is the girl drying her?]
Adult response: YES
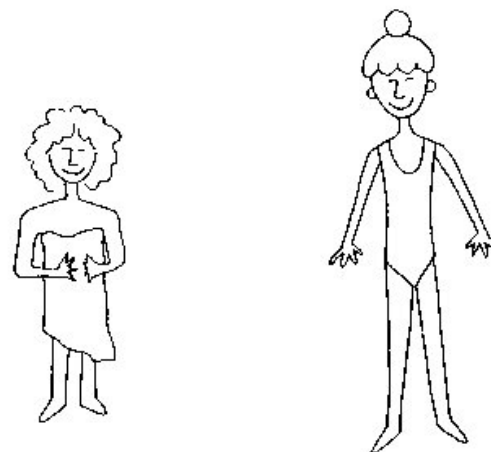
Mmm…una niña y una madre. La niña la seca? [Is the girl drying her?]
Adult response: NO

Delay of Principle B Effect: Experiments

Results PS vs. TVJ

Delay of Principle B Effect: Experiments

Results PS vs. TVJ

- Ceiling effects for Pron condition, both PS and TVJ.
- For ECM, more target-like performance on PS (75% correct) than TVJ (around 50% correct).

Delay of Principle B Effect: Experiments

Experiment 2

Aim: compare Spanish agrammatics' performance in PS on simple pronominal and ECM sentences, with earlier TVJ study (Baauw & Cuetos 2003).

Subjects PS study: 7 adult Spanish speaking agrammatic Broca's aphasic patients (age range: 47 – 68 years, mean age 52).

Items: 100 items, 4 sentence types (reflexives, pronouns in transitive sentences and ECM constructions, fillers)

Delay of Principle B Effect: Experiments
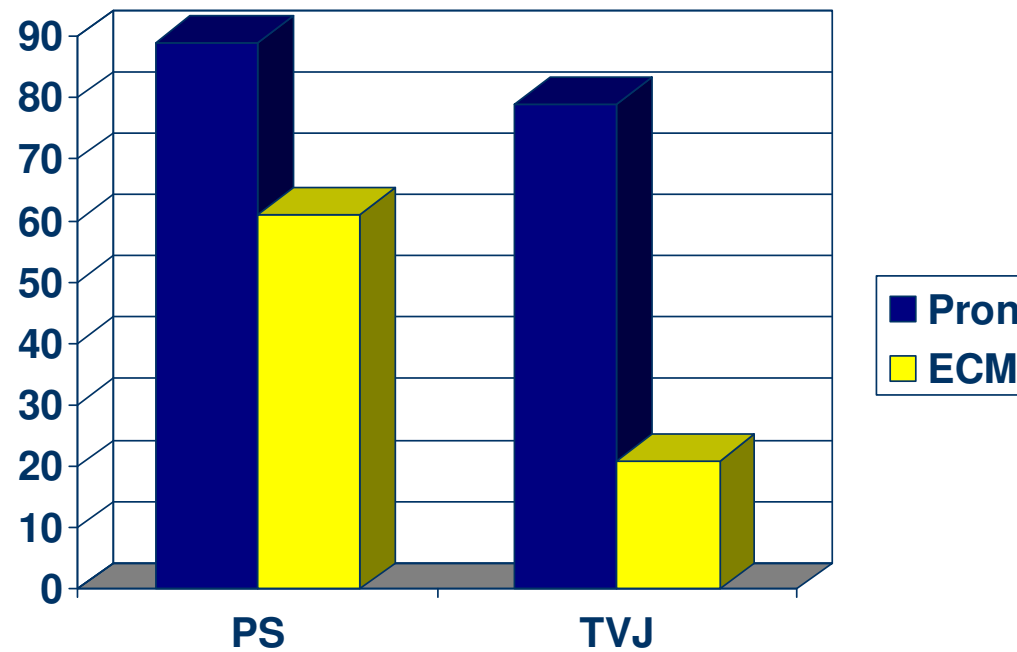
Results PS vs. TVJ

Delay of Principle B Effect: Experiments

Results PS vs. TVJ

- Highly targetlike performance on Pron condition, both PS and TVJ.

- For ECM, more target-like performance on PS (61% correct) than TVJ (21% correct).
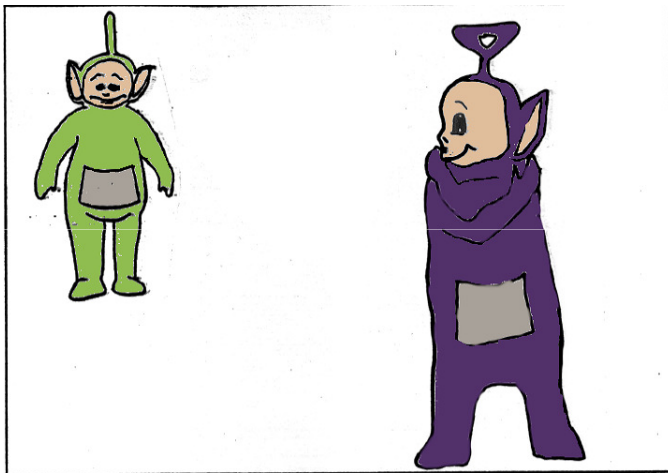
Delay of Principle B Effect: Experiments

Experiment 3

Aim: test Dutch children's performance with a test in which PS and TVJ items alternate.

Subjects: 20 4-6-year old Dutch speaking children

Items: 36 items, 3 sentence types (pronouns in transitive sentences, ECM, Fillers) and two methods (PS, TVJ).

Delay of Principle B Effect: Example TVJ

Een groene en een paarse tele-tubby… Ik denk dat de paarse hem knuffelt. [I think that the purple one is hugging him]
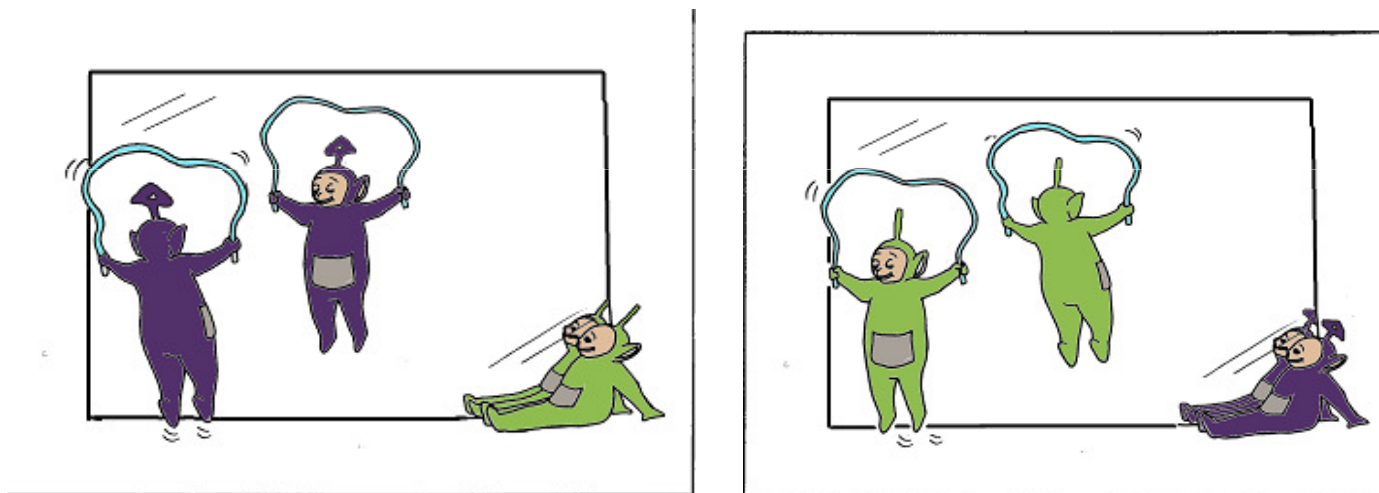
Adult response: NO

Een groene en een paarse tele-tubby… Ik denk dat de paarse hem knuffelt. [I think that the purple one is hugging him]
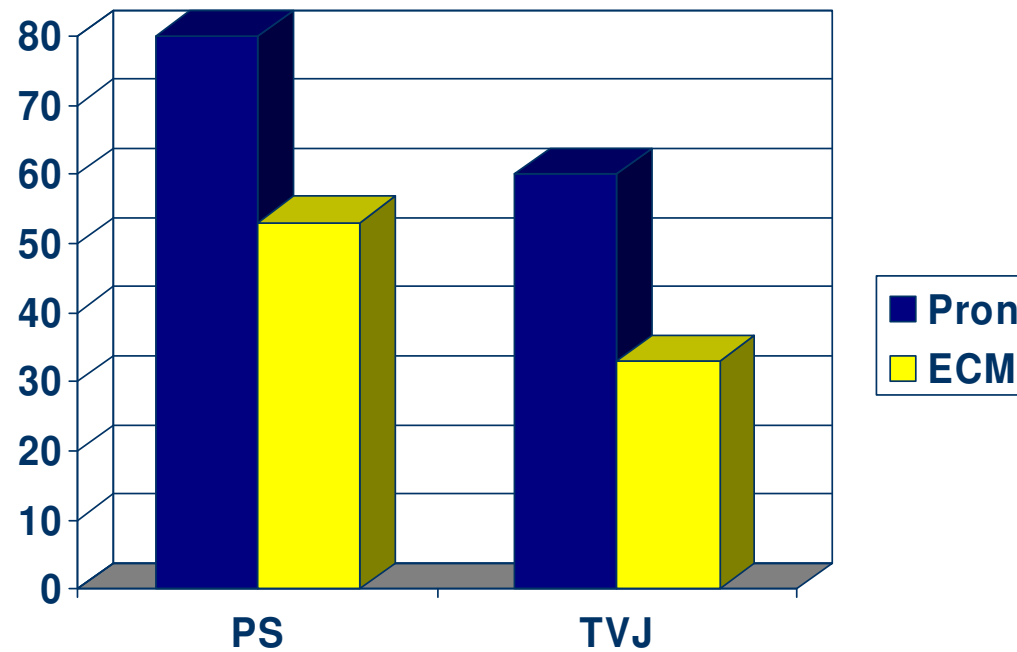
Adult response: YES

Delay of Principle B Effect: Example PS

In welk plaatje ziet de paarse tubby hem touwtje springen? [In which picture does the purple tuby see him jump-rope?]

Delay of Principle B Effect: Experiments

Results PS vs. TVJ

Delay of Principle B Effect: Experiments

Results PS vs. TVJ

- For both ECM and Pron more target-like performance on PS than TVJ.

- Significant effect of methodology (F=19.504,P=.000) as well as an effect of structure (F=30.009,P=.000).
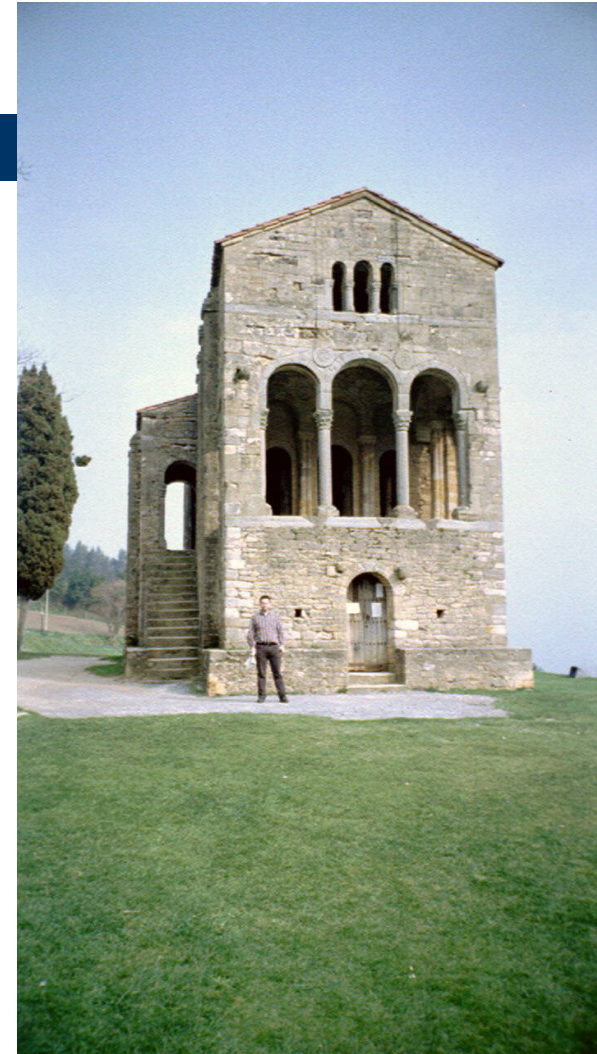
Conclusion

➢ The results support a processing account for the DPBE phenomenon. If children's (and agrammatics') problem were one of missing knowledge, methodology should not have mattered.

➢ **TVJ imposes a higher processing load than PS**, since only with the former method subjects are *forced* to establish and evaluate a reflexive reading (local coreference / bound variable), which for processing reasons is complicated (Grodzinsky & Reinhart 1993; Reuland 1998), hence a stronger DPBE is found with this method.

Relevance for production

➢ In production the child is not forced to consider the possibility of local coreference/binding reading (as in TVJT), it is not even "invited" to do so (as in PS tasks).

➢ A child who wants to express a "reflexive" meaning will most likely select a reflexive pronoun straight away.

➢ If a child wants to express a non-reflexive meaning, pronouns are the only option.

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