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Validity of the Communication Function Classification System for use with preschool children with communication disorders

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ABBREVIATIONS

CFCS	Communication Function Classification System
FOCUS	Focus on the outcomes of Communication Under Six
SLP	Speech–language pathologist

AIM To evaluate construct and predictive validity of the Communication Function Classification System (CFCS) for use with preschool children with a range of speech and language disorders.

METHOD Seventy-seven preschool children with speech and language disorders (50 males, 27 females; mean 2y 7mo, standard deviation [SD] 1y) participated in this cohort study. Preschool children had speech and language, language-only, or speech-only disorders. Together with parent input, speech–language pathologists (SLPs) completed the CFCS at time 1. Parents and SLPs then independently completed a validated change-detecting functional communication outcome measure, the Focus on the outcomes of Communication Under Six (FOCUS), three times: at assessment (time 1), at the start of treatment (time 2), and at the end of treatment (time 3).

RESULTS There was a significant negative correlation between CFCS classifications and FOCUS scores at all three measurement points for the ratings by both parents and SLPs (correlations ranged from -0.60 to -0.76). As expected, no correlations between CFCS classifications and FOCUS change scores were statistically significant.

INTERPRETATION This study provides evidence of construct and predictive validity of the CFCS, demonstrating its value as a discriminative tool for use with preschool children with a range of speech and language disorders.

The Communication Function Classification System (CFCS) is a validated discriminative tool that allows clinicians and parents to categorize children's communication skills into five mutually exclusive levels of everyday communicative function. Classifications are made on the basis of explicit written descriptions of the levels and of the distinctions between them.¹ Using the CFCS, adults classify children's communication by how they communicate on a day-to-day basis.² The levels vary by the familiarity of the communication partner, the child's successful sending and receiving of messages, and the pace of communicative interactions. Children in level I function best and those in level V function least well in terms of their communication skills. Descriptions for the five levels of communicative function are presented in Figure S1 (online supporting information), and more specific information about differentiating between the five levels of function can be found on the CFCS website (<http://cfcs.us/>), where the tool can be freely downloaded. (Note that the levels

are described with Roman numerals I–V, not Arabic numbers 1–5.)

The CFCS was originally developed for use with children with cerebral palsy (CP) by applying concepts from the World Health Organization's International Classification of Functioning, Disability and Health.^{1,3} Specifically, it was intended to shift clinician and researcher focus beyond body functions and structures (i.e. how a child produces individual speech sounds, the length of a child's sentences, how a child uses grammar) towards a focus on participation (i.e. how a child uses their communication to engage in real-life situations).¹ With this population, the CFCS has adequate content validity and interrater and test–retest reliability.^{1,2,4,5}

Classification tools are distinct from assessment tools in that they are used to discriminate between children with varying levels of ability. Unlike assessment measures, classification tools do not measure change over time, but simply describe how a child functions at a single point in time.⁶

Classification tools like the CFCS can be used with traditional measures of assessment to benefit clinicians, administrators, and researchers.⁶ Instead of using ill-defined terms grounded in impairment-based thinking such as ‘mild’, ‘moderate’, and ‘severe’ to describe children’s communication impairments, clinicians can use the consistent and strengths-focused language in the five CFCS levels to describe children’s current communication abilities in real-world situations.⁶ Administrators can use CFCS classifications to understand the functional status of the children they serve and to plan and allocate resources for those children.⁶ Researchers can use the CFCS to stratify children on the basis of functional ability, which should lead to more meaningful interpretations of intervention outcomes based on functional abilities at the start of treatment.⁶

Traditionally, classification tools have organized children’s skills according to their primary impairment, such as the type and severity of speech sound disorder.^{7–9} To our knowledge, the CFCS is the only classification tool for overall functional communication skills: both sending and receiving messages for children with a broad range of ages (2–18y).¹ One other classification tool, the Functional Communication Classification System, classifies expressive, but not receptive, communication for 4- to 6-year-olds with CP.¹⁰

The CFCS has recently been adopted by speech–language pathologists (SLPs) and researchers to classify the functional communication skills of children with a wide range of speech and language disorders, beyond those seen in children with CP.^{11,12} The CFCS has not yet been validated for use with children other than those with CP. As a first step towards establishing the usefulness of the CFCS with populations other than that for which it was developed, we evaluated the construct and predictive validity of the CFCS with preschool children with a range of speech and language disorders. Specifically, we investigated whether ‘the scores on the new test (CFCS) [though the CFCS is not a ‘test’] were correlated with another accepted measure of the same behaviour.’¹³ In this case, we wanted to know whether classifications on the CFCS (the new tool) were correlated with another tool that evaluated the same participation-based construct.

Another measure that addresses related aspects of children’s communicative function is the Focus on the outcomes of Communication Under Six (FOCUS).¹⁴ The FOCUS is a published outcome measure that evaluates changes in how children use their communication to participate and engage in their world – namely, their communicative participation skills.¹⁵ The FOCUS is able to detect changes in communicative functioning in children across a range of speech and language disorders, and has high internal consistency and adequate test–retest reliability among raters.^{16–21}

The CFCS and the FOCUS both address children’s functional communication skills, in ways that are complementary. The FOCUS describes a child’s current communicative functioning in some detail, and has been validated to measure changes in those skills over time; the CFCS classifies

What this paper adds

- The Communication Function Classification System is valid for use with preschool children with speech and language disorders.
- It can be used to explore the impact of outcomes by level of function.

children’s levels of communicative functioning and has been validated as a discriminative tool. This paper reports further evidence of validity of the CFCS, using data collected with both of these tools to identify meaningful correlations.

It was hypothesized that there would be significant correlations between CFCS levels and FOCUS scores at the point of first assessment, and that CFCS levels identified at the point of first assessment would be correlated with (i.e. predictive of) FOCUS scores at two later assessment points. The study also explored the strength of correlations between CFCS levels and FOCUS change scores, although we did not expect to find correlations between these.

METHOD

Sampling

This work reports a secondary analysis of data collected in a previous study.¹⁸ The original study included a convenience sample of 97 families of preschool children (birth to 6y of age) recruited from eight organizations across Canada that provided publicly-funded preschool speech–language services. Children in the original sample had been identified by a registered SLP as having a speech, language, or speech and language disorder, and were receiving or had received speech–language intervention services of various types. (Note that neither the original study, nor this one, was designed to evaluate a specific type of intervention.) The FOCUS was used as primary outcome measure in the original study, while the CFCS was used to describe levels of communicative functioning. Parents of children included in the sample provided consent for their children to participate in the original study.¹⁸

Data for 77 of the children included in the original sample were used for this secondary analysis. Data for the other 20 children were excluded because their CFCS classifications were not available.

Participants

Demographic characteristics and information related to speech–language interventions for the 77 children (50 males and 27 females) included in this analysis are provided in Table SI (online supporting information). Children in the original sample were similar in age, sex, CFCS distribution, and type of communication impairment to those included in this secondary analysis. Children in the original sample had slightly more intervention time than those included in these analyses. On average, children included in these analyses received just over 7 hours of intervention. Typical of the programs in which these children were receiving services, most therapy sessions lasted for 60 minutes, but ranged from 30 minutes to 2 hours. Seventy-four per cent ($n=54$) of children received intervention once a week (fairly common in pediatric rehabilitation across Canada). Others received

intervention less often, ranging from twice a week or monthly to irregularly throughout the year.

Materials

The CFCS

Please see the description of the CFCS in the introduction.

The FOCUS

The FOCUS is a published 50-item clinical tool validated to measure change in the functional communication skills (communicative participation) of preschool children with speech and language disorders; it can be reliably completed either by a parent or by an SLP.^{12,18} The FOCUS has two parts. Part 1 includes 34 items assessed on a 7-point rating scale that ranges from 'not at all like my child' to 'exactly like my child'. Part 2 includes 16 items and uses a 7-point rating scale that ranges from 'cannot do at all' to 'can always do without help'. The FOCUS has a minimum score of 50 and a maximum of 350, with higher scores reflecting better communicative function. When used to measure change, the minimal clinically significant difference on the FOCUS is 16 points. Between 10 points and 16 points, some change is occurring, which may or may not be clinically significant.¹² The FOCUS is freely available and can be found at <http://research.hollandbloorview.ca/outcomemeasures/focus>. There is now a briefer 34-item version (FOCUS-34; Thomas-Stonell et al., personal correspondence, 2016; <http://research.hollandbloorview.ca/outcomemeasures/focus/forms%20and%20manuals>) that was not available when this study was done.

Procedures

SLPs obtained informed consent from parents of preschool children with speech and language disorders to participate in the study. To be included, children had to be younger than 6 years of age; have an identified speech, language, or speech and language impairment; and be on a waiting list for intervention services.¹⁸

Parents and SLPs independently completed the FOCUS, and SLPs worked with parents to classify children's functional communication skills using the CFCS once, at the point of first assessment (time 1). Parents and SLPs also

independently completed the FOCUS at the start of treatment (time 2), and at the end of treatment (time 3). There was an average of 60 days between time 1 and time 2, and an average of 90 days between time 2 and time 3.

Statistical analysis

To examine construct validity, the relationships between SLPs' and parents' FOCUS scores and CFCS classifications were examined using Spearman's rank correlations at the point of first assessment (i.e. time 1). To examine predictive validity, the relationship between children's initial CFCS classifications and parents'/SLPs' later FOCUS scores (time 2 and time 3) was examined using the same method. Spearman's rank correlations were also calculated for CFCS classifications and FOCUS change scores (i.e. change between time 1 and time 2, and between time 2 and time 3) for both parents' and SLPs' ratings. For the CFCS, a higher level (level IV or V) indicates a lower level of communicative function, while for the FOCUS higher scores indicate better communicative participation skills, so negative correlations were expected.

RESULTS

Relationship between initial CFCS classification and total FOCUS scores

As reported both by SLPs and by parents, FOCUS scores and CFCS levels were inversely correlated (a function of the scaling of the two systems). Mean total FOCUS scores by CFCS level, as reported separately by SLPs and parents, are presented in Table I.

Construct validity

There were statistically significant negative correlations between SLPs' (correlation coefficient, $r_s[77]=-0.76$, $p<0.001$) and parents' ($r_s[77]=-0.65$, $p<0.001$) total FOCUS scores and CFCS classifications at time 1.

Predictive validity

There were also statistically significant negative correlations between CFCS classifications at time 1 and SLPs' total FOCUS scores at time 2 ($r_s[77]=-0.72$, $p<0.001$), and time 3 ($r_s[77]=-0.68$, $p<0.001$); and between CFCS

Table I: Mean Focus on the outcomes of Communication Under Six (FOCUS) scores by Communication Function Classification System (CFCS) level as reported by parents and speech–language pathologists (SLPs)

	SLP FOCUS, time 1	SLP FOCUS, time 2	SLP FOCUS, time 3	Parent FOCUS, time 1	Parent FOCUS, time 2	Parent FOCUS, time 3
	Mean (SD)			Mean (SD)		
CFCS level I	274.0 (32.16)	272 (28.61)	285.6 (33.43)	259.4 (27.34)	263.0 (25.15)	282.6 (38.66)
CFCS level II	202.5 (59.79)	222 (64.56)	234.5 (62.50)	214.8 (61.09)	220.0 (56.07)	248.8 (60.32)
CFCS level III	174.9 (58.94)	193.2 (72.65)	212 (63.65)	192.5 (57.35)	190.0 (49.13)	205.1 (54.02)
CFCS level IV	120.1 (47.52)	129.1 (45.83)	152.3 (56.12)	145.9 (44.69)	152.0 (48.72)	167.0 (53.25)
CFCS level V	72.3 (11.17)	80.4 (21.27)	100.3 (39.52)	107.8 (32.95)	109.3 (34.59)	128.5 (39.66)
Correlation coefficient (r_s) ^a	-0.76	-0.72	-0.68	-0.65	-0.63	-0.60

^aAll significant at $p<0.001$.

Table II: Mean Focus on the outcomes of Communication Under Six (FOCUS) change scores by Communication Function Classification System (CFCS) level based on parent and speech–language pathologist (SLP) ratings

	SLP FOCUS change scores, time 1/ time 2	SLP FOCUS change scores, time 2/ time 3	Parent FOCUS change scores, time 1/ time 2	Parent FOCUS change scores, time 2/ time 3
CFCS level I	-2.0	13.6	3.6	19.6 ^a
CFCS level II	19.5 ^a	12.5	5.2	28.8 ^a
CFCS level III	18.3 ^a	18.8 ^a	-2.5	15.1
CFCS level IV	8.9	23.2 ^a	6.1	15.1
CFCS level V	8.1	19.9 ^a	1.5	19.1 ^a
Correlation coefficient (r_s)	-0.05	-0.02	-0.00	-0.08

^aSixteen points is considered a clinically significant change on the FOCUS. Between 10 points and 16 points, some change is occurring, which may or may not be clinically significant.

classifications at time 1 and parents' total FOCUS scores at time 2 ($r_s[77]=-0.63$, $p<0.001$), and time 3 ($r_s[77]=-0.60$, $p<0.001$).

Relationship between initial CFCS classification and FOCUS change scores

There were some differences between parents' and SLPs' FOCUS change scores within CFCS levels. For example, SLPs rated children in CFCS levels II and III as making clinically meaningful change (16 points on the FOCUS)^{12,18} between time 1 and time 2, while parents reported no clinically meaningful change across all CFCS levels. SLPs rated children in levels III, IV, and V as making clinically meaningful change between time 2 and time 3, while parents rated children in levels I, II, and V as making meaningful change during the same period.

No correlations were statistically significant for SLPs' FOCUS change scores between time 1 and time 2 ($r_s[77]=-0.05$, $p=0.67$) or between time 2 and time 3 ($r_s[77]=-0.02$, $p=0.84$). Correlations were also not statistically significant for parents' FOCUS change scores and CFCS classifications between time 1 and time 2 ($r_s[77]=0.00$, $p=0.97$) or for change between time 2 and time 3 ($r_s[77]=-0.08$, $p=0.50$). FOCUS change scores did not differ significantly by CFCS level as reported by SLPs or parents, indicating that mean FOCUS change scores were relatively similar for children at each of the CFCS levels. Mean FOCUS change scores by CFCS level for SLPs and parents are presented in Table II.

DISCUSSION

This is the first study to assess the psychometric properties of the CFCS in a group of preschool children who did not have CP, but who had a range of speech and language disorders. We found evidence of construct validity of the CFCS by identifying strong negative correlations between CFCS classifications and both parent- and SLP-reported

FOCUS scores at initial assessment. We found evidence of predictive validity of the CFCS by identifying similar negative correlations between CFCS classifications made at initial assessment and parent- and SLP-reported FOCUS scores at two later assessment points.

As expected, we did not find any statistically significant relationships between CFCS classifications and FOCUS change scores. This is because children in all the CFCS levels showed improvements in their functional communication skills over time. This finding is consistent with development of the FOCUS measure, which was designed to measure change equally for children at all levels of communicative function so that change scores would not be biased by the severity of a child's impairment.^{12,14}

A second contributing factor to the absence of significant finding between CFCS classifications and FOCUS change scores might be that opportunities for change in FOCUS scores were variable for children at each of the CFCS levels. For example, children functioning in CFCS level I had relatively high FOCUS scores to begin with and thus less room to change. At the other extreme, children in CFCS level V were significantly impaired, and had considerably more room for improvement but also had more complicated communication issues (hence their categorization in CFCS level V). This may suggest a ceiling effect for the FOCUS and some limits to predictive validity for lower CFCS levels; however, we are hesitant to make this conclusion. SLPs did observe significant change scores, primarily for children in the lower CFCS levels; however, parents rated children in the higher CFCS levels (I and II) as making clinically meaningful change between time 2 and time 3.

The strong correlations between a validated measure of children's communicative function (FOCUS) and CFCS levels of function provide support for both the construct and predictive validity of the CFCS within this group of children. We hope this finding will encourage other research and clinical groups to use the CFCS as a way to classify children's functional skills. We believe using the CFCS can help clinicians, administrators, and researchers to take a strengths-based approach when evaluating children with a range of speech–language impairments, as has been done with the analogue classification systems Gross Motor Function Classification System²² and Manual Ability Classification System²³ for children with CP. With its focus on participation, the CFCS can also help us to better understand how our interventions affect the everyday lives of children and families.⁶

Further research, now underway by the authors, will explore in greater detail and with a very much larger data set, whether and how children's functional communication skills change by CFCS levels, types of communication impairment, and duration of SLP interventions. So far, we have learned that CFCS classifications can change over time for some children, but we do not yet know whether the CFCS can be used as a change-detecting measure, and thus we do not encourage use of the CFCS as an outcome measure. This will be a focus of future research. Studies to

further validate the CFCS for use with preschool children with a range of speech–language disorders are also planned for the near future. Other validation studies are underway, including the stability and convergent validity of the CFCS.

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SUPPORTING INFORMATION

The following additional material may be found online:

Figure S1: Descriptions for the five Communication Function Classification System (CFCS) levels of function.

Table S1: Demographic and intervention characteristics for children included in the analyses.

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