

Outcomes and predictors in preschoolers with speech-language and/or developmental mobility impairments

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Abstract

The purpose of this article is to describe communicative-participation outcomes measured by the Focus on the Outcomes of Communication Under Six (FOCUS[®]; Thomas-Stonell et al., 2013) for interventions provided by speech-language pathologists (SLPs) in different community settings for preschoolers with speech-language impairments (Sp/LI) with and without developmental mobility impairments (MI). The predictive relationships between communicative-participation and (1) functioning-and-disability, and (2) contextual factors, was also investigated. Sixty-one preschoolers with Sp/LI and their parents participated. Twenty-six preschoolers were identified with Sp/LI and received speech-language interventions (Group 1), 20 preschoolers were identified with Sp/LI and MI and received speech-language interventions (Group 2), and 15 preschoolers with Sp/LI awaiting intervention served as waitlist controls (Group 3). Parents completed structured interviews about children's communicative-participation outcomes using the FOCUS[®] at three time points (pre-intervention, post-intervention, and 3-months post-intervention) with an SLP. Only Groups 1 and 2 experienced statistically and clinically meaningful communicative-participation outcomes over time as measured by the FOCUS[®]. Pre- to post-intervention communicative-participation was predicted by functioning-and-disability and contextual factors, initial social skills and intervention status, respectively. Post-intervention to 3-month post-intervention scores were also predicted by functioning-and-disability and contextual factors, risk status (Sp/LI only, Sp/LI+developmental MI)

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and intervention status, respectively. Significant and clinically meaningful changes in communicative-participation over time are associated with speech-language interventions for preschoolers with Sp/LI.

Keywords

Children, communicative-participation outcomes, ICF-CY, predictors, speech-language/mobility impairment

I Introduction

Increased ability to participate in everyday social and educational activities is an important intervention outcome (ASHA, 2004). The World Health Organization's (WHO, 2001) *International Classification of Functioning, Disability and Health* (ICF) framework for functioning and disability in adults and children has fostered an interest in real-world communication outcomes. However, there is little research describing participation outcomes longitudinally in children with speech-language impairments (Sp/LI) (Threats, 2003).

I WHO frameworks

In 2001, the WHO endorsed the ICF as a framework for measuring functioning and disability (WHO, 2001). The ICF framework utilizes a biopsychosocial model that emphasizes the connectedness between functioning, disability and contextual factors that are unique to individuals and their environments. Consequently, an individual's overall functioning, including communication, can be viewed in a holistic manner.

In 2007, the WHO introduced the ICF-Children and Youth (ICF-CY), which focuses on the birth to 18-year population (WHO, 2007). Like the ICF, the ICF-CY framework has two parts, each with a corresponding set of components that classifies an individual's functioning using a structured and interrelated hierarchical organization. Part 1 contains components for Body Functions¹ ('physiological functions of body systems, including psychological functions'), Body Structures¹ ('anatomical parts of the body') and Activities and Participation¹ ('involvement in a life situation'). Body Functions considers the individual's communication within 'specific mental functions' (e.g. reception of language and expression of language in spoken, written, or other forms) and movement functions (e.g. gait patterns and voluntary movement) while Activities and Participation considers participation-level communication with other people (e.g. starting/sustaining/ending a conversation). Part 2 of the ICF-CY, Contextual Factors¹, combines Environmental Factors¹ (e.g. services, systems, and policies, such as health care services that includes intervention) and Personal Factors¹. Environmental Factors also encompasses the social, cultural and institutional factors that influence children's functioning.

2 Communicative-participation

Communicative-participation describes an individual's communication in life situations where knowledge, information, ideas, or feelings are exchanged (Eadie et al., 2006; Yorkston et al., 2008). For children, communicative-participation means being able to initiate a conversation, partake in school and community activities, and engage in classroom learning for the purpose of being included with others (Washington et al., 2012). Using the ICF-CY's theoretical framework,

communicative-participation can be considered within the context of a child's everyday life activities. The communicative-participation outcomes literature (i.e. outcomes over time) for young children with Sp/LI is sparse, thus identification of factors influencing outcomes has not been fully explored. The paucity of information describing these outcomes may be directly related to the availability of valid and reliable participation outcome measures in speech-language pathology (Eadie et al., 2006; Yorkston et al., 2008). A critical component in establishing these outcomes is the use of measures with established reliability and validity that reflect current, relevant theoretical frameworks (Jette and Haley, 2005).

The Focus on the Outcomes of Communication Under Six (FOCUS[®]; Thomas-Stonell et al., 2013) is a new, free, 50-item outcome measure that assesses communicative-participation outcomes based on parent or speech-language pathologist (SLP) reports. Unlike most speech-language outcome measures, the FOCUS[®] evaluates changes in both Capacity (what the child is capable of doing in an ideal environment such as a structured, therapy session) and Performance (what the child is able to do in various environments such as home, school, daycare) (Thomas-Stonell et al., 2010). For each of the 50 items, parents and SLPs rate their child/client on a seven point scale that ranges from 'not at all like my child' to 'exactly like my child' (Capacity) or 'cannot do at all' to 'can always do without help' (Performance). Development of the FOCUS[®] was informed by parental and SLP observations of changes they observed in their child's communicative-participation following intervention (Thomas-Stonell et al., 2013). The FOCUS[®] is a valid and reliable measure for use by parents and SLPs (Thomas-Stonell et al., 2013; Washington et al., 2013a, 2013b). Aligned with the ICF-CY framework, the FOCUS[®] contains items from Part 1 (Functioning and Disability) and Part 2 (Contextual Factors), with most items describing Activities and Participation. The FOCUS fits with the Royal College of Speech and Language Therapy Guidelines for Communication Quality by providing SLPs with access to an outcome measure that evaluates children's quality in communication as it is related to being included with others. See the FOCUS[®] website at http://www.hollandbloorview.ca/research/FOCUS/FOCUS_works.php (accessed May 2014).

A preliminary investigation to determine communicative-participation outcomes and parental perspectives on the child-SLP therapeutic relationship during the attainment of these outcomes was previously completed. This investigation was undertaken using the FOCUS[®] and the Vineland Adaptive Behavior Scales-II (VABS-II; Sparrow et al., 2005) Socialization domain (Washington, et al., 2012). Parents reported that preschoolers with Sp/LI ($n = 67$) experienced significant increases in communicative-participation outcomes immediately following speech-language interventions, and that the SLPs' rapport and professional competence were important to achieving those outcomes. However, there was no exploration of maintenance of communicative-participation outcomes, magnitude of change, or factors predicting change.

3 Factors impacting outcomes for children with Sp/LI

Previous investigations have identified factors that have prognostic value for developmental progress and speech-language outcomes of children with Sp/LI (Bishop and Edmundson, 1987; Dale et al., 2003; Schery, 1985). The ICF-CY conceptualizes communicative-participation as being mediated by Functioning and Disability (e.g. initial social skills; risk status) and Contextual Factors that are environmental (e.g. intervention status) or personal (e.g. age). Exploring the nature of relationships between communicative-participation outcomes and predictors of these outcomes might offer insights into the types of relationship that exist between these variables, which would be important in informing SLP practices. In the current study we considered three predictors: initial

social skills, risk status, and intervention status. A rationale and description for each predictor variable is provided below.

a Social skills. The ability to communicate well with others (i.e. social skills) is a vital part of a child's life that greatly impacts on quality of life (Markham et al., 2009). It has been established that older and younger children with Sp/LI experience difficulties in social situations in their attempts to be included with others (Fujiki et al., 2004; McCabe, 2005), making them at-risk for not experiencing successful social interactions. Consequently, where a child starts in terms of his or her social skills may impact communicative-participation outcomes experienced (Washington et al., 2012).

b Risk status. Preschoolers with physical impairments (e.g. developmental mobility impairment or MI) are frequently at a disadvantage when socially interacting with others due to the limitations imposed by their impairments and the reaction of individuals in their environment (King et al., 1997). Decreased opportunities for exposure to, and practice in, daily life events can further intensify or create new communication problems, resulting in decreased participation (Washington, 2007). Thus, for those preschoolers identified with Sp/LI and developmental MI (i.e. a dual-risk status group) there may be greater difficulties in achieving significant communicative-participation outcomes over time compared to their cohorts with Sp/LI only, a single-status risk group.

c Intervention status. Part of the SLPs' scope of practice when working with young children with Sp/LI, including those with MI, is to 'facilitate the preschooler's activities and participation by assisting the child to acquire new communication skills and strategies' (ASHA, 2004). Typically these skills and strategies are acquired after being directly targeted in intervention. However, more recently there is evidence identifying spreading effects of intervention to other untargeted areas such as pragmatics or social skills (Frome Loeb et al., 2001; Washington, 2013). It is important to determine if children who receive intervention experience an advantage over those who do not by virtue of being enrolled in intervention with a SLP, ultimately experiencing better communicative-participation outcomes.

4 The current study

Describing and predicting communicative-participation outcomes for children with Sp/LI only and those with a developmental MI is an important next step within SLP research. This is particularly important, given that these children are members of different risk-status groups who can experience negative consequences affecting their abilities to be included with others (Dempsey and Skarakis-Doyle, 2010).

The research undertaken in the current study had two aims. First, we sought to explore outcomes in communicative-participation over time for a sample of preschoolers with Sp/LI with and without concomitant developmental MI. It is of value to compare these groups for communicative-participation outcomes to determine if being a member of a single-status risk group (i.e. Sp/LI only) versus being a member of a dual-status risk group (i.e. Sp/LI + developmental MI) results in different or similar outcomes following speech-language intervention. Importantly, we were interested in determining outcomes of communicative-participation following interventions that did not directly target these skills, but may have been indirectly addressed by virtue of being enrolled in therapy with a SLP who would have provided guided opportunities to learn to wait, listen, and take turns, necessary skills in being successfully included with others (Washington, 2013). Second, we

sought to identify predictors of communicative-participation outcomes over time. These predictors were grouped according to the ICF-CY components:

- Functioning and Disability: initial social skills and risk status (dual or single); and
- Contextual Factors: intervention status (intervention or waitlist control).

The authors of this study completed this research to address two primary implications for speech-language therapy practices. First, there is a dearth of information on the spreading effects of speech-language intervention on areas not directly targeted during the intervention block (see Washington, 2013). Being enrolled in therapy with a SLP who provides guided opportunities for appropriate play and behaviour while targeting other goals such as speech (e.g. articulation) or language (e.g. grammar) could have wide-ranging impacts on a child's ability to be included with others, even though this was not direct target of intervention. Our previous work using the ICF-CY theoretical framework has suggested that targeting goals in one ICF-CY domain can have direct effects in other domains immediately following intervention (Washington et al., 2012). The investigation of this theoretical concept in a clinical research study that considers maintenance of skills was deemed relevant to SLPs as it could establish the worth of speech-language services on a co-occurring area of development, communicative-participation over a longer time period. The importance of considering maintenance of skills has been established in the speech-language literature as an indicator of development (see Washington and Warr-Leeper, 2013; Yoder et al., 2011), suggesting that this is an important topic to be investigated in children with Sp/LI.

Three groups of preschoolers were included in this study: (1) preschoolers with Sp/LI only who received intervention; (2) preschoolers with Sp/LI and developmental MI who received intervention; and (3) preschoolers with Sp/LI only who did not receive intervention (waitlist-control group). These participant groups were not devised to evaluate the effectiveness of a particular intervention but to demonstrate whether communicative-participation outcomes measured by the FOCUS[®] were sensitive to change over time for a range of interventions that did not directly target these outcomes and were provided by SLPs in different community-based settings. In this article, the term 'community-based' refers to speech-language intervention routinely offered by SLPs in different contexts (e.g. school-based, preschool, speech-language centre) within a community (see Glogowska et al., 2000). It was hypothesized that:

1. Preschoolers receiving speech-language intervention will experience significant changes in communicative-participation outcomes over time.
2. Preschoolers on the waitlist for speech-language intervention will not experience significant changes in communicative-participation outcomes over time.
3. Functioning and disability factors (i.e. initial social skills, risk status) will predict change in communicative-participation outcomes over time.
4. Contextual factors (i.e. intervention status) will predict change in communicative-participation outcomes over time.

II Methods

I Ethics approval

The Office of Research Ethics at participating sites provided ethical approval. Parental' consent and children's assent was obtained prior to starting the study.

2 Recruiting procedures and success

Three agencies in Canada participated in this study. Each agency provides government-funded access to speech-language services for children with Sp/LI only and those with physical disabilities. Seven SLPs facilitated participant recruitment. To be included children had to have: (1) a diagnosis of Sp/LI; (2) been offered speech-language intervention; and (3) parents who were proficient users of English (i.e. conversant in English, not requiring an interpreter). SLPs invited 96 parents of preschool children (6-year-olds and younger) attending participating services. Investigators successfully recruited 67 parents of the original invitees and 57 parents completed the study. Four additional preschoolers from the FOCUS[®] reliability study (Washington et al., 2013a) who were on the waitlist for intervention were also included. This increased sample size supported the statistical power for analyses. Therefore, the final sample included 61 preschoolers and their parents (58 mothers, 3 fathers).

3 Demographics

Participants were recruited from urban speech-language services and had not received prior intervention. They resided in rural and urban settings and came from either single or dual income earning families. Preschoolers were 3;2 to 6;0 at pre-intervention and 42 were boys. Twenty of the 61 preschoolers had a specific medical diagnosis, including cerebral palsy ($n = 10$), hypotonia ($n = 2$), clubfoot ($n = 2$), global developmental delay ($n = 2$), spina bifida ($n = 3$) and spinal cord tumour ($n = 1$). Thirty-five percent of these 20 preschoolers were classified as Level 4 on the Gross Motor Function Classification System for Cerebral Palsy: 'child functions in sitting in a chair but needs adaptive seating for trunk control to maximize hand function. Children may achieve self-mobility using a power wheelchair' (GMFCS; Palisano et al., 1997). For participants' pre-intervention characteristics, see Table 1; see also Figures 1 and 2.

Preschoolers' communication levels were established by participating SLPs using the Communication Function Classification System (CFCS; Hidecker et al., 2011). The CFCS classifies everyday communication performance into one of five levels: Level 1 (most functional) to Level 5 (least functional). It focuses on Activity and Participation levels as described in the ICF. Participating SLPs classified most preschoolers (46%) as an 'effective sender and receiver with familiar partners' (Level 3).

4 Participant groups

Preschoolers were grouped according to their communication profile and services received (attribute status):

- Group 1 ($n = 26$): Sp/LI only and receiving intervention;
- Group 2 ($n = 20$): Sp/LI plus a developmental MI and receiving intervention; and
- Group 3 ($n = 15$): Sp/LI and waitlist control.

There were no statistically significant between-group differences for pre-intervention communicative-participation as measured by FOCUS[®]; $F(2,58) = .83$, $p = .440$, $\eta^2 = .03$, gender distribution; $F(2,58) = 1.55$, $p = .221$, $\eta^2 = .05$, initial communication level (CFCS); $F(2,58) = 2.35$, $p = .104$, $\eta^2 = .08$, or initial social skills (VABS-II; Sparrow et al., 2005); $F(2,58) = .40$, $p = .672$, $\eta^2 = .01$. In terms of parental characteristics, preschoolers were also not statistically different for: racial background (Caucasian versus non-Caucasian), $F(2,58) = 1.54$, $p = .222$, $\eta^2 = .05$;

Table 1. Participants' pre-intervention characteristics.

	Total sample (n = 61)	Group 1 ^a (n = 26)	Group 2 ^b (n = 20)	Group 3 ^c (n = 15)
Age range	3:2 to 6:0	3:2 to 5:0	3:11 to 6:0	3:5 to 5:2
Gender distribution	Female = 19 Male = 42	Female = 9 Male = 17	Female = 12 Male = 8	Female = 2 Male = 13
FOCUS ^{od}	260.74 (46.14) minimum = 128 maximum = 337	251.88 (49.36) minimum = 128 maximum = 310	267.80 (46.78) minimum = 171 maximum = 337	266.67 (39.33) minimum = 199 maximum = 309
VABS-II ^e	118.84 (20.50) minimum = 62 maximum = 169	121.00 (21.98) minimum = 79 maximum = 169	118.90 (21.07) minimum = 86 maximum = 152	115.00 (17.63) minimum = 62 maximum = 137
CFCS-Level ^f	Mode = 3 (46%) Range = 1–5	Mode = 3 (46%) Range = 1–5	Mode = 3 (50%) Range = 1–4	Mode = 3 (33%) Range = 1–4
Speech-language impairment	Speech-language = 61% Language = 23% Speech = 15%	Speech-language = 65% Language = 12% Speech = 23%	Speech-language = 55% Language = 35% Speech = 10%	Speech-language = 53% Language = 20% Speech = 27%
Racial background	Caucasian (n = 37, 61%); Hispanic (n = 6, 10%); Caribbean-Black (n = 5, 8%); South-Asian (n = 5, 8%); Asian (n = 4, 7%); African-Black (n = 2, 3%); Other (n = 2, 3%)	Caucasian (n = 18, 69%); Hispanic (n = 3, 11%); South-Asian (n = 2, 8%); Asian (n = 1, 4%)	Caucasian (n = 9, 45%); African-Black (n = 2, 10%); Caribbean-Black (n = 3, 10%); Hispanic (n = 2, 10%); South-Asian (n = 2, 10%); Other (n = 1, 7%)	Caucasian (n = 10, 66%); Hispanic (n = 1, 7%); Caribbean-Black (n = 2, 13%); Other (n = 1, 7%); South-Asian (n = 1, 7%)
Residential status	Rural = 43% Urban = 57%	Rural = 40% Urban = 60%	Rural = 45% Urban = 55%	Rural = 33% Urban = 67%
Income-earning status	Single = 43% Dual = 57%	Single = 62% Dual = 38%	Single = 50% Dual = 50%	Single = 60% Dual = 40%
Specific medical diagnosis	n = 20 (33%)	n/a	n/a	n = 20 (100%)

Notes: Mean or mode values are reported with standard deviations in parentheses for the FOCUS^o and VABS-II raw scores. ^a Group 1 = Intervention and speech-language impairment (Sp/LI). ^b Group 2 = Intervention and Sp/LI+developmental mobility impairment. ^c Group 3 = Waitlist control. ^d FOCUS^o = Focus on the Outcomes of Communication Under Six; Thomas-Stonell et al., 2013. ^e VABS-II = Vineland Adaptive Behavior Scales-II (Socialization Domain); Sparrow et al., 2005. ^f CFCS = Communication Function Classification System (CFCS); Hidecker et al., 2011). Level 1 = 'effective sender and receiver with unfamiliar and familiar partners'. Level 2 = 'effective but slower paced sender and/or receiver with unfamiliar and/or familiar partners'. Level 3 = 'effective sender and receiver with familiar partners'. Level 4 = 'inconsistent sender and/or receiver with familiar partners'. Level 5 = 'seldom effective sender and receiver even with familiar partners'.

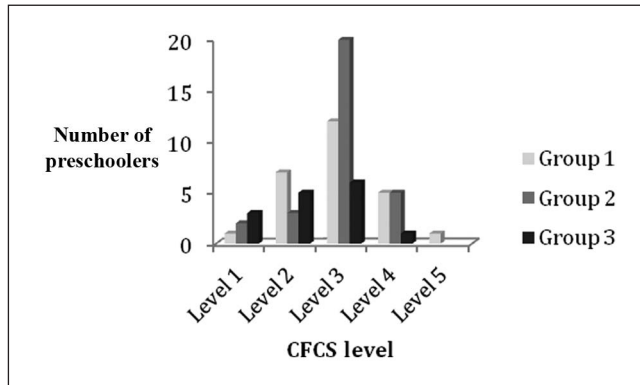


Figure 1. Preschoolers' distribution illustrated for the Communication Function Classification System (CFCS): CFCS levels for each group.

Notes. Group 1 = Speech-language impairment+intervention. Group 2 = Speech-language impairment+developmental mobility impairment+intervention. Group 3 = Waitlist controls.

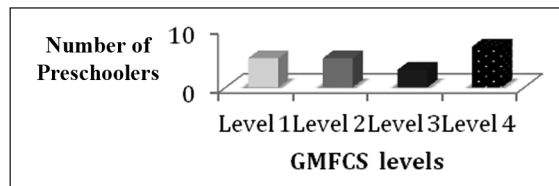


Figure 2. Preschoolers' distribution illustrated for the Gross Motor Function Classification System (GMFCS): Group 2: GMFCS distribution.

income, $F(2,58) = .32$, $p = .725$, $\eta^2 = .01$ and English as a second language home environment, $F(2,58) = 1.87$, $p = .164$, $\eta^2 = .06$. Within groups, participants' pre-intervention performance was statistically non-significant on each of the above-mentioned characteristics and measures ($p > .05$).

5 Procedures

All parents completed FOCUS[®] assessments; however, only Groups 1 and 2 also received speech-language intervention.

a FOCUS[®] assessment protocol. All parents completed 10–15-minute telephone interviews about their preschooler's communicative-participation at pre-intervention, post-intervention and 3-months post-intervention. Parents' perspectives on children's communicative-participation were considered important because parents have opportunities to observe their children's interactions in everyday environments (e.g. home, playground) (Washington et al., 2012). Telephone interviews were used to reduce respondent burden for travel to the research site (see Johnson et al., 1999), and to allow parents maximum flexibility. The FOCUS[®] was administered by a registered SLP (the first author) who was not involved in the preschoolers' speech-language assessment or intervention. Test-retest issues were not a concern for these interviews, as responses were considered to be spontaneous at each assessment time point. However, integrity in data collection of the FOCUS[®] interviews was addressed.

b Procedural validity. Integrity of data collection was safeguarded in three ways. First, questions from the FOCUS[®] were always administered in the same order. Second, the first author had no knowledge of the FOCUS[®] score calculation procedures until all data were collected. Third, two graduate SLP students observed 10% percent of interviews, which were randomly selected from all three assessment periods. The interviewer was found to have adhered to an invariant protocol 100% of the time.

c Intervention overview. The study's intent was to describe the communicative-participation outcomes measured by the FOCUS[®] for a range of interventions provided by SLPs in different community settings. Therefore the number of interventions utilized was not restricted. However, intervention fidelity was addressed.

d Intervention fidelity. The first author randomly observed 20% of intervention sessions. Each session observed was for a different preschooler ($n = 9$), and sites were equally observed. Before the first author travelled to a community setting, the SLP conducting the intervention confirmed the following information about each participant: (1) Sp/LI addressed; (2) goals targeted in the session; (3) techniques/approaches; (4) materials; and (5) intervention length. Random observations of SLPs at each participating site revealed that SLPs adhered to the information provided 100% of the time for all five items (1) to (5). The first author also met with participating SLPs individually to obtain information about session details and an overview of services.

Speech-language intervention goals were targeted based on preschoolers' initial assessments with a registered SLP (see Appendix 1). The most to least frequently addressed intervention goals across preschoolers were: expressive language (41%), speech-sound production (31%), receptive language (23%), voice/resonance (2.5%), and use of augmentative-and-alternative communication devices (2.5%). Each goal targeted an identified need for each preschooler (e.g. velar fronting). Participants' communicative-participation was not directly targeted.

Participating SLPs provided intervention services using different therapy techniques and approaches (e.g. drill-play, focused stimulation, indirect language stimulation, facilitated play, script therapy, structured play, emphatic stress) within family-centred practices. The use of family-centred practice along with the mentioned intervention approaches and techniques are considered common to SLP intervention services for preschool children (see Law et al., 2012; Paul and Norbury, 2012). During intervention sessions, between three to four goals typically were targeted (e.g. production of /s/-initial, use of 'he' subject-slot, comprehension of basic concepts, increasing understanding of 'wh' questions'). Following practice activities, preschooler-SLP dyads engaged in training opportunities to address areas of need. Multiple repeated opportunities were provided during each session. SLP support and guidance was provided during sessions with scaffolding and intermittent reinforcement being used, as needed. The SLP also provided direction and modelling on listening, waiting, taking-turns, and making requests. Primarily, success in intervention was determined based on training to a 70% or 80% criterion for each goal.

On average, Groups 1 and 2 preschoolers ($n = 46$) received 16 hours of direct group ($n = 16$ preschoolers) or individual ($n = 30$ preschoolers) intervention with a SLP ($SD = 10.20$, range = 5–41 hours, inter-quartile range = 12.0). The average intervention length was 17 weeks ($SD = 10.43$, range = 5–29 weeks, inter-quartile range = 20.0). Individual intervention (63%), group intervention (28%), and group plus individual intervention (9%) was provided. Also intervention frequency varied from one per week to twice per week, most preschoolers (83%) received intervention once weekly. At the end of each session, SLPs provided suggestions for home activities targeting goals addressed during the session. All intervention sessions were provided in English. At follow-up (i.e. 3-months post-intervention), children were discharged from their current block of

intervention, and parents were provided with home-practice suggestions targeting goals addressed during the intervention block. SLPs ($n = 7$, 100%) reported that preschoolers achieved success in intervention for goals targeted over the therapy block.

e Identification of predictor variables. Predictor variables were identified using demographic information and following testing. Three variables were included as predictors of outcomes. The Functioning and Disability factors included in this study were: (1) initial social skills (VABS-II) and (2) risk status, i.e. (a) single Sp/LI only or (b) dual Sp/LI and developmental MI. The Contextual Factor included in this study was 'intervention status', i.e. (a) intervention or (b) waitlist control.

III Results

I Statistical analyses and design

A pre–post follow-up design was employed. One-Way Analyses of Variance (ANOVAs) were used to compare communicative-participation outcomes across time (pre- to post- to 3-months post-intervention) for each group (row effects). An adjusted pre-set alpha level ($p < .017$) representing a Bonferroni correction was used to establish statistical significance. The authors sought to establish whether a 'minimal clinically important difference' (MCID) had occurred in communicative-participation over time for each group. A MCID is defined as the difference in function that is perceived as beneficial and leads to changes in the child's management (Jaeschke et al., 1989). The FOCUS[®] developers state that a 16-point gain from pre-test FOCUS[®] scores is clinically significant (Thomas-Stonell et al., 2013). Specifically, parents and clinicians agreed that there had been significant progress greater than 95% of the time associated with a score change of 16 points or more. To establish the MCID in the current study we used difference scores between pre- and post-intervention (post minus pre) and between post- and 3-months post-intervention (3-months post-minus post-intervention).

Regression analyses were completed to examine specific relationships. The relationship between Functioning and Disability (initial social skills, risk status) and communicative-participation changes was evaluated. The relationship between Contextual Factors (intervention status) and communicative-participation changes was also evaluated. Pre-intervention to post-intervention (immediate change) and post-intervention to 3-months post-intervention (continued change) performance for communicative-participation outcomes were considered as dependent variables. The significance of the relationships was evaluated using a pre-set alpha level ($p < .05$). Standard conventions (i.e. .10, .30, and .50) to indicate small, medium, and large coefficients were used to determine the magnitude of the regression coefficients (Green and Salkind, 2011).

Raw scores on the FOCUS[®] were entered into the Statistical Program for the Social Sciences (SPSS) to complete the ANOVA. To complete the regression analyses, raw score changes on the FOCUS[®] were utilized.

2 Communicative-participation outcomes

Univariate ANOVAs for Group 1, $F(2, 50) = 32.56$, $p < .001$, $\eta^2 = .57$ and Group 2 preschoolers, $F(2, 38) = 20.06$, $p < .001$, $\eta^2 = .51$ met the adjusted pre-set alpha level of .017. Pairwise comparisons of means revealed significant mean differences for pre-intervention to post-intervention and pre-intervention to 3-months post-intervention. The magnitude of gains between these time points also met the 16-point criterion for a MCID. Outcomes for Group 3 preschoolers did not meet the set significance level, $F(2, 20) = 1.41$, $p = .267$, $\eta^2 = .12$, and also did not meet the criterion for a

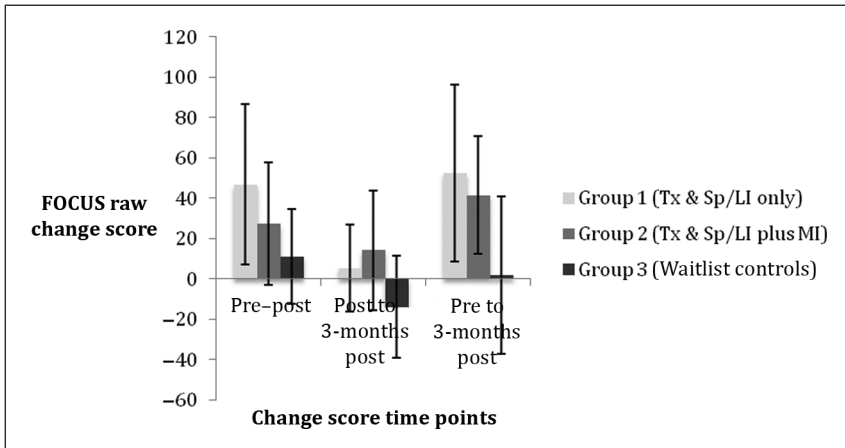


Figure 3. Mean raw change scores on the FOCUS® illustrated for assessment time points. Notes. Tx = Intervention. Sp/LI = Speech-language impairment+intervention. MI = Developmental mobility impairment+intervention. Header and footer data. Preschool participation outcomes and predictors 22.

MCID. Therefore, only intervention participants experienced clinically meaningful outcomes across time; for mean change score performance between time points, see Figure 3.

3 Predictors of communicative-participation outcomes

Regression analyses were interpreted for significance of the overall regression models, and the impact of individual predictor variables on dependent variables (Green and Salkind, 2011). All preschoolers ($n = 61$) were included in the regression analyses. Raw change scores for immediate change (pre to post) and continued change (post- to 3-months post-intervention) on the FOCUS® were dependent variables. Functioning and Disability Factors and Contextual Factors were predictor (independent) variables. For the relationships among predictor and dependent variables, see Table 2.

Two-predictor and a single-predictor regression models were included. The two-predictor model included initial social skills and risk status (Sp/LI only or Sp/LI+developmental MI) as predictors for Functioning and Disability. The single-predictor model included intervention status as the predictor for Contextual Factors.

a Functioning and disability and FOCUS® immediate change scores. The regression model was significant, $R = .33$, $R^2 = .11$, $F(2,58) = 3.47$, $p = .038$. A significant negative correlation was observed between initial social skills, $r(58) = -.32$, $p = .013$ and change scores pre-intervention to post-intervention only. Examination of the predictor variables revealed that initial social skills, $\beta = -.32$, $t(58) = -2.54$, $p = .014$, was the only significant single predictor of FOCUS® change scores. The magnitude of the regression coefficient (β) was medium.

b Functioning and disability and FOCUS® continued change scores. The regression model was not significant, $R = .31$, $R^2 = .09$, $F(2,58) = .299$, $p = .058$. However, a significant negative correlation was observed between risk status, $r(58) = -.28$, $p = .012$, and the dependent variable. Examination of the predictor variables revealed that risk status, $\beta = -.28$, $t(59) = -2.20$, $p = .032$, was the only significant single predictor of FOCUS® change scores. The magnitude of the regression coefficient (β) was small.

Table 2. Correlations among independent and dependent variables.

	Intervention status (ITx or waitlist control)	Initial social skills	Pre-post FOCUS [®] change	Post-3-months post FOCUS [®] change	At risk status (dual or single)
Intervention status (ITx or waitlist control)	–				
Initial Social Skills	-.12 ^a	–			
Pre-post FOCUS change	-.31 ^c	-.32 ^c	–		
Post-3-months post FOCUS change	-.40 ^c	.13 ^a	-.07 ^a	–	
At risk status (dual or single)	.38 ^c	-.12 ^a	.09 ^a	-.28 ^b	–

Notes. ^a $p > .05$, ^b $p < .05$, ^c $p \leq .01$. Initial Social Skills = Vineland Adaptive Behavior Scales (VABS-II) raw scores. FOCUS = Focus on the Outcomes of Communication Under Six. At risk status (dual) = speech-language impairment (Sp/LI)+developmental mobility impairment. At risk status (single) = Sp/LI only.

c Contextual factors and immediate FOCUS[®] change scores. The regression model was significant, $R = .33$, $R^2 = .11$, $F(1,59) = 7.18$, $p = .010$. There was a significant negative correlation, $r(58) = -.31$, $p = .014$, with the dependent variable. Intervention status also significantly predicted FOCUS[®] change scores, $\beta = -.33$, $t(59) = -2.68$, $p = .010$. The magnitude of the regression coefficient (β) was medium.

d Contextual factors and FOCUS[®] continued change scores. The regression model was significant, $R = .37$, $R^2 = .14$, $F(1,59) = 9.29$, $p = .003$. A significant negative correlation was observed between the variables, $r(58) = -.40$, $p = .001$. Intervention status was also found to be a significant predictor of FOCUS[®] change scores, $\beta = -.37$, $t(59) = -3.05$, $p = .003$. The magnitude of the regression coefficient (β) was medium.

IV Discussion

The study's purpose was to investigate communicative-participation outcomes, including magnitude of change achieved and maintained, and the predictor(s) of outcomes for a sample of preschoolers with speech-language impairments (Sp/LI) with and without concomitant developmental mobility impairments (MI). Research on communicative-participation outcomes for preschoolers with Sp/LI has been under-represented in the literature compared to the vast research on traditional speech-language outcomes (e.g. increased grammatical abilities).

I Communicative-participation outcomes

The varieties of speech-language interventions provided were related to significant communicative-participation outcomes as measured by the FOCUS[®]. Thus, as hypothesized, only preschoolers who received some form of speech-language intervention provided in community-based settings experienced significantly better communicative-participation outcomes across time. A key interpretation was that these communicative-participation outcomes were achieved, despite not being an actual targeted goal in intervention. Follow-up tests revealed that statistically significant changes in performance occurred between starting and completing the intervention programs and between the starting point and the end of the follow-up period. These outcomes were also reflective of a

MCID in performance for the same time points. Parents reported observing improvements in preschoolers' ability to make friends, handling frustration, and joining in conversations with others. Thus, participating in therapy with a SLP was beneficial in improving these skills. In contrast, the sample of waitlist controls did not achieve statistically significant or MCID over the same time-periods. The lack of MCID changes in performance observed for the waitlist-control group suggested that the level of outcomes achieved were not sufficient to lead beneficial changes in these children's inclusions with others, considered an important part of communicative-participation.

A child's ability to use his or her speech-and-language skills to be included with others for the purpose of communicating has been recognized in the literature (Threats, 2003). This ability is an important intervention outcome and a natural consequence of having increased speech and language skills (ASHA, 2004). Further, changes in performance that facilitate a positive difference in function and result in changes in inclusions with others, are critical to achieving clinically important differences in a child's performance (Jaeschke et al., 1989).

2 Predictors of communicative-participation outcomes

Functioning and Disability and Contextual Factors can mediate communicative-participation outcomes (WHO, 2007). We hypothesized that regression models for Functioning and Disability Factors and Contextual Factors would predict the magnitude of changes observed in communicative-participation outcomes over time. However, there was a differential impact of models depending on the time frame of evaluation.

a Functioning and disability. Initial social skills and risk status (i.e. Sp/LI only, Sp/LI + developmental MI) both predicted communicative-participation outcomes, thus supporting our hypothesis. Initial social skills was predictive of communicative-participation outcomes immediate change scores. Preschoolers who had lower social scores at pre-intervention achieved greater change scores in communicative-participation. The authors do not interpret this to mean that children with lower social skills have better communicative-participation outcomes over time, nor that this performance pattern is a regression to the mean. Instead, these preschoolers had more 'room to grow' in their social skills development and as such demonstrated larger gains compared to preschoolers who initially had higher social skills. Preschoolers with Sp/LI have been shown to be less likely to initiate interactions with peers, limiting their opportunities to practice communication and social skills (Redmond and Rice, 1998). Thus, it is beneficial that those children who had the greatest 'room to grow' were able to improve, thereby increasing opportunities to interact successfully with others. Increased abilities to participate with others in everyday activities that are social or educational in nature are important (Dempsey and Skarakis-Doyle, 2010). The current findings support the notion that communicative-participation outcomes can be positively impacted by increased social skills.

The presence of developmental mobility impairment along with Sp/LI was associated with lower FOCUS[®] change scores post- to 3-months post-intervention for the sample of preschoolers. Consequently, it appears that having a dual risk status presents additional challenges that reduce the magnitude of gains preschoolers can continue to achieve following a break in intervention. Paul and Roth (2011) in their review indicated that congenital conditions and biological/medical risk factors could put children at risk and impact speech-language outcomes. Earlier research had also noted that children with dual diagnoses might be less successful in their attempts to be included with others (King et al., 1997). The current findings therefore support the notion that communicative-participation outcomes (Activities and Participation) can be negatively impacted by developmental MI (Body Functions and Structures), particularly for the maintenance of these outcomes.

b Contextual factors. The relevant finding was intervention status was significantly correlated with and predicted FOCUS[®] change scores immediate gains and continued growth. This finding relates to Glogowska et al. (2000) who found that receiving intervention is important to children achieving good outcomes. Previous research has demonstrated that preschoolers with Sp/LI require and benefit from speech-language intervention. These findings demonstrate that the interventions can have broad impacts on untargeted areas, highlighting the breadth of impact on speech-language functioning (Frome Loeb et al., 2001; Tyler et al., 2002; Washington, 2013). Our findings are therefore important since they suggested that children who received intervention experienced an advantage in their communicative-participation outcomes over waitlist controls by virtue of being enrolled in intervention with a SLP.

3 Limitations and future directions

Our investigation included a variety of interventions across preschoolers rather than investigating the effectiveness of one particular intervention on communication-participation outcomes. Ideally, more details about a particular intervention could elucidate which features of the intervention result in significant communicative-participation outcomes for preschoolers with Sp/LI. Other researchers (e.g. Tyler et al., 2002; Washington, 2013) have investigated cross-domain influences following specific types of speech-language intervention. Future research would continue to contribute to the body of evidence documenting the spreading effects of speech-language interventions on untargeted domains.

It would have been ideal to have two control groups to strengthen conclusions made in the current study. Future research should include one control group for the sample of preschoolers with Sp/LI only who received intervention and preschoolers with Sp/LI and developmental MI who received intervention. Specific statements could be made about the outcomes for those children who did and did not receive intervention. In the current study, it was not possible to recruit a two such groups of control preschoolers.

The authors acknowledge that the strength of the predictors to the dependent variables ranged from small to medium, thus limiting the magnitude of statements that can be made for the population of children with Sp/LI.

V Conclusions and clinical implications

This study highlighted clinical information that is beneficial to SLPs providing services in community-based settings (e.g. schools, daycares, speech-language centres). In this study, the sample of preschoolers who received speech-language interventions (i.e. 16 hours on average) from a SLP in a community-based setting achieved statistically significant and clinically meaningful changes over time in their communicative-participation, even though these changes were not the direct focus of the interventions received. Preschoolers who were on a waitlist for intervention did not experience similar outcomes.

The magnitude of immediate changes observed in communicative-participation was predicted by: (1) initial social skills, with those preschoolers who had the most need for room to grow in this area demonstrating the most changes; (2) risk status, where preschoolers with a dual risk status achieving lower communicative-participation outcomes; and (3) intervention status, with waitlist controls not achieving good outcomes.

The current findings provide clinical support for the theoretical notion that communicative-participation outcomes are mediated by a preschooler's functioning-and-disability and contextual situations. Ultimately, positive communicative-participation outcomes are possible for some

preschoolers with Sp/LI and specific factors reflective of the ICF-CY components are predictive of magnitude of immediate and continued changes achieved in communicative-participation outcomes over time.

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Declaration of Conflicting Interest

We would like to acknowledge that the second author NTS is a co-developer of the Focus on the Outcomes of Communication Under Six (FOCUS®). There are no other conflicts of interest to declare.

Note

1. Capitalization has been used to be consistent with usage in the ICF-CY and to differentiate between everyday usage of these terms. Definitions are taken from WHO (2007: 9).

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Appendix I. Sample intervention information.

Preschooler	Disorder area	Community setting	Amount of intervention	Type of intervention	Goals targeted
G1019	Speech sound disorder (SSD)	Preschool speech-language centre (PSLC)	5 hours	Individual	<ul style="list-style-type: none"> • /k, g, s, z, f/-initial, final position • /s/-consonant clusters
G1033	SSD	PSLC	12 hours	Individual	<ul style="list-style-type: none"> • /f, m, n, b, p, d, k, g/-initial, final • speech intelligibility
G2010	Speech-language impairment (Sp/LI)	School-based	15.5 hours	Individual	<ul style="list-style-type: none"> • expressive-vocabulary • understanding and use: action-words • understanding and use: basic and linguistic concepts
G2001	(Sp/LI)	School-based	15.5 hours	Individual	<ul style="list-style-type: none"> • /s, ʃ/-medial • /t, d, f, s/-all positions • /s/-consonant clusters • nasal-turbulence on fricatives
G1034	(Sp/LI)	(PSLC)	7 hours	Individual	<ul style="list-style-type: none"> • expressive grammar (<i>he, she</i>) • receptive-language (first/last; top/bottom) • /k, g, s, f/-initial, final position

Note. Goal information provided by participating SLPs, representing 10% of the sample of preschoolers receiving intervention. These samples were randomly chosen.