

Finding evidence of Deductive and Abductive Reasoning abilities: an experiment with Lateral-Brain-Damage patients

Franco Salvetti*[#], Nicolas Nicolov*

CogSci July 26-29, 2006

* Umbria Inc., [#] Dept. of Computer Science – University of Colorado at Boulder

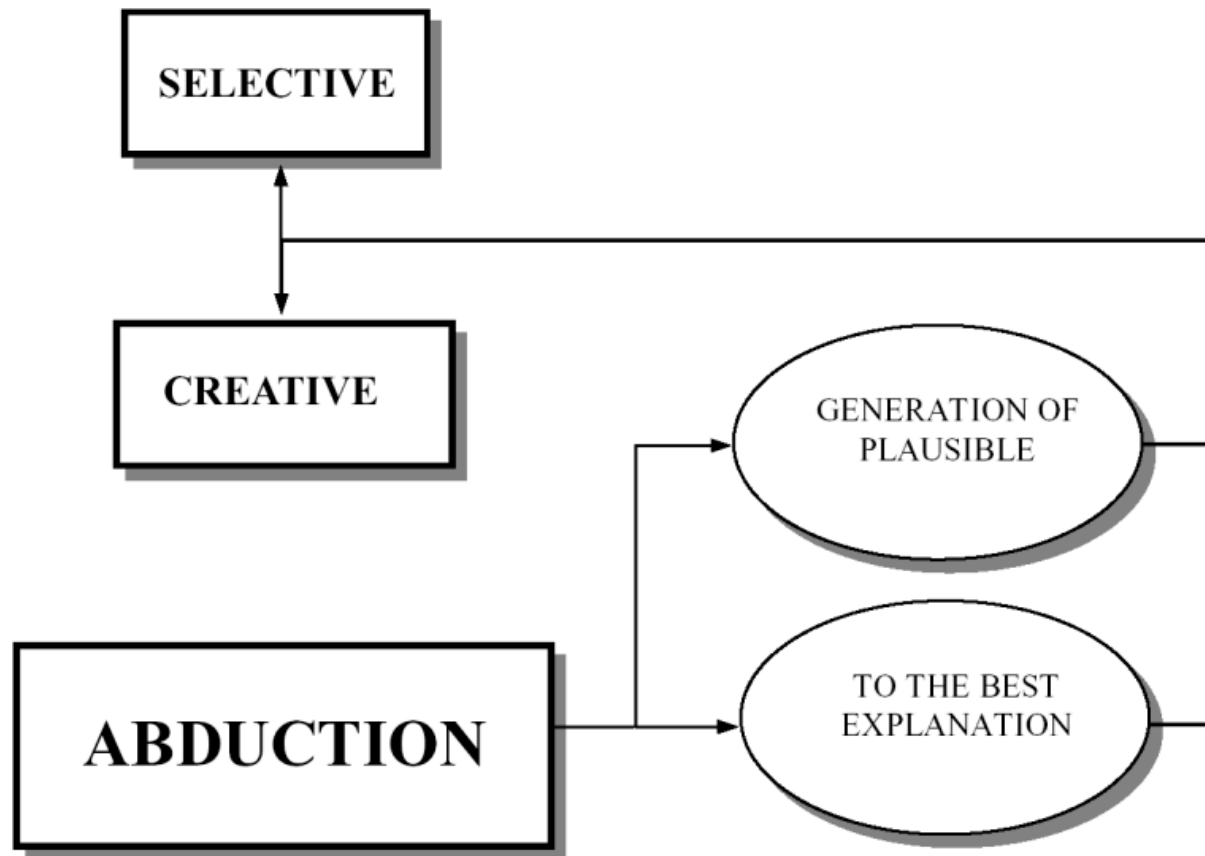
Agenda

- Brain damage
- Reasoning
- Data analysis
- Conclusions

Left and Right Hemisphere Patients

- Left Hemisphere – aphasia
- Right Hemisphere

Creative Reasoning

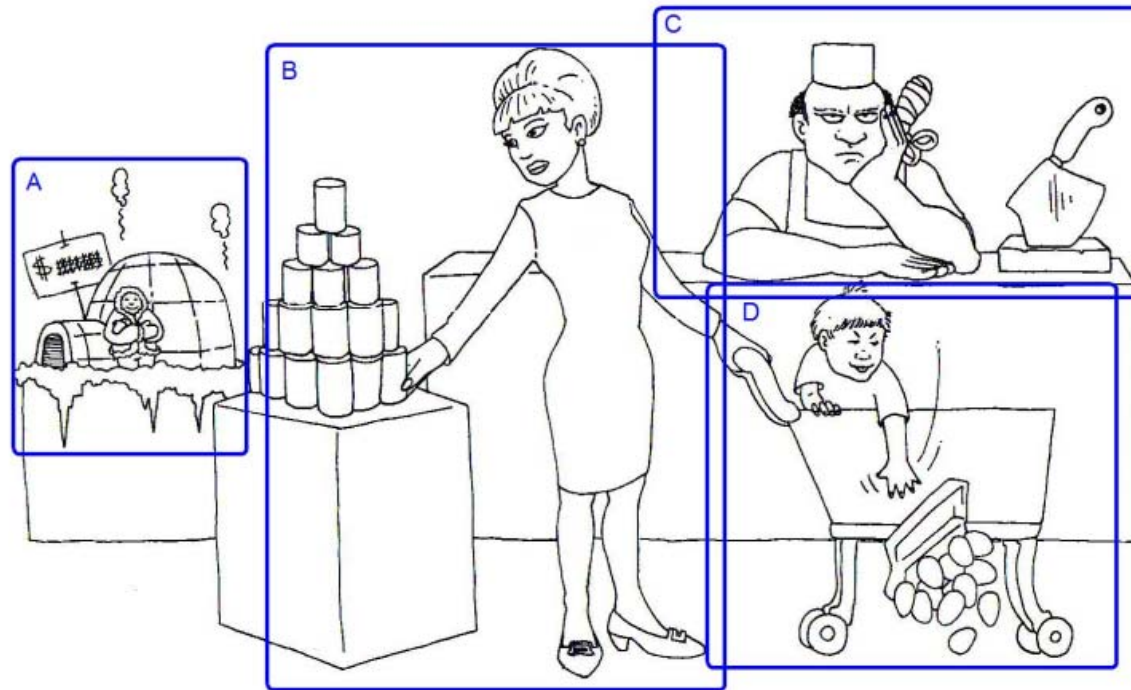


Salvetti and Nicolov – *Finding evidence of Deductive and Abductive Reasoning abilities: an experiment with Lateral-Brain-Damage patients.*

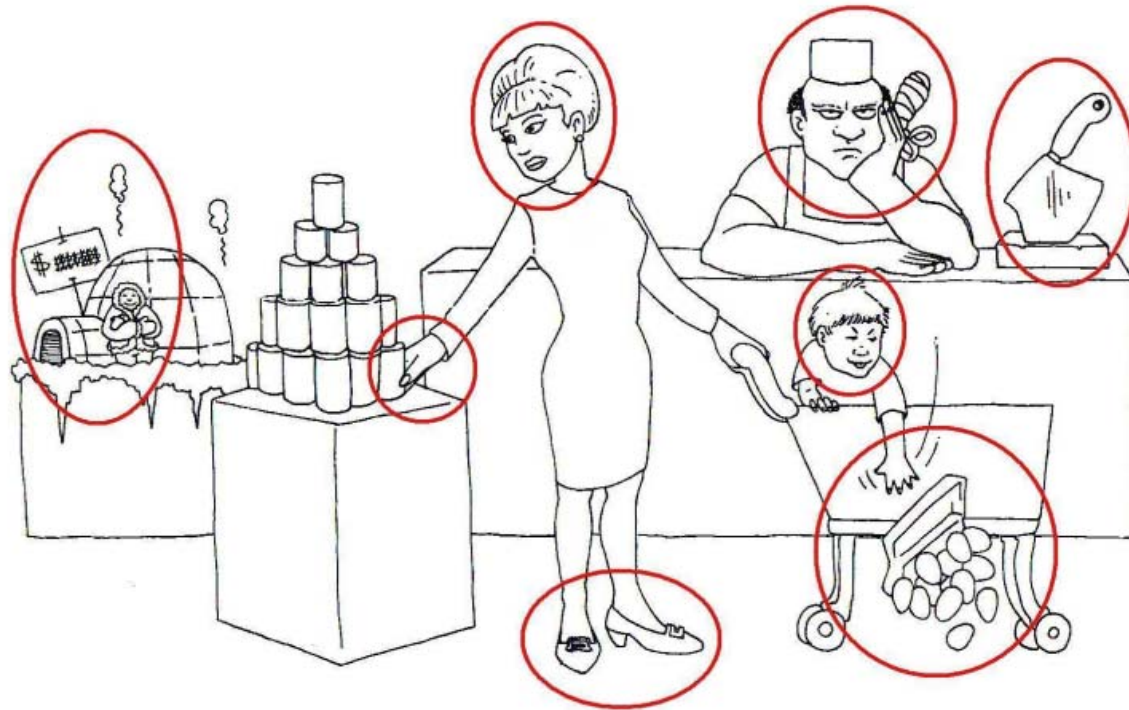
*“I have a picture here. As you see, there’s
a lot going on.
Look it over and tell me about it.”*



4 scenes. . .



. . . many details

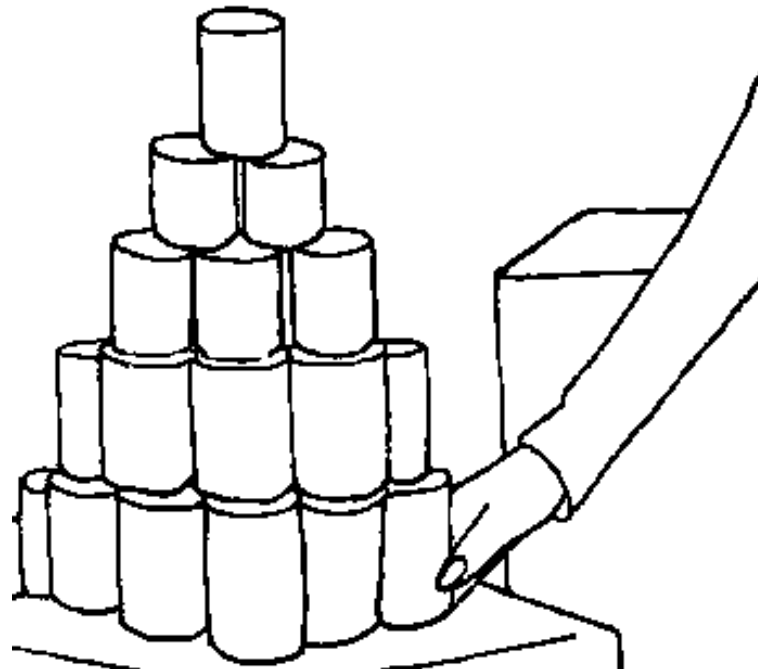


Salvetti and Nicolov – *Finding evidence of Deductive and Abductive Reasoning abilities: an experiment with Lateral-Brain-Damage patients.*

“The butcher cut his thumb with the cleaver.”



“The lady is going to make the cans fall.”



“Probably a special display for ice cream.”

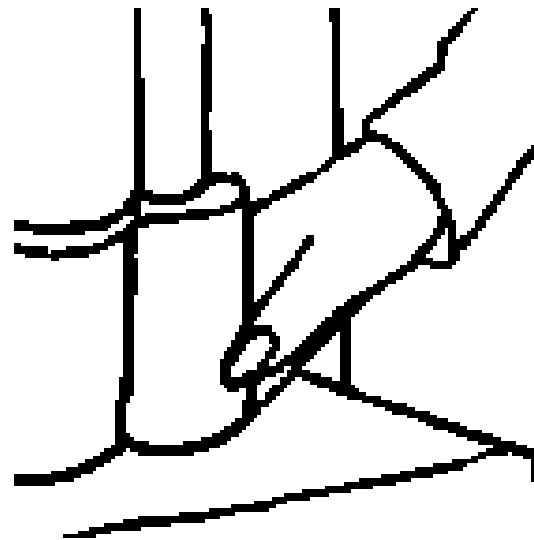


Lexical Evidence of Reasoning

- Only reasoning about the picture will be labeled
- Prediction is future and explanation is past



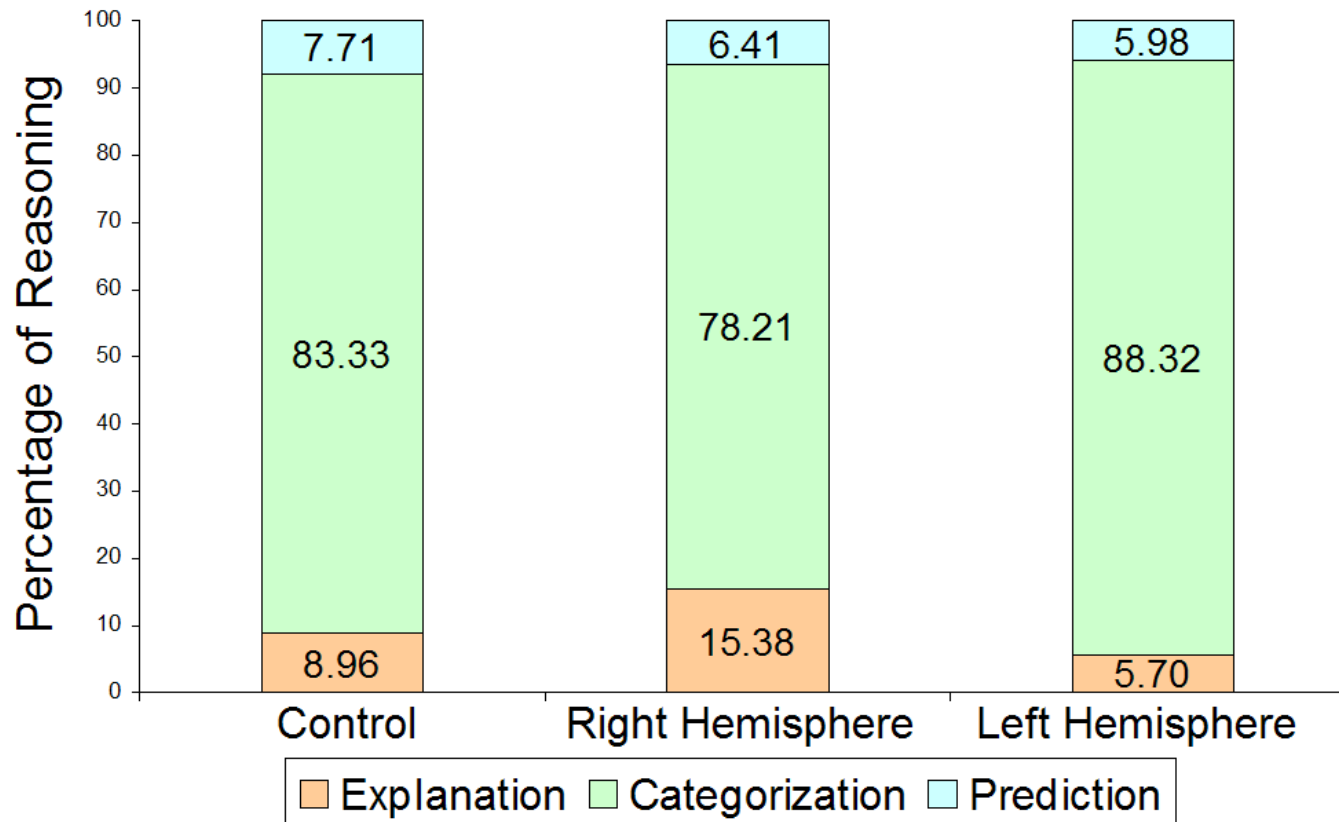
Telicity: *Pulling, taking, reaching for a can.*



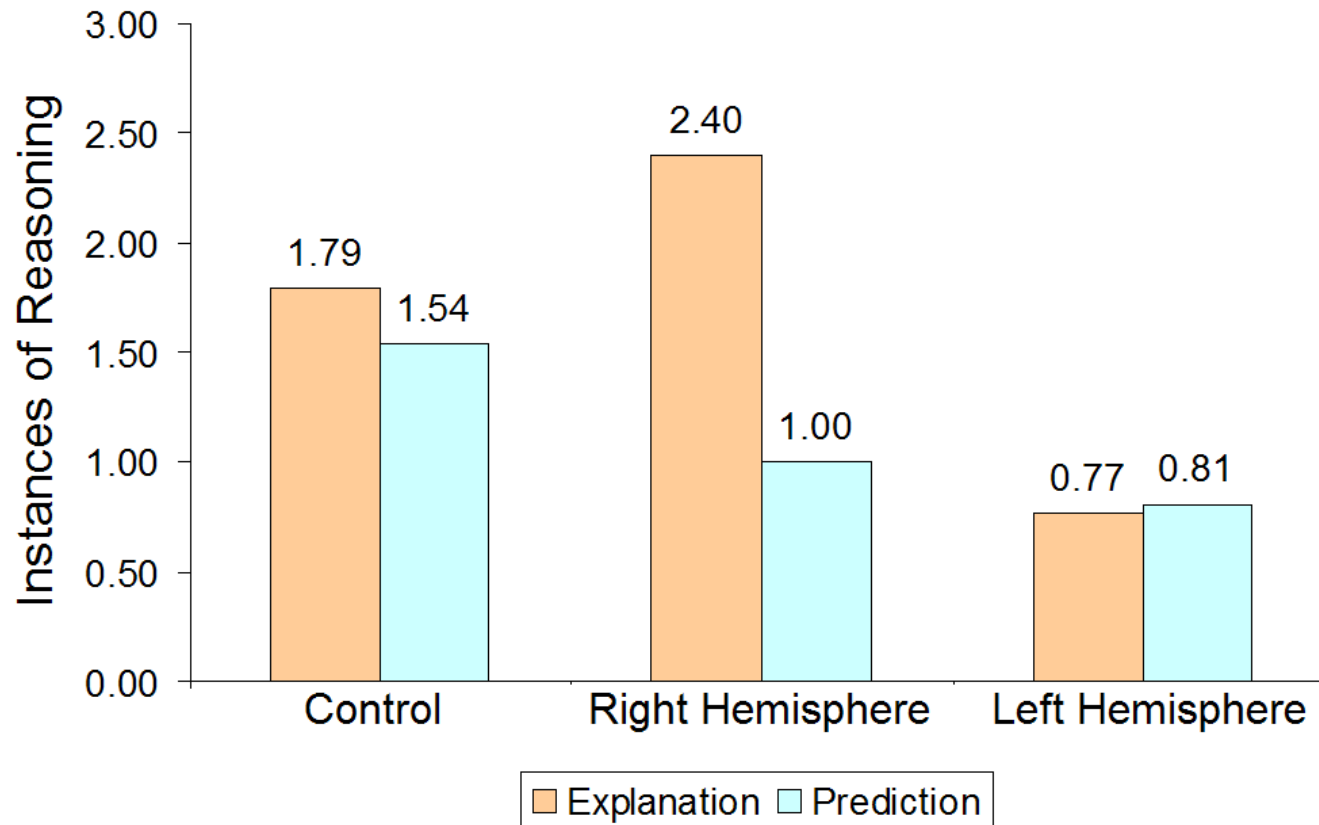
Results: Left Hemisphere Patients

Patient ID	Word Count.	Exp.	Cat.	Pre.
000001	90.00	3.00	17.00	4.00
044033	93.00	0.00	13.00	2.00
080007	111.00	0.00	16.00	0.00
⋮	⋮	⋮	⋮	⋮
sum	1960.00	20.00	310.00	21.00
mean	75.38	0.77	11.92	0.81
std.dev	67.43	1.07	7.25	1.10

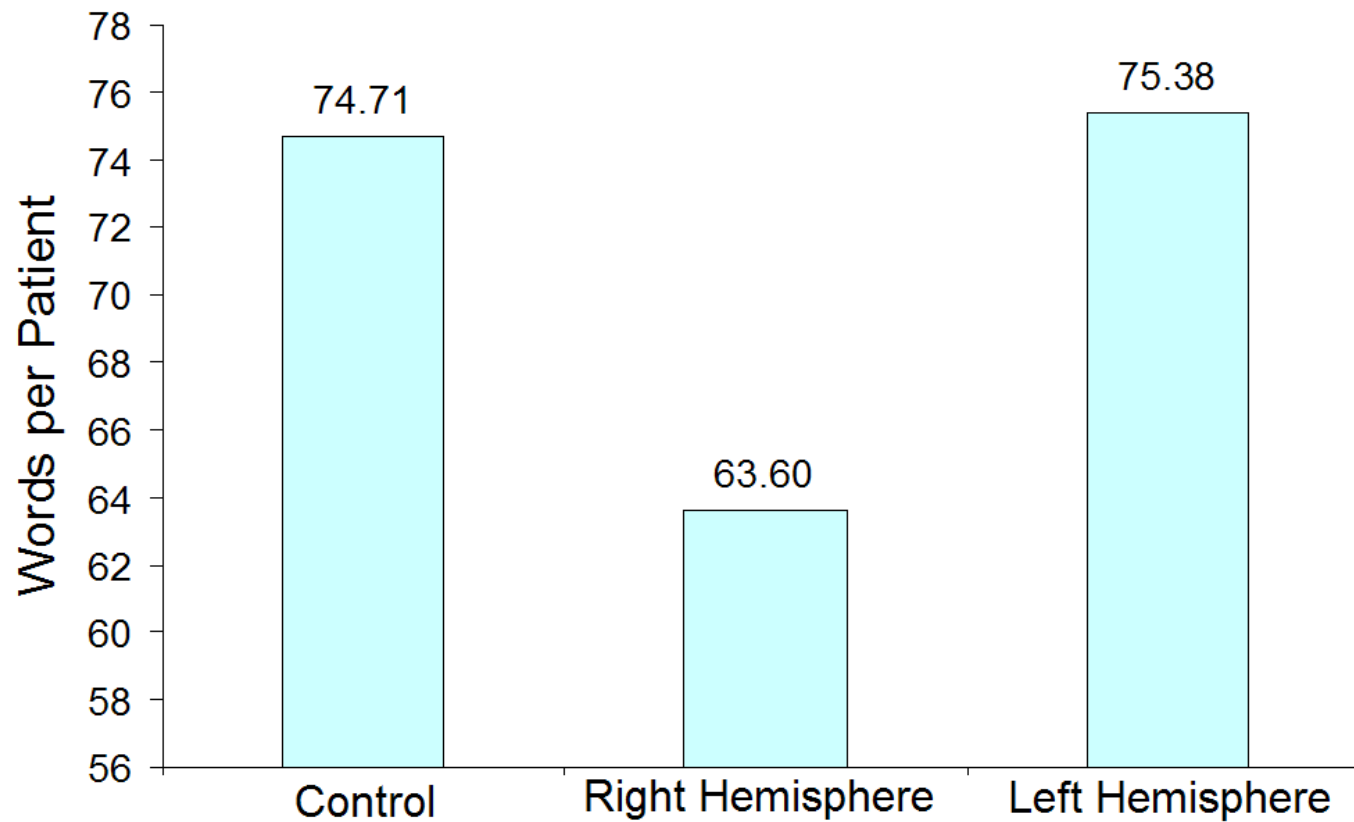
Percentage of reasoning per group



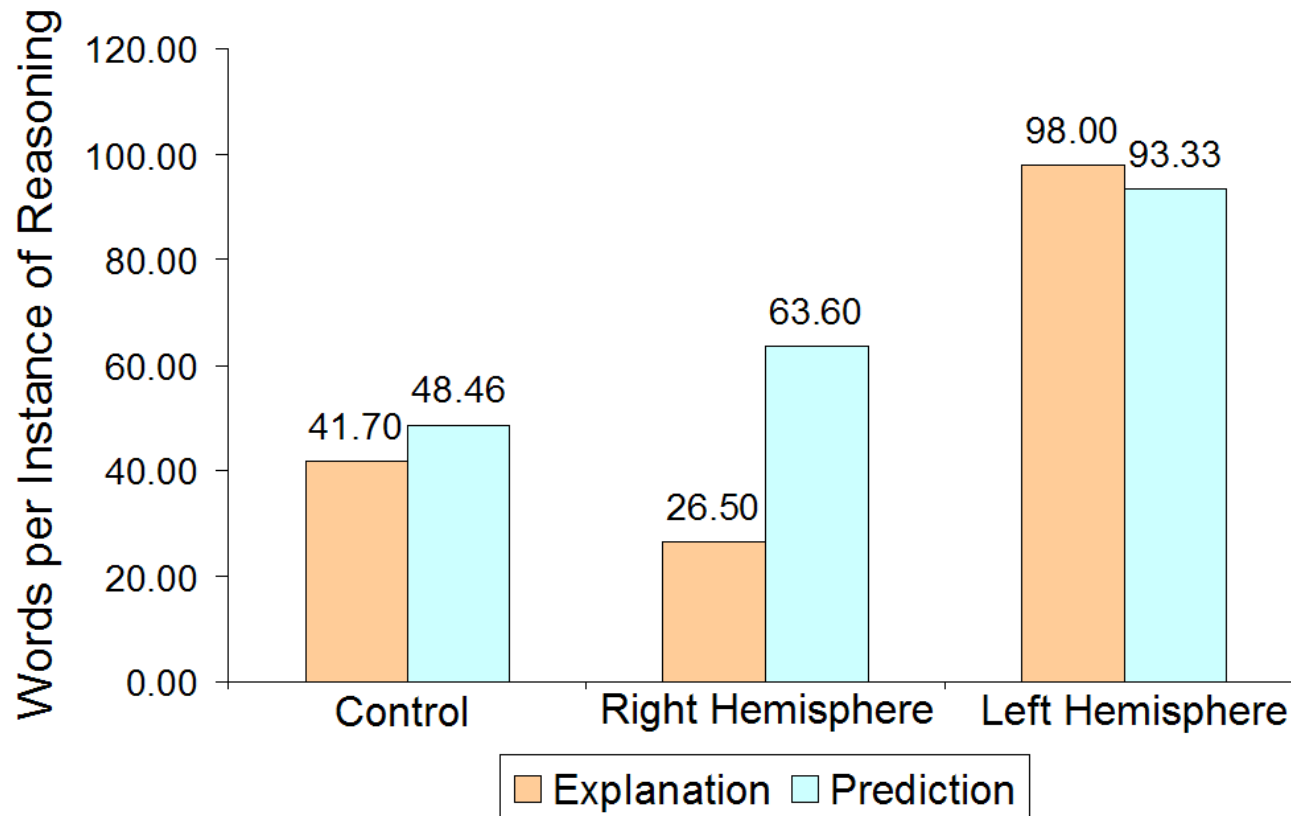
Explanation and Prediction per Patient



Results: Words per Patient



Results: density of Reasoning



Conclusions

- Right Hemisphere best in “creative” reasoning
- Association of Right Hemisphere and creativity might need to be re-examined
- Aphasic perform fewer linguistic instances of reasoning

Acknowledgments

The authors wish to thank Anna Clark, Stephen Lewis, Alessandro Provetti, James H. Martin, Gail Ramsberger, Lise Men, Clayton Lewis, and Carolyn Rickard.

Questions . . .

Salvetti and Nicolov – *Finding evidence of Deductive and Abductive Reasoning abilities: an experiment with Lateral-Brain-Damage patients.*

. . . thank you.