Validation of Language Classifications within the School Neuropsychological Conceptual Model using Exploratory Factor Analysis in a Mixed Clinical Group Sample

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These data were drawn from an archival sample of 956 mixed clinical case studies with imputed data conducted by students in the School Neuropsychology Post-Graduate Certification Program (2001 – 2010).

School Neuropsychology Conceptual Model of Language (Miller, 2007, 2010)

PHONOLOGICAL /AUDITORY PROCESSING
- CTOPP: Elision
- CTOPP: Blending Words
- NEPSY-II: Phonological Processing
- WJIII-*COG*: Incomplete Words
- WJIII-*COG*: Sound Blending
- WJIII-*ACH*: Sound Awareness

ORAL EXPRESSION
- **Oral Motor Production**
  - CTOPP: Segmenting Words
  - NEPSY-II: Repetition of Nonsense Words
- **Vocabulary Knowledge**
  - WISC-IV: Vocabulary
  - WISC-IV Integrated: Vocabulary Multiple Choice
  - WISC-IV Integrated: Picture Vocabulary
- **Verbal Fluency (Rapid Automatic Naming)**
  - CTOPP: Rapid Digit Naming
  - CTOPP: Rapid Letter Naming
  - CTOPP: Rapid Color Naming
  - CTOPP: Rapid Object Naming
  - D-KEFS: Color-Word Interference Condition 1
  - D-KEFS: Color-Word Interference Condition 2
  - NEPSY-II: Speeded Naming
  - WJIII-*COG*: Rapid Picture Naming

RECEPTIVE LANGUAGE
- WJIII-*ACH*: Oral Comprehension
- NEPSY-II: Comprehension of Instructions
- WJIII-*ACH*: Understanding Directions

Test	Factors and Related Loadings								
	1	2	3	4	5	6	7	8	9
Factor 1: Verbal Fluency Subcomponent #1									
CTOPP: Rapid Digit Naming	**.932**	.086	.087	.076	-.025	.085	-.006	.054	.042
CTOPP: Rapid Letter Naming	**.869**	-.051	.101	-.091	.044	-.008	-.016	-.008	.154
CTOPP: Elision	**.644**	.143	-.013	**.391**	.145	.076	.057	.049	-.112
Factor 2: Verbal Knowledge Applied to Phonological Processing									
NEPSY-II: Phonological Processing	.000	**.843**	-.198	-.073	-.074	-.067	-.122	.160	.049
WISC-IV Int: Vocabulary Multiple Choice	.280	**.770**	-.128	-.099	.110	-.068	.264	-.063	.146
WISC-IV Int: Picture Vocabulary	-.252	**.617**	.224	.181	.054	.040	**.378**	-.053	-.091
CTOPP: Blending Words	.171	**.544**	.222	.198	**.443**	-.031	.123	.126	-.217
Factor 3: Verbal Fluency Subcomponent #2 (with increased semantic demands)									
CTOPP: Rapid Color Naming	-.045	-.117	**.877**	-.237	.003	-.018	.107	.004	.017
CTOPP: Rapid Object Naming	.174	.028	**.853**	-.025	.020	.019	.018	-.023	.122
Factor 4: Receptive Language									
WJIII-ACH: Oral Comprehension	-.084	-.087	-.104	**.818**	.164	.092	.021	.102	.036
WJIII-ACH: Understanding Directions	.232	.058	-.132	**.799**	-.190	.053	-.142	.157	.022
Factor 5: Basic Auditory Discrimination									
WJIII-ACH: Sound Awareness	-.052	.161	-.115	.172	**.802**	.036	.149	-.038	.172
Factor 6: Rapid Automatic Naming									
D-KEFS: Color-Word Interference Condition 2	.098	.017	-.029	.029	-.018	**.889**	-.086	.071	-.025
D-KEFS: Color-Word Interference Condition 1	-.016	-.105	.042	.090	.063	**.883**	.031	-.100	.138
Factor 7: Oral Expression									
NEPSY-II: Repetition of Nonsense Words	.089	.053	.073	-.088	.299	.128	**.681**	.185	-.089
WISC-IV: Vocabulary	-.080	.126	.085	.028	-.190	-.131	**.632**	-.024	.039
CTOPP: Segmenting Words	**.502**	.042	-.137	-.161	.111	-.084	**.570**	.027	.299
Factor 8: Higher Order Auditory Processing									
WJIII-*COG*: Incomplete Words	-.123	-.018	-.006	.145	.152	-.049	.173	**.784**	.055
WJIII-*COG*: Sound Blending	.172	.110	-.024	.080	-.121	.014	-.040	**.768**	.084
Factor 9: Verbal Fluency Subcomponent #3 (with visual stimuli)									
WJIII-*COG*: Rapid Picture Naming	.082	-.111	.196	-.075	.076	.113	.069	.070	**.722**
NEPSY-II: Comprehension of Instructions	.043	.179	-.299	**.390**	.026	-.131	.030	.024	**.553**
NEPSY-II: Speeded Naming	.135	.287	.208	.066	-.118	.201	-.134	.284	**.444**
Percentage of the variance explained by factor	11.61%	9.73%	8.37%	8.26%	8.01%	7.49%	6.79%	6.23%	5.74%
Cumulative percentage of variance explained by factor	11.61%	21.33%	29.70%	37.97%	45.98%	53.47%	60.25%	66.48%	72.22%

Implications:
- The tests thought to measure phonological / auditory processing are tapping into broader language constructs. For example, the WJIII-*COG* Incomplete Words and Sound Blending form a factor reflecting higher order auditory analysis/synthesis.
- In terms of Oral Expression, not all tests that are designed to measure verbal fluency load together. The factor analyses yielded three separate factors related to verbal fluency, based on differences in the format of the test.
- The receptive language tests generally held together into one factor.