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

Julia Phillips, B.A., Ashley Fournier, M.A., Daniel C. Miller, Ph.D., & Denise E. Maricle, Ph.D.
Texas Woman's University, Denton, Texas

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 Sensory Motor (Miller, 2007, 2010)

Coordinated Finger/Hand Movements
- NEPSY-II: Fingertip Tapping Combined
- NEPSY-II: Imitating Hand Positions Combined

Psychomotor Speed
- D-KEFS: Trail Making Condition 5 – Motor Speed

Psychomotor Speed and Accuracy
- NEPSY-II: Visuomotor Precision Combined

Visual-Motor Copying Skills
- Beery Visual Motor Integration Total
- NEPSY-II: Design Copying General Score
- WISC-IV Integrated: Coding Copy

Test	Factors and Related Loadings		
	1	2	3
Factor 1: Visual-Motor Copying Skills			
Beery Visual Motor Integration Total	**.620**	.112	.226
NEPSY-II: Design Copy – General Score	**.527**	.319	-.019
WISC-IV: Integrated: Coding Copy	**.519**	.151	-.559
Factor 2: Coordinating Finger/Hand Movements (Complex Motor Movements)			
NEPSY-II: Imitating Hand Positions Combined	-.025	**.759**	-.047
NEPSY-II: Fingertip Tapping Combined	.145	**.736**	.043
NEPSY-II: Visuomotor Precision Combined	-.636	**.363**	.075
Factor 3: Psychomotor Speed			
D-KEFS: Trail Making Test – Condition 5 (Motor Speed)	.185	.045	**.833**
Percentage of the variance explained by factor	19.90%	19.86%	15.51%
Cumulative percentage of variance explained by factor	19.90%	39.76%	55.28%

Implications:
- Tasks focusing on motor speed factor separately from tasks requiring accuracy.
- The NEPSY-II: Visual Motor Precision subtest is inversely related to visual motor copying tasks, possibly due to the lack of fine motor skill requirements.
- Copying from visual stimuli is separate from forming complex motor movements.
- Further research needs to determine how the tests from the Dean-Woodcock Sensory Motor Battery would factor with the reported measures of sensory motor abilities.
- Future versions of the School Neuropsychological Conceptual Model may need to be modified based on these results.

References:
Miller, D. C. (2007). *Essentials of school neuropsychological assessment*. Hoboken, NJ: Wiley.
Miller, D. C. (Ed.) (2010). *Best practices in school neuropsychology: Guidelines for effective practice, assessment, and evidence-based assessment*. Hoboken, NJ: Wiley.