

Testing the Structure of HELP 3-6 Assessment among Head Start Children using Confirmatory Factor Analysis



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ABSTRACT

The primary goal of the present study was to evaluate the factor structure of the HELP® 3-6 with data collected from children attending Head Start using confirmatory factor analysis. The HELP® 3-6 is an early childhood, curriculum-based, assessment tool designed for early childhood professionals to measure skill development among preschool-aged children. 1,195 preschoolers participated in the present study. CFA results indicate strong support for the structure of the HELP® 3-6 assessment. The lowest fitting domain, Social Development, met all goodness of fit requirements, with no single items strongly influencing the overall fit. The HELP® 3-6 assessment is a structurally valid early childhood assessment that yields consistent ratings among children attending Head Start.

AUTHOR INFORMATION

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OVERVIEW AND BACKGROUND

The goal of this study is to evaluate the factor structure of the HELP® 3-6, an early childhood, curriculum-based, assessment, using Head Start data. The HELP® 3-6 is an upward extension of the Hawaii Early Learning Profile, which focuses on birth through 3 years, and shown to be reliable and valid (Li, Gooden, & Toland, 2019).

As shown in Table 1, HELP® 3-6 consists of six domains, which are composed of 47 strands. Strands are considered solitary constructs in which age-graded indicators (480 in total for these strands) progress from 36 months through 72 months. Validity of strand-to-domain structure was evaluated.

METHOD

Data were collected as part of an ongoing evaluation of Head Start students in southwestern portion of the U.S. The sample for the current study included 1,195 Head Start students. Children were initially assessed with the HELP® 3-6 in the fall between October and November, one and a half months after the academic year began. At the beginning of the study, participants were 47.751 months old (SD = 7.164) and ranged from 36 months to 66 months. Data gathered from the larger evaluation included HELP® 3-6 score information at domain, strand, and indicator levels. Data also included child date of birth, age at time of assessment, and date of assessment.

Assessors mark indicators for each strand as "fully," "partially," or "not having" when completing the assessment. Indicators advance following choronological age grades for each strand. Strand developmental age scores are based on the highest age-graded indicator selected and are used to generate domain scores.

RESULTS

CFA models were calculated and fit using M-plus to evaluate the degree HELP® 3-6 strand scores load to latent factors representing domains. Six CFAs were conducted, one for each domain. An omnibus CFA was not conducted because developmental age scores would be undistinguishable across assumed latent factors in a single test.

Estimates presented in Table 1 (below) indicate the degree to which each of the strands contributes to the latent factor. P-values less than 0.001 were used as a conservative indicator that coefficients contributed significantly to the latent factor.

TABLE 1

Confirmatory Factor Analyses Exploring how Well Strands Align With Presumed Domains

#	Strand Name	EST	SE	t		
Domain 1: Cognitive						
1 4D	Problem Solving/ Reasoning	0.803	0.011	71.335		
1 7A	Classification: Matching/ Sorting	0.863	0.008	102.454		
1 7B	Classification: Size	0.801	0.011	70.839		
1^{-7C}	Classification: Associative	0.856	0.009	97.033		
1 8	Attention	0.755	0.013	56.403		
1 9	Reading Readiness	0.846	0.009	91.074		
$1^{-}10$	Math Readiness	0.834	0.010	84.579		
1 11	Writing Skills	0.734	0.014	51.550		
1 12	Dramatic Play	0.561	0.021	27.142		
		χ^2 (3)	(35) = 305.070	p < .001		
			CFI = 0.967			
Domain	2: Language					
2 1A	Receptive: Understanding Words	0.832	0.011	74.232		
2 2	Following Directions	0.621	0.020	31.824		
2 3	Expressive Vocabulary	0.867	0.010	87.533		
2 4B	Communicating: Verbally	0.831	0.011	72.611		
2 7	Communicating through Rhythm	0.738	0.015	48.809		
		$\chi^2(5) = 60.857, p < .001$				
		<i>CFI</i> = 0.983				
Domain	3: Gross Motor					
3_7A	Balance/Standing	0.611	0.020	29.995		
3_7B	Walking/Running	0.834	0.012	70.644		
3_7C	Jumping	0.809	0.013	64.090		
3_7F	Catching/Throwing	0.765	0.015	52.315		
3_7G	Bilateral Play	0.695	0.017	40.384		
3_7H	Balance Beam	0.664	0.018	36.132		
		χ^2	$\chi^{2}(9) = 82.617, p < .001$			
			CFI = 0.977			
Domain	4: Fine Motor					
4_6A	Pre-Writing	0.580	0.025	23.176		
4_6B	Blocks/Puzzles	0.543	0.026	20.776		
4_6D	Paper Activities	0.603	0.025	24.605		
4_7C	Stringing Beads	0.568	0.025	22.570		
4_7D	Scissors	0.669	0.023	29.602		
4_8	Perceptual Motor: Tactile	0.514	0.027	19.366		
		χ^2 ($\chi^2(9) = 104.889, p < .001$			

	<i>CFI</i> = 0.931			
5: Social				
Attachment/Adaptive Skills	0.795	0.013	58.996	
Self Identification	0.469	0.025	18.929	
Responsibility/Rules	0.635	0.020	32.052	
Social Interactions and Play	0.401	0.026	15.161	
Social Manners	0.833	0.012	69.112	
Social Language	0.824	0.012	66.534	
Personal Welfare/Safety	0.337	0.028	12.078	
	$\chi^2(14) = 409.473, p < .001$			
	CFI = 0.872			
6: Self Help				
Dressing	0.641	0.021	30.959	
Undressing	0.696	0.019	37.550	
Eating	0.554	0.023	24.110	
Drinking	0.685	0.019	36.296	
Grooming	0.597	0.022	27.569	
Toileting	0.607	0.021	28.591	
Oral Hygiene	0.660	0.020	32.968	
Nasal Hygiene	0.656	0.020	33.204	
	χ^{2} (20	$\chi^2(20) = 510.028, p < .001$		
	CFI = 0.850			
	 15: Social Attachment/Adaptive Skills Self Identification Responsibility/Rules Social Interactions and Play Social Manners Social Language Personal Welfare/Safety 6: Self Help Dressing Undressing Eating Drinking Grooming Toileting Oral Hygiene Nasal Hygiene 	5: Social Attachment/Adaptive Skills 0.795 Self Identification 0.469 Responsibility/Rules 0.635 Social Interactions and Play 0.401 Social Manners 0.833 Social Language 0.824 Personal Welfare/Safety 0.337 χ^2 (14 6: Self Help Dressing 0.641 Undressing 0.696 Eating 0.554 Drinking 0.685 Grooming 0.597 Toileting 0.607 Oral Hygiene 0.660 Nasal Hygiene 0.656 χ^2 (20)	CFI = 0.93 15: Social Attachment/Adaptive Skills 0.795 0.013 Self Identification 0.469 0.025 Responsibility/Rules 0.635 0.020 Social Interactions and Play 0.401 0.026 Social Manners 0.833 0.012 Social Language 0.824 0.012 Personal Welfare/Safety 0.337 0.028 $\chi^2 (14) = 409.473$, $CFI = 0.87$ Of: Self Help 0.696 0.019 Dressing 0.641 0.021 Undressing 0.554 0.023 Drinking 0.685 0.019 Grooming 0.597 0.022 Toileting 0.607 0.021 Oral Hygiene 0.660 0.020 Nasal Hygiene 0.656 0.020	

Note. All *t*-test statistics are p < .001.

FINDINGS AND DISCUSSION

CFA results indicated each of the six models fit the data well. All of the strands were significantly associated with their respective domain, as specified by the assessment protocol, and most strands yielded strong coefficients with their respective domain. Three strands in the Social domain yielded coefficients below 0.50, indicating lower influence on that domain score. These strands, self identification, social interaction and play, and personal safety, may represent slightly different aspects of social development than the other strands, which emphasize adaptivity, rules, manners, and language. Despite this, the factor structure of the social domain using all strands fit well. Overall, these findings indicate good factor strand-to-domain structure for the HELP® 3-6 assessment. This suggests the aggregated scores yielded by the HELP® 3-6 assessment are valid representations of sub-developmental areas and appropriate for assessing Head Start students.

REFERENCES

Li, Z., Gooden, C., & Toland, M.D. (2019). Reliability and validity evidence for the Hawaii Early Learning Profile, birth-3 years. *Journal of Early Intervention*, *41*, 62-83.