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RUNNING HEAD: Impact of speech impairment

The impact of speech impairment in early childhood: Investigating parents' and speech-language pathologists' perspectives using the ICF-CY

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Keywords: speech impairment, International Classification of Functioning, Disability and Health – Children and Youth (ICF-CY), impact, parents, speech-language pathologists

Abstract

Purpose: To explore the application of the Activities and Participation component of the International Classification of Functioning, Disability and Health – Children and Youth (ICF-CY, World Health Organization, 2007) as a framework for investigating the perceived impact of speech impairment in childhood.

Method: A 32-item questionnaire based on six ICF-CY domains was distributed to a) a national sample of speech-language pathologists (SLPs; n=205), and b) parents (n=86) of preschool children identified with speech impairment.

Results: Factor analysis of the SLP data revealed six coherent factors with moderate-high internal reliability: Verbal communication (e.g., Conversation, Speaking), Advanced learning (e.g., Learning to read/write), Interpersonal interactions (e.g., Relating with strangers, Informal social relationships), Basic learning (e.g., Copying, Rehearsing), Applied learning and general tasks (e.g., Focussing attention, Handling stress), and Non-verbal communication. The first five factors were also confirmed by the parent data. Both SLPs and parents rated the first two factors, Verbal communication and Interpersonal interactions, as the most difficult activities for children with speech impairment.

Conclusion: The ICF-CY Activities and Participation component is a useful framework for considering the breadth of activities that may be impacted by speech impairment in childhood.

1.0 Introduction

Speech impairment, which includes articulatory, phonological, and motor speech disorders, has been identified as the most common communication concern among parents and teachers of preschool children (McLeod & Harrison, 2009). In addition, speech impairment is the most common diagnostic category among referrals received by paediatric speech-language pathologists (SLPs) (Broomfield & Dodd, 2002; Mullen & Schooling, 2009). Speech impairment may continue beyond childhood (Law, Boyle, Harris, Harkness, & Nye, 2000), and there is a growing awareness that difficulties associated with speech impairment may extend beyond unclear speech (cf. McCormack, McLeod, Harrison, & McAllister, 2009). Consequently, SLPs working with children with speech impairment and their families need a holistic framework to guide their assessment and service provision for these clients and to ensure they address all their client's needs.

1.1. The ICF and ICF-CY

The International Classification of Functioning, Disability and Health (ICF) was proposed by the World Health Organization in 2001 as a framework for considering health in a holistic sense. It has been recommended as applicable to the field of speech-language pathology (e.g., Threats, 2006; Threats & Worrall, 2004), and together with the ICF-Children and Youth (ICF-CY; WHO, 2007), it has been recommended as applicable specifically to children with speech impairment (e.g., McLeod & McCormack, 2007; McLeod & Threats, 2008).

The ICF and ICF-CY classify health and wellbeing by describing features of health (e.g., speaking, seeing, hearing) and health-related domains (e.g., social interactions) in a structured, inter-related way. Both are organised in a hierarchy, with

two parts, each with two components (see Figure 1). Part 1 relates to Functioning and Disability, and is comprised of the Body Functions and Structures component, and the Activity and Participation component. The Body Functions and Structures component is further divided into domains, which are organised according to body structures and systems. The Activities and Participation component is further divided into domains which include the tasks and actions in which an individual engages in everyday life. Part 2 is labelled Contextual Factors, and comprises the Environmental Factors component, and Personal Factors component. These components are also further divided into domains which cover the external (Environmental) and internal (Personal) influences on functioning and disability.

[Insert Figure 1 here]

The ICF-CY was derived from the ICF to specifically cover the ages from birth to 17 years. The development of the Children and Youth version was deemed necessary to take into account the differences between children and adults, and the constantly changing nature of children's health and development (McLeod & Threats, 2008). In the ICF-CY, the main structure of the ICF was maintained; however, new content (e.g., new Activities and Participation items) were added and inclusion/exclusion criteria for codes were expanded.

The WHO (2001, 2007) has recognised the range of possible applications of the ICF and ICF-CY; specifically as a statistical tool, a research tool, a clinical tool, a social policy tool and an educational tool. In the application of the ICF to speech-language pathology research, Worrall and Hickson (2008) identified the need to focus on the effect

of impairment on the range of Activities and Participation (rather than only the severity or extent of the impairment), as an important consideration for professional practice. At present, there is a lack of empirical data regarding the use of the ICF and ICF-CY (particularly the Activities and Participation component) as a framework for researching effects of impairment. This paper focuses on use of the Activities and Participation component of the ICF-CY in identifying the impact of speech impairment in childhood.

1.2. The Activities and Participation Component: Researching Impact

In the ICF and ICF-CY, Activity¹ is defined as “the execution of a task or action by an individual” and Participation is defined as “involvement in a life situation” (WHO, 2001, p. 14). The domains in this component are intended to cover “the full range of life areas” with “no overlap or redundancy” (WHO, 2001, p. 14). Consequently, domains from the ICF and ICF-CY components of Activities and Participation are useful when assessing the impact of a health condition to ensure consideration is given to the full range of areas that may be affected. Nine domains are identified: Learning and applying knowledge, General tasks and demands, Communication, Mobility, Self care, Domestic life, Interpersonal interactions and relationships, Major life areas, and Community, social and civic life. Each domain is described by specific items (total number of two-level items in the ICF-CY = 132).

Simeonsson (2003) identified a core set of 11 items from the Activities and Participation component of the ICF that could be applied to children with communication impairment. However, the recommended items all came from the Communication domain. Since then, researchers have suggested other domains are also relevant to

¹ Capitalization has been used for Activities and Participation terms to be consistent with usage in the ICF and to differentiate between everyday usage of these terms.

considering communication skills (McLeod & Threats, 2008; Worrall & Hickson, 2008). Indeed, Worrall and Hickson (2008) have suggested that consideration of the full range of domains should occur in order to avoid “ignoring the effect that a communication disability may have on all areas of life” (p. 76).

In the ICF and ICF-CY, when individuals have difficulty executing activities, it is termed “Activity Limitations” and when individuals experience problems in involvement in life situations, it is termed “Participation Restrictions” (WHO, 2001, p. 10). The potential breadth of Activities and Participation that may be difficult for children with speech impairment may have implications for the ways in which impairments are managed.

1.3. The Impact of Speech Impairment: Research Using the ICF and ICF-CY

McCormack et al. (2009) conducted a systematic review of 57 papers investigating the association between childhood speech impairment and Activity Limitations and Participation Restrictions across the lifespan. The systematic review used the ICF as its framework to consider the range of Activities and Participation that may be difficult for children with speech impairment. The results of this review showed that speech impairment had been associated with limitations in Activities and Participation related to Learning and applying knowledge (e.g., Reading, Writing, Focussing attention, Thinking), Communication, Mobility, Interpersonal interactions and relationships (e.g., Informal social relationships, Parent-child relationships, Sibling relationships), and Major life areas (e.g., School education and Acquiring, keeping and terminating a job). However, in concluding, McCormack et al. (2009) acknowledged that other factors, including other impairments (e.g., concomitant language impairment), and personal

factors could have contributed to the results reported in some of the studies.

Only one of the 57 studies reviewed by McCormack et al. (2009) had used the ICF as a framework to inform their research (Teverovsky, Bickel, & Feldman, 2009), demonstrating the current lack of empirical research investigating the ICF. Teverovsky et al. (2009) used the ICF framework to guide the development of a questionnaire distributed to parents of children (2-15 years) with childhood apraxia of speech (CAS), requesting identification of Activities and Participation that may be difficult for their children. Parents reported the following to be difficult: Communication (e.g., Conversation and Discussion), Mobility (e.g., Fine motor skills), Handling stress and other psychosocial demands (e.g., Managing behaviour), Learning and applying knowledge (e.g., Learning to write), and Interpersonal interactions and relationships (e.g., Relating with strangers and peers). The study by Teverovsky et al. (2009) provides valuable information about the potential impact of speech impairment on children's life activities. However, some of the children were reported to have co-existing medical conditions (e.g., otitis media) so it is possible that the presence of other communication impairments and medical conditions contributed to the problems they experienced. Furthermore, no assessment results were provided to outline the speech skills of the children.

Since publication of the systematic review, Thomas-Stonell, Oddson, Robertson, and Rosenbaum (2009) have drawn on the ICF-CY to analyse the results of a questionnaire distributed to a) parents of children (2-5;7 years) with a range of communication needs (including 41% with developmental speech disorders) and b) the SLPs working with them. The questionnaire included three open-ended questions

examining the concerns about difficulties experienced by the children and expectations for therapy. Thomas-Stonell et al. (2009) reported that difficulties described by parents and SLPs were aligned with components of the ICF-CY (WHO, 2007). Consequently, they used the ICF-CY to categorise the concerns raised by the parents and SLPs and to enable a comparison between the two groups. Half the parents (48%) and SLPs (50%) were concerned prior to therapy that the children experienced Activity Limitations, and most (85% of SLPs and 63% of parents) expected this to change as a result of intervention. Concerns about Activity Limitations and expectations about improvements to Activities were the most frequent responses.

These two studies provide initial evidence of the usefulness of the ICF and ICF-CY in the field of childhood speech impairment and the importance of considering the Activities and Participation that may be affected by speech impairment (as well as the functional difficulties). However, the type and range of Activities and Participation SLPs and parents perceive as being difficult for children with speech impairment is unknown.

1.4. Incorporating parent perceptions

SLPs have traditionally managed speech impairment on the basis of functional difficulties (McLeod, 2004; Skahan, Watson, & Lof, 2007; Williams, McLeod, & McCauley, 2010). That is, children are diagnosed with speech impairment when unable to articulate particular sounds or words, and intervention then typically targets those sounds and words. While parents and significant others are encouraged to be involved in the management process, SLPs typically make the final decision regarding intervention goals (Watts Pappas, McLeod, McAllister, & McKinnon, 2008). McLeod and Baker (2004) reported that stimulability and normative data more commonly influence SLPs'

decision-making, than sounds the parent/child would like to say. Knowledge of parental perceptions of the impact of having speech impairment and their preferences for management is necessary for practice to become more family-friendly. It is currently unclear whether SLPs' perceptions are consistent with parental perceptions regarding the activities that may be affected by childhood speech impairment.

1.5. Aims of this Research

The research reported in this paper used the Activities and Participation component from the ICF-CY (WHO, 2001) as a framework for investigating the impact of speech impairment on young children's life activities. The aims of the research were 1) to explore the usefulness of the ICF-CY as a framework for investigating the impact of speech impairment on life activities in early childhood; 2) to examine the range of Activities and Participation that may be difficult for young children as a result of speech impairment from the perspectives of parents and SLPs; and 3) to compare Activities and Participation identified by parents and by SLPs in order to consider the emphasis and priorities of intervention for those who seek intervention (parents) and those who provide intervention (SLPs) for children with speech impairment.

2.0. The Development of the ICF-CY Questionnaire for Early Childhood

Simeonsson et al. (2003) suggested the ICF could contribute to the development of assessments by guiding the selection of items on questionnaires and scales that document the type and extent of impairments and their impact on functioning and participation. Thus, in order to determine the impact of speech impairment on life activities in early childhood, a questionnaire was developed, based on the Activities and

Participation component of the ICF-CY. The list of Activities and Participation items selected for the questionnaire was informed by previous research by McCormack et al. (2009) and Teverovsky et al. (2009). That is, items were selected that previously have been found to be associated with speech impairment. In addition, items were chosen to reflect the tasks and activities relevant to 4- to 5-year-old children. Consideration was given to all domains of the component, as recommended by Worrall and Hickson (2008). The resulting questionnaire listed 32 items, taken from the ICF-CY Activities and Participation component (see Table 1; Column 1, Domain and Activity). Items were selected from six domains: Learning and applying knowledge (n=10), General tasks and demands (n=5), Communication (n=8), Domestic life (n=1), Interpersonal interactions and relationships (n=6), and Community, social and civic life (n=2). Items from the three other domains were not included: Mobility, Self care and Major life areas. Items from the Mobility and Self care domains were excluded due to lack of relevance to the population of interest. Most items from the Major life areas were excluded due to lack of relevance to the age group of interest. Two items (Informal education and Preschool education) were appropriate for the age-group, but were omitted because it was likely that some SLPs would not be familiar with this aspect of the children's experience.

The 32-item ICF-CY questionnaire for early childhood was used in two research studies. Ethical approval for both studies was obtained from the Charles Sturt University Ethics on Human Research Committee.

3.0. Study One: SLPs' Perceptions of Activities and Participation Impacted by Speech Impairment

3.1. Method

3.1.1. Participants.

A total of 240 Australian SLPs were invited to participate in this study during two workshops about children with speech impairment presented as part of Speech Pathology Australia's professional development program (Baker, 2008; McLeod, 2008). Of these, 231 SLPs returned their questionnaires, with 204 responding to the ICF-CY items.

Participants were asked to provide information about their experience as an SLP (years working in the profession), their caseload (percentage of children with articulation and phonological delay/disorder, or childhood apraxia of speech (CAS)), and their area of specialisation (phonological delay/disorder or CAS). Approximately half of the SLPs (51.5%) had been working for 10 years or less (less than 1 year: 8.0%, 1-3 years: 15.9%, 4-6 years: 16.9%, and 7-10 years: 10.4%). The rest (48.5%) had been working for more than 10 years. Half of the SLPs (50.0%) had caseloads in which at least 40% were children with speech impairment and most (81.7%) had smaller caseloads of children with CAS (e.g., fewer than 10% of the caseload). The majority of SLPs (62.0%) identified that they specialised in the area of phonological delay/disorder, but fewer (21.8%) specialised in CAS. Further information about specialisation was not obtained, thus the extent of participants' specialised knowledge and skills is unclear.

3.1.2. ICF-CY questionnaire.

SLPs completed a 6-page questionnaire about their assessment and management of children with speech impairment. Only their responses to the 32 ICF-CY questions were used in the present study. Participants were asked to: "Think of typical 4- to 5-year-old children with moderate-severe speech impairment and no concomitant language

impairment. Please identify any activities that these children may have difficulty participating in, as a result of his/her speech (communication) difficulty (tick all that apply).” They were asked to rate the frequency of difficulty on a 3-point scale: 0 = never, 1 = sometimes, 2 = often.

3.1.3. Data analysis.

Responses to the questionnaire item and demographic data from the SLPs were entered into the Statistical Program for the Social Sciences (SPSS) Version 17.0.2 computer program (PASW Statistics, 2009). Descriptive statistics were used to determine the frequency and perceived level of impact that having a speech impairment had on ICF-CY Activities and Participation. Factor analysis was conducted to examine the coherence of the ICF-CY Activity and Participation domains and to inform the identification and computation of higher order constructs. Participant characteristics (experience, caseload, specialisation) were tested as a function of ICF-CY ratings in a series of analysis of variance (ANOVA) tests.

3.2. Results

3.2.1. Descriptive statistics: Activities and Participation perceived by SLPs as impacted by speech impairment.

A list of all the Activities and Participation items included on the questionnaire is presented in Table 1, with the corresponding number of SLPs who identified each item as “often,” “sometimes” or “never” being difficult for children with speech impairment (Columns 2 to 4). Not all SLPs responded to each item being analysed for this study, therefore the total number of responses for each item is also given in Table 1 (Column 5). The SLPs identified that all of the 32 listed items could “sometimes” or “often” be

difficult for children with moderate-severe speech impairment. Of these, there were five items that were perceived by the majority as “often” being difficult for children with speech impairment: Conversation (80.1%), Speaking (79.2%), Discussion (78.7%), Using communication devices (61.5%), and Relating with strangers (57.0%). Other items that were frequently identified as often being difficult were: Learning to read (47.0%), Learning to write (42.6%), Singing (42.0%), Informal social relationships (37.4%) and Formal relationships (36.2%). In contrast, Activities and Participation that were frequently identified as “never” being difficult included: Receiving non-verbal messages (56.0%), Producing non-verbal messages (45.8%), Undertaking a single task, (45.5%), Thinking (42.1%), Receiving – spoken messages (41.5%), Carrying out daily routine (39.1%), and Making decisions (38.2%).

[Insert Table 1 about here]

3.2.2. Exploratory factor analysis of ICF-CY items.

The underlying structure of the 32 ICF-CY items was analysed using Pearson product moment correlations as input in a principal components analysis. Results revealed six factors accounting for 60.19% of the common factor variance. Column 5 of Table 1 shows the Factor number (1 to 6) and the coefficient for each of the 32 items. Each of these six factors was given a unique title that drew on the ICF-CY domains and the features of the Activities and Participation items that loaded onto each. The six factors were labelled as: 1 = Applied learning and general tasks (Eigenvalue = 6.95), 2 = Interpersonal interactions (Eigenvalue = 5.78), 3 = Verbal communication (Eigenvalue =

2.07), 4 = Basic learning (Eigenvalue = 1.73), 5 = Advanced learning (Eigenvalue = 1.50, 6 = Non-verbal communication (Eigenvalue = 1.23).

The 6-factor structure showed coherence with the structure of the ICF-CY, in that the way items loaded onto factors was similar to the groupings of items in the Activities and Participation domains. Factor 1, Applied learning and general tasks, comprised nine items from two of the ICF-CY Activities and Participation domains. All of the items from the General tasks and demands domain loaded on this factor (Undertaking a single task: 0.662, Undertaking multiple tasks: 0.731, Carrying out daily routine: 0.536, Managing one's own behaviour: 0.623, Handling stress and other psychological demands: 0.462), along with four items from the Learning and applying knowledge domain (Focusing attention: 0.587, Thinking: 0.738, Solving problems: 0.795, and Making decisions: 0.800).

Factor 2, Interpersonal interactions, related to engaging with others and comprised nine items from three ICF-CY domains. All of the items from the Interpersonal interactions and relationships domain loaded on this factor (Basic interpersonal interactions: 0.652, Complex interpersonal interactions: 0.672, Relating with strangers: 0.599, Formal relationships: 0.678, Informal social relationships: 0.728, Family relationships: 0.679), along with the two items from the Community, social and civic life domain (Recreation and leisure: 0.664, and Play: 0.643) and the single item from the Domestic life domain (Assisting others: 0.460).

Factor 3, Verbal communication, related to producing verbal language and comprised five items, all of which were taken from the ICF-CY domain of Communication (Speaking: 0.789, Singing: 0.515, Conversation: 0.879, Discussion:

0.875, and Using communication devices and techniques: 0.588).

Factor 4, Basic learning, and Factor 5, Advanced learning, were both related to learning and comprised items taken from the Learning and applying knowledge domain. Factor 4 was comprised of the three items that related to skills required for basic learning (Copying: 0.696, Acquiring information: 0.647, Rehearsing: 0.688). Factor 5 was comprised of three items that related to more advanced learning skills (Learning to read: 0.856, Learning to write: 0.825, Acquiring skills: 0.512).

Factor 6, Non-verbal communication, related to receptive/non-verbal language and comprised three items from the ICF-CY domain of Communication (Receiving - spoken messages: 0.760, Receiving - non-verbal messages: 0.695, Producing non-verbal messages: 0.573).

Internal reliability for all factors was tested using Cronbach's alpha (α) and each was assessed to be within the acceptable range: Factor 1 $\alpha=0.86$, Factor 2 $\alpha=0.87$, Factor 3 $\alpha=0.81$, Factor 4 $\alpha=0.66$, Factor 5 $\alpha=0.73$ and Factor 6 $\alpha=0.72$. Therefore, composite scores were computed by taking the average of the scores for the items that loaded onto the factor to generate six new variables, each with a possible range of 0 (never difficult) to 2.0 (often difficult).

Results showed that SLPs rated Verbal communication (Factor 3) as the most difficult area for children with speech impairment: highest mean score ($M = 1.65$, $SD = 0.40$). Advanced learning (Factor 5) was the second most difficult area: mean score of 1.30 ($SD = 0.44$). Interpersonal interactions (Factor 2) had a mean score of 1.19 ($SD = 0.40$) and Basic learning (Factor 4) had a similar rating ($M = 1.17$, $SD = 0.41$). Lower ratings were given for Applied learning and general tasks (Factor 1) ($M = 0.90$, $SD =$

0.35) and Non-verbal communication (Factor 6) ($M = 0.57$, $SD = 0.45$) suggesting that these were perceived as least difficult for children.

3.2.3. Comparison of means (ANOVAs) between SLPs' perceptions and demographic variables.

The six factors were tested using analysis of variance (ANOVA) to determine whether the ratings provided by the SLPs were influenced by the demographic and clinical characteristics of the participants: years of experience (10 or less *vs.* more than 10); caseload characteristics (percent of children with speech impairment, percent with apraxia); specialisation (phonological delay/disorder, childhood apraxia). A series of 30 one-way ANOVAs were conducted (six factors by five demographic characteristics). Results (presented in Table 2) were non-significant for 29 tests. Only one achieved significance: SLPs who had a higher percentage of children with CAS on their caseload rated items relating to Non-verbal communication (Factor 6) as more difficult for children with speech impairment than SLPs with a lower percentage of children with CAS. Overwhelmingly, however, the Factor scores did not differ by the demographic characteristics of the SLPs.

[Insert Table 2 about here]

4.0. Study Two: Parents' Perceptions of Activities and Participation Impacted by Speech Impairment

4.1. Method

4.1.1. Participants.

There were 86 parents who participated in this study. All parents had children (aged 3;11 – 5;8 years; months) who were participating in the Sound Effects Study investigating the prevalence, severity and impact of speech impairment in a community-based sample of children (McLeod, Harrison, & McAllister, 2007-2009). All parents had reported that they were concerned about how their children “talk and make speech sounds.” However, parents were included as participants only when their concern was confirmed by a formal speech assessment (the Diagnostic Evaluation of Articulation and Phonology (DEAP); Dodd, Hua, Crosbie, Holm, & Ozanne, 2002), and when they returned their questionnaires. Figure 2 presents the protocol for inclusion of participants.

[Insert Figure 2 about here]

Children were identified as having speech impairment when their percentage of consonants correct (PCC) on the DEAP was more than one standard deviation below the normal range for their age (equivalent to a standard score of 6 or below). The children’s PCC on the DEAP ranged from 33.6% to 90.6% (mean = 66.7%). Most of the children were identified as having mild-moderate (57.0%) or moderate-severe (27.9%) speech impairment, according to the Severity Index (Shriberg & Kwiatkowski, 1982). Fewer were identified with mild (4.7%) or severe (10.5%) speech impairment. Only 30.2% of the children had been assessed previously and only 27.9% had received intervention with an SLP in the past. At the time of this study only 15.1% of children were receiving intervention.

4.1.2. ICF-CY questionnaire.

Parents were provided with an 18-page questionnaire containing information about their child’s birth and development, current functioning, and lifestyle. One section of the questionnaire was the same as that given to the SLPs in Study 1 and was analysed for this study. Parents were asked, “Please identify any (of the following 32) activities that your child has difficulty participating in, as a result of his/her speech (communication) difficulty (tick all that apply).” Response options were yes (1) or no (0).

4.1.3. Data analysis.

Responses to the questionnaire item and assessment results from the 86 children were entered into the Statistical Program for the Social Sciences (SPSS) Version 17.0.2 computer program (PASW Statistics, 2009). Descriptive statistics were used to determine the frequency with which the 32 ICF-CY Activities and Participation items were perceived by parents as difficult for children as a result of speech impairment. The six higher order constructs, based on the factor structure identified in Study 1, were tested for internal consistency and where appropriate, factor composite scores were computed.

4.2. Results

4.2.1. Descriptive statistics: Activities and Participation perceived by parents as impacted by speech impairment.

The ICF-CY Activities and Participation items are presented in Table 3, with the corresponding number of parents who identified each item as being difficult (yes) or not difficult (no) for their children. All 32 items were identified as being difficult by at least one parent. The Activities and Participation items most commonly identified as difficult were: Conversation (29.1% of parents), Speaking (27.9%), Learning to write (25.6%), Focusing attention (22.1%), Discussion (18.6%), Handling stress (17.4%), and Managing

one's own behaviour (17.4%). In contrast, the items identified by parents as not being difficult for children were: Carrying out daily routine, Receiving – non-verbal messages, and Recreation and leisure (98.8%), and Acquiring skills and Producing non-verbal messages (both identified by 97.7%).

[Insert Table 3 here]

4.2.2. Factor computation.

The factor structure identified in Study 1 was applied to Study 2, and the internal reliability was checked. Internal reliability for five of the six factors was within the acceptable range: Factor 1 $\alpha=0.76$, Factor 2 $\alpha=0.78$, Factor 3 $\alpha=0.71$, Factor 4 $\alpha=0.76$, and Factor 5 $\alpha=0.68$. The reliability for Factor 6 (Non-verbal communication) was outside the acceptable range ($\alpha=0.13$) and so was not included in further analyses. Composite scores were computed by averaging the relevant items, to generate five new variables each with a possible range of zero (not difficult) to 1.0 (difficult).

Results are presented in Table 4 and show that Verbal communication (Factor 3) was rated by parents as the most difficult area for children, with the highest mean score ($M = 0.19$, $SD = 0.26$). Advanced learning (Factor 5) ($M = 0.15$, $SD = 0.27$) was the second most difficult area and Applied learning and general tasks (Factor 1) ($M = 0.10$, $SD = 0.17$) was rated the third most difficult. Interpersonal interactions (Factor 2) ($M = 0.07$, $SD = 0.16$) and Basic learning (Factor 4) ($M = 0.09$, $SD = 0.23$) were rated the least difficult areas for children.

5.0. Comparing Parent and SLP Perceptions.

SLPs were asked to base their responses to the questionnaire on their knowledge of a child with “moderate-severe” speech impairment, whereas parents were asked to base their responses on their own child (over half of whom were assessed as having “mild-moderate” speech impairment). This difference in the severity of speech impairment in the Study 1 and 2 samples prevents direct comparisons being made between the responses of participants. Furthermore, the response options on the ICF-CY questionnaire distributed to parents (yes/no) and SLPs (never/sometimes/often) were different. However, the items on both questionnaires were the same, and the same factor structure was able to be applied to results for both groups in the computation of composite factor scores. Consequently, preliminary comparisons can be made based on results from Study 1 and Study 2, in an attempt to identify similarities and differences in the perceptions of SLPs and parents about the impact of speech impairment on children’s Activities and Participation.

For all the ICF-CY domains and their contributing items (Tables 2 and 3), SLPs were more likely to identify 4- to 5-year-old children with speech impairment as experiencing some degree of difficulty than were parents of children with speech impairment. Table 4 summarises the factor scores and items within each factor for SLPs and parents. Mean scores were consistently higher for SLPs (means up to 1.65 on a 0-2.0 scale) than for parents (means up to 0.19 on a 0-1.0 scale). However, whilst the mean scores cannot be directly compared, there was similarity in the order of impact. Both groups of participants rated Verbal communication (Factor 3; including Conversation, Speaking, and Discussion) as the area of greatest difficulty for children with speech

impairment, followed by Advanced learning (Factor 5; including Learning to read, and Learning to write).

For SLPs, Interpersonal interactions (Factor 2; including Relating with strangers, Informal social relationships, and Formal relationships) and Basic Learning (Factor 4; including Rehearsing, and Copying) were rated as the next most difficult. Applied learning and general tasks (Factor 1; including Focussing attention, Handling stress, Managing one's own behaviour, Undertaking multiple tasks) was seen by SLPs to be moderately difficult for children with speech impairment, and Non-verbal communication (Factor 6; including Producing non-verbal messages) was seen as the least difficult.

In contrast, parents' ratings placed Applied learning and general tasks as an area of greater difficulty than Interpersonal interactions and Basic learning. This suggests that parents and SLPs may have different perceptions regarding the Activities and Participation that are commonly difficult for their children as a result of their speech impairment. Specifically, parents may be more likely to identify Applied learning and general tasks as being problematic in comparison to SLPs.

[Insert Table 4 about here]

6.0. Discussion

6.1. Use of the ICF-CY (Activities and Participation) as a Measure of Impact

The first aim of this research was to evaluate the use of the ICF-CY Activities and Participation component as a framework for investigating the impact of speech impairment in childhood. Results from the factor analysis revealed Activities and

Participation items were predominantly grouped in factors that were similar in organisation to the ICF-CY Activity and Participation domains, although there were some new groupings that appeared in the factor structure. It is likely that the population under investigation influenced the groupings. For instance, items from the Communication domain loaded onto two separate Factors (3 and 6) which separated verbal versus non-verbal Activities and Participation. Given that this study focussed on children identified with verbal communication difficulties (i.e., speech impairment), the distinction between non-verbal and verbal communication skills (and the difference between SLPs' ratings of impact for both of these factors) is not unexpected.

Similarly, items from the Learning and applying knowledge domain loaded onto more than one factor, but again there were distinguishing features among the Activities and Participation items identified for each factor. For instance, items loading onto Factor 4 related to skills required for learning, items loading onto Factor 1 related to application of learning/knowledge, and those loading onto Factor 5 related to outcomes of learning. Given that this study focused on preschool children, who are in a rapid period of learning and developing, the distinction between these three separate stages in the acquisition and application of knowledge is particularly relevant.

Finally, Activities and Participation items from three different domains (Interpersonal interactions and relationships, Community, social and civic life domain, Domestic life) combined to form Factor 2, Interpersonal interactions, which related to engaging with others. This reflects the way in which communication and social interactions pervade many other activities of daily life, and thus supports the recommendation by Worrall and Hickson (2008) to consider more than just two ICF

Activities and Participation domains (Communication and Interpersonal interactions and relationships) when investigating the effect of communication impairment.

The internal reliability of the groupings identified through factor analysis was examined using Cronbach's alpha, and all were found to be within an acceptable range. The coherence of the six factors was confirmed in a series of one-way ANOVAs which showed that the demographic and caseload characteristics of the SLPs did not influence their scores, in 29 of 30 tests. That is, using the questionnaire as a measure of impact worked equally effectively regardless of the experience or specialisation of the participant. Only one difference was noted: SLPs who had more children with CAS on their caseload rated Non-verbal communication as more difficult for children with speech impairment than did SLPs with fewer children with CAS. The significance of this one ANOVA may be due to a Type 1 error, given the number of tests that were conducted. However, the significance may also be evidence of child-driven differences rather than participant-driven differences. CAS may be associated with an underlying motor impairment that could contribute to a range of difficulties (including difficulties with skills required for Non-verbal communication such as gesture), not typically associated with speech impairment (Hall, 2000; McCabe, Rosenthal, & McLeod, 1998). In this study, SLPs were asked to think about "typical 4- to 5-year-old children with a moderate-severe speech impairment," so those with a higher number of children with CAS on their caseload might have been thinking about these children with CAS when responding to items.

A further test of the coherence of the factors was conducted by applying the factor structure identified with the SLPs to the parent findings and re-checking the internal

reliability. Five of the six factors achieved an acceptable level of reliability. Only Non-verbal communication (Factor 6) had low internal reliability. . Notably, two of the three Activities and Participation items (Receiving – non-verbal messages, and Producing non-verbal messages) in this factor were the least frequently identified by parents (n=1 and n=2 respectively), suggesting that the low number of responses to these items affected the reliability of this factor. The otherwise consistent reliability of the factor structure when applied to different participants (both SLPs and parents) is further evidence of the effectiveness of the questionnaire as a measure of impact.

The ICF-CY Activities and Participation component has not been tested previously in this empirical way, and so the results of the present research, which are based on close to 300 participants, make an important contribution to research investigating the application of the ICF-CY as a clinical tool in the field of speech-language pathology.

6.2. Activities and Participation Impacted by Speech Impairment as Perceived by Parents and SLPs

The secondary aim of this research was to examine the range of Activities and Participation that may be difficult for children as a result of speech impairment and to compare the perspectives of SLPs and parents. Such comparison enables evaluation of the degree to which the two groups view the impairment from similar or different perspectives. Both groups perceived that children with speech impairments experienced difficulties with a range of activities as a result of their speech impairment. Indeed there were no Activities and Participation items that SLPs and parents identified as not being impacted.

The questionnaire completed by SLPs allowed them to distinguish between Activities and Participation that were “often” versus “sometimes” impacted by speech impairment. The majority of SLPs identified most Activities and Participation as being “sometimes” affected, which likely reflects their awareness that the experience of difficulty is dependant both on individuals and their environment. The impact of speech impairment on participation in life activities will not be the same for each child, nor will it be the same for a single child in different contexts. The ICF and ICF-CY recognises that functioning and disability are multifaceted and result from “an interaction or complex relationship between the health condition and contextual factors (i.e., environmental or personal factors)” (WHO, 2001, p. 19). Parent responses also reflected this individuality. Awareness of the possible range of Activities and Participation that may be impacted by speech impairment, and of the variability that exists among individual children, is important for SLPs to ensure appropriate clinical management. The Activities and Participation items identified by parents and SLPs as being impacted by speech impairment are grouped according to the factors to which they contributed and discussed in the following sections.

6.2.1. Factor 1: Applied learning and general tasks.

Parents rated difficulties with Applied learning and general tasks as the third most impacted area for their children with speech impairment ($M = 0.10$ on a 0-1.0 scale), compared with SLPs ($M = 0.90$ on a 0 to 2.0 scale) who rated it fifth. The factor scores for both parents and SLPs suggest neither group identified this area as being difficult for children with speech impairment. However, investigation of individual item scores showed four of the Activities and Participation items most frequently identified by

parents as being impacted by their child's speech impairment fall with this factor – Focusing attention (22.1%), Managing one's own behaviour (17.4%), Handling stress and other psychosocial demands (17.4%), Undertaking multiple tasks (15.1%). A similar percentage of SLPs as parents identified Handling stress as an area that might be difficult for children with speech impairment (16.1%), but fewer identified Managing behaviour, Focusing Attention, and Undertaking multiple tasks as “often” being an area of difficulty. None of the Activities and Participation items was among the most commonly identified by SLPs, as most indicated that they could be impacted “sometimes.”

The findings of the present study are consistent with findings by Teverovsky et al. (2009) who identified that parents of children with speech impairment (or CAS) are concerned about their child's ability to participate in activities related to Applying knowledge and general tasks. For instance, Teverovsky and colleagues reported Managing behaviour to be one of the most common areas of Activities and Participation with which children with CAS have difficulty. Half the parents who participated in their study identified Managing behaviour as a functional problem experienced by their children.

It is possible that the parent's identification of difficulty handling stress and managing behaviour is due to their awareness of their child's frustration with communication breakdowns associated with their speech impairment. Families of children with speech impairment have reported children may withdraw from communication interactions, or alternatively become frustrated when their attempts to communicate are not understood (McCormack, McLeod, McAllister, & Harrison, in press). Parent's identification of the difficulty that children with speech impairment may

have with general tasks and demands is evidence of the different knowledge they have about the impact of speech impairment in other contexts. This supports the finding of Thomas-Stonell et al. (2009, p. 39) that “parents were more aware of their child’s participation restrictions than clinicians.” SLPs may be less aware of a client’s difficulty with Handling stress and Managing behaviour due to the limited contexts in which they observe and interact with children. Thus, parents provide a unique and valuable perspective that is not otherwise available to SLPs.

6.2.2. Factor 2: Interpersonal interactions.

The area of Interpersonal interactions was rated by SLPs as the third most impacted for children with speech impairment ($M = 1.19$ on a 0-2.0 scale), compared to parents, whose score rated it last ($M = 0.07$ on a 0-1.0 scale). The SLPs’ mean score indicates that they perceive Interpersonal interactions are “sometimes-often” difficult for children as a result of their speech impairment; however, the parents’ mean score suggests a perception that this area is rarely difficult.

Inspection of parents’ and SLPs’ responses to individual Activities and Participation items in this factor revealed both groups recognised that Relating with strangers commonly caused difficulties for children with speech impairment. Previous research has found perceptions of intelligibility to be associated with familiarity (Flipsen, 1995), with “strangers” rated as the group most likely to be have difficulty understanding children with speech impairment (McLeod, 2009; McLeod, McCormack, & Harrison, 2010). Consequently, it would be expected that children with speech impairment would experience greater difficulty when communicating with strangers than with others.

SLPs also identified children with speech impairment had difficulties with Formal

relationships and Informal social relationships; however, this was less commonly reported by parents. It may be that parents often observe their children interacting with others who are familiar with their speech and so difficulties with the interaction are not encountered. Alternatively, it may be that their children with speech impairment have other strategies for making themselves understood that prevent their speech impairment from impacting significantly on interactions. Teverovsky et al. (2009) reported both Relating with strangers and Informal social relationships were commonly identified by parents of children with CAS as being areas of difficulty.

6.2.3. Factor 3: Verbal communication.

As would be expected, SLPs and parents both rated Verbal communication as the most difficult area for children with speech impairment ($M = 1.65$ on a 0-2.0 scale and $M = 0.19$ on a 0-1.0 scale, respectively). However, the mean scores were considerably lower for parents, suggesting a difference in the degree of impact perceived by the two groups. It is possible that the difference was related to the instructions given to both sets of participants. For instance, SLPs were asked to base their responses on a past or current client with moderate-severe speech difficulty. In contrast, parents based their responses on their own child; for some parents, their child's speech impairment was not diagnosed as moderate-severe. Other parents may not have perceived their child's speech impairment as severe due to their own ability to understand their child's speech. Thus, they may have been less likely to identify the impact of speech impairment compared to the SLPs.

The Verbal communication factor comprised four of the five Activities and Participation items that were identified by SLPs as "often" difficult for children with

speech impairment (Conversation, Speaking, Discussion, and Using communication devices), and the two most common Activities identified by parents as being difficult (Conversation and Speaking). These findings are consistent with those of Teverovsky et al. (2009), who reported difficulties with verbal communication-based skills (Conversation and Discussion) as being the most common difficulties identified by parents of children with CAS.

6.2.4. Factor 4: Basic learning.

The Factor scores for Basic learning revealed this area to be one of the less difficult for children with speech impairment, as rated by SLPs ($M = 1.17$) and parents ($M = 0.09$). For both groups of participants, the scores computed for this factor were similar to those computed for Interpersonal interactions. Inspection of the frequencies for individual items showed most SLPs perceive Activities and Participation items that loaded onto this factor were “sometimes-often” difficult for children as a result of their speech impairment. In contrast, most parents “never” perceived this impact.

6.2.5. Factor 5: Advanced learning.

Both SLPs and parents rated Advanced learning as the second most difficult area for children with speech impairment ($M = 1.30$ and $M = 0.15$, respectively). Inspection of individual item responses showed the literacy activities (Learning to read and Learning to write) which loaded onto this factor were identified by almost half the SLPs as “often” being impacted by speech impairment. Learning to write was also a skill that parents frequently identified as being difficult for their children as a result of their speech impairment (25.6%). However, fewer parents (16.3%) identified Learning to read as a skill that was difficult.

The responses from parents in this study are again consistent with findings reported by Teverovsky et al. (2009), who found Learning to write was more commonly identified as a difficulty by parents of children with CAS, than was Learning to read. The link between speech impairment (especially when unresolved at the commencement of formal schooling) and ongoing literacy difficulties is well-established (e.g., Leitão & Fletcher, 2004; Lewis, Freebairn, & Taylor, 2002; Nathan, Stackhouse, Goulandris, & Snowling, 2004; Rvachew, 2007).

6.2.6. Factor 6: Non-verbal communication.

Computation of factor scores for Non-verbal communication was only possible for the SLPs, and the mean factor score ($M = 0.57$) was the lowest of all factors, indicating that Non-verbal communication was rated the least difficult area for children with speech impairment. Inspection of individual item responses from SLPs and parents supports this finding. Activities and Participation items related to receptive language and/or non-verbal communication were among the least frequently identified by both groups of participants. Indeed, over half the SLPs perceived Receiving non-verbal messages to “never” be impacted. In the review by McCormack et al. (2009), 14 papers were found that investigated the association between speech impairment and other communication skills. However, only one paper (Nathan, Stackhouse, & Goulandris, 1998) investigated the link between speech impairment and Receiving spoken messages. Nathan et al. (1998) found children with speech and language impairment had greater difficulties with speech processing. No papers had examined the link between speech impairment and non-verbal language when there was no evidence of co-occurring language impairment. The link between childhood speech impairment and receptive

language or non-verbal communication skills may as yet be under-researched; however, the present study indicates that SLPs and parents are more concerned about the impact of speech impairment on verbal communication.

6.3. Limitations

One limitation affecting the comparability of the two studies reported here has already been identified: that is, the possibility that the SLPs and the parents were basing their responses on different levels of severity of speech impairment when answering the questionnaire. A further limitation is that the questionnaires distributed to SLPs and parents had different scales. As the parent questionnaire was only one of a number of demands placed on participating parents in the larger Sound Effects Study, a decision was made to reduce the response burden in a lengthy questionnaire by requesting only a yes/no response, rather than the 3 item Likert scale (often/ sometimes/ never) that was used in the SLP questionnaire.

In an ideal situation, the parents and SLPs would be asked to complete the same questionnaire and to report on the same children. In the Sound Effects Study, all of the children whose parents participated were recruited from a community sample, rather than through an SLP service. Indeed, only 15% of children were currently receiving intervention with an SLP. Consequently, a separate recruitment procedure was used to investigate the perceptions of SLPs. Therefore, it is not possible to form conclusions about the consistency (or otherwise) of parent and SLP perceptions of Activities and Participation that may be difficult for children with speech impairment. However, the results of this study provide preliminary information regarding the perceptions of both groups, and it is possible to draw some inferences from them.

It may also be considered a limitation that the items selected for the questionnaire were not evenly distributed across the nine Activities and Participation domains, with a greater number taken from the domains relating to Communication and Interpersonal interactions and relationships, and some domains lacking any representation. Nonverbal communication items were included and these did not yield the same robust findings as other questionnaire items. This, with the fact that items that were selected were not chosen by all participants, suggests that respondents did not simply check off all options provided to them and justifies the lack of non-related items in the questionnaire as a control.

The items that were selected for this study aimed to reflect the most relevant and appropriate items for inclusion in a questionnaire about speech impairment in children. It is acknowledged that other items excluded from the questionnaire developed in this research (particularly those related to Major life areas such as preschool education) may be appropriate to incorporate in future research. Thus, the development of the questionnaire for this study may be regarded as a preliminary step in designing a clinical tool to investigate the full range of Activities and Participation that may be impacted by speech impairment in early childhood.

6.4. Conclusion

There is an existing body of literature that provides evidence of the impact that speech impairment may have on children's lives. This paper is unique in considering the impact of speech impairment using the ICF-CY Activities and Participation component as a framework. The breadth of Activities and Participation identified shows the value of the ICF and ICF-CY as frameworks for considering health conditions (including speech

impairment) in a more holistic manner.

This study found Activities and Participation that may be difficult for children as a result of speech impairment extend beyond communication and include interpersonal interactions, learning (especially writing/spelling), and handling stress and other psychosocial demands. Further research should seek to determine whether SLPs' knowledge of the breadth of difficulties caused by speech impairment corresponds to the provision of interventions that aim to lessen the difficulties.

Results from the research also provide further evidence of the value of including parents in the assessment and intervention process. Parents have expert knowledge of the impact that speech impairment has on their children's participation in other activities and this knowledge should be a factor, if not a priority, when selecting intervention goals. A valuable extension to the present research would be to compare parents' priorities for intervention with SLPs' goal selection. Through developing a greater understanding of the way in which speech impairment may limit life activities, and through including the views of family members in clinical decision-making, SLPs may be able to address the needs of children with speech impairment and their families in a more holistic manner.

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author's PhD, supervised by the subsequent authors.

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Figure 1: Parts, Components and Domains of the ICF and their interactions (adapted from the ICF and ICF-CY, WHO, 2001; 2007)

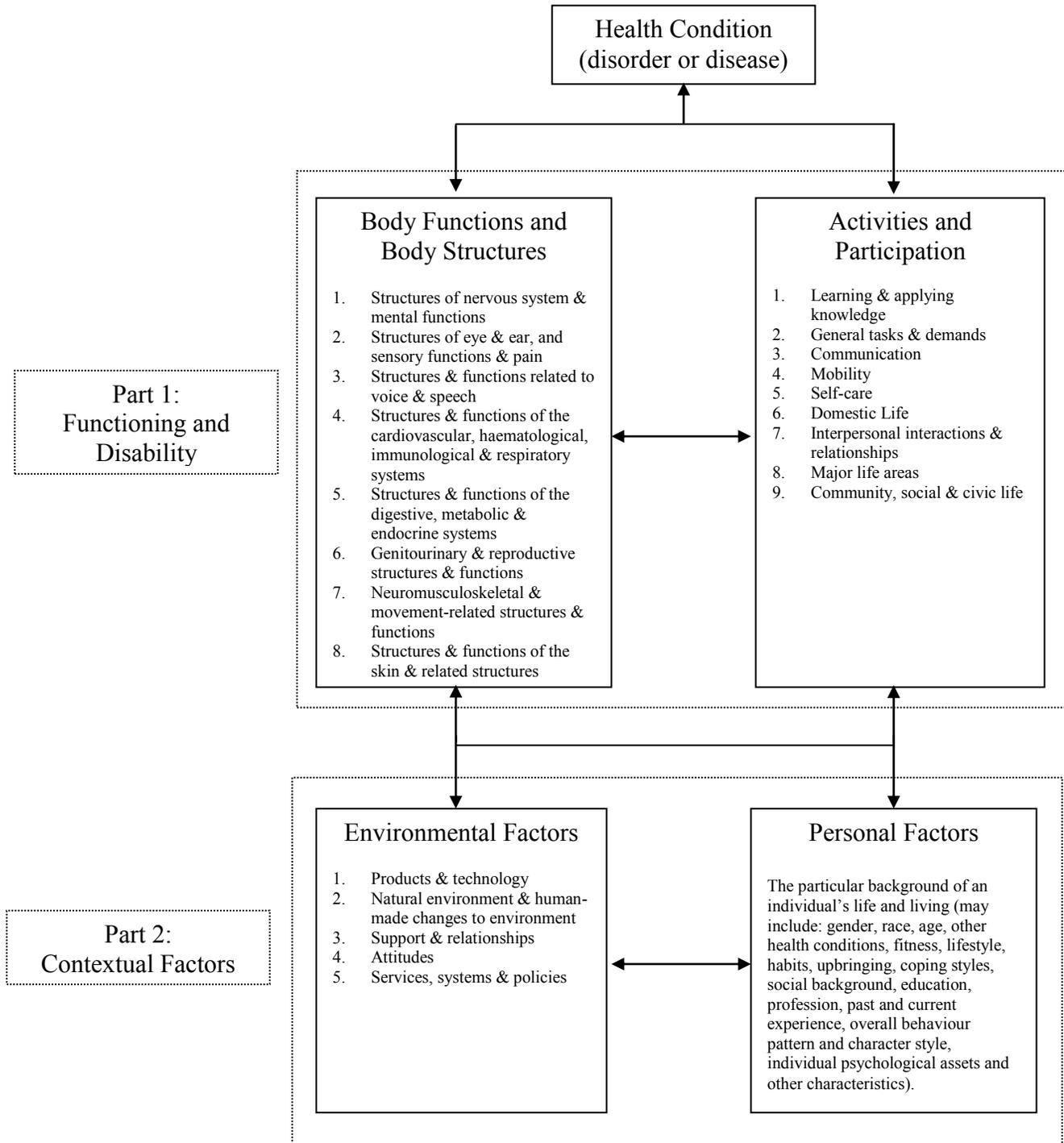


Figure 2. Protocol for inclusion in Study 2: Parents' perceptions of Activities and Participation impacted by speech impairment

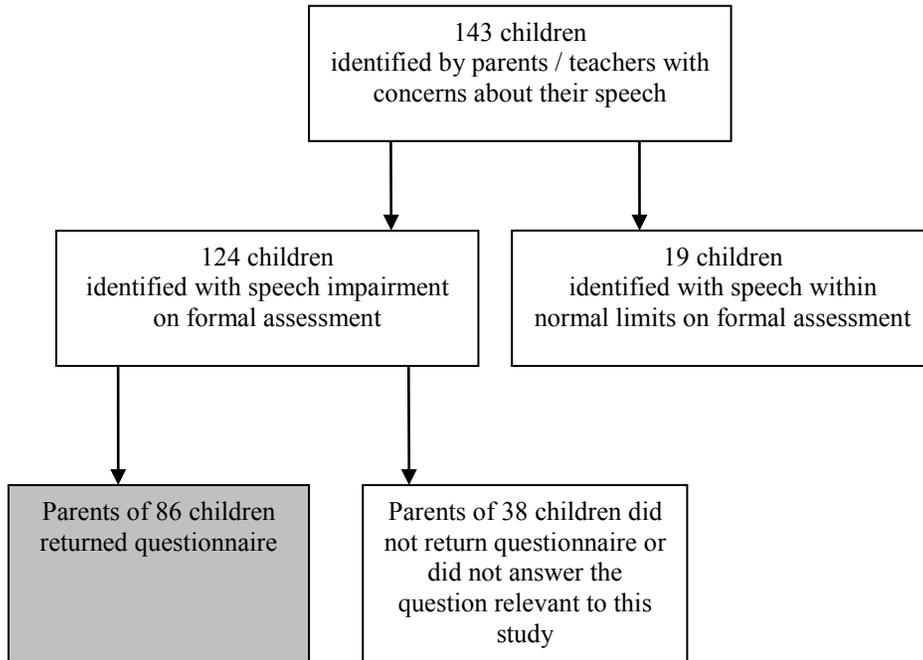


Table 1.

*SLPs' Perceptions of Activities and Participation that may be Difficult for Children with Speech**Impairment*

Domain and Activity^a	SLPs			Total	Factor^b
	Often	Sometimes	Never	responses	(loading)
Learning and applying knowledge (d1)					
Copying (d130)	55 (27.8%)	135 (68.2%)	8 (4.0%)	198	4 (.696)
Acquiring information (d132)	31 (16.2%)	129 (67.5%)	31 (16.5%)	191	4 (.647)
Rehearsing (d135)	61 (31.0%)	129 (65.5%)	7 (3.6%)	197	4 (.688)
Learning to read (d140)	95 (47.0%)	103 (51.0%)	4 (2.0%)	202	5 (.856)
Learning to write (d145)	87 (42.6%)	105 (51.5%)	12 (5.9%)	204	5 (.825)
Acquiring skills (d155)	27 (13.9%)	153 (78.9%)	14 (7.2%)	194	5 (.512)
Focusing attention (d160)	15 (7.7%)	149 (76.8%)	30 (15.5%)	194	1 (.587)
Thinking (d163)	5 (2.6%)	105 (55.3%)	80 (42.1%)	190	1 (.738)
Solving problems (d175)	3 (1.6%)	124 (64.9%)	64 (33.5%)	191	1 (.795)
Making decisions (d177)	8 (4.2%)	110 (57.6%)	73 (38.2%)	191	1 (.800)
General tasks and demands (d2)					
Undertaking a single task (d210)	2 (1.1%)	101 (53.4%)	86 (45.5%)	189	1 (.662)
Undertaking multiple tasks (d220)	17 (9.0%)	130 (68.8%)	42 (22.2%)	189	1 (.731)
Carrying out daily routine (d230)	17 (8.9%)	100 (52.1%)	75 (39.1%)	192	1 (.536)
Managing one's own behaviour (d235)	15 (7.8%)	149 (77.6%)	28 (14.6%)	192	1 (.623)
Handling stress and other psychological demands (d240)	31 (16.1%)	151 (78.6%)	10 (5.2%)	192	1 (.462)
Communication (d3)					
Receiving – spoken messages (d310)	9 (4.7%)	104 (53.9%)	80 (41.5%)	193	6 (.760)
Receiving – non-verbal messages (d315)	7 (3.7%)	77 (40.3%)	107 (56.0%)	191	6 (.695)
Speaking (d330)	160 (79.2%)	38 (18.8%)	4 (2.0%)	202	3 (.789)
Singing (d332)	81 (42.0%)	102 (52.8%)	10 (5.2%)	193	3 (.515)
Producing non-verbal messages (d335)	7 (3.6%)	97 (50.5%)	88 (45.8%)	192	6 (.573)
Conversation (d350)	157 (80.1%)	38 (19.4%)	1 (0.5%)	196	3 (.879)
Discussion (d355)	155 (78.7%)	40 (20.3%)	2 (1.0%)	197	3 (.875)
Using communication devices and techniques (d360)	123 (61.5%)	67 (33.5%)	10 (5.0%)	200	3 (.588)
Domestic Life (d6)					
Assisting others (d660)	50 (26.3%)	120 (63.2%)	20 (10.5%)	190	2 (.460)
Interpersonal interactions and relationships (d7)					
Basic interpersonal interactions (d710)	40 (20.8%)	105 (54.7%)	47 (24.5%)	192	2 (.652)
Complex interpersonal interactions (d720)	53 (27.9%)	109 (57.4%)	28 (14.7%)	190	2 (.672)
Relating with strangers (d730)	110 (57.0%)	74 (38.3%)	9 (4.7%)	193	2 (.599)
Formal relationships (d740)	71 (36.2%)	120 (61.2%)	5 (2.6%)	196	2 (.678)
Informal social relationships (d750)	73 (37.4%)	118 (60.5%)	4 (2.1%)	195	2 (.728)
Family relationships (d760)	41 (20.9%)	143 (73.0%)	12 (6.1%)	196	2 (.679)
Community, social and civic life (d9)					
Recreation and leisure (d920)	31 (15.8%)	132 (67.3%)	33 (16.8%)	196	2 (.664)
Play (d9200)	45 (23.1%)	127 (65.1%)	23 (11.8%)	195	2 (.643)

^a The code in brackets (e.g., d740) refers to the code in the ICF (WHO, 2001)

^b The names of the factors have been created by the researchers. Factors refer to the following: 1 = Applied learning and general tasks, 2 = Interpersonal interactions, 3 = Verbal communication, 4 = Basic learning, 5 = Advanced learning, 6 = Non-verbal communication

Table 2.

Comparison of SLPs' Factor Means by SLPs' Demographic and Clinical Characteristics

SLP characteristics	Factor 1 ^a Applied learning and general tasks Mean (SD)	Factor 2 Interpersonal interactions Mean (SD)	Factor 3 Verbal communication Mean (SD)	Factor 4 Basic learning Mean (SD)	Factor 5 Advanced learning Mean (SD)	Factor 6 Non-verbal communication Mean (SD)
Percentage of children with speech impairment on caseload						
Less than 40% (n=96)	0.86 (0.35)	1.20 (0.44)	1.65 (0.37)	1.19 (0.42)	1.30 (0.46)	0.55 (0.45)
40% or more (n=98)	0.94 (0.34)	1.17 (0.37)	1.62 (0.43)	1.18 (0.38)	1.27 (0.42)	0.60 (0.47)
Total (n=194)	0.90 (0.35)	1.19 (0.41)	1.64 (0.40)	1.19 (0.40)	1.29 (0.44)	0.57 (0.46)
F ratio (significance)	2.218 (p=.138)	0.244 (p=.622)	0.394 (p=.531)	0.009 (p=.926)	0.249 (p=.618)	0.512 (p=.475)
Percentage of children with childhood apraxia on caseload						
Less than 10% (n=160)	0.87 (0.35)	1.20 (0.41)	1.63 (0.41)	1.16 (0.40)	1.26 (0.43)	0.53 (0.46)
10% or more (n=37)	0.98 (0.37)	1.19 (0.40)	1.68 (0.36)	1.25 (0.47)	1.41 (0.48)	0.72 (0.37)
Total (n=197)	0.89 (0.35)	1.19 (0.41)	1.64 (0.40)	1.17 (0.41)	1.29 (0.44)	0.56 (0.45)
F ratio (significance)	2.814 (p=.095)	0.018 (p=.893)	0.390 (p=.533)	1.529 (p=.218)	3.291 (p=.071)	5.623 (p=.019)*
Length of time working as a speech pathologist						
10 years or less (n=103)	0.88 (0.38)	1.17 (0.43)	1.61 (0.44)	1.14 (0.40)	1.30 (0.46)	0.55 (.48)
More than 10 years (n=98)	0.92 (0.33)	1.21 (0.37)	1.68 (0.35)	1.22 (0.42)	1.29 (0.42)	0.58 (0.43)
Total (n=201)	0.90 (0.35)	1.19 (0.40)	1.65 (0.40)	1.18 (0.41)	1.29 (0.44)	0.57 (0.46)
F ratio (significance)	0.476 (p=.491)	0.470 (p=.494)	1.474 (p=.226)	2.287 (p=.132)	0.003 (p=.954)	0.262 (p=.609)
Specialise in phonological delays/disorders						
Yes (n=117)	0.93 (0.34)	1.17 (0.37)	1.61 (0.41)	1.19 (0.42)	1.33 (0.46)	0.56 (0.41)
No (n=75)	0.89 (0.37)	1.22 (0.42)	1.69 (0.38)	1.19 (0.41)	1.28 (0.43)	0.58 (.49)
Total (n=192)	0.90 (0.36)	1.20 (0.40)	1.66 (0.39)	1.19 (0.42)	1.30 (0.44)	0.57 (0.46)
F ratio (significance)	0.657 (p=.418)	0.581 (p=.447)	1.773 (p=.185)	0.008 (p=.930)	0.575 (p=.449)	0.124 (p=.725)
Specialise in childhood apraxia						
Yes (n=43)	0.92 (0.35)	1.19 (0.40)	1.65 (0.40)	1.18 (0.41)	1.29 (0.45)	0.57 (0.44)
No (n=149)	0.87 (0.38)	1.25 (0.41)	1.69 (0.36)	1.21 (0.45)	1.31 (0.42)	0.57 (0.51)
Total (n=192)	0.90 (0.36)	1.20 (0.40)	1.66 (0.39)	1.1887 (0.42)	1.30 (0.44)	0.57 (0.46)
F ratio (significance)	0.567 (p=.452)	0.700 (p=.404)	0.334 (p=.564)	0.145 (p=.704)	0.056 (p=.813)	0.007 (p=.932)

Key: * = significant at $p < 0.05$ level. ^a The names of the factors have been created by the researchers.

Table 3.

*Parents' Perceptions of Activities and Participation that may be Difficult for Children with Speech**Impairment*

Domain and Activity ^a	Parents (n=86)	
	Yes	No
Learning and applying knowledge (d1)		
Copying (d130)	5 (5.8%)	81 (94.2%)
Acquiring information (d132)	10 (11.6%)	76 (88.4%)
Rehearsing (d135)	7 (8.1%)	79 (91.9%)
Learning to read (d140)	14 (16.3%)	72 (83.7%)
Learning to write (d145)	22 (25.6%)	64 (74.4%)
Acquiring skills (d155)	2 (2.3%)	84 (97.7%)
Focusing attention (d160)	19 (22.1%)	67 (77.9%)
Thinking (d163)	6 (7.0%)	80 (93.0%)
Solving problems (d175)	5 (5.8%)	81 (94.2%)
Making decisions (d177)	3 (3.5%)	83 (96.5%)
General tasks and demands (d2)		
Undertaking a single task (d210)	3 (3.5%)	83 (96.5%)
Undertaking multiple tasks (d220)	13 (15.1%)	73 (84.9%)
Carrying out daily routine (d230)	1 (1.2%)	85 (98.8%)
Managing one's own behaviour (d235)	15 (17.4%)	71 (82.6%)
Handling stress and other psychological demands (d240)	15 (17.4%)	71 (82.6%)
Communication (d3)		
Receiving – spoken messages (d310)	11 (12.8%)	75 (87.2%)
Receiving – non-verbal messages (d315)	1 (1.2%)	85 (98.8%)
Speaking (d330)	24 (27.9%)	62 (72.1%)
Singing (d332)	6 (7.0%)	80 (93.0%)
Producing non-verbal messages (d335)	2 (2.3%)	84 (97.7%)
Conversation (d350)	25 (29.1%)	61 (70.9%)
Discussion (d355)	16 (18.6%)	70 (81.4%)
Using communication devices and techniques (d360)	12 (14.0%)	74 (86.0%)
Domestic Life (d6)		
Assisting others (d660)	3 (3.5%)	83 (96.5%)
Interpersonal interactions and relationships (d7)		
Basic interpersonal interactions (d710)	4 (4.7%)	82 (95.3%)
Complex interpersonal interactions (d720)	10 (11.6%)	76 (88.4%)
Relating with strangers (d730)	14 (16.3%)	72 (83.7%)
Formal relationships (d740)	4 (4.7%)	82 (95.3%)
Informal social relationships (d750)	10 (11.6%)	76 (88.4%)
Family relationships (d760)	4 (4.7%)	82 (95.3%)
Community, social and civic life (d9)		
Recreation and leisure (d920)	1 (1.2%)	85 (98.8%)
Play (d9200)	6 (7.0%)	80 (93.0%)

^a The code in brackets (e.g., d740) refers to the code in the ICF (WHO, 2001)

Table 4.

Mean Factor Scores for SLPs and Parents

Rating	Factor ^a	SLPs Mean ^b (SD)	Rating	Factor ^a	Parents Mean ^b (SD)
1	Factor 3 Verbal communication (e.g., Conversation, Speaking, Discussion, Using communication devices, Singing)	1.65 (0.40)	1	Factor 3 Verbal communication (e.g. Conversation, Speaking, Discussion)	0.19 (0.26)
2	Factor 5 Advanced learning (e.g., Learning to read, Learning to write)	1.30 (0.44)	2	Factor 5 Advanced learning (e.g., Learning to write, Learning to read)	0.15 (0.27)
3	Factor 2 Interpersonal interactions (e.g., Relating with strangers, Informal social relationships, Formal relationships)	1.19 (0.40)	3	Factor 1 Applied learning and general tasks (e.g., Focussing attention, Managing one's own behaviour, Handling stress, Undertaking multiple tasks)	0.10 (0.17)
4	Factor 4 Basic learning	1.17 (0.41)	4	Factor 4 Basic learning	0.09 (0.23)
5	Factor 1 Applied learning and general tasks	0.90 (0.35)	5	Factor 2 Interpersonal interactions (e.g., Relating with strangers)	0.07 (0.16)
6	Factor 6 Non-verbal communication	0.57 (0.45)			

^a Items with frequent responses for each factor are listed. The names of the factors have been created by the researchers. The examples are ICF codes.

^b The mean score for SLPs was out of a possible total of 2; the mean for parents was out of a possible total of 1.

Appendix A: Continuing Education Questions

1. What Activity was the most frequently identified by both parents and SLPs as being impacted by speech impairment in childhood?
 - a. Speaking
 - b. Conversation
 - c. Play
 - d. Informal social relationships

2. What was the area (Factor) that SLPs rated as least likely to be impacted by speech impairment?
 - a. Non-verbal communication
 - b. Basic Learning
 - c. Applied Learning
 - d. Interpersonal interactions

3. What was the area (Factor) that parents rated as least likely to be impacted by speech impairment?
 - a. Communication
 - b. Basic Learning
 - c. Applied Learning
 - d. Interpersonal interactions

4. True or False: An SLP's area of specialisation and years of experience influence the effectiveness of the ICF-CY questionnaire as a measure of impact?

5. True or False: The ICF-CY provides a useful and effective framework for considering the range of

activities that may be impacted by speech impairment in early childhood?

Answer Key:

1. b

2. a

3. d

4. False

5. True