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A validation of the Cantonese version of the Birmingham Cognitive Screen (BCoS) for stroke survivors in Hong Kong

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Introduction

The Birmingham Cognitive Screening Test (BCoS; Humphreys et al., 2012) is designed to isolate a wide range of cognitive functions in patients with brain injuries including the assessment of aphasia, apraxia, attention, memory, and spatial neglect. The purpose of the present study was to (1) develop a Cantonese version of BCoS (HK-BCoS) by translation with cultural modifications of the original English version; (2) validate the Cantonese version of the BCoS by comparing the scores on HK-BCoS with scores in other published cognitive and/or language assessments in Cantonese; and (3) evaluate the ability of the HK-BCoS to differentiate between stroke survivors and healthy individuals matched in age, education and gender.

Method

Twenty two participants with aphasia (fourteen male and eight female) were recruited. Subjects had a post-onset time of at least 6 months on first assessment day and were all native speakers of Cantonese. Controls were recruited if they had no history of stroke and matched with each subjects in age, education and gender.

Each subject was tested on the HK-BCoS, Hong Kong version of the Montreal Cognitive Assessment Test (HK-MoCA; Wong et al., 2009), Cantonese version of the Mini-Mental State Examination (C-MMSE; Chiu et al., 1994), and Cantonese version of the Western Aphasia Battery (CAB; Yiu, 1992) for up to three separate testing sessions.

Using Pearson correlation coefficients to examine the concurrent validity of the HK-BCoS, scores obtained from subtests of orientation, naming, attention, immediate recall, delayed recall, language, visuospatial ability, reading and writing were compared to scores obtained from corresponding tasks in the HK-MoCA, C-MMSE, and CAB. Discriminant validity of the HK-BCoS was investigated by examining the ability of the assessment to differentiate between stroke survivors and controls of a similar age using multiple paired-sample *t*-tests.

Results and conclusions

Table 1 displays correlations between the subtests of the HK-BCoS, HK-MoCA, C-MMSE, and CAB. Most of the coefficients were significant at the $p < .01$ level or lower, suggesting a strong concurrent validity of the BCoS assessment. In addition, results of multiple paired-sample *t*-tests

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suggested that performance was significantly different for the clinical and control groups on a range of subtests in the HK-BCoS. Extension of the study will involve further collection of clinical data from individuals who have different cognitive impairments, e.g. dementia and head injury.

Table 1. The Correlations between Scores in HK-BCoS, CAB, C-MMSE, and HK-MoCA.

	HK-BCoS scores														
	Orient	Naming	Sent Constr	Sent Reading	Nonw Reading	Imme Recall (Free)	Audit Attent	Delayed Recall (Free)	Delayed Recall (Recog)	Num Reading	Num Writing	Word Writing	Complex Figure Copy	Instruct Compre	
CAB scores	SS-Information	–	.821***	.910***	–	–	.641***	–	.638***	–	–	–	–	–	
	SS-Fluency	–	–	.958***	–	–	.631**	–	.636***	–	–	–	–	–	
	SS-Total	–	–	.962***	–	–	.648***	–	.650***	–	–	–	–	–	
	Auditory Comprehension	–	–	–	–	–	–	–	–	–	–	–	–	.681***	
	Naming	–	.939***	–	–	–	–	–	–	–	–	–	–	–	
	Reading	–	–	–	.780***	.906***	–	–	–	.714***	–	–	–	–	
	Writing	–	–	–	–	–	–	–	–	–	.812***	.772***	–	–	
	AQ	–	–	.906***	–	–	.660***	–	.702***	–	–	–	–	.743***	
	LQ	–	–	.933***	.912***	.954***	.632**	–	.678***	–	.860***	.908***	.702***	–	.730***
	Orientation	.882***	–	–	–	–	–	–	–	–	–	–	–	–	–
C-MMSE scores	Immediate Recall	–	–	–	–	.436*	–	–	–	–	–	–	–	–	
	Attention	–	–	–	–	–	.636***	–	–	–	–	–	–	–	
	Delayed Recall	–	–	–	–	–	–	.622**	.369 ^o	–	–	–	–	–	
	Naming	–	.529*	–	–	–	–	–	–	–	–	–	–	–	
	Language	–	–	.681***	–	–	.495*	–	.534*	–	–	–	–	–	
	Reading	–	–	–	.615**	.650***	–	–	–	.443*	–	–	–	–	
	Visual-Spatial	–	–	–	–	–	–	–	–	–	–	–	.757***	–	
HK-MoCA scores	Visual-Spatial/Executive	–	–	–	–	–	–	–	–	–	–	–	.325 ^o	–	
	Naming	–	.607**	–	–	–	–	–	–	–	–	–	–	–	
	Attention	–	–	–	–	–	.727***	–	–	–	–	–	–	–	
	Language	–	–	.823***	–	–	.546**	–	.557**	–	–	–	–	–	
	Delayed Recall	–	–	–	–	–	–	.870***	.692***	–	–	–	–	–	
Orientation	.872***	–	–	–	–	–	–	–	–	–	–	–	–		

Note: Orient = Orientation, Sent Constr = Sentence Construction, Sent Reading = Sentence Reading, Nonw Reading = Nonword Reading, Audit Attent = Auditory Attention, Delayed Recall (Recog) = Delayed Recall (Recognition), Num Reading = Number/ Price/ Time Reading, Num Writing = Number Writing, Instruct Compre = Instruction Comprehension, SS = Spontaneous Speech, AQ = Aphasia Quotient, LQ = Language Quotient.

^o Value is not significant, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$. A dash indicates that the correlations were not examined.

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