Particle placement in early child language. A case study

Holger Diessel
University of Jena

holger.diessel@uni-jena.de
http://www.holger-diessel.de/

Verb-particle construction

(1) He looked **up** the number.

(2) He looked the number **up**.

(3) He walked **up** the hill.

(4) *He walked the hill **up**.

Verb-particle construction

Bolinger 1971; Fraser 1974, 1976; Bock 1977; Dixon 1982; Chen 1986; Hawkins 1994; Peters 1999; Wasow 2002; Dehé et al. 2002; Gries 1999, 2003

NP-type

(1) He put it **down**.

(2) He put the ball **down**.

(3) *He put **down** it.

(4) He put **down** the ball.

Length

(1) He looked the number **up**.

(2) He looked the number of his neighbour in the yellow pages **up**.

Complexity

(1) He put the ball with the blue stripes **down**.

(2) He put the ball that Sue had given him **down**.

Meaning

(1) He pushed the chair **away**.

(2) He ate **up** his lunch.

(3) He turned **on** the TV.

Information structure

(1) What did she do with the ball?

-> She picked the ball **up**.

(2) What did she pick up?

-> She picked **up** the ball.

Definiteness

(1) I turn the light **on**.

(2) I turn **on** a light.

Stress

(1) *Pick up him.

(2) Pick up HIM (not her).

Directional PP

(1) Peter put the cup back.
(2) Peter put back the cup.

(3) Peter put the cup back on the table.
(4) Peter put back the cup on the table.

Research question

1. Does the positioning of the particle in child language vary with the same factors as in adult language?
2. Do children use the two particle positions productively?

Data collection

	Age	Files	First VPC
Peter Eve	1;9-3;1 1;6-2;3	20 20	1;9 1;7
	>2;3	40	

Data collection

Attested:

on, off, back, away, in, out, down, over, around, up

Not attested:

against, upon, …

Data collection

turn up hill / up hill .
then wake up
up the wall .
up .
Eve stand up Mommy stool .
I pick up .
up wall .
bobbing up an(d) down .
I covered it up .
well this is up in the house .

Data collection

turn up hill / up hill .
then wake up
up the wall.
up .
Eve stand up Mommy stool .
I pick up .
up wall .
bobbing up an(d) down .
I covered it up .
well this is up in the house .

Types of constructions

(17)	He picked me up.	[Transitive VPC]
(18)	He walked away.	[Intransitive VPC]
(19)	I am back.	[Predicative VPC]
(20a)	Shoes on.	[Fragmented VPC]
(20b)	Down!	[Fragmented VPC]
(21)	Put it on the table.	[PP]

Types of constructions

	Peter	Eve	Total
Transitive	291	281	572
Intransitive	232	256	488
Predicative	17	25	42
Fragmented	130	70	200
Prepositional	519	754	1273
	1189	1386	2575

Types of constructions

	Peter	Eve	Total	Percentage
Transitive	291	281	572	22.2
Intransitive	232	256	488	19.0
Predicative	17	25	42	1.6
Fragmented	130	70	200	7.8
Prepositional	519	754	1273	49.4
	1189	1386	2575	100.0

Types of constructions

	Peter	Eve	Total	Percentage
Transitive	291 **(24.5)**	281 **(20.3)**	572	22.2
Intransitive	232 **(19.5)**	256 **(19.5)**	488	19.0
Predicative	17 **(1.4)**	25 **(1.4)**	42	1.6
Fragmented	130 **(10.9)**	70 **(10.9)**	200	7.8
Prepositional	519 **(43.7)**	754 **(43.7)**	1273	49.4
	1189	1386	2575	100.0

Types of constructions

	Peter	Eve	Total	Percentage	Mean%
Transitive	291 **(24.5)**	281 **(20.3)**	572	22.2	**22.4**
Intransitive	232 **(19.5)**	256 **(19.5)**	488	19.0	**19.0**
Predicative	17 **(1.4)**	25 **(1.4)**	42	1.6	**1.6**
Fragmented	130 **(10.9)**	70 **(10.9)**	200	7.8	**8.0**
Prepositional	519 **(43.7)**	754 **(43.7)**	1273	49.4	**49.1**
	1189	1386	2575	100.0	100.0

Hypothetical example

	Jack	Sue	Total	Percentage
Transitive Intransitive Predicative Fragmented Prepositional	491 432 37 30 121	81 156 29 50 321	572 588 66 80 442	32.7 33.6 3.8 4.5 25.3
	1111	637	1748	100.0

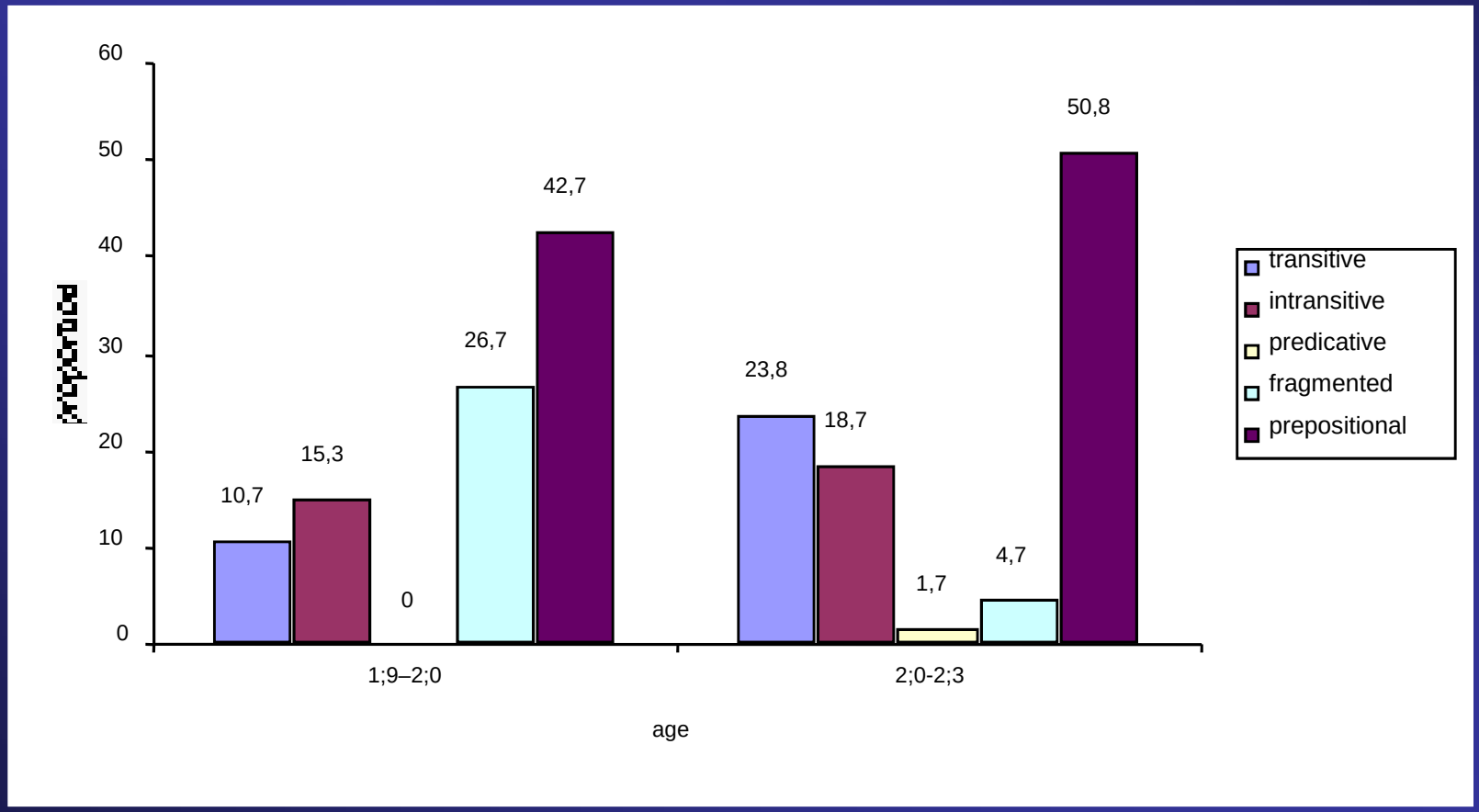
Hypothetical example

	Jack	Sue	Total	Percentage
Transitive Intransitive Predicative Fragmented Prepositional	491 (44.2) 432 (38.9) 37 (3.3) 30 (2.7) 121 (10.9)	81 (12.7) 156 (24.5) 29 (4.6) 50 (7.8) 321 (50.4)	572 588 66 80 442	32.7 33.6 3.8 4.5 25.3
	1111	637	1748	100.0

Hypothetical example

	Jack	Sue	Total	Percentage	Mean
Transitive Intransitive Predicative Fragmented Prepositional	491 **(44.2)** 432 **(38.9)** 37 **(3.3)** 30 **(2.7)** 121 **(10.9)**	81 **(12.7)** 156 **(24.5)** 29 **(4.6)** 50 **(7.8)** 321 **(50.4)**	572 588 66 80 442	32.7 33.6 3.8 4.5 25.3	**28.5** **31.7** **3.9** **5.2** **30.6**
	1111	637	1748	100.0	

Development of construction types



Construction fragments

(1) Down.
(2) Shoes on.
(3) Me up.
(4) Hat off.

Construction fragments

- The particles basically function as predicates.
- Children acquire the meaning of the transitive VPC before they master its form.

Particles

	Peter Freq	First	Eve Freq	First	Total Freq	Mean%
on	59	2;0	49	1;7	108	18.9
off	73	1;11	33	1;9	106	18.4
back	61	1;11	39	1;9	100	17.5
up	21	1;11	44	1;7	65	11.5
in	9	1;11	46	1;9	55	9.8
away	19	1;11	35	1;9	54	9.5
out	24	1;11	19	1;8	43	7.6
down	20	1;10	13	1;10	33	5.8
over	5	1;9	2	2;3	7	1.2
around	0	–	1	2;1	1	0.2
	291		281		572	100.0

Verbs

	Peter	Eve	Total in VPCs	Total in the entire corpus
put	120	144	264	597
take	72	30	102	178
turn	48	1	49	111
blow	0	20	20	33
get	4	14	18	447
have	1	14	15	429
push	6	8	14	41
pick	6	6	12	26
move	8	0	8	42
pull	1	6	7	25
	291	281	572	1929

VPC	Age	CHILD
turn down	1;10	Peter
pick up … thank you .	1;11	Peter
mm … put down …	1;11	Peter
take off this .	1;11	Peter
one ... rinse off ...	1;11	Peter
rinse off ...	1;11	Peter
put the screw in .	1;11	Peter
Put milk in .	1;11	Peter
Plug in .	1;11	Peter
Plug in.	1;11	Peter
take out ...	1;11	Peter
I put them back .	1;11	Peter
put back	1;11	Peter
I put back .	1;11	Peter
put back .	1;11	Peter

Omitted object NPs

	Peter	Eve	Total	Mean%
Overt object	210	240	450	78.8
No overt object	81	41	122	21.1
Total	291	281	572	100.0

Data analysis

Predictor variables

- Length of object
- Complexity of object
- NP Type
- Meaning of particle
- Definiteness
- Directional PP

Dependent variables

Two levels:

- Construction 1 V_P_NP
- Construction 2 V_NP_P

Coding

Spalte1	Construction	Lenght	Complexity	Definiteness	Meaning
take off this .					
put the screw in .					
Put milk in .					
I put them back .					
put em back ... ok .					
turn it over .					
turn it over .					
turn on a light off .					
... turn on a light off .					
pick up my cup .					

Coding

(1)	You put on lipstick on.	[Eve 2;1]
(2)	I do it turn on the light on.	[Peter 2;1]
(3)	Taking off one my roller skates off	[Peter 2;3]
(4)	Turn on a light off.	[Peter 2;0]

Raw frequency

	Peter	Eve	Total
V NP Part V Part NP	195 15	226 14	421 (93.5%) 29 (6.5%)
	210	240	450

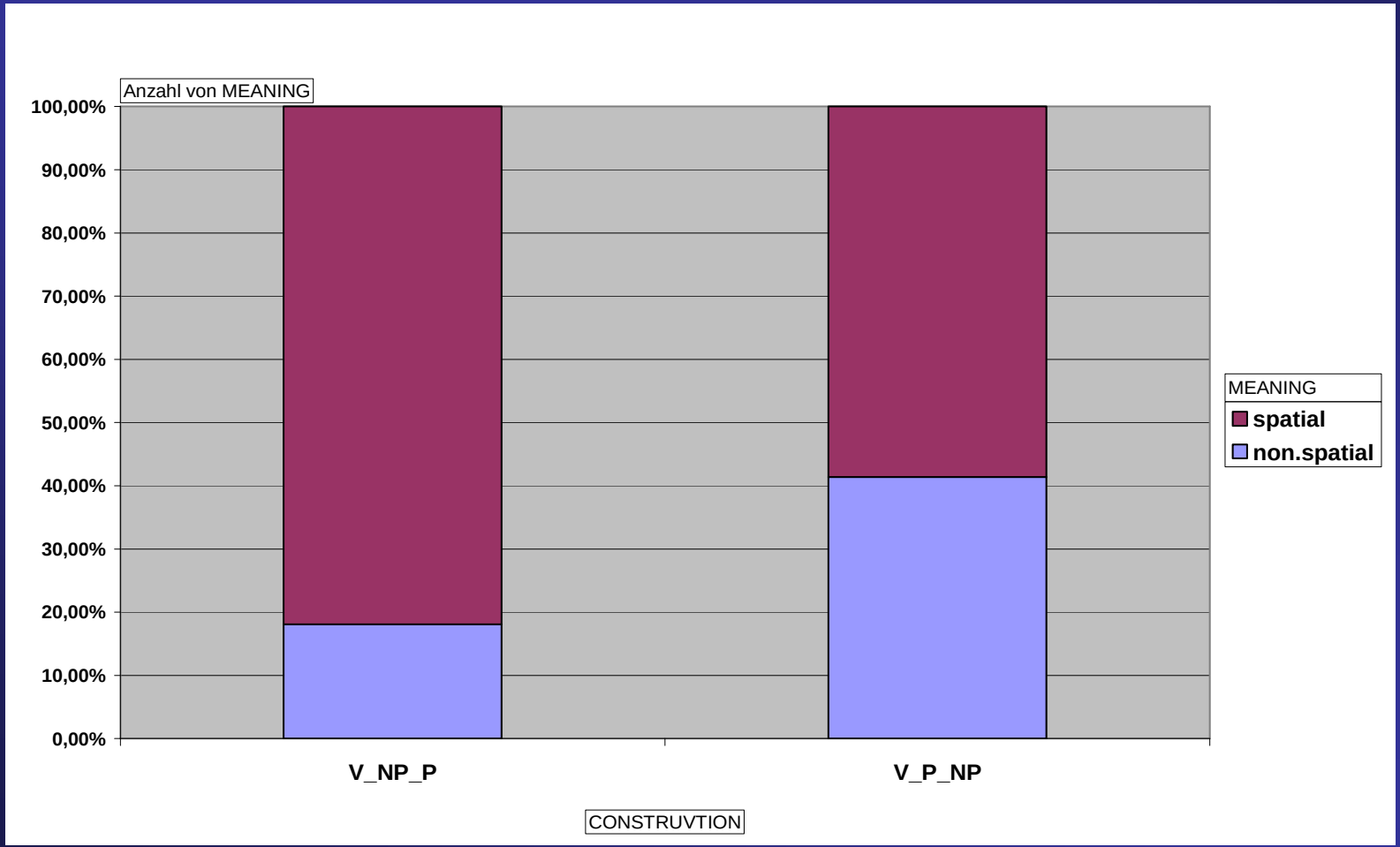
Meaning

	VP NP P	VP P NP	Total
Spatial Non-spatial	345 76	17 12	362 (80.4%) 88 (19.6%)
	421	29	450

(1) He pushed the chair away. Spatial

(2) He turned on the TV. Non-spatial

Meaning


Anzahl von MEANING
100,00%
90,00%
80,00%
70,00%
60,00%
50,00%
40,00%
30,00%
20,00%
10,00%
0,00%
V_NP_P
V_P_NP
CONSTRUVTION
MEANING
spatial
non.spatial

Statistical hypothesis testing

- Null hypothesis: There is no significant difference between the two groups.
- Alternative hypothesis: There is a significant difference between the two groups.

$\chi 2$-square

	VP_NP_P	VP_P_NP	Total
Spatial Non-spatial			362 88
Total	421	29	450

Length

	VP NP P	VP P NP	Total
1 word 2 words 3 words	279 133 9	4 20 5	283 153 14
	421	29	450

(1) Pick him up. 1 word

(2) Pull this thing up. 2 words

(3) He wiping up that I spilled. 3 words

Length

	VP NP P	VP P NP	Total
1 word 2 words 3 words	279 (264.8) 133 (143.1) 9 (13.1)	4 (18.2) 20 (9.9) 5 (0.9)	283 153 14
	421	29	450

(χ^2 (2)=57.56; p<.001)

(1) Pick him up. 1 word

(2) Pull this thing up. 2 words

(3) He wiping up that I spilled. 3 words

Complexity

	VP NP P	VP P NP	Total
simple intermediate complex	406 15 0	26 1 2	432 (96.0%) 16 (3.6%) 2 (0.4%)
	421	29	450

(χ^2 (2)=29.16; p<.004)

(1) He put the ball down.	Simple
(2) Pulls Eve sleeve up	Intermediate
(3) He wiping up that I spilled.	Complex

Complexity

	VP NP P	VP P NP	Total
simple inter + complex	406 15	26 3	432 (96.0%) 18 (4.0%)
	421	29	450

($\chi 2(1) = 3.25$; $p > .102$)

NP type

	VP NP P	VP P NP	Total
Per. PROs	200	0	200 (44.4%)
Other PROs	47	2	49 (10.9%)
Lexical N	174	27	201 (44.7%)
	421	29	450

($\chi^2(2)=30.51$; $p<.001$)

(1) He picked it up. Third person pronoun

(2) Put that down. Other pronouns

(3) Put my glasses on. Lexical NPs

Definiteness

	VP NP P	VP P NP	Total
Definite det. Indefinite det. No determiner	90 25 305	12 8 9	102 (22.7%) 33 (7.3%) 315 (70.0%)
	421	29	450

($\chi 2(2) = 28.85$; $p < .001$)

(1) Put the top on. — Definite determiner

(2) Picked up a ball. — Indefinite determiner

(3) Taking these off. — No determiner

Definiteness

	VP NP P	VP P NP	Total
Definite det. Indefinite det.	90 25	12 8	102 33
	116	20	135

($\chi 2(1) = 3.076$; $p > .094$)

(1) Put the top on. — Definite determiner

(2) Picked up a ball. — Indefinite determiner

(3) Taking these off. — No determiner

Directional PP

	VP NP P	VP P NP	Total
No PP PP	409 12	29 0	438 (97.3%) 12 (2.7%)
	421	29	450

(χ2(1)=.849; p<.622)

(1) Put the hat away. No PP

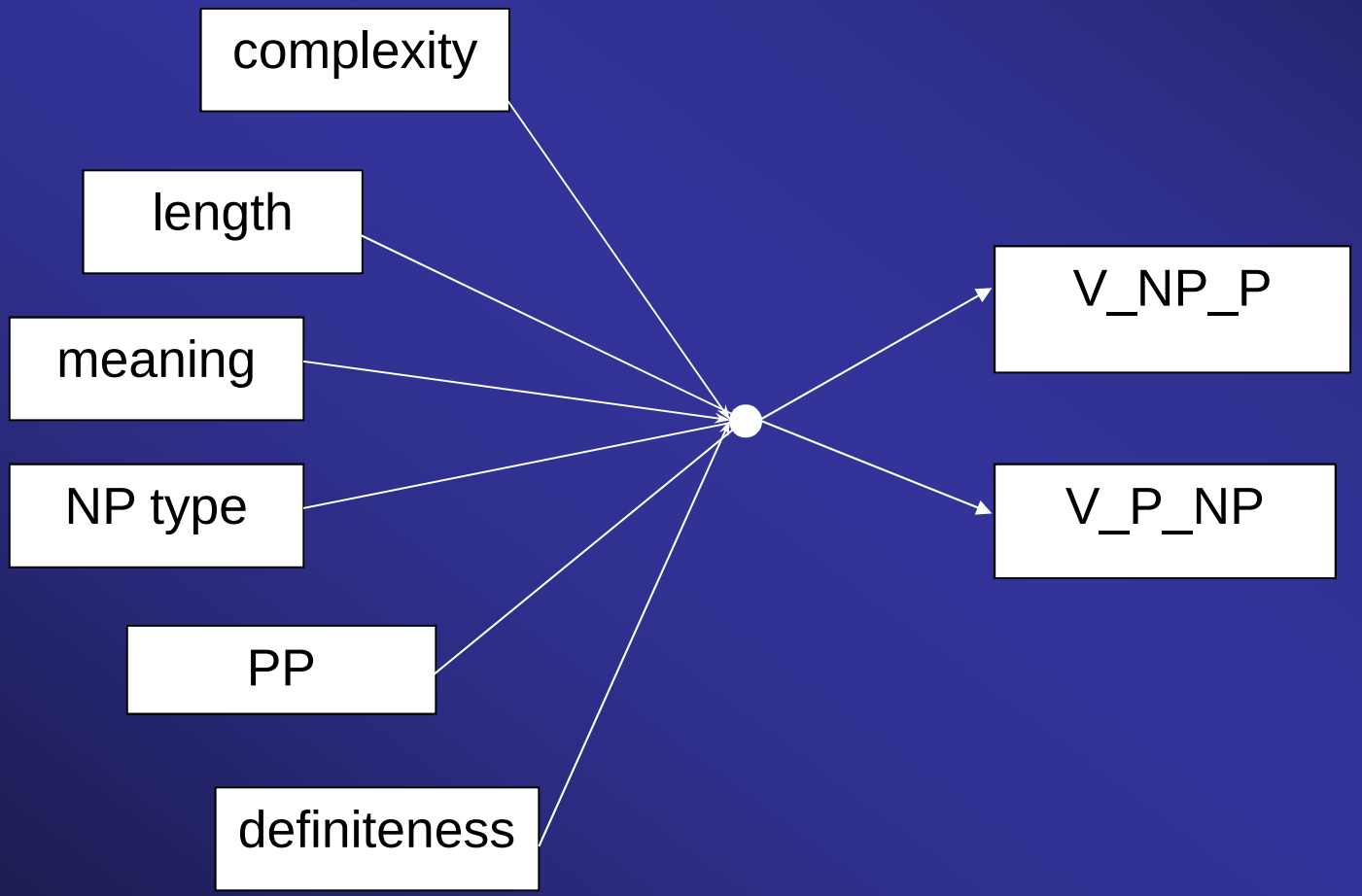
(2) Put the hat down on the table. PP

Interim summary

Four of the six factors that correlate with particle placement in adult language are also significant in early child language:

- Length of object
- Complexity of object
- NP type of object
- Meaning of particle

Multifactorial analysis



Multifactorial analysis

Factor	Odds ratio		p value
NP type	lexical Ns vs. personal PROs	= 72.46	.001
	other PROs vs. personal PROs	= 22.04	.029
	lexical Ns vs. other PROS	= 3.29	.156
Meaning	spatial vs. non-spatial	= 7.1	.001

Effect size

Overall model:	Nagelkerkes R2 = .315
Without meaning of particle:	Nagelkerkes R2 = .223
Without NP-type	Nagelkerkes R2 = .045

Discussion

Hypothesis

The multifactorial analysis suggests that the NP type of the direct object and the meaning of the particle influence the children's decision to place the particle in a particular position.

Alternative explanation

Alternative hypothesis

Children use the verb-particle constructions they encounter in the ambient language without processing the factors that influence particle placement in adult language.

Imitation

There is no evidence that children just imitate the verb-particle constructions they encounter in the ambient language.

Route-learning

(1)	a.	Pick them up.	[Peter 2;0]
	b.	Pick up my cup.	[Peter 2;1]
(2)	a.	Turn the light on.	[Peter 2;1]
	b.	Turn on a light.	[Peter 2;0]
(3)	a.	Don’t take a wheels off.	[Peter 2;0]
	b.	Take off wheels.	[Peter 2;0]
(4)	a.	I can blow it up.	[Eve 2;1]
	b.	I want blow up this.	[Eve 2;1]
(5)	a.	You wipe it up.	[Eve 2;2]
	b.	He wiping up that I spill.	[Eve 2;2]
(6)	a.	Gloria picking her up.	[Eve 2;3]
	b.	Picking up leaves.	[Eve 1;10]
(7)	a.	Put their hats on.	[Eve 2;2]
	b.	She putting on her coat.	[Eve 2;2]

Route-learning

(1)	I put them back.	[Peter 1;11]
(2)	Put it back.	[Peter 2;0]
(3)	Put a back.	[Peter 2;0]
(4)	I have to put the pen back into my pocket.	[Peter 2;0]
(5)	Put more back.	[Peter 2;0]
(6)	Put more back.	[Peter 2;0]
(7)	Put it back right there.	[Peter 2;0]
(8)	Put it back … tape right there.	[Peter 2;1]
(9)	Put a back other wheel.	[Peter 2;1]
(10)	I put a back.	[Peter 2;2]
(11)	Let me put it back	[Peter 2;2]
(12)	Let's put a back.	[Peter 1;11]

Route-learning

(1)	You put on lipstick on.	[Eve 2;1]
(2)	I do it turn on the light on.	[Peter 2;1]
(3)	Taking off one my roller skates off.	[Peter 2;3]
(4)	Turn on a light off.	[Peter 2;0]

Conclusion

Children as young as 2;0 years of age process at least some of the factors that motivate particle placement in adult language.

Children play an active role in the acquisition process and begin very early to use grammatical patterns creatively.