

Validity of the Peg Tapping Measure of Executive Function for Hmong Children

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Abstract

Research has shown Executive Function (EF) to be predictive of school readiness. This study examined the concurrent validity of the Peg Tapping (PT) measure of EF for Hmong-speaking children compared to children administered the task in English during early childhood screening in an urban school district. PT scores collected in Hmong and English were compared and analyzed for concurrent and predictive validity. In contrast to results for children tested in English, PT scores for Hmong-speaking children were not significantly correlated with validated screening measures. However, Hmong PT scores did trend in the hypothesized direction. Future research should examine a larger sample of Hmong children being screened in Hmong and English.

Introduction



❖ Minnesota is home to one of the largest populations of Hmong children in the United States.¹ Yet, research on the development and achievement of Hmong children is rare. More specifically, there is little to no research on EF skills and school readiness in young Hmong children.

❖ EF skills refer to neurocognitive processes classified into 'hot' and 'cool', where 'hot' behaviors are emotionally based and 'cool' behaviors are reasoning based.²

- ❖ Peg Tapping, a measure of EF that is widely used to measure effortful control and inhibitory control,³ is associated with academic achievement⁹
- ❖ The primary aim of this study was to examine the validity of the PT task as an indicator of school readiness when given in the Hmong language during early childhood screening, in comparison to its validity when administered in English.

Methodology

- ❖ Data were drawn from a larger study conducted in the summer of 2012, collected in the context of regular early childhood screening for preschoolers by a urban school district.
- ❖ 300 children and their parents participated, including 13 children assessed on the Peg Tapping task in the Hmong language and 237 children in English.
- ❖ Screening measures included the Minneapolis Preschool Screening Instrument - R (MPSI-R) and the Ages & Stages Questionnaire – Social Emotional (ASQ-SE).
- ❖ Peg Tapping: The child is asked to tap a wooden peg once when the examiner taps twice and twice when the examiner taps once (16 trials). Children must inhibit the natural tendency to imitate what has been demonstrated and follow the stated rule to get an item correct.

Acknowledgments

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Results



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Table 1. Descriptive Data

Tested in English	N	Minimum	Maximum	Mean	Std. Deviation
Peg Tapping score	237	0	16	8.76	5.736
Age (in months)	250	36	75	54.17	9.479
Valid N (listwise)	236				

Tested in Hmong	N	Minimum	Maximum	Mean	Std. Deviation
Peg Tapping score	13	2	12	5.77	3.413
Age (in months)	14	48	69	56.14	6.724
Valid N (listwise)	13				

Figure 1 Scatterplot of Self Regulation and Peg Tap Scores for Hmong Students

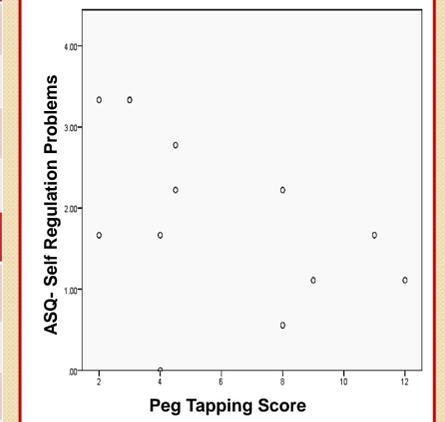


Figure 1: Correlation among Parent reported self-regulation (higher scores account for more problem behaviors) and PT scores for children assessed in the Hmong language.

Table 2 Hmong Bivariate Correlations for Peg Tapping and Screening Measures

	Sex	Peg Tapping	MPSI-R score	Problem Behavior Ratings	ASQ-Self Regulation	ASQ-Compliance	CBQ
Age	.28	.30	.63*	.29	.07	-.35	.66*
Sex	---	-.10	.39	.18	-.22	-.11	.29
Peg-tapping		---	.31	-.33	-.48†	.01	.05
MPSI-R score			---	-.02	-.35	-.58*	.62*
Problem Behavior Ratings				---	.39	.16	-.17
ASQ-Self Regulation					---	.18	-.15
ASQ-Compliance						---	-.35
CBQ							---

Note: N = 13-14
High scores on Behavior ratings(MSPI-R), ASQ-Self Regulation, and ASQ-Compliance indicate behavior problems (low scores indicate better adjustment). * p<.05, †p<.10.

- ❖ Language was a significant predictor for PT scores ($t = -2.34, p = .02$)
- ❖ Age was a significant predictor for PT scores ($t = 7.72, p < .001$)
- ❖ Peg Tapping scores were not significantly related to screening measures in the Hmong sample but did trend in the predicted direction.

Table 3 English Bivariate Correlations for Peg Tapping and Screening Measures

	Sex	Peg Tapping	MPSI-R Score	Problem Behavior Ratings	ASQ-Self Regulation	ASQ-Compliance	CBQ
Age	-.03	.44***	.69***	-.29***	-.10	.06	.16***
Sex	---	.03	.06	-.13**	-.02	.05	-.02
Peg-tapping		---	.56***	-.32***	-.22**	-.23**	.25***
MPSI-R score			---	-.51***	-.25***	-.19**	.27***
Problem Behavior Ratings				---	.24***	.23**	-.34***
ASQ-Self Regulation					---	.60***	-.62***
ASQ-Compliance						---	-.56***
CBQ							---

Note: N = 209-216.
High scores on Behavior ratings(MSPI-R), ASQ-Self Regulation, and ASQ-Compliance indicate behavior problems (low scores indicate better adjustment). *p<.05, **p<.01, ***p<.001

- ❖ Hmong parent reports on screening surveys show promising convergent validity and expected correlations with age.
- ❖ Students who were assessed in Hmong had lower scores than those who were assessed in English.

Discussion

- ❖ Children who were assessed in the Hmong language were somewhat older but had lower PT scores.
- ❖ Results for Hmong children may be affected by the small sample size of children assessed in Hmong.
- ❖ Results for children tested in English suggest good validity for PT scores for school readiness.

Limitations

- ❖ Statistical power was limited by the small sample of children tested in Hmong. Thus, the validity of the PT task for the Hmong children could not be determined with confidence.
- ❖ Additional data are being collected during the summer of 2013 to expand the sample size.
- ❖ The socioeconomic and educational background of the family is not assessed as part of district screening. Observed differences could be due to differences in family background or child experiences with assessment, as well as cultural differences.
- ❖ It is also possible that the translation or fidelity of administration of the PT task in Hmong was not ideal.

Implications

- ❖ Results suggest that additional research is needed on the validity of measures of cognitive skills and behavior for Hmong children, both for screening purposes and for research on the development of Hmong children.
- ❖ It will be important to compare the validity of measures administered to Hmong children in English as well as Hmong.
- ❖ Longitudinal studies will be important to study predictive validity and also to study developmental change.
- ❖ Future analyses will examine the predictive validity of Peg Tapping and other measures for Hmong and other children.