Semantic Development in Toddlers with Language Delays: Effects of a Parent-Implemented Language Intervention

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Background

Rationale

Children with delayed language development show less-structured semantic networks (Beckage, Smith, & Hills, 2011). We have shown that the variability in the structure of children's early vocabularies has predictive power in forecasting children's later language development (Curtis, Beckage, McWeeny, & Roberts, 2017). However, the impact this early structure has on the efficacy of early language intervention is not known.

Research Questions

How does the semantic structure of children's early vocabulary impact the outcome of language therapy?

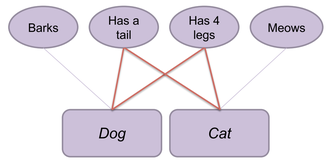
Hypothesis

Children who have more organized semantic networks will have larger gains, compared to children with less organized semantic networks.

Creation of Semantic Networks

Materials

- Children's parent-reported vocabulary from the MCDI
- McRae feature norms (McRae, Cree, Seidenberg, & McNorgan, 2005



Method

- Bipartite (two-mode) networks were created using the tnet package in R (Opsahl, 2009). The two-mode global clustering coefficient (Opsahl, 2013) was used as a measure of semantic structure.
- Each child's score was compared to a 'random-acquisition graph' (Beckage, Smith, & Hills, 2011)

Analyses

Main Analyses

For each measure of expressive language development, a regression analysis was run. An interaction term between baseline semantic score and intervention status was included to model whether intervention changes the influence of baseline semantic organization on later language development:

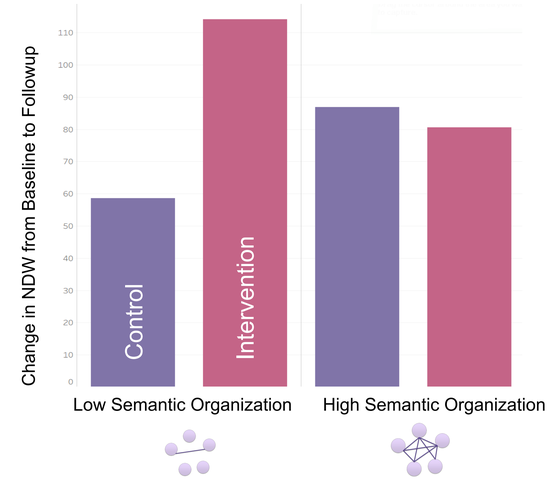
Regression Equation

Y = BaselineLanguage + MCDI Raw Score + Age + SemanticOrganizationCoefficient * Intervention

Planned Follow-up Analyses

Follow-up regressions were run to probe the effect of semantic organization in both groups separately

Results: Graphical Representation



Methods

Participants

54 children with mixed receptive-expressive language delays were recruited (see Table 1). Children were randomized to either a "business-as-usual" control group, or an intervention group. Full study details can be found in Roberts and Kaiser (2015).

Measures

MacArthur-Bates Communicative Development Inventory (MCDI): A parent-report measure of children's expressive vocabulary.

Expressive One-Word Picture Vocabulary Test: a standardized measure of expressive language, in which children name pictured items.

Language Sample: Number of Different Words. Children participated in a 20-minute play-based interaction with an examiner. The number of different word roots that children produced was coded.

Intervention

Enhanced Milieu Teaching (EMT). Parents of children in the intervention condition received 24 sessions of EMT. In this intervention, parents are taught a group of language facilitation strategies to encourage and enhance their children's communication.

Measurement Structure

Measures were given at baseline and one year after the end of the intervention ("Follow-Up").

Table 1. Participants Baseline Characteristics

Variable	Control	Intervention
N	28	24
Age (Months)	31.32 (5.11)	32.07 (4.97)
Gender	82	79
Bayley Expressive Scaled Score	5.32 (1.16)	4.96 (1.12)
Bayley Receptive Scaled Score	6.11 (1.47)	5.71 (1.60)

Results: Regression Analyses

Main Regressions

Analyses revealed significant interactions between Intervention Status and Baseline Semantic Organization for all three outcome variables. Follow-up regressions were performed.

Table 2. Effect of Semantic Clustering: intervention group

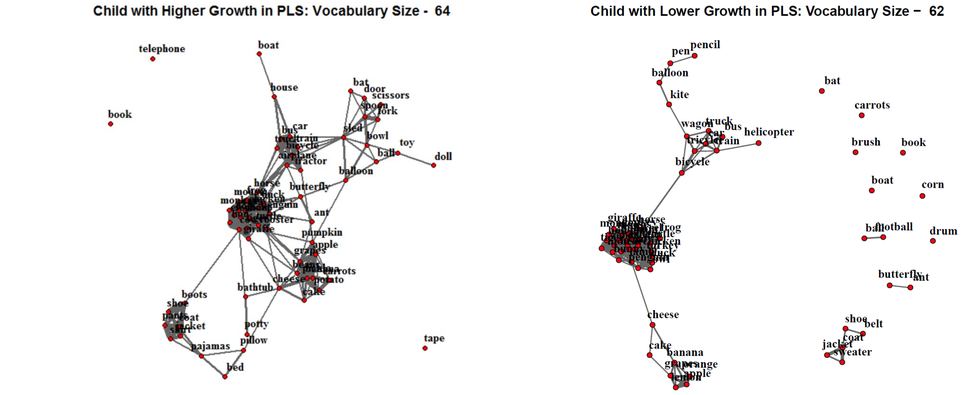
Baseline Variable	Follow-Up PLS-4 Expressive Score	Follow-Up EOW Score	Follow-Up NDW
Baseline Semantic Clustering Score	B(SE) -13.723 (5.932)* β = -0.584	ns	ns
Baseline PLS-4 Expressive Score	ns	N/A	N/A
Baseline EOW Score	N/A	ns	N/A
Baseline NDW	N/A	N/A	ns

Table 3. Effect of Semantic Clustering: control group

Baseline Variable	Follow-Up PLS-4 Expressive Score	Follow-Up EOW Score	Follow-Up NDW
Baseline Semantic Clustering Score	16.83 (4.22) ** β = 0.602	20.87 (7.93) * β = 0.495	61.39 (25.11) * β = 0.451
Baseline PLS-4 Expressive Score	1.73 (0.53) ** β = 0.741	N/A	N/A
Baseline EOW Score	N/A	*ns*	N/A
Baseline NDW	N/A	N/A	*ns*

Figure 1. Example Baseline Semantic Networks

One-mode, weighted projections of semantic networks



Conclusions and Limitations

Conclusions

- In the control group, children with high semantic organization at baseline had better long-term outcomes
- Intervention was especially helpful for children with low semantic organization at baseline

Limitations

- This was a relatively small sample size
- Only children's *expressive* vocabularies were modeled
- Receptive semantic processing was not available

References

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More Information

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Conflict of Interest

Philip R Curtis reports no conflicts of interest
Ann Kaiser reports no conflicts of interest
Megan Roberts reports to conflicts of interest