Reevaluating the Maratsos Effect

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Passive delay

- Children are delayed in comprehending passives compared to actives (*e.g.*, Hirsch and Wexler 2006).
- This delay appears cross-linguistically, having been found in German, Danish, Dutch, French, Spanish, Catalan, Brazilian Portuguese, Russian, Serbian, Greek, Hebrew, Japanese, and K'iche' (Orfitelli 2012: 10). (One notable purported exception is Sesotho (Demuth et al. 2010), but see Crawford (2012).)

Accounts of the passive delay

- A-Chain Deficit Hypotheis (Borer and Wexler 1987, 1992)
- Theta Transmission Hypothesis (Fox and Grodzinsky 1998)
- Universal Phase Requirement (Wexler 2004)
- Argument Intervention Hypothesis (Orfitelli 2012)
- Smuggling, Universal Freezing, and semantic coercion (Hyams and Snyder 2006; Snyder and Hyams 2015)

What is the Maratsos Effect?

- Children are delayed in acquiring passives compared to actives.
- Children furthermore comprehend passives of "actional" verbs (*e.g.*, *kick*, *hit*, *kiss*) earlier than the passives of "nonactional" verbs (*e.g.*, *hear*, *see*, *love*), first observed by Maratsos et al. (1985).
- This has been robustly replicated in the literature and has come to be called the "Maratsos Effect" (*e.g.*, Fox and Grodzinsky 1998; Gordon and Chafetz 1990).

When is the Maratsos Effect?

- Hirsch and Wexler (2006) tested 60 children across 6 different age groups.

Group	*n*	Age range	Mean age
3−	10	3;0–3;5	3;3
3+	10	3;6–3;10	3;8
4−	10	4;1–4;5	4;3
4+	10	4;6–4;11	4;8
5−	10	5;1–5;5	5;3
5+	10	5;7–5;11	5;9
	60	3;0–5;11	4;5

When is the Maratsos Effect?

- Children perform poorly on comprehension tasks involving the passive until 4;0.
- At 5;0, children perform above chance on "actional" passives.
- By 6;0, they are still not above chance on "nonactional" passives.

Group	Actional actives	Actional long passives	Actional short passives	Psych actives	Psych long passives	Psych short passives
3−	93.8%	66.2%	72.5%	97.5%	35.0%	30.0%
3+	93.8%	53.7%	76.2%	95.0%	33.8%	35.0%
4−	95.0%	73.8%	80.0%	95.0%	33.8%	40.0%
4+	90.0%	65.0%	76.2%	97.5%	45.0%	50.0%
5−	96.3%	88.7%	87.5%	97.5%	38.8%	47.5%
5+	96.3%	78.7%	92.5%	98.8%	43.8%	55.0%
	94.2%	71.0%	80.8%	96.9%	39.2%	42.9%

Accounts of the Maratsos Effect

- Syntactic homophone theories (cf. Babyonyshev et al. 2001)
  - A-Chain Deficit Hypotheis (Borer and Wexler 1987, 1992)
  - Theta Transmission Hypothesis (Fox and Grodzinsky 1998)
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S-homophone accounts

- S-homophone accounts of the Maratsos Effect assume:
  - (i) Children do not actually understand the passive until 6;0 (theories vary on the mechanism that matures at 6;0).
  - (ii) Children only perform above chance on actional trials prior to 6;0 because actional passive participles make good adjectives.
  - (iii) In other words: *The monkey was chased* $\approx$ *The monkey was brown*.
- However, some "actional" participles don't make good adjectives:

(1) a. * the bumped child
b. * the carried child
c. * the licked spoon

- And some "nonactional" participles do make good adjectives:

(2) a. the known suspect
b. the forgotten movie
c. the hated man

Snyder and Hyams (2015)

Glossing over some details (which can be found in an appendix) . . .

- Snyder and Hyams (2015) adopt a smuggling analysis of the passive (Collins 2005).
- At 4;0, smuggling becomes available and the Universal Freezing Hypothesis is relaxed to allow extraction out of a smuggled eventive verbal shell.
- At 6;0, children are able to coerce stative verbal shells into eventive verbal shells, thereby allowing extraction out of a smuggled stative verbal shell (cf. Gehrke and Grillo 2009; Grillo 2008).
- Importantly, Snyder and Hyams (2015) only predict eventive verbs to be better in the passive than stative verbs for children 4;0 – 6;0.

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Previous studies

- So does "actional" = eventive and "nonactional" = stative?
- Previous studies haven't used (consistent) diagnostics for classifying verbs as "actional" and "nonactional".
- If anything, "actional" = agentive and "nonactional" = nonagentive.

Linguistic diagnostics for verbal properties

- We can split verbs into three classes, based on eventivity and agentivity.

(3) eventive agentive

a. Grover deliberately watched Elmo.

b. * Grover watches Elmo.

(4) eventive nonagentive

a. * Grover deliberately saw Elmo.

b. * Grover sees Elmo.

(5) noneventive nonagentive (stative)

a. * Grover deliberately liked Elmo.

b. Grover likes Elmo.

Verbs that have been tested

- eventive agentive eventive nonagentive noneventive nonagentive

Study	"Actional" verbs tested
de Villiers and de Villiers (1973) Exp. 1	bite, push, touch, bump, hit, kiss
Maratsos and Abramovitch (1975) Exp. 1	bump, kick, kiss, tickle, hit, push, bite, touch
Maratsos et al. (1985) Exp. 1	find, hold, wash, shake
Maratsos et al. (1985) Exp. 2	wash, kiss, push, kick, find, hold
Gordon and Chafetz (1990) Exp. 2	drop, eat, carry, kiss, hold, wash, shake, hug, kick
Fox and Grodzinsky (1998)	touch, chase
Hirsch and Wexler (2006)	push, kiss, kick, hold
O'Brien et al. (2006) Exp. 1	chase, hug
O'Brien et al. (2006) Exp. 2	chase, hug
Crain et al. (2009, 1987)	kick, kiss, push
Orfitelli (2012) Exp. 3	push, kick, kiss, carry

Study	"Nonactional" verbs tested
Maratsos et al. (1985) Exp. 1	watch, know, hear, like, remember, see, forget, miss
Maratsos et al. (1985) Exp. 2	see, hear, like, love, hate, remember
Gordon and Chafetz (1990) Exp. 2	watch, forget, hear, know, remember, believe, like, see, hate
Fox and Grodzinsky (1998)	hear, see
O'Brien et al. (2006) Exp. 1	see
Hirsch and Wexler (2006)	remember, love, hate, see
O'Brien et al. (2006) Exp. 2	see, like
Orfitelli (2012) Exp. 3	remember, love, hear, see

Reinterpreting past results

- Given the heterogenous nature of the "nonactional" verbs both across and within studies, it's not necessarily easy to reinterpret past results.
- If anything, it seems like agentivity—not eventivity, like Snyder and Hyams (2015) predict—is the relevant property for the Maratsos Effect.
- But given that past studies haven't been careful about the verb classes they test, it would be good to have a study that carefully controls which verbs are used, using actual linguistic diagnostics.

Teasing apart agentivity and eventivity

- Two experiments:

Experiment 1	Experiment 2	
eventive agentive	eventive nonagentive	noneventive nonagentive
paint	forget	know
fix	find	hate
wash	spot	love

Predictions of extant theories

- S-homophone theories:
  - predict only a two-way distinction between performance on verbs whose passive participles make good adjectives and those whose passives participles do not.
  - predict that {paint, fix, wash, forget} should be better than {find, spot} in Experiment 1.
  - predict that {forget, know, hate} should be better than {find, spot, love} in Experiment 2.

Predictions of extant theories

- Snyder and Hyams (2015):
  - predict only a two-way distinction between performance on passives of eventive verbs and passives of noneventive verbs.
  - predict that {paint, fix, wash, forget, find, spot} should be above chance and undifferentiated in Experiment 1.
  - predict that {forget, find, spot} should be better than {know, hate, love} in Experiment 2.

The task

- We used aTruth Value Judgment Task (Crain and Thornton 1998).
- Experimenter A read the child participant a story with an accompanying 3-page comic strip of pictures on a computer screen.
- Experimenter B played the puppet, Rex, who was so smart that he could figure out what happened in the story without listening. Rex's hubris led him to don earmuffs.
- At the end of the story, Rex uttered a sentence describing the story, and Experimenter A prompted the participant to indicate whether Rex was right.
- Adult participants were presented the experimental materials via PsychoPy (Peirce 2007); sadly, there was no puppet.

Controlling for discourse felicity

- Rex's utterances were prefaced with an introductory sentence in order to ensure that the target sentence actually answered the Question Under Discussion and was felicitous in the discourse.
- Introductory sentences were *I know what happened!* except in cases where this did not make the target sentence felicitous in the discourse.
- (6) is an example where *I know what happened!* was used to ensure discourse felicity, and (7) is an example where an alternative was used in order to ensure discourse felicity.

(6) I know what happened! The orange car was fixed by the green car!

(7) I know how they found Andy! Andy was spotted by Natalie!

Target sentences

- Each experiment had 6 target verbs.
- For each verb, voice (active $\times$ passive) was crossed with truth value (true $\times$ false), for a total of 24 target sentences.
- Participants were given 4 training trials (intransitives), though only child participants received explicit feedback in training.

Experiment 1 methods

- Materials
  - The eventive agentive verbs were *fix*, *paint*, and *wash*.
  - The eventive nonagentive verbs were *find*, *forget*, and *spot*.
- Participants
  - 17 native English speaking adults were tested.
  - 20 children were tested.
  - 2 were not considered because their first language was not English.
  - 4 were not above chance on the active control trials and were thus not considered.
  - So only the data for 14 children was actually analyzed (age range: 4;05,10 – 6;02,08; mean age: 5;01,07).

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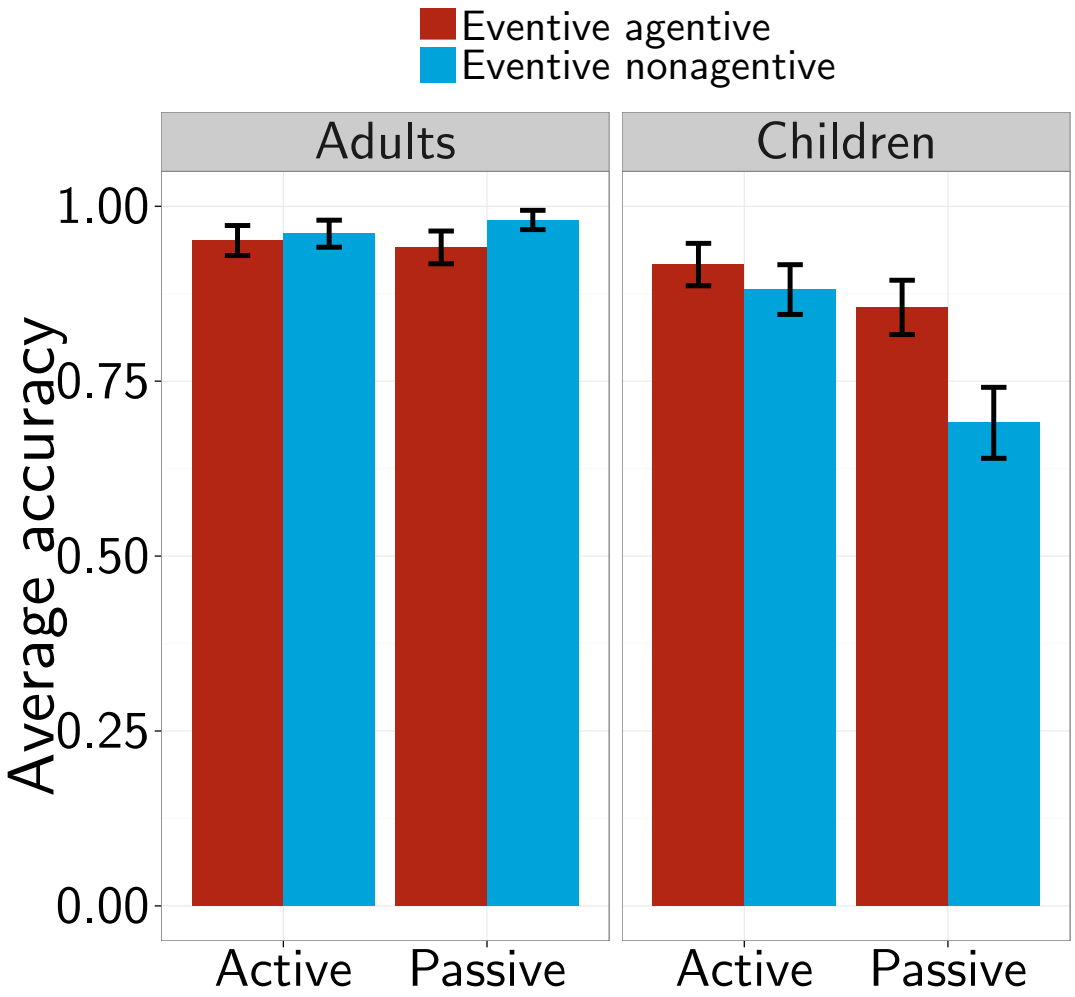
Experiment 1 results

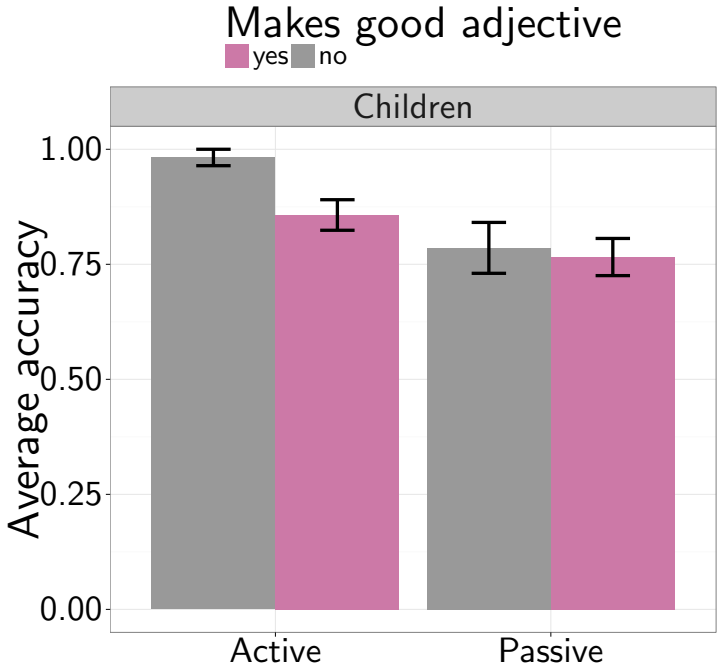


- Children performed significantly better on passives of eventive agentive verbs than on passives of eventive nonagentive verbs ($t(13) = 3.606, p = 0.002$).

Experiment 1 discussion

- Snyder and Hyams (2015) predict verbs in Experiment 1 to be undifferentiated because eventivity is held constant in this experiment; this prediction is not borne out.
- S-homophone accounts predict that the verbs whose passive participles make good adjectives should be better than those whose passive participles do not; this prediction is also not borne out.

Experiment 1 discussion



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Experiment 2 methods

- Materials
  - The noneventive nonagentive verbs were *hate*, *know*, and *love*.
  - The eventive nonagentive verbs were *find*, *forget*, and *spot*.
- Participants
  - 17 native English speaking adults were tested.
  - 24 children were tested.
  - 12 were not above chance on the active control trials and were thus not considered.
  - So only the data for 12 children was actually analyzed (age range: 3;09,11 – 5;10,07; mean age: 4;11,21).

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  - 17 native English speaking adults were tested.
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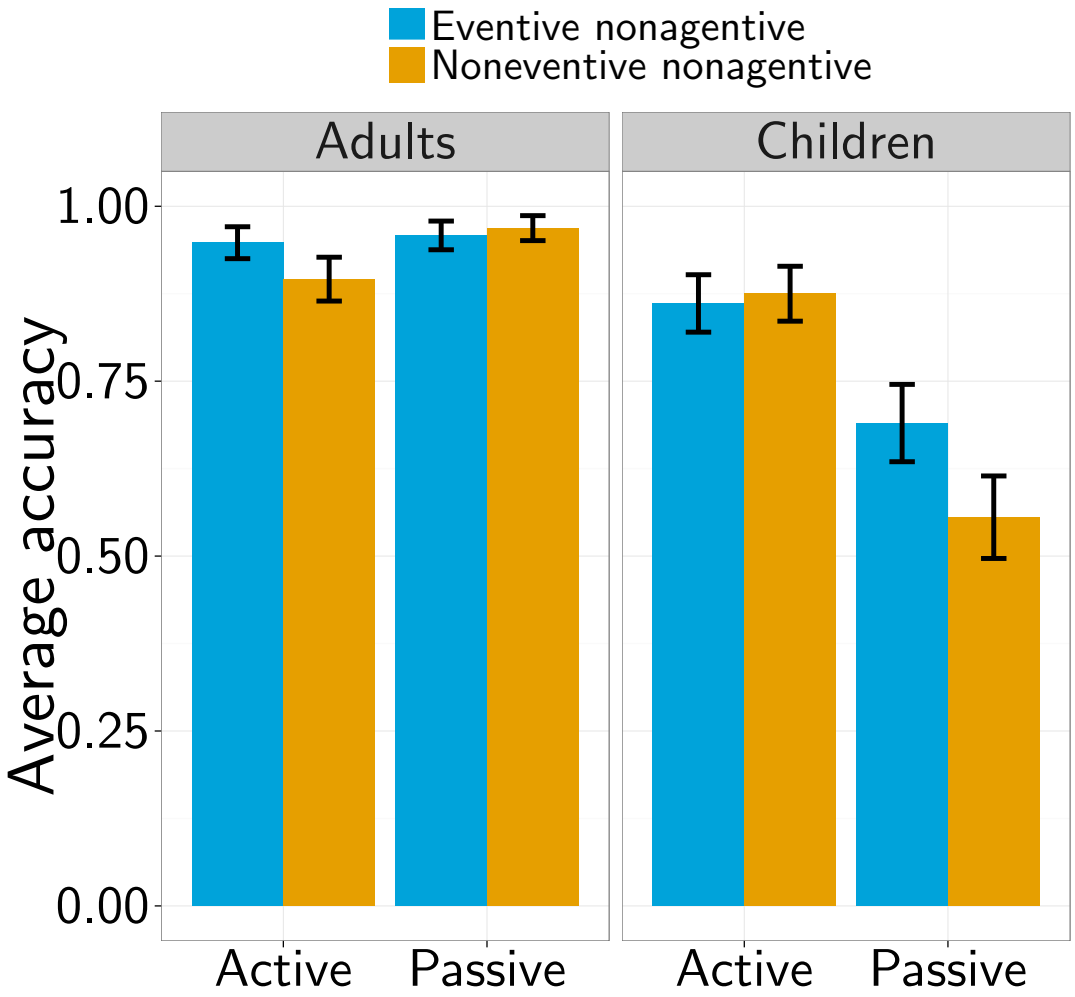
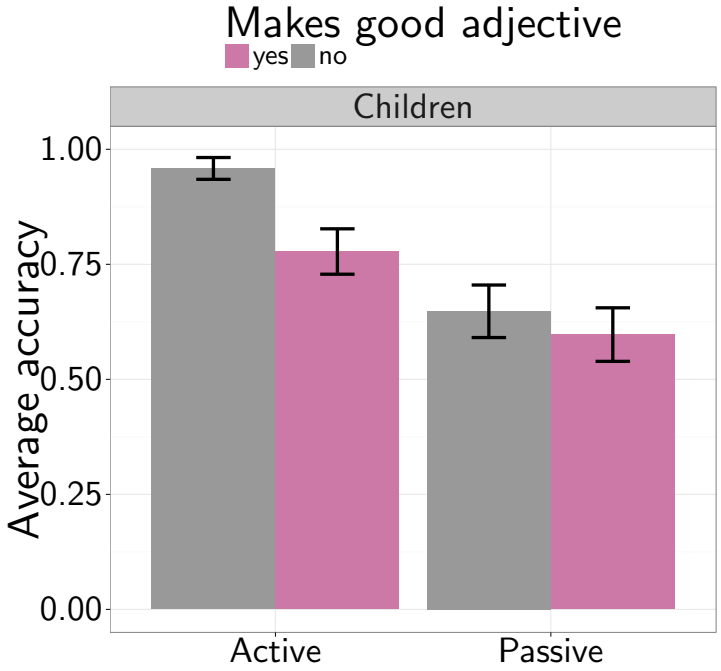


- Children performed significantly better on passives of eventive nonagentive than on passives of noneventive nonagentive verbs ($t(11) = 2.117, p = 0.029$).

Experiment 2 discussion

- Snyder and Hyams (2015) predict verbs in Experiment 2 to be differentiated based on eventivity; this prediction is borne out.
- S-homophone accounts predict that the verbs whose passive participles make good adjectives should be better than those whose passive participles do not; this prediction is not borne out.

Experiment 2 discussion



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General discussion

- Since only children who performed above chance on actives were included in the analysis, their performance cannot be attributed to them not knowing the verb.
- Because discourse felicity was controlled for, it is unlikely to be driving children's performance.

Conclusions

- Experiment 1 suggests agentivity plays a role in the Maratsos Effect.
- Experiment 2 suggests eventivity plays a role in the Maratsos Effect.
- Children seem to learn the passives of different verb types in the order eventive agentive > eventive nonagentive > noneventive nonagentive.
- None of the accounts of the Maratsos Effect account for our data.
- The Maratsos Effect is likely due to incremental learning of the range of passivizable verb types, not the result of children not knowing the passive at all.

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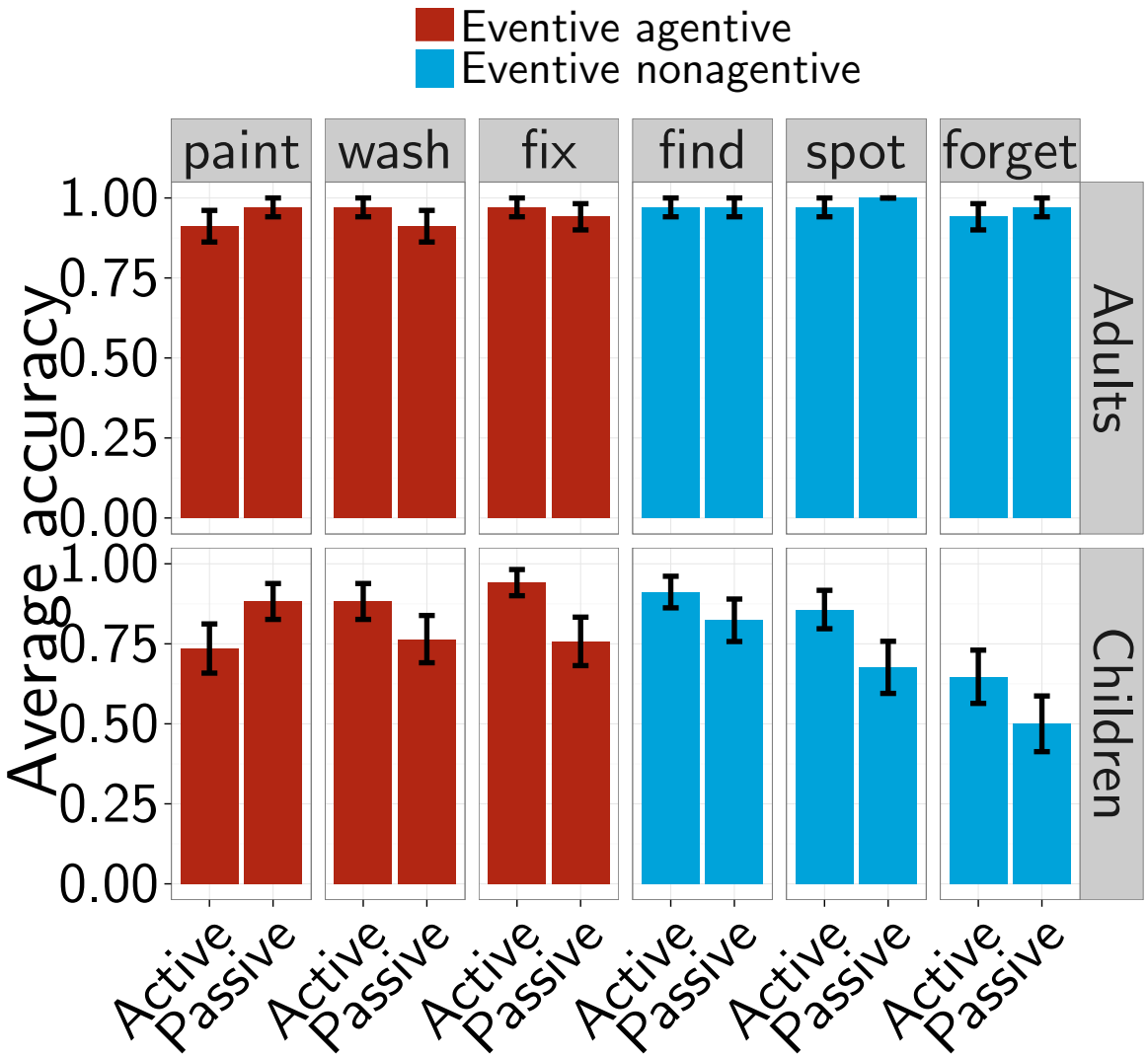
Experiment 1 results

	Adults		Children	
	eventive agentive	eventive nonagentive	eventive agentive	eventive nonagentive
Active	0.951	0.961	0.917	0.881
Passive	0.941	0.961	0.855	0.69

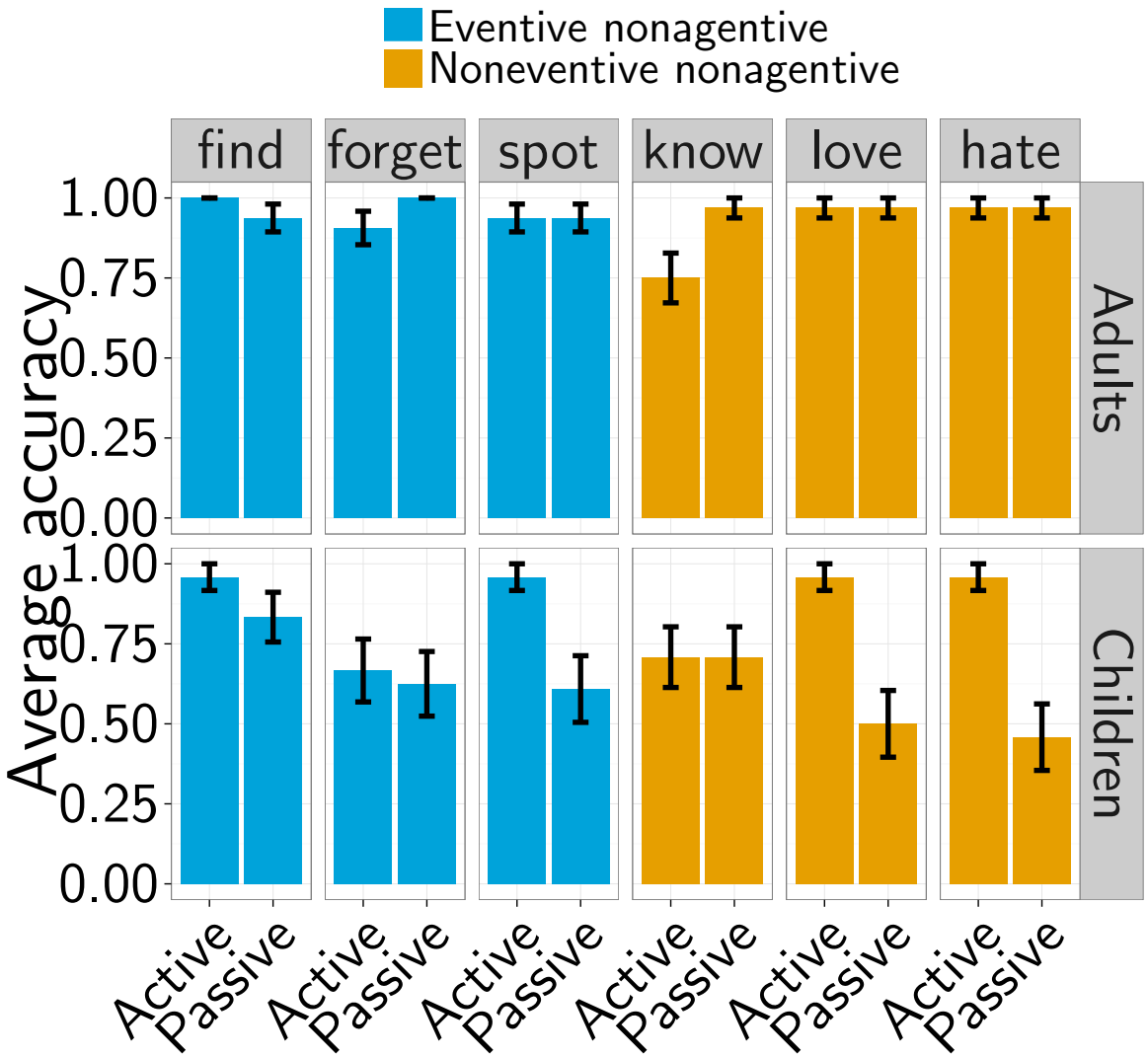
Experiment 1 graphed by verb



Experiment 2 results

	Adults		Children	
	eventive nonagentive	noneventive nonagentive	eventive nonagentive	noneventive nonagentive
Active	0.948	0.896	0.861	0.875
Passive	0.948	0.969	0.69	0.556

Experiment 2 graphed by verb



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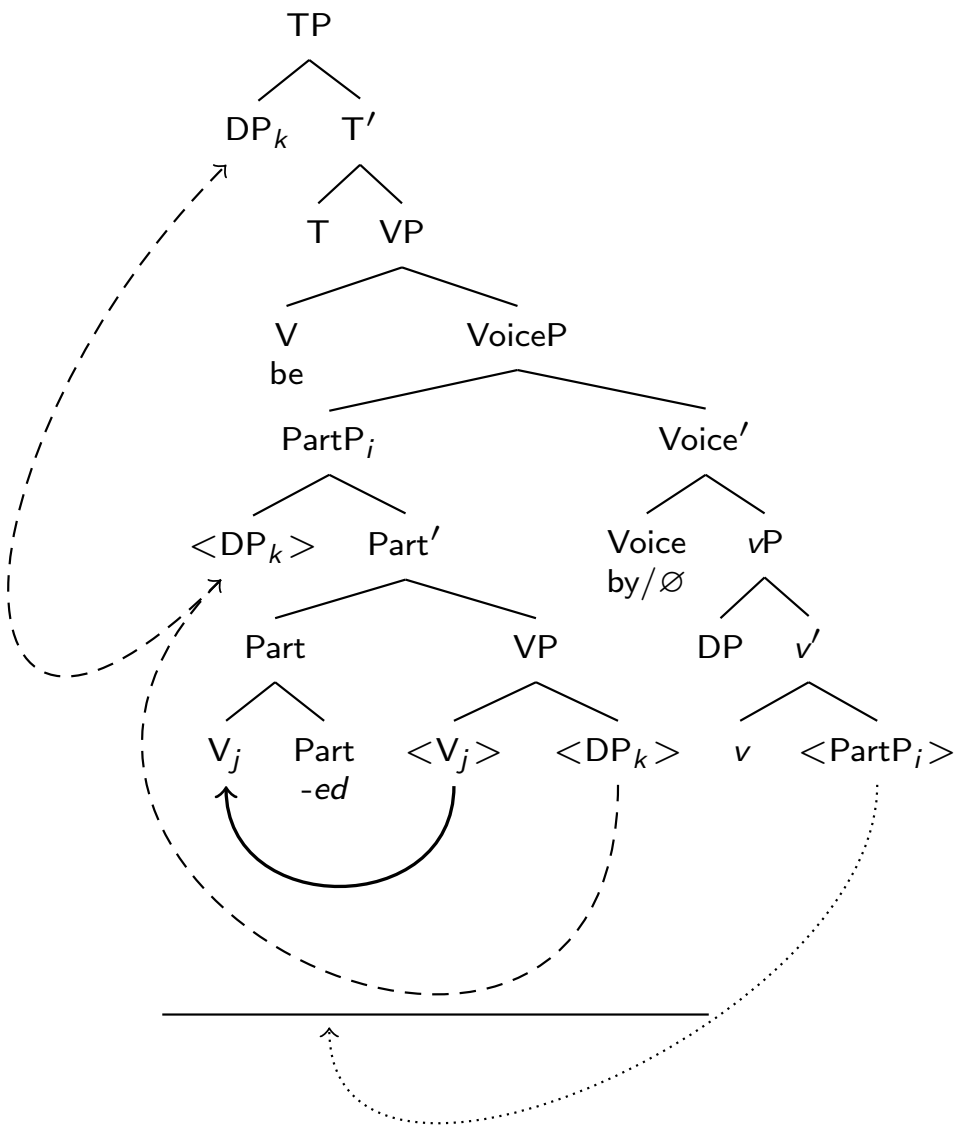
- Experiments with above-chance performance by kids under 4;0 (*e.g.*, Crain et al. 2009; O'Brien et al. 2006) have materials where there are +WH/+Topic features on the thematic object, thereby allowing children to overcome Minimality violations (the verbal shell is moved afterwards in their analysis, violating Extension Condition ☹).

Snyder and Hyams (2015)

- Collins (2005)



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- At 6;0, children are able to coerce stative verbal shells into eventive verbal shells, thereby allowing extraction out of a smuggled stative verbal shell (cf. Gehrke and Grillo 2009; Grillo 2008).
- Experiments with above-chance performance by kids under 4;0 (*e.g.*, Crain et al. 2009; O'Brien et al. 2006) have materials where there are +WH/+Topic features on the thematic object, thereby allowing children to overcome Minimality violations (the verbal shell is moved afterwards in their analysis, violating Extension Condition ☹).

Snyder and Hyams (2015)

- Snyder and Hyams (2015) account for the passive delay by assuming a smuggling analysis of the passive (Collins 2005) and that children adopt a strict Universal Freezing Hypothesis.
- Smuggling is an operation that is not available until 4;0.
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