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Ashley E. Hopkin
a_e_hopkin@hotmail.com

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Assessing Typically Developing Toddler Communication Using the CFCS and FOCUS

Ashley E. Hopkin, Mary Jo Cooley Hidecker, Ph.D.

Communication Disorders

University of Wyoming

Abstract

The Communication Function Classification System consists of five levels of communication performance with familiar and unfamiliar partners, from Level I (most functional) to Level V (least functional). In pilot data of 32 children aged 24 to 60 months, the communication performance of children older than 31 months was generally classified as CFCS Level I. However, the relationship between CFCS levels and age needs further study. The purpose of this study was to use the CFCS to determine at what age 80% of typically-developing toddlers consistently communicate at each CFCS Level and compare those results to the Focus on the Outcomes of Communication Under Six (FOCUS) items, subset scores, and total scores. Two researchers observed 37 toddlers between 12 months and 45 months of age as they interacted with familiar and unfamiliar communication partners (e.g., parents, siblings, teachers, peers). Each observation lasted approximately 30 minutes and research team members individually noted the child's CFCS classification at five-minute intervals. A parent and a teacher of each child were asked to complete a survey, including a parent-friendly version of the CFCS, a demographics form, and the FOCUS, to quantify real-world changes in these children's communication. The results for this study showed a positive correlation between a toddler's age and his or her CFCS Level. Children 12 to 24 months of age were generally classified as communicating at CFCS Level IV. Children 24 to 36 months of age were classified between Level IV and Level I. 80% of children ages 36 to 45 months were classified at CFCS Level I.

Assessing Typically Developing Toddlers Using the CFCS and FOCUS

The World Health Organization developed the 2001 International Classification of Functioning, Disability and Health (ICF) (World Health Organization, 2001, 2007) to help classify clients across health care disciplines in six categories: health conditions, body functions and structures, activity, participation, environmental factors, and personal factors (World Health Organization, 2001). A version of the ICF was created for individuals under the age of 18 and is called the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY) (Petersson, Simeonsson, Enskar, & Huus, 2013). Both versions of the ICF are used to help guide assessment, diagnosis, and intervention across disciplines based on individual needs.

The ICF has also been used to create instruments and classification systems. Classification systems provide a common language for professionals to use across several disciplines (Rosenbaum et al., 2014). Examples of such classification systems include the Gross Motor Function Classification System (GMFCS), the Manual Ability Classification System (MACS), and the Eating and Drinking Ability Classification System (EDACS). Each of these classification systems were created to classify the functioning of children with cerebral palsy (Eliasson et al., 2006; Rosenbaum, Palisan, Bartlett, Galuppi, & Russell, 2008; Sellers, Mandy, Pennington, Hankins, & Morris, 2014). Each of these systems classifies an individual's ability into five levels based on capacity and need in each area.

The Communication Function Classification System (CFCS), similar to the classification systems previously described, consists of five levels and is based on an individual's everyday communication performance with familiar and unfamiliar partners (Hidecker, 2011). The CFCS was first created for use with individuals with cerebral palsy and other severe disabilities. The

CFCS is based on the Participation and Activity levels of the ICF (Threats, 2006). Studies have shown strong inter-rater reliability between these classification systems (Gunel, Mutlu, Tarsuslu, & Livanelioglu, 2009; Hidecker et al., 2012).

Though previous research has looked at CFCS classification of children with cerebral palsy, little research has been done with typically-developing children. Though speech and language development continue into the school-age years, communication begins before children speak—via cries, babbling, and non-verbal behavior. On average, a child says his or her first words at about 12 months of age and produces multiple word utterances by the time a child is aged 18 to 24 months (Hulit, Howard, & Fahey, 2011). The CFCS and the Focus on the Outcomes of Communication Under Six (FOCUS) look at the effectiveness of communication regardless of form. This includes (but is not limited to): verbal speech, sign language, non-verbal cues, and communication devices (Hidecker, 2011; Thomas-Stonell, Oddson, Robertson, & Rosenbaum, 2010).

The FOCUS is a questionnaire that measures changes in young children's communication, with forms for both parents and professionals to complete. The FOCUS uses a seven-point categorical response scale to rank daily communicative behavior. It has commonly been used by speech-language pathologists to view a child's progress as he or she participates in speech therapy (Thomas-Stonell, Oddson, Robertson, & Rosenbaum, 2010). The FOCUS was used in this research as a tool to compare communication development with CFCS levels.

This research is part of a larger project to validate communication classification systems for individuals with cerebral palsy and other disabilities with communication involvement (Santos, Pavão, Campos, & Rocha, 2012). In pilot data of 32 children ages 24 to 60 months, the communication performance of children older than 31 months was generally classified at CFCS

Level I. However, the age when typically developing children reach CFCS Level I and the relationships between age, CFCS Levels, and FOCUS scores are in need of further study. This research expanded the number of children observed, included a younger sample, and added information obtained using the FOCUS.

Methods

Instruments

As stated in the introduction, the purpose of the CFCS is to classify the everyday communication performance of an individual. This depends on how well an individual sends and receives messages with familiar and unfamiliar communication partners. The CFCS was developed by Dr. Mary Jo Cooley Hidecker to be used with children who have cerebral palsy. It has since been validated to be used with adult and adolescent populations. In this study, the CFCS was used to classify toddler communication during observations and was given as part of the survey to parents and children to rate their child's communication. See Table 1 for a brief description of each CFCS level.

Table 1	
<i>CFCS Level I Through V Description</i>	
<u>CFCS Level</u>	<u>Description</u>
Level I	The person independently alternates between sender and receiver roles with familiar and unfamiliar partners at a comfortable pace.
Level II	The person alternates between sender and receiver roles with familiar and unfamiliar partners, but at a slower pace.
Level III	The person alternates between sender and receiver roles with familiar partners, but is not consistently effective with unfamiliar partners.
Level IV	The person does not consistently alternate between sender and receiver roles, but may be effective with familiar partners.
Level V	The person is limited as both a sender and a receiver, and communication is seldom effective, even with familiar partners.

(Hidecker et. al. 2011)

The Focus on the Outcomes of Communication Under Six (FOCUS) is a questionnaire used to capture real-world changes in preschool children's daily communication and may be filled out by parents and/or professionals. The FOCUS form consists of parent-friendly statements regarding a child's ability to communicate and participate in his or her community. Each statement is rated by the parent/caregiver on a scale from one (i.e., not at all like my child) to seven (i.e., exactly like my child). The items on the parent version begin with "my child" and the items on the clinical version (i.e., for professionals to complete) begin with "my client." The FOCUS falls under the activity and participation levels of the ICF. Each questionnaire can be scored by the research team members in different communication categories and an overall score can be computed. The FOCUS was part of the survey given to parents and teachers to assess their children's current level of communication performance.

1. My child makes friends easily						
28. My child will ask for things from other children						
Not like my child	A little like my child	Some what like my child	A fair bit like my child	Quite a bit like my child	Very much like my child	Exactly like my child

Figure 1. FOCUS sample items and scale. (Thomas-Stonell et. al. 2010)

Participants and Study Sites

Participants consisted of 37 English-speaking, typically-developing toddlers of any gender between the ages of 12 months and 45 months who attended child care centers in Laramie, Wyoming. Children that spoke multiple languages were included in this sample. Twenty-one parents or guardians opted to take the parent version of the survey and twelve teachers completed surveys.

Observations were conducted at three childcare facilities in Laramie, Wyoming. They included the University of Wyoming Early Care and Education Center and both the North and South sites of the Basic Beginnings Early Learning Center. Observations of the children took place at the childcare facilities where the parent/child consent forms were signed and returned.

Observations typically took place in classroom settings during free playtime or outside on the playground under the supervision of classroom teachers and staff members. Classrooms of children were generally grouped by age of the children, but sometimes included multiple ages of children in one setting. Children were generally included in classrooms ranging from four to twelve children per class and one to three teachers/staff members were generally present. Most communication took place between peers (child to child) or between the child and their teacher/staff member.

Procedures

Researchers who were unfamiliar to the children classified each child's communication using the CFCS. Two researchers observed each toddler/preschooler interacting with familiar communication partners (e.g., siblings, teachers, peers) in a natural environment (e.g., the child's classroom) for approximately 15 minutes, noting the child's CFCS level at 5-minute intervals. Researchers also recorded reasons why the CFCS level was chosen and any specific communicative behaviors exhibited by the child that influenced the decision. After 15 minutes, one researcher interacted with the child as an unfamiliar communication partner while the other researcher observed, noting any differences in communication effectiveness. After another 15 minutes, each researcher independently classified the child's overall communication

performance using the CFCS. Researchers used an observer sheet to record CFCS levels and comments for all children who participated.

If both CFCS researchers did not classify a child's communication as CFCS Level I, the child was re-visited by the researchers to see if changes in the child's performance occur. This continued until the parent withdrew consent or the child's communication performance was classified as Level I.

Parents/guardians and teachers/staff who are familiar communication partners with each child were also asked to complete a survey about the child's everyday communication performance. The survey for familiar partners included a parent-friendly version of the CFCS, a basic demographics form, and the Focus on the Outcomes of Communication Under Six (FOCUS). Parents/guardians were asked to complete the parent version of the FOCUS and daycare/preschool teachers were asked to complete the clinical version of the FOCUS. Familiar partners had the option of completing the survey online, over the phone, or by hard copy, depending on the preference of the participant. The entire survey took under 20 minutes for parents and teachers to complete.

Results

Research team members observed 37 children in total. Out of children observed, 9 of the children were between the ages of 12 months and 23 months. Between the ages of 24 months and 35 months, 13 children were observed. Researchers observed 15 children over the age of 36 months, with the oldest child being 45 months old.

Of the 37 toddlers observed, the largest amount of the children communicated at CFCS Level I, meaning that they could consistently and effectively communicate with familiar and unfamiliar partners. This consider of forty-one percent of all children observed. Eleven percent of the toddlers were classified as communicating at CFCS Level II, meaning that they could consistently communicate at with both familiar and unfamiliar partners, but were slower at sending and receiving messages. Twelve percent of children communicated at a CFCS III, meaning that they could consistently communicate with familiar partners only. The second largest CFCS level observed was CFCS Level IV. Thirty-six percent of all toddlers observed were classified at CFCS Level IV, meaning that they sometimes communicated effectively with familiar partners. No children were classified at CFCS Level V, meaning none were found to be seldom effective communicators, even with unfamiliar partners.

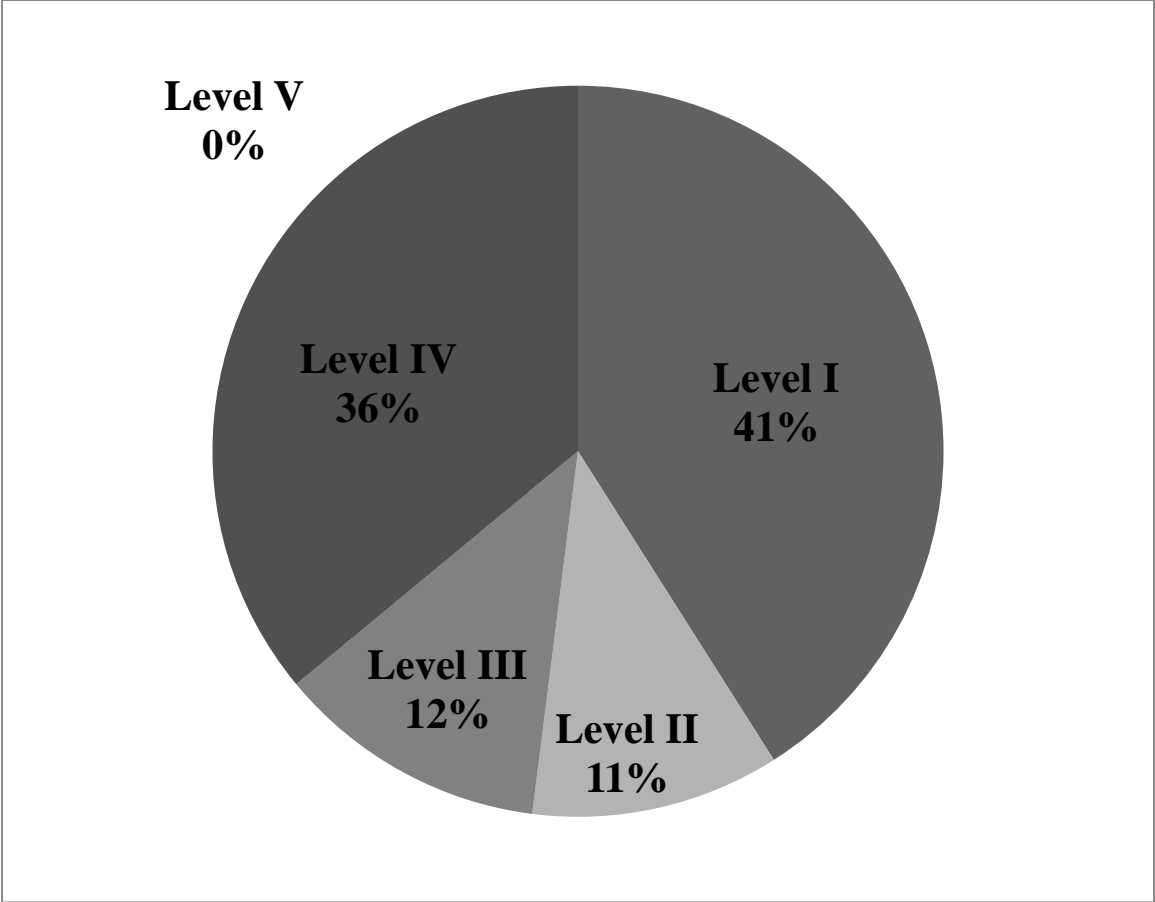


Figure 2. The percent of toddler’s CFCS Level observed, classified and analyzed by researchers.

<u>CFCS</u>	<u>Age 1:0-1:11</u>		<u>Age 2:0-2:11</u>		<u>Age +3:0</u>		<u>Total</u>	
	%	n	%	n	%	n	%	n
<u>Level I</u>	0	0	23	6	80	24	41	30
<u>Level II</u>	0	0	15	4	13	4	11	8
<u>Level III</u>	0	0	27	7	7	2	12	9
<u>Level IV</u>	100	18	35	9	0	0	36	27
<u>Level V</u>	0	0	0	0	0	0	0	0
<u>Total</u>	100	18	100	26	100	30	100	74

Between the ages of 12 months and 23 months, all 18 children's communication was classified as CFCS Level IV. This means that these children were inconsistent senders and receivers of messages with familiar partners. These children were usually misunderstood by the unfamiliar partners (i.e., the researchers) but could still not always communicate effectively with familiar partners (i.e., teachers). These children tended to be better at receiving and understanding messages than they were at sending messages. Though some simple speech took place, most communication involved non-verbal cues, crying, and gestures.

Children between the ages of 24 months and 35 months were spread across four of the five CFCS Levels. The largest CFCS level seen by this group was CFCS IV with thirty-five percent communicating at this level. The second largest group was CFCS Level III with twenty-seven percent communicating at this level. This was followed by twenty-three percent communicating at CFCS Level I and, lastly, fifteen percent communicating at CFCS Level II. Though the most children communicated at the less functional CFCS levels (CFCS Level III and CFCS Level IV), this only made up sixty-two percent of communicators, indicating that the levels were fairly evenly distributed across this age group. There tended to be a trend from younger children being classified in the less functional CFCS levels (i.e., CFCS Level III or

CFCS Level IV) and older toddlers being classified in the more functional CFCS Levels (CFCS Level I or II). When looking at a wide range of communication abilities for this age, this is not abnormal, as children at this age are quickly gaining a larger vocabulary and are acquiring more communicated language (.). This large spread of CFCS levels at this age group could indicate that communication rapidly changes for toddlers during this time of life.

By 36 months, 80% of these children communicated at CFCS Level I, meaning that they could communicate effectively and efficiently with anyone. In addition, 90% of children over 36 months old communicated at CFCS Level I or CFCS Level II. Two children in this age group communicated at a CFCS Level III, meaning that their communication was effective with familiar partners, but not with unfamiliar partners. At age three, this is not a CFCS level typically expected when classifying a child's communication. This could indicate a future speech or language problem, but a larger sample size could help determine if this is typical.

Twenty-one parents completed the optional survey and twelve teachers/staff members completed the survey. Out of the parents who completed the survey, 20 of them were female (mothers/female guardians) and one of them was male (father). Nineteen of the parents and all 12 of the teachers assigned CFCS ratings to the children whose communication they were filling the survey out.

Table 3: *CFCS rating inter-rater reliability between researchers*

	I	II	III	IV	V	Total
I	14					14
II	2	2				4
III		2	3	1		6
IV				13		13
V					0	0
Total	16	4	3	14	0	37

Inter-rater reliability. Inter-rater reliability was found between researchers doing observations and given CFCS ratings to children participants. Inter-rater reliability between researchers was calculated using weighted kappa's. The Roman numerical are CFCS levels from CFCS Level I to CFCS Level V. The top row of Table 3 represents the ratings given by one research and the first column represents the ratings given by the second researcher on the same children during observations. The numbers in the gray boxes diagonal represent agreement of the CFCS level by both researchers. The numbers outside of the gray boxes represent disagreement of a CFCS level between researchers.

Inter-rater reliability between researchers was considered “excellent” with a weighted kappa of .92 (95% CI .85-.99). Researchers agreed on the communication of 32 of the observed children. The researchers disagreed on the communication of five observed children. All disagreements on CFCS level were only one level apart, meaning disagreements were not major (i.e., one researcher rated a child's communicated at a CFCS Level III and the other researcher rated the child a CFCS Level IV). Inter-rater reliability between researchers and parents, researchers and teachers, and parents and teachers will be analyzed in future research.

Discussion

Personality and CFCS. It is not yet known how much the personality of a child affects his or her CFCS Level. Some children may be more outgoing or shy than others and this could affect the likelihood they may communicate effectively with unfamiliar partners. At CFCS Level III, communication is characterized by an individual who is an effective communicator with familiar partners, but who is not effective with unfamiliar partners. A CFCS Level II is characterized by effectively sending and receiving with familiar partners, but slower passed communication with unfamiliar partners. A CFCS Level I is effectively sending and receiving messages with both familiar and unfamiliar partners. Because of this, if an individual's personality is such that they are less likely to communicate effectively with unfamiliar partners (e.g. shyness, wariness), CFCS Level may go from a Level I communicator to a Level II or III communicator. However, the CFCS may be used to classify communication regardless of the reason for the communication classification (e.g., intelligibility, age,). In this case, the effect of personality on CFCS level matters little to research outcomes.

Significance. This research can be used to help with the continued validation of the Communication Function Classification System (CFCS). The CFCS can be used in clinical intervention and research descriptions. This information will help identify the relationship between the FOCUS and the CFCS. This study also expanded to a younger sample of typically developing children that have not previously been observed and classified using the CFCS. Speech-language pathologists may use this information to help determine if a toddler or preschooler is making typical communication progress and may give directions for when and how to intervene.

Limitations of Study. In a study, researchers are usually looking for a diverse group of individuals to represent a population. Because the sample was obtained from a college town, it could be expected that the level of parental education and family income may be higher than average. Thus, our results may not be considered typical for the general population. Additionally, although we have definitions for familiar and unfamiliar communication partners, there is a continuum of familiarity. It is possible for certain communication partners to be more familiar or unfamiliar with the child than other communication partners. Another limitation to our study is that the sample size obtained in this research was small, particularly when looking at individual age groups. A larger sample would be useful in validating correlations and results in the data analysis.

Future Research. In the future, the results obtained from the 37 children that were observed and whose parent/teacher filled out the survey, will be analyzed. The children's ages and CFCS scores will be compared to FOCUS scores. For children who were both observed and rated and whose parent and/or teacher filled out the survey, FOCUS scores will be compared to both will compare their FOCUS scores to both the CFCS score given by parents, teachers, and researchers. The relationship between the FOCUS and the CFCS Levels will be assessed using Spearman's rank correlation. Descriptive statistics will be used to make summaries about the age range for each CFCS Level as compared to FOCUS scores and information.

Specific areas of communication broken down in the FOCUS score sheet will also be analyzed. Certain questions throughout the FOCUS form address various areas important to communication. The scoring profile breaks the specific areas into two groups: Body Function/Capacity Items and Performance Items. The Body Function areas are as follows: Speech, Expressive Language, Pragmatics, and Receptive Language/Attention. The Performance

Items are as follows: Intelligibility, Expressive Language, Social/Play, Independence, and Coping Strategies/Emotions. These areas will be scored individually with students and compared to child's age and overall FOCUS score. Areas of communication on the FOCUS form will also be compared to CFCS level rated by researchers, parents, and teachers. This will allow possible explanation of what areas of the toddlers' communication effected CFCS level the most in this study.

This study will also be analyzed with the data from the Michigan pilot study that looked at the effectiveness of the CFCS with typically developing toddlers. The study includes 32 children aged 24 to 60 months. The study found that the communication performance of children older than 31 months was generally classified as CFCS Level I. However, a younger age group and larger sample size was needed in order to pair individual CFCS levels with age, especially less functional CFCS levels (i.e., CFCS Level III and CFCS Level IV). The results from this study and the pilot study will be analyzed together in order to have a larger sample size when comparing age of the child participants and their communication performance as measured by the CFCS. This were create a total of 69 typically-developing toddlers and preschoolers between the ages of 12 months and 60 months old who were observed and rated using the CFCS.

Other Future Outlooks. The sample size of typically developing toddlers may also be expanded to include more children in each age group. A larger sample of younger children may be looked at in order to determine the ages in which typically developing children communicate at CFCS Level V. The effects of family dynamics on CFCS Level may also be included in future research. This may include having parents complete a more extensive demographics form that includes questions regarding family makeup and the amount and type of communication used in the home.

Conclusion

This study was intended to provide speech-language pathologists with information regarding the use of the CFCS with typically developing toddlers. The results from this investigation suggest that there is a positive correlation between age and CFCS level. This study also suggests that the CFCS may be used reliably with children as young as twelve months of age. Inter-inter-rater reliability between researchers and parents, researchers and teachers, and parents and teachers will be analyzed. FOCUS information and compared to age and CFCS level in future research. The data collected on CFCS level during observation from this study and the Michigan pilot study will be analyzed together.

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