



Language Change as a Predictor of Stuttering Persistence or Recovery

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ABSTRACT

Language factors were analyzed to determine the effect of language on the development of stuttering, specifically in regards to stuttering persistence or recovery. Thirty-four children were participants in this study (20 recovered children who stutter-RCWS, and 14 persistent children who stutter-PCWS) and were administered various standardized assessments and a spontaneous language sample was elicited at an initial visit within 1 year of stuttering onset, and again one year later. Results indicate some differences between the two stuttering groups in regards to Peabody Picture Vocabulary-III (PPVT-III), and mean length of utterance (MLU-z). Logistic regression analysis was used to determine if any linguistic variables were significant in predicting placement in the categorical dichotomous group of persistence or recovery. PPVT-III was the only significant predictor. Conclusions are discussed in the context of previous research findings and clinical implications.

INTRODUCTION

- Three themes have come to light in the research of how language skills affect the development of stuttering after its onset:
 - CWS may have precocious language skills (Ryan, 2001; Watkins, 2005; Watkins & Yairi, 1997; Watkins, Yairi, & Ambrose, 1999; Yairi, Ambrose, Paden, & Throneburg, 1996).
 - The language skills of PCWS and RCWS may be different close to the onset of stuttering (Häge, 2001; Watkins & Yairi, 1997; Yairi, Ambrose, Paden, & Throneburg, 1996).
 - Language paths may be different for those whose stuttering persists and those whose stuttering recovers (Watkins, 2005; Watkins & Yairi, 1997).
- While themes have emerged, research findings have been inconsistent in the areas of: presence of language differences between the two groups, which group has the higher language skills, and how differences in language skills develop over time between the two groups (e.g., Kloth, Kraaimatt, Janssen, & Bruten, 1999; Watkins, 2005; Watkins & Yairi, 1997).
- Investigating the relationship between language skills and persistence and recovery of stuttering is supported by theoretical frameworks, as well as ensuring linguistic information is being interpreted appropriately for clinical decision making.
- The purpose of this longitudinal investigation is to provide additional information regarding the differences between language skills close to the onset of stuttering, and how language changes in children who persist or recover from stuttering.

RESEARCH QUESTIONS

1. Can language skills close to onset provide predictive information as to the eventual recovery from or persistence in early childhood stuttering?
2. Is there a presence of dissociations close to the onset of stuttering, and do these dissociations hold any predictive value as to the eventual course of stuttering?
3. Can the changes in language skills over time provide information as to a child's stuttering persistence or recovery?

HYPOTHESES

- Language scores would predict eventual persistence or recovery from developmental stuttering.
- The presence of dissociations close to onset would be predictive of stuttering persistence.
- Over time, changes in language skills would predict eventual persistence of or recovery from stuttering.

METHOD

- PARTICIPANTS
 - 20 participants classified as recovered from stuttering (59%).
 - 14 participants classified as persistent in stuttering (41%).
 - Differences were not observed between the two groups regarding gender or maternal education level.
 - The PCWS were significantly older at visits 1 (mean PCWS = 45.86, RCWS = 37.55) and 2 (mean PCWS = 58.43, RCWS = 50.35).
- PROCEDURES
 - Each child was administered the following assessments at an initial visit (T1) within 12 months of stuttering onset and one year after the initial visit (T2):
 - Spontaneous language sample
 - Peabody Picture Vocabulary Test-III (PPVT-III)
 - Expressive Vocabulary Test (EVT)
 - From these measures, the following information was derived for both T1 and T2:
 - MLU-z
 - Standard scores for PPVT-III and EVT
 - The difference between PPVT-III and EVT standard scores
 - Changes in scores from T1 to T2 were calculated for the following:
 - MLU-z (T2-T1)
 - PPVT-III and EVT (T2-T1)
 - The difference between PPVT-III and EVT (T2-T1)
- DATA ANALYSIS
 - Mean group differences were calculated to determine if language skills were different in RCWS and PCWS.
 - Logistic regression analysis was used to determine if any independent predictor variables listed were significant in predicting placement in the categorical dichotomous variable of persistence or recovery, while controlling for age.

RESULTS

Table 1. Mean scores for language assessments for persistent and recovered CWS.

Variable	Persistent (n=14)		Recovered (n=20)		p
	M	SD	M	SD	
PPVTIII-1	96.36	13.99	106.60	8.65	.025*
EVT-1	105.36	10.96	109.68	11.24	.278
MLUz-1	-7.99	.71	-1.62	.81	.046*
PPVT-EVT-1	-9.0	10.60	-3.74	9.67	.148
PPVT-III-2	103.38	17.54	112.20	10.93	.084
EVT-2	106.43	15.40	112.95	11.02	.159
MLUz-2	-1.20	.95	-.47	.71	.036*
PPVT-III-EVT-2	-1.54	14.64	-.75	10.47	.858
PPVT-III Change	6.77	11.93	5.60	9.05	.751
EVT Change	1.07	12.33	1.95	11.43	.835
MLU Change	-.487	1.21	-.29	.64	.601

Table 2. Adjusted odds ratios of factors related to persistence and recovery of CWS

Factor	Adjusted Odds Ratio (95% CI)	p
PPVT-III-1 ¹	.922 (.852 to .997)	.041*
EVT-1 ¹	.957 (.899 to 1.030)	.242
MLUz-1 ¹	.402 (.114 to 1.414)	.155
PPVT-III-EVT-1 ¹	.951 (.881 to 1.027)	.201
PPVT-III-2	.949 (.888 to 1.015)	.127
EVT-2	.974 (.914 to 1.037)	.407
MLUz-2	.354 (.112 to 1.125)	.078
PPVT-III-EVT-2	.977 (.912 to 1.046)	.506
PPVT-III Change	1.014 (.939 to 1.096)	.718
EVT Change	1.015 (.948 to 1.087)	.664
MLU Change	.727 (.283 to 1.867)	.508

¹ = controlling for age at time 1 (the remainder were controlled for age at time 3)
* = p < .05

DISCUSSION

The results from mean group differences show that the persistent children who stutter have significantly different PPVT-III and MLU-z scores at T1 and significantly different MLU-z scores at T2. For all three variables, the scores were lower for the PCWS. This result is even more interesting when the increased age of the persistent children who stutter at both visits is considered. Only small dissociations were observed at T1 (higher EVT scores), and the amount of difference in PPVT-III and EVT scores between the two groups was not significant.

Both groups had mean scores that fell within 1SD of the mean on standardized assessments of vocabulary (PPVT-III and EVT). MLU-z scores fell below the mean for both groups, and at both visits, as evidenced by negative z-scores. All scores, however fell within 1.5SD.

Results from the logistic regression model showed that the PPVT-III score at T1 significantly contributed to membership in the persistent group. The adjusted odds ratio showed that a 1 point increase in PPVT-III is significantly associated with an 8% decrease in the predicted odds of being a PCWS. Stated differently, as the PPVT-III scores increase, an individual is more likely to be classified as recovered from stuttering. Additional variables in the model were not significant in predicting persistence or recovery, including those that considered changes in language factors over time.

These results do not appear consistent with research that shows precocious language skills are associated with the presence of stuttering (Ryan, 2001; Watkins, 2005; Watkins & Yairi, 1997; Watkins, Yairi, & Ambrose, 1999; Yairi, Ambrose, Paden, & Throneburg, 1996). There is some support, however, to the idea that the language skills of PCWS and RCWS are different in regards to receptive vocabulary and expressive language close to stuttering onset and one year later, with the PCWS having lower scores (although still within normal limits). Additionally, language skills over time were not statistically different between groups as evidenced by a similar increase in PPVT-III and EVT, and a slight decrease in MLU-z scores over time.

Clinically, these results do not point to a strong relationship between language skills at onset and their subsequent change over time, and eventual persistence or recovery from stuttering. Additional research is needed to develop a better understanding of how language skills can contribute to clinical decisions involved in assessing and treating early childhood stuttering.

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