



## Lesion evidence

- If the RH maintains meanings not maintained by the LH, what should happen if the RH is damaged?
  - **No particular consequences if those meanings are not needed.**
- If the RH performs sense selection?
  - **Impaired comprehension of polysemous words.**

# Grindrod & Baum (2003)

Table 3  
Example of experimental stimuli

Context	Sentence prime	Visual targets	
		First meaning	Second meaning
Unbiased	Before giving it to her, he looked at the CARD (TEST)	birthday	poker
First-meaning biased	After writing a long message, he looked at the CARD (TEST)	birthday	poker
Second-meaning biased	Although trying not to cheat, he looked at the CARD (TEST)	birthday	poker

*Note.* Control words given in parentheses replaced sentence-final ambiguous words in control sentences.

- Idea: The prime sentence either disambiguates or doesn't disambiguate the final word.
- If the LH performs disambiguation and the RH maintains unbiased meanings, then LH damage should lead to overpriming and RH damage to underpriming, as compared to controls.
- Visual targets presented 0 or 750ms after the offset of the final word.
- Prime words seem to be polysemous rather than homonyms.

# Controls

Marginal priming for more frequent meaning in the longer ISI condition. No other effects.

Table 4  
Mean reaction times and standard deviations (in ms), and percentage of errors for control subjects as a function of Sentence Context, Prime Relatedness, Target Type and ISI

Target type	Unbiased		First meaning biased		Second meaning biased	
	Related	Control	Related	Control	Related	Control
	<i>0 ms ISI</i>					
First meaning						
<i>M</i>	994	1011	972	1032	997	1014
<i>SD</i>	122	145	130	140	118	117
% Error	1.3	1.3	1.3	1.0	0.7	1.3
Second meaning						
<i>M</i>	974	978	999	989	944	993
<i>SD</i>	130	117	149	129	115	126
% Error	0.3	0.3	0.0	0.3	0.0	0.0
	<i>750 ms ISI</i>					
First meaning						
<i>M</i>	995	1011	989	1010	1006	1024
<i>SD</i>	204	190	189	186	193	197
% Error	0.7	0.0	0.7	0.3	0.0	0.0
Second meaning						
<i>M</i>	1002	1005	1003	1001	973	1003
<i>SD</i>	197	193	183	193	191	182
% Error	0.7	0.3	0.0	0.0	0.3	0.3

Note. ISI, interstimulus interval.

# LH damage

Marginal priming for both meanings in the shorter ISI condition. No other effects.

Table 5  
Mean reaction times and standard deviations (in ms), and percentage of errors for nonfluent aphasic subjects as a function of Sentence Context, Prime Relatedness, Target Type and ISI

Target type	Unbiased		First meaning biased		Second meaning biased	
	Related	Control	Related	Control	Related	Control
<i>0 ms ISI</i>						
First meaning						
<i>M</i>	1171	1212	1184	1231	1203	1193
<i>SD</i>	252	275	288	326	315	279
% Error	3.4	3.4	1.9	3.1	2.8	4.4
Second meaning						
<i>M</i>	1157	1198	1167	1201	1176	1181
<i>SD</i>	272	328	287	306	289	295
% Error	3.1	2.5	2.8	1.6	3.1	1.6
<i>750 ms ISI</i>						
First meaning						
<i>M</i>	1202	1185	1200	1219	1216	1219
<i>SD</i>	218	206	251	216	194	230
% Error	3.8	3.8	3.4	4.1	3.8	4.7
Second meaning						
<i>M</i>	1202	1205	1229	1203	1213	1193
<i>SD</i>	221	212	195	198	218	195
% Error	1.6	3.4	2.8	3.4	2.8	2.8

Note. ISI, interstimulus interval.

Priming for the first meaning in both ISI conditions.

## RH damage

Table 6

Mean reaction times and standard deviations (in ms), and percentage of errors for right hemisphere-damaged subjects as a function of Sentence Context, Prime Relatedness, Target Type and ISI

Target type	Unbiased		First meaning biased		Second meaning biased	
	Related	Control	Related	Control	Related	Control
<i>0 ms ISI</i>						
First meaning						
<i>M</i>	1016	1046	993	1019	1013	1040
<i>SD</i>	210	211	206	228	201	210
% Error	1.1	1.5	0.4	1.5	0.8	0.4
Second meaning						
<i>M</i>	1036	1038	1032	1020	1021	1014
<i>SD</i>	213	211	201	230	223	215
% Error	1.5	1.9	1.1	1.1	1.5	1.5
<i>750 ms ISI</i>						
First meaning						
<i>M</i>	1038	1071	1042	1050	1075	1084
<i>SD</i>	183	196	187	205	186	187
% Error	2.6	3.7	3.0	3.0	3.7	3.0
Second meaning						
<i>M</i>	1026	1028	1081	1059	1021	1049
<i>SD</i>	181	194	199	184	173	190
% Error	1.9	1.5	2.2	2.6	1.9	3.0

Note. ISI, interstimulus interval.

Priming for the more frequent meaning in both ISI conditions.

## Controls

Table 4  
Mean reaction times and standard deviations (in ms), and percentage of errors for control subjects as a function of Sentence Context, Prime Relatedness, Target Type and ISI

Target type	Unbiased		First meaning biased		Second meaning biased	
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Note. ISI, interstimulus interval.

# LH damage

Significant priming for the the first meaning and marginal priming for the second meaning in the short ISI condition. No priming when ISI is long.

Table 5  
Mean reaction times and standard deviations (in ms), and percentage of errors for nonfluent aphasic subjects as a function of Sentence Context, Prime Relatedness, Target Type and ISI

Target type	Unbiased		First meaning biased		Second meaning biased	
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% Error	1.6	3.4	2.8	3.4	2.8	2.8

Note. ISI, interstimulus interval.

No priming.

## RH damage

Table 6

Mean reaction times and standard deviations (in ms), and percentage of errors for right hemisphere-damaged subjects as a function of Sentence Context, Prime Relatedness, Target Type and ISI

Target type	Unbiased		First meaning biased		Second meaning biased	
	Related	Control	Related	Control	Related	Control
<i>0 ms ISI</i>						
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Note. ISI, interstimulus interval.

## Priming for the second meaning for both ISIs.

# Controls

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Mean reaction times and standard deviations (in ms), and percentage of errors for control subjects as a function of Sentence Context, Prime Relatedness, Target Type and ISI

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	Related	Control	Related	Control	Related	Control
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Note. ISI, interstimulus interval.

No priming.

## LH damage

Table 5

Mean reaction times and standard deviations (in ms), and percentage of errors for nonfluent aphasic subjects as a function of Sentence Context, Prime Relatedness, Target Type and ISI

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% Error	1.6	3.4	2.8	3.4	2.8	2.8

Note. ISI, interstimulus interval.

## RH damage

Marginal priming for the *first* meaning in the short ISI condition. Marginal priming for the second meaning in the long ISI condition.

Table 6

Mean reaction times and standard deviations (in ms), and percentage of errors for right hemisphere-damaged subjects as a function of Sentence Context, Prime Relatedness, Target Type and ISI

Target type	Unbiased		First meaning biased		Second meaning biased	
	Related	Control	Related	Control	Related	Control
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% Error	1.9	1.5	2.2	2.6	1.9	3.0

Note. ISI, interstimulus interval.

# Summary

A lack of an interference effect in LHD subjects. Second meaning not active in RHD subjects

Target type	Unbiased		First meaning biased		Second meaning biased	
	Related	Control	Related	Control	Related	Control
	<i>0 ms ISI</i>					
First meaning	<b>LHD, RHD</b>		<b>NBD, LHD</b>		<b>RHD</b>	
<i>M</i>						
<i>SD</i>						
% Error						
Second meaning	<b>LHD</b>		<b>LHD</b>		<b>NBD</b>	
<i>M</i>						
<i>SD</i>						
% Error						
First meaning	<b>RHD</b>		<b>NBD</b>			
<i>M</i>						
<i>SD</i>						
% Error						
Second meaning					<b>NBD, RHD</b>	
<i>M</i>						
<i>SD</i>						
% Error						

Note. ISI, interstimulus interval.

# Summary

Overpriming in LHD subjects.  
Underpriming in RHD subjects.

Target type	Unbiased		First meaning biased		Second meaning biased	
	Related	Control	Related	Control	Related	Control
			<i>0 ms ISI</i>			
First meaning						
<i>M</i>	<b>LHD, RHD</b>		<b>NBD, LHD</b>		<b>RHD</b>	
<i>SD</i>						
% Error						
Second meaning						
<i>M</i>	<b>LHD</b>		<b>LHD</b>		<b>NBD</b>	
<i>SD</i>						
% Error						
First meaning						
<i>M</i>	<b>RHD</b>		<b>NBD</b>			
<i>SD</i>						
% Error						
Second meaning						
<i>M</i>					<b>NBD, RHD</b>	
<i>SD</i>						
% Error						

Note. ISI, interstimulus interval.

# Summary

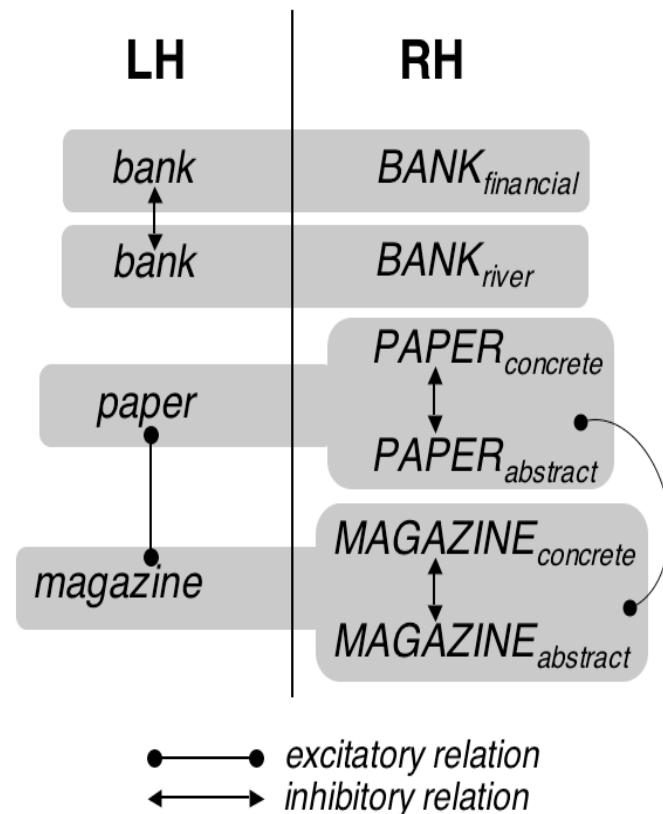
Overpriming in RHD subjects.  
Underpriming in LHD subjects.

Target type	Unbiased		First meaning biased		Second meaning biased	
	Related	Control	Related	Control	Related	Control
	<i>0 ms ISI</i>					
First meaning						
<i>M</i>	<b>LHD, RHD</b>		<b>NBD, LHD</b>		<b>RHD</b>	
<i>SD</i>						
% Error						
Second meaning						
<i>M</i>	<b>LHD</b>		<b>LHD</b>		<b>NBD</b>	
<i>SD</i>						
% Error						
First meaning						
<i>M</i>	<b>RHD</b>		<b>NBD</b>			
<i>SD</i>						
% Error						
Second meaning						
<i>M</i>					<b>NBD, RHD</b>	
<i>SD</i>						
% Error						

Note. ISI, interstimulus interval.

# Compatible with the RH sense selection hypothesis?

- According to these results, the less frequent sense of a word cannot prime a semantic relative in RHD subjects.
- Makes sense if the less dominant sense representation is stored in the RH and the priming is RH mediated.
- This is very different from saying that the RHD subjects “cannot use context” (G&B).





## Issues

- No overlap in lesion location.
- LH damaged subjects described as nonfluent aphasics, i.e., Broca's, which would be interesting if they had damage to Broca's area, but only some of them do.
- Lots of between-subjects variance -- if lesion site predictive of effect types?

**Table 1**  
Summary of nonfluent aphasic subjects' background information

Patient	Age (years)	Education <sup>a</sup> (years)	Sex	Etiology	Lesion site <sup>b</sup>	MPO	BDAE AC <sup>c</sup> (Mean %ile)	BNT (60)	PAL	
									SWPM (32)	ASC (40)
1	72	12	F	I	L parietal	80	89	53	32	40
2	80	9	M	H	L frontal	57	89	55	30	34
3	76	12	M	I	L MCA distribution	51	84	n/a	27	28
4	52	14	M	I	L parietal	148	90	45	32	32
5	68	9	F	H	L frontal-temporal-parietal	80	60	15	32	27
6	83	8	F	n/a	n/a	77	83	39	31	31
7	48	15	F	I	L frontal-parietal	102	88	43	31	36
8	74	16	M	I	L MCA distribution	35	15	18	32	37
9	73	12	M	I	L temporal-parietal	120	93	n/a	31	35
10	82	12	F	I	L MCA distribution	16	84	24	30	35
11	68	11	F	I	L frontal-parietal	60	83	18	32	30
<i>M</i>	70.55	11.82				75.09	78.00	34.44	30.91	33.18
<i>SD</i>	11.36	2.52				37.87	22.64	15.81	1.51	3.97

*Note.* H, hemorrhage; I, ischemic infarct; MCA, middle cerebral artery; MPO, months post-onset; n/a, information not available.

<sup>a</sup>Best estimated conversion into years, based on information from subject (e.g., 2 years college, high school).

<sup>b</sup>Established based on CT/MRI scan and/or neurological reports.

<sup>c</sup>Mean of percentiles on four auditory comprehension subtests of the BDAE.

**Table 2**  
Summary of right-hemisphere-damaged subjects' background information

Patient	Age (years)	Education <sup>a</sup> (years)	Sex	Etiology	Lesion site <sup>b</sup>	MPO	TLC-E (adapted)		PAL ASC (40)
							Figurative (10)	Inferences (10)	
1	60	13	F	H	R PCA distribution	129	8	10	40
2	66	13	F	H	R basal ganglia (subcortical)	69	n/a	n/a	n/a
3	43	9	F	I	R MCA distribution	52	6	4	36
4	88	11	M	H	n/a	48	7	6	38
5	34	13	F	I	R MCA distribution	67	9	10	38
6	71	14	M	H	R thalamus (subcortical)	52	6	7	37
7	72	12	M	n/a	R parietal	58	9	8	39
8	79	11	M	I	R temporal-parietal	45	7	7	37
9	63	12	M	n/a	n/a	7	7	6	35
<i>M</i>	64.00	12.00				58.56	7.38	7.25	37.50
<i>SD</i>	16.87	1.50				31.98	1.19	2.05	1.60

*Note.* H, hemorrhage; I, Ischemic infarct; MCA, middle cerebral artery; MPO, months post-onset; n/a, information not available; PCA, posterior cerebral artery.

<sup>a</sup>Best estimated conversion into years, based on information from subject (e.g., 2 years college, high school).

<sup>b</sup>Established based on CT/MRI scan and/or neurological reports.

## Our LH sources



## Our RH sources

