

## REVIEW ARTICLE

# Exploring the international uptake of the “F-words in childhood disability”: A citation analysis

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## Abstract

**Background:** The “F-words in childhood disability” (function, family, fitness, fun, friends, and future) were introduced in a concept paper in 2012 entitled, “The F-words in childhood disability: I swear this is how we should think!”. The “F-words” are grounded in, and aim to operationalize, the World Health Organization’s (World Health Organization, 2001) International Classification of Functioning, Disability and Health (ICF) framework. A citation analysis was conducted to explore the extent of research uptake of the “F-words” concepts.

**Methods:** Three databases—Google Scholar, Wiley Online, and Web of Science—were searched from July 2012 to December 2018 for sources that cited the original F-words paper. Dates of publication and countries of first authors were extracted from all cited articles, and a taxonomy was developed to categorize the type of usage.

**Results:** The search yielded 157 sources from 26 countries, and the number of citations has continued to increase since the paper’s publication. Sources were placed into three categories: *cited/referenced* ( $n = 109$ ; i.e., the paper was simply cited), *integrated/informed* ( $n = 36$ ; i.e., the F-words were stated within the text), and *non-English* ( $n = 12$ ). Of the 36 *integrated/informed* sources, 34 (94.4%) applied the F-words to the ICF framework and five themes emerged with respect to the use of the F-words: (a) support of a holistic approach to childhood disability, (b) association of the F-words to physical activity and rehabilitation, (c) application and measurement of quality of life, (d) F-words research team-related papers, and (e) “other” category.

**Conclusion:** This citation analysis shows that the F-words are mainly being used to operationalize the ICF, support a holistic approach to childhood disability, and inform physical activity and rehabilitation-based interventions. These perspectives will play an important role in informing the next steps with respect to moving the F-words into research and practice.

## KEYWORDS

childhood disability, F-words, ICF, physical activity, quality of life, rehabilitation

## 1 | INTRODUCTION

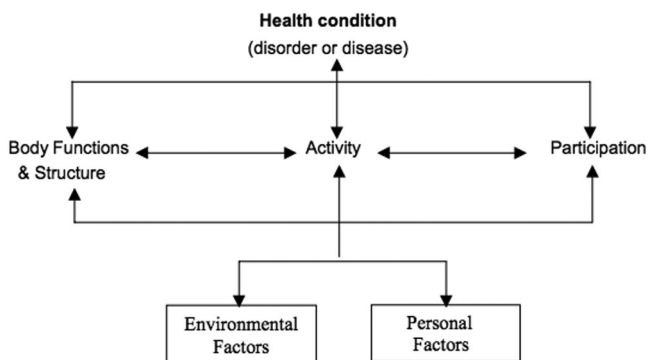
Following the *Convention on the Rights of Persons with Disabilities* (United Nations, 2006), disability has been increasingly recognized as

a human rights issue and has gained widespread attention (World Health Organization, 2001). In 2001, the WHO introduced the International Classification of Functioning, Disability, and Health (ICF). The ICF framework provides a universal language and a conceptual

foundation to describe health (Figure 1). “Functioning” and “disability” are the overarching concepts, which break down into *body structure and functions*, and impairments thereof; *activities* of people, and limitations they may experience; and *participation*, or involvement in all aspects of life, and the restrictions they may experience. The ICF also formally highlights the impact of contextual factors on an individual's functioning and health including both *environmental factors* and *personal factors* (World Health Organization, 2001). Overall, the ICF describes a person's level of functioning as an interaction among health conditions and their consequences, environmental factors, and personal factors (World Health Organization, 2001).

In 2012, the ICF framework was adapted by mapping onto its six “F-words” (function, family, fitness, fun, friends, and future; Rosenbaum & Gorter, 2012). In an article entitled “The F-words in Childhood Disability: I swear this is how we should think!” the authors argued that these are six fundamental aspects of every child's life. The F-words are embedded within the ICF framework to illustrate the interconnectedness among the concepts (Figure 2). Thus, the “F-word” *function* relates to the ICF category *activity*, describing activities in which an individual can engage, such as usual activities in daily living. *Fitness* builds on the ICF's *body structure and function* category, and *family* is an essential element of children's *environmental factors*. *Friends* and *fun* share components of the ICF's *participation* and *personal factors*, respectively. Finally, *future* was included in the F-words to highlight the impact of a child's current condition on their future life, as “development” is always about future. The authors' hope was to promote modern ways of thinking about childhood disability and to move beyond the traditional focuses of “fixing” and “normality.” They argue that instead of placing limits on people with disabilities, the focus should be on individuals' strengths and what they *can* do, no matter how it is done.

Since the publication of the F-words paper in 2012, there has been increasing national and international interest and uptake by people around the world. In 2014, an integrated research team of parents and health services researchers was formed to promote and study systematically the dissemination and implementation of the F-words in practice (Cross et al., 2018; Cross, Rosenbaum, Grahovac, Kay, & Gorter, 2015). Since then, the research team has worked with many stakeholders (including families, service providers, and administrators)



**FIGURE 1** International Classification of Functioning, Disability and Health Framework (World Health Organization, 2001)

## Key messages

- Researchers around the world are using the “F-words” to inform their research and practice.
- The “F-words” have been used to operationalize the ICF and to support a holistic approach to childhood disability.
- Sources to date are predominantly focused on physiotherapy for children and youth with cerebral palsy to inform physical activity interventions, so more effort is needed to promote the uptake by other health care provider groups and rehabilitation-based interventions.

to develop and share tools and resources to support the adoption of the F-words in practice. These tools and resources are now freely available on CanChild's F-words Knowledge Hub (CanChild, 2019) [www.canchild.ca/f-words](http://www.canchild.ca/f-words).

As of December 2018, the F-words paper had been downloaded >16,000 times from the publishers' website. This is a substantial number of downloads, but we do not know how the paper is being cited and referenced, and by whom. The citation analysis reported here was conducted to (a) identify the countries of researchers and when their research was published (i.e., *Who* is using the F-words?) and (b) explore the contexts in which the F-words are being cited (i.e., *How* are the F-words being referenced?).

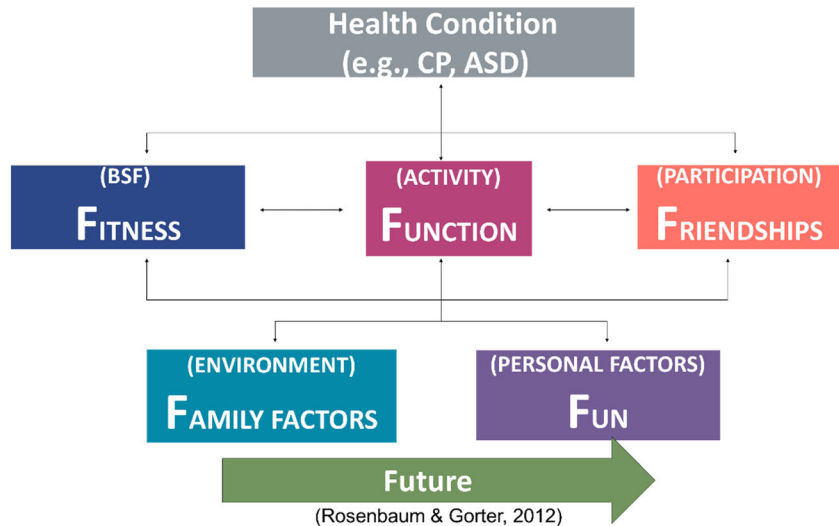
## 2 | METHODS

### 2.1 | Citation analysis

A citation analysis was conducted to identify all sources that had used or referenced the original F-words paper to determine the impact of work. We aimed to retrieve all reported sources in any language, regardless of how the F-words paper was cited.

### 2.2 | Database search, screening, and data extraction

Three databases—Google Scholar, Wiley Online, and Web of Science—were searched from July 2012 (date of formal publication of F-words paper) to December 2018. All duplicates were removed prior to screening citations. The remaining citations were imported into an Excel spreadsheet for review by one researcher (A. K. S.), with each source categorized as defined in Table 1: (a) *referenced/cited*, (b) *integrated/informed*, and (c) *non-English*. Data collected for sources from all categories included date of publication and country of the first author. For each *integrated/informed* source, additional data were reported on the focus of each publication and context in which the F-words paper was cited.



**FIGURE 2** The “F-words in childhood disability” (Rosenbaum & Gorter, 2012) [Colour figure can be viewed at wileyonlinelibrary.com]

**TABLE 1** Authors' definitions of source categories

Context of citation	Description
Integrated/informed	The “F-words” concepts are directly stated and/or integrated into the source.
Cited/referenced	The author references the paper with no mention of the F-words.
Non-English	Non-English sources without English translated versions available.

**2.3 | Inclusion/exclusion criteria**

All citations identified were screened by title and abstract by A. K. S. and included individual studies, reviews, editorials, book chapters, and thesis dissertations. Citations excluded were PowerPoint presentations (*n* = 2), poster presentations (*n* = 2), and a Public Health guide (*n* = 1).

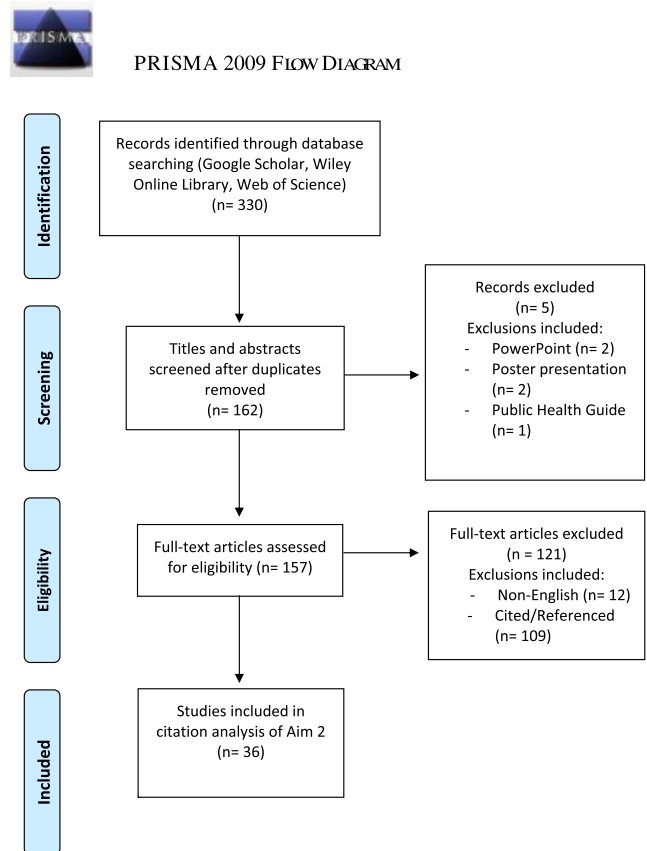
**2.4 | Data analysis**

Data analysis was divided into two phases. First, to identify the rate and reach of uptake of the F-words paper, data were extracted on year of publication and country of first author of all sources. Descriptive statistics captured the rate at which the F-words paper was cited and the extent of international uptake. Second, to explore how the F-words are being used, sources from the *integrated/informed* category were analysed. We used qualitative content analysis (conducted by A. K. S. and A. C. and discussed with P. R. and J. W. G.) to identify themes with respect to how the F-words were applied by researchers (Hsieh & Shannon, 2005).

**3 | RESULTS**

The citation search for the original F-words paper identified 330 results, from Google Scholar (*n* = 168), Wiley Online Library (*n* = 75), and Web

of Science (*n* = 85). Duplicates were removed (*n* = 168), resulting in 162 sources for screening. After applying the exclusion criteria, 157 sources remained for analysis of the dates of publication and locations of researchers. These sources were sorted into the three categories: (a) *cited/referenced* (*n* = 109), (b) *integrated/informed* (*n* = 36), and (c) *non-English* (*n* = 12). The search results for the *integrated/informed* studies are illustrated in the Prisma Flow Diagram (Figure 3).



**FIGURE 3** Prisma flow diagram [Colour figure can be viewed at wileyonlinelibrary.com]

### 3.1 | Identification of the years of publications and locations of researchers

#### 3.1.1 | Dates of Publication

From July 2012 to December 2018 the F-words paper was cited 157 times; half of these citations ( $n = 79$ , 50.3%) appeared in 2017 and 2018. In contrast, less than 10% ( $n = 13$ , 8.3%) were from the first 2 years following publication of the F-words paper. This is typical of the expected delay between publication and citation and demonstrates an exponential increase in uptake (Table 2).

#### 3.1.2 | Location of researchers

Researchers from 26 countries have cited the F-words paper. Of the 157 sources, 47 (30.0%) researchers resided in Canada. Of the 36 *integrated/informed* sources, 13 (36.1%) were from researchers located in Canada. The authors of the F-words paper were also authors or

coauthors of nine (25.0%) of the *integrated/informed* sources. Table 3 lists the countries with over two citations.

#### 3.1.3 | Use of the F-words in the *integrated/informed* sources

To explore the context in which the F-words are being cited, the *informed/integrated* sources ( $n = 36$ ) were analysed in detail, with themes identified from the full text reviews of these sources. Some sources fell under multiple themes but were classified according to what we judged to be their primary focus. Identifying the target audiences and populations studied also contributed to understanding how the F-words are being used.

#### 3.1.4 | Target audiences and populations studied

The *integrated/informed* sources ( $n = 36$ ) targeted multiple stakeholder groups (audiences) and focused on a variety of childhood

**TABLE 2** Number and percentage of citations from 2012 to 2018

Years of uptake								
Year	Integrated/informed (N = 36)		Cited/referenced (N = 109)		Non-English (N = 12)		Total (N = 157)	
	Number	%	Number	%	Number	%	Number	%
2012	1	2.8	2	1.8	0	0.0	3	1.9
2013	2	5.6	5	4.6	3	25.0	10	6.4
2014	3	8.3	13	11.9	3	25.0	19	12.1
2015	7	19.4	8	7.3	1	8.3	16	10.2
2016	8	22.2	19	17.4	3	25.0	30	19.1
2017	6	16.7	27	24.8	1	8.3	34	21.7
2018	9	25.0	35	32.1	1	8.3	45	28.7

**TABLE 3** Location of researchers according to country of the first author's department affiliations

Location of researchers								
Country (N = 26)	Integrated/informed (N = 36)		Cited/referenced (N = 109)		Non-English (N = 12)		Total (N = 157)	
	Number	%	Number	%	Number	%	Number	%
Australia	3	8.3	11	10.1	0	0	14	8.9
Brazil	1	2.8	5	4.6	0	0	6	3.8
Canada	13	36.1	34	31.2	0	0	47	30.0
China	0	0.0	0	0.0	4	33.3	4	2.5
Finland	1	2.8	3	2.8	3	25.0	7	4.5
Netherlands	0	0.0	11	10.1	0	0	11	7.0
Norway	0	0.0	4	3.7	0	0	4	2.5
South Africa	2	5.6	4	3.7	0	0	6	3.8
Sweden	7	19.4	8	7.3	0	0	15	9.6
United Kingdom	4	11.1	4	3.7	0	0	8	5.1
United States	3	8.3	12	11.0	0	0	15	9.6

Only countries with >2 citations shown in table. Countries with 1 citation include the following: Belgium, Columbia, Denmark, Germany, Iceland, India, Kenya, Lithuania, Russia, and Slovenia. Countries with ≤2 citations include the following: Iran, Ireland, Israel, New Zealand, and Spain.

disabilities/conditions (populations studied). Target audiences included service providers, children/youth with disabilities and family stakeholders, researchers, policy makers, conference attendees, and nongovernmental organizations. A majority of the sources ( $n = 29$ , 80.6%) primarily targeted health care providers, of which the majority were physiotherapists ( $n = 16/29$ , 55.2%). Sixteen sources (44.4%) identified multiple target audiences (e.g., health care providers and families).

The populations studied included multiple childhood disabilities/conditions—the most common being cerebral palsy (CP;  $n = 13$ , 36.1%). Other conditions included congenital Zika syndrome, Down syndrome, spina bifida, intellectual disability, traumatic brain injury, spinal cord injuries, autism spectrum disorder, chronic pain, epilepsy, attention deficit hyperactivity disorder, and developmental coordination disorder. Two sources included more than one of the aforementioned conditions. An additional 16 sources (44.4%) did not specify the condition but referred to “physical disabilities” or “neurodevelopmental disabilities.” Eight sources included adolescents/youth and two sources specifically included transition-aged youth.

### 3.1.5 | Applications of the F-words

Five underlying themes emerged from full text reviews of the *integrated/informed* sources with respect to their use of the F-words: (a) support of a holistic approach to childhood disability, (b) association of the F-words to physical activity (PA) and rehabilitation, (c) application and measurement of quality of life, (iv) F-words research team-related papers, and (v) “other.” It is also important to note that the majority of sources ( $n = 34$ , 94.4%) made reference to the ICF (i.e., introduced the F-words as an application to the ICF framework). This is important because one of the main goals of the F-words paper was to operationalize the ICF through the F-words (Rosenbaum & Gorter, 2012).

#### Support of a holistic approach to childhood disability

Eleven sources used the F-words to describe a holistic approach to thinking about and approaching childhood disability (Table 4). Four of these described the F-words as a modern way of thinking that has challenged traditional approaches to disability (i.e., children with disabilities should be “fixed”; Dalton, 2017; Murphy, 2016; Panayi, 2014; Shimmell, Gorter, Jackson, Wright, & Galuppi, 2013). Similarly, Fehlings (2014) described the F-words as “*attitudinal shifts*” in how society views disability. Four sources recommended that service providers focus on the F-words as a guide to clinical practice and rehabilitation, transition from pediatric to adult services, family-centred services, and the positive management of childhood disability (Camden, Wilson, Kirby, Sugden, & Missiuna, 2015; de Camargo, 2016; Kersley, 2015; Nordström, 2014). Two sources noted how the F-words provide “a more whimsical” rendition and adaptation of the ICF to support a holistic approach to disability (Nguyen et al., 2018; Ross, Case, & Leung, 2016). All sources from this theme aligned with the emphasis on shifting from the traditional biomedical approach to disability to one that takes into account the socio-ecological factors that influence all aspects of the child's life (Rosenbaum and Gorter (2012).

#### Association of the F-words to PA and rehabilitation

Thirteen sources focused on promoting children's participation in PA and rehabilitation (Table 5). Four discussed how the outcomes of PA-based interventions, including an adapted gymnastics program (Cook et al., 2015), an adapted cycling program (Pickering, Horrocks, Visser, & Todd, 2015), an aquatic physiotherapy program (Güeita-Rodríguez et al., 2018), and a robotic trainers intervention (Bayón et al., 2018), aligned with the F-words. Cook et al. (2015) examined the feasibility of an adapted gymnastics program, CAN-flip, to improve the fitness, motor skills, and physical self-perceptions of children with CP. The authors discussed how the gymnastics program fulfilled all the F-words (Cook et al., 2015). Similarly, Pickering et al. (2015) and Güeita-Rodríguez et al. (2018) described how the cycling program and the aquatic physiotherapy program, respectively, promoted the F-words. Lastly, Bayón et al. (2018) stressed the importance of the F-words concepts to create personal goals that aim to motivate and engage the young person to maximize treatment outcomes (e.g., improved gait functions) with regard to the robotic trainers.

The additional nine sources described more broadly how the F-words facilitate the participation of children with disabilities in PA and rehabilitation. Four sources (Adolfsson, 2017; Mäkelä, 2016; Pickering, 2018; Willis et al., 2018) encouraged professionals working with children with disabilities to use the F-words as motivators/incentives to engage children in PA programs and rehabilitation-based interventions. Similarly, Adolfsson (2017) and four other sources (Järviokoski, Martin, Autti-Rämö, & Härkäpää, 2013; Jeglinsky, 2012; Lauruschkus, 2015; Lauruschkus, Nordmark, & Hallström, 2015) highlighted the importance of incorporating “fun” into medical rehabilitation to promote children's participation and engagement. Rosenbaum and Gorter (2012) highlighted the important role of fun in relation to participation and stated that, “Fun spans the ICF elements of ‘personal factors’ (What does/might this particular child enjoy doing?) and ‘participation’, which in ICF terms refers to ‘involvement in (meaningful) life situations’ (p. 460).

#### Application and measurement of quality of life

Three sources directly connected the F-words to components of quality of life (QoL; Table 6). Acharya, Meza, and Msall (2017) used the F-words as a holistic framework to explore the gaps in services in each F-words domain for youth and young adults with autism spectrum disorder, Down syndrome, and CP. More specifically, the authors identified four components of transition (e.g. medical care, health insurance, self-care skills, and postsecondary education or employment) that influence QoL of youth. The authors stated that, “Despite the importance of transition, youth with disabilities continue to experience disparities in all six ‘F-words’ domains” (p. e371). This highlights the link between the F-words and QoL, and the need to support youth during transition.

Davis and colleagues published two articles (Davis et al., 2017, 2018) on how the F-words apply to QoL and can be used to support QoL measurement. Their 2017 study used the F-words to organize 11 domains of QoL that fit within the definitions of fun, “family/friends,” “fitness,” and “function” (Davis et al., 2017). Building on this, their 2018 article suggested the use of the F-words to measure QoL domains. Davis and colleagues' articles represent an

**TABLE 4** Support of a family-centred holistic approach to childhood disability (*n* = 11)

First author (Date of publication)	Country of first author	Target audience and population	Focus of source	Context of the "F-words" citation	Supporting quotes from sources
Camden et al. (2015)	Canada	Researchers, managers, clinicians, community partners, and families with regards to children with DCD.	Identifies the principles that should guide service providers in providing the best practice and service delivery for children with DCD.	Recommends that family-centred services focus on the F-words concepts to guide positive management of childhood disability.	"Family-centred service is also one of the six key principles recommended as the 'F-word's that should guide management of childhood disability; services should focus on Family, Fun, Future, Friends, Function and Fitness. Delivering services based on these principles would contribute to the prevention of secondary consequences in children with DCD, and also decrease the negative impact DCD is reported to have on families."
Dalton (2017)	South Africa	Health care professionals working with children with CP.	Evaluates the applicability of an existing behavioural observation tool and assesses whether it could be used to quantify and define physiotherapeutic actions in treatment sessions with children with CP.	Uses the F-words as a framework for supporting a holistic family-centred approach to childhood disability. Explains that the F-words are a reverse approach to the medical model and can improve participation leading to positive outcomes in other areas of the ICF such as body structure and function.	"This also led to the widely-cited opinion piece referred to as 'The F-words' in childhood disability" where Rosenbaum and Gorter (2012) named six words that should be incorporated in all services surrounding the child with CP namely: function, family, fitness, fun, friends and future. These words were to replace the term 'fixing' that referred to the notion that the accurate diagnosis would dictate the correct intervention. This in turn will amend the underlying impairment in body function and structure and lead to a positive outcome for the child."
de Camargo (2016)	Canada	Attendees of the First International Developmental Pediatrics Congress in Istanbul, Turkey.	Reports on the First International Developmental Pediatric Congress and reflects on the role of the discipline for low and middle-income and highlights the need for development monitoring.	Introduces the ICF framework and suggests that the F-words can guide service providers.	"The 6 F-words 'Fitness', 'Function', 'Family', 'Friendships', 'Fun' and 'Future' can guide us in how we think about patients and their families, plan research and care for children with impairments."
Fehlings (2014)	Canada	Attendees of the 2014 AACPDM annual meeting and all individuals involved with childhood with CP.	Reflects on the 2014 AACPDM annual meeting and on the important opportunities for global	Shifts from a focus on health problems and illness to one of health and wellness.	"Rosenbaum and Gorter have coined what they call the six 'F' words of disability: Function, Family,

(Continues)



TABLE 4 (Continued)

First author (Date of publication)	Country of first author	Target audience and population	Focus of source	Context of the "F-words" citation	Supporting quotes from sources
Kersley (2015)	Canada	Chiropractic interns of the Canadian Memorial Chiropractic College.	Examines the outcomes of an educational presentation describing the ICF on chiropractic interns' clinical thought process, report writing and goal-setting.	Includes the F-words in an educational intervention to provide a way of describing how the ICF components can be applied in practice to support a biopsychosocial approach.	<p>Fitness, Fun, Friends, and Future. This is powerful in its simplicity and has the potential to create attitudinal shifts in how society views disability."</p> <p>"These concepts [the 'F-words'] are meant to help clinicians to manage clinical cases more effectively by supporting the shift away from the sole use of a traditional biomedical model to one that incorporates the adoption of a biopsychosocial approach."</p>
Murphy (2016)	United States	Service providers working with children with SB.	Determines the most effective program for the management of neurogenic bowel and bladder dysfunction in children with SB.	Reiterates that there is no way to "fix" certain neurogenic dysfunctions, but rather, manage them and focus on the F-words in the life of the child.	<p>"Therefore, we need not aim to 'fix' it, but manage it. This prompts us to reframe measures of effectiveness with the ICF in mind. Rosenbaum and Gorter whimsically remind us of important F-words of childhood disability: Function, Family, Fitness, Fun, Friends, and Future"</p>
Nguyen et al. (2018)	Canada	Researchers and professionals working in transition services.	Using a scoping review investigates the degree to which the ICF and ICF-CY have been used in transition research and in practice since its publication.	Describes the F-words as an adaptation to the ICF that has become a popular way for people to apply the ICF concepts in plain language.	<p>"Rosenbaum and Gorter offered a whimsical adaptation of the ICF with the 'F-Words in Childhood Disability' that provides what has become a popular way for people to apply the ICF concepts using plain language (function, family, fitness, fun, friends and future)."</p>
Nordström (2014)	Sweden	Children and youth using standing devices and service providers such as PTs and OTs.	Describes children's and parents' experiences using standing devices.	Encourages professionals to focus on the child's development with respect to the F-words rather than focus on the concept of "normality."	<p>"Rosenbaum and Gorter proposed the inclusion of the 'F-words,' function, family, fitness, fun, friends and future, in all aspects of clinical work, research and advocacy that relate to children with disabilities and their families. In other words, we should focus on the achievement of an activity instead of focusing on how things</p>

(Continues)

TABLE 4 (Continued)

First author (Date of publication)	Country of first author	Target audience and population	Focus of source	Context of the "F-words" citation	Supporting quotes from sources
Panayi (2014)	United Kingdom	Service providers (i.e., physicians, PTs, OTs, and SLPs) working with children and youth with CP.	Develops a conceptual framework for re-thinking the gestures of neuro-atypical youth, develops an inclusive qualitative analytical tools for annotation and interpretation of gestures, and considers the conceptual framework in terms of its theoretical and practical implications.	Uses the F-words as an example of how practitioners in the field of childhood disability have seriously questioned and re-considered decades of traditional clinical practice.	"Support for the need for new ideas is illustrated by the reflection of leading practitioners in the field of child disability who are seriously questioning decades of traditional practice. For example, Rosenbaum and Gorter (2012) have proposed the notion of the 'F' words to emphasise the need to re-consider our traditional models of practice, particularly when working in the area of neuro-disability."
Ross et al. (2016)	United States	Physiotherapists working with children with physical disabilities.	Conceptualizes childhood physical activity within the ICF and provides guidance on aligning measurement tools with physical activity dimensions.	Refers to the F-words as a "more whimsical rendition of the ICF" and explicitly connects the ICF domains with the F-words; function, friendship, and fitness.	"Rosenbaum and Gorter offered a more whimsical rendition, "The F-words in childhood disability, in which the three ICF health dimensions are equated to Fitness (i.e., body function and structure), Function (i.e., activity), and Friendship (i.e., participation)."
Shimmell et al. (2013)	Canada	Youth with CP and their parents.	Identifies what helps and what hinders participation in physical activity of youth with CP.	Implies that the F-words are a modern way of thinking about childhood disability and that they are a shift away from the biomedical mindset of "fixing."	"It is hoped that a better understanding of the processes at work will shift the traditional biomedical thinking, that is, from 'fixing' the child, to novel approaches that focus on family, function, fitness, fun, and friends, as these 'F-words' encourage 'modern' thinking in childhood disability and reminds us of what is important in the development of all children."

Abbreviations: CP: cerebral palsy; DCD: developmental coordination disorder; ICF: International Classification of Functioning, Disability and Health; OTs, occupational therapists; PTs, physiotherapists; SB: spina bifida; SLPs, speech language pathologists



**TABLE 5** Association of the "F-words" to physical activity and rehabilitation

First author (Date of publication)	Country of first author	Target audience and population	Focus of source	Context of the F-words citation	Supporting quotes from sources
Adolfsson (2017)	Sweden	Physicians, PTs, OTs, psychologists, and children and youth with a range of disabilities.	Suggests how the ICF-CY can be used for various for children and youth with disabilities and highlights how it can contribute to increased motivation of a child in rehabilitation services.	Describes the F-words as a version of the ICF-CY that can motivate children to participate in rehabilitation interventions by applying their interests (i.e., what they consider as "fun").	"As suggested by Rosenbaum and Gorter (2012), a populated version of the ICF-CY model can include five F-words: fitness, function, friendship, family, and fun. To motivate children for interventions, they would be encouraged to tell about their interests, i.e. what they perceive as Fun and professionals should discuss with the family way to develop and maintain friendships."
Bayón et al. (2018)	Spain	Clinicians (i.e., physiotherapists) working in rehabilitation with children with CP and their parents.	Tests the effectiveness of a robotic trainers to improve gait functions of children with ambulatory and non-ambulatory CP	Stresses the importance of the F-words concepts to create personal goals that aim to motivate and engage the patient to maximize treatment outcomes.	"In the field of physical rehabilitation, especially in childhood disability, the F-words (Function, Family, Fitness, Fun, Friends and Future) defined by Dr. Rosenbaum become really important. It is essential to maintain a high patients' motivation because this concept could affect treatment outcomes."
Cook et al. (2015)	Canada	Physiotherapists and parents of children with CP.	Examines whether an adapted gymnastics program could be feasible for children with CP to improve muscle fitness, motor performance, and physical self-perception.	Discusses how the CAN-flip program fulfilled all 6 F-words for a child with CP who participated in the pilot study.	"Thus, in selected function and fitness variables (two of the five F-words) the results of this study were at similar magnitude to those of previously reported improvements in GMFM-88 scores, walking endurance, and muscle strength in children with CP after aquatic and strength-training interventions. In addition, based on the encouraging comments from the participants and their caregivers, the program seems to have achieved some of its goals in terms of the other F-words."
Güeita-Rodríguez et al. (2018)	Spain	Clinicians working with children and adolescents with CP and their parents.	Explores the experiences of parents of children with CP regarding aquatic physiotherapy (ATP) and identifies relevant intervention categories for aquatic physiotherapy treatments.	Introduces the F-words as an operationalization of the ICF. Uses the ICF as a conceptual framework to explore parents' perceptions and experiences regarding aquatic physical therapy. In the discussion,	"They [parents of children with CP in the ATP program] stressed that the water is a facilitator for family and social relations, and that the current services, systems and health policies represent a barrier for the practice

(Continues)

TABLE 5 (Continued)

First author (Date of publication)	Country of first author	Target audience and population	Focus of source	Context of the F-words citation	Supporting quotes from sources
Järvikoski et al. (2013)	Finland	Service providers working with children with severe disabilities in client-centred rehabilitation.	Analyses the experiences of parents and their child with a severe disability in client-centred rehabilitation.	Advises to incorporate the F-words concepts such as fun into medical rehabilitation of young children in order to promote motivation and willingness to participate in rehabilitation.	“Correspondingly, Rosenbaum and Gorter (2012) emphasize the roles of function, family, fitness, fun, friends, and future in children’s services. Incorporation of fun and challenges into medical rehabilitation of school-age children is needed.”
Jegjinsky (2012)	Sweden	Professionals working with children and youth with CP in family-centred rehabilitation.	Explores how professionals working with children and youth with CP describe and document the rehabilitation planning procedure and professionals and parents perceive family-centred care.	Reiterates that rehabilitation not only focus on function, but also incorporate fun, fitness, friends, and future and that in order to touch on all these areas, an interprofessional approach to rehabilitation is required.	“Recently Rosenbaum and Gorter (2012) calls for rehabilitation not only to focus on function, but also incorporate fitness, fun, friends and future. These multidimensional issues and concerns cannot effectively be managed by one professional alone. Therefore, multidisciplinary teamwork is highly recommended in the rehabilitation services for children and youth with CP.”
Lauruschkus et al. (2015)	Sweden	Service providers and parents of children with CP with varying gross motor, cognitive, and communicative functions.	Explores the experiences of children with CP regarding participation in physical activity and describes the barriers.	Uses the F-words to highlight the importance of fun and personalized interventions for children to participate in physical activity.	“Using the concepts of ‘F-words’ can contribute to personalising interventions and increasing each child’s motivation to participate in joyful physical activities.”
Lauruschkus, Nordmark, and Hallström (2017)	Sweden	Parents of children with CP.	Explores how parents of children with CP experience their child’s participation in physical activities and identifies facilitators and barriers for being physically active and reducing sedentary behaviour.	Describes the F-words as a popularized thinking in childhood disability with a focus on strengths of the child with regards to physical activity.	“Using the ‘F-words’ might benefit children, their families and personnel when designing fun and personalised interventions for increased motivation when participating in physical activities.”
Lauruschkus (2015)	Sweden	Clinicians (PTs, OTs, and paediatricians) and parents with regards to children with disabilities such as CP.	Explores the experiences of children with physical disabilities from various backgrounds and evaluates the feasibility and effectiveness of an	Introduces F-words as one conceptual framework guiding this thesis. Describes each F-word in depth and	“Time and availability of self-selected activities, competent leaders, and other children to be friends with as well as overall costs for the activity

(Continues)

TABLE 5 (Continued)

First author (Date of publication)	Country of first author	Target audience and population	Focus of source	Context of the F-words citation	Supporting quotes from sources
Mäkelä (2016)	Sweden	Professionals working with children/youth (6–18 years) with physical disabilities.	Identifies the individual and contextual facilitators that support the participation of children with physical disabilities in physical activity.	Draws parallels between the identified facilitators to support participation in physical activity and the F-words. The authors suggest that the F-words can be used as a framework to recognize physical activity facilitators and support children's participation.	"Rosenbaum and Gorter (2012) encourage professionals to use the 'F-words' to individualize interventions. Many of the facilitators found in this study are easy to connect to these 'F-words'. This adds to the assumption that the 'F-words' can help professionals to recognize facilitative factors for participation in physical activities."
Pickering et al. (2015)	UK	Health care professionals working with children (2–13 years) with CP.	Explores the physical activity participation of children and adolescents with CP and introduces information about adapted cycling and its future prospects.	Describes the cycling program as promoting each F-word through managing the child's function, supporting their family, encouraging fitness, providing fun, and enabling them to keep friends. The hope is that the cycling becomes habitual and part of their "future."	"Rosenbaum and Gorter (2012) have suggested it is the 'future' which is missing in the planning for children with neurodisabilities. This is alongside managing their function, supporting their family, encouraging fitness, providing fun, and enabling them to make and keep friends. By offering information about adapted cycling even of these children were able to try a new activity that has been made accessible for them."
Pickering (2018)	UK	Health care professionals in childhood disability rehabilitation.	Seeks to understand the impact of meaningful recreational activities on the emotional wellbeing of disabled children and young people with disabilities.	States that the F-words concepts, such as fun are excellent incentives for children to engage in activities leading to positive health outcomes.	"The dragon was placed at the top by Becky's instruction, as he was flying away, whereas the horse riding, bike riding, swimming, reading and playing the violin were still important to her and fitted with the six 'F' words of Fun, Fitness, Family, Friends, Function and the Future."

(Continues)

TABLE 5 (Continued)

First author (Date of publication)	Country of first author	Target audience and population	Focus of source	Context of the F-words citation	Supporting quotes from sources
Willis et al. (2018)	Australia	Health care professionals working with children and youth with a range of disabilities.	Seeks to better understand what works, in what conditions, and how for a participation-focused physical activity intervention for children and youth with disabilities.	Reports that findings of the study align with the F-words concepts in that the child's participation in physical activities can have an impact on any of the six F-words, such as fun and friends.	"The mechanisms, contexts and outcomes described in this study incorporate the essence of the F-words in childhood disability (function, fitness, friends, family, fun and future) and present a novel approach to how this widely adopted framework is incorporated into clinical practice. In highlighting the bidirectional nature of the ICF, these authors similarly encourage the reader to imagine how a child's participation and engagement in physical activity may have an important impact on outcomes across all domains"

Note.  $n = 13$ .

Abbreviations: CP: cerebral palsy; ICF: International Classification of Functioning, Disability and Health; OTs, occupational therapists; PTs, physical therapists.

important progression in the use of the F-words from simply linking the F-words to QoL to suggesting the application of the F-words as a measurement instrument for QoL.

### F-words research team-related projects

In 2014, an integrated research team, including parents and researchers, formed at CanChild to disseminate and study the uptake of the F-words proactively. To date, the research team has published two papers on their dissemination work (Cross et al., 2015; Cross et al., 2018). The additional four sources in this category described the F-words research team's work as an example of stakeholder-driven and knowledge translation research (Longo, Galvão, Ferreira, Lindquist, & Shikako-Thomas, 2017; Phoenix et al., 2018; Rosenbaum, 2016; Miller & Rosenbaum, 2016; Table 7).

### Other

Three additional sources did not fit any of the aforementioned themes (Table 8). One used the F-words as a "guide" to identify important responses to the Public Health Emergency International Concern for the 2015 Zika virus outbreak (Atalla, 2016). A literature review by Green (2018) explored the physical areas (i.e., playgrounds) that could have positive influences on the health and well-being of children with disabilities. The author suggested the addition of the F-word, "freedom"; however, no additional context or description of the F-words was included (Green, 2018). Lastly, one source (Snyman, van Zyl, Müller, & Geldenhuys, 2016) used the F-words to explain the ICF framework; however, they added "F" words to each component (e.g., food, finances, foes, facilitators, and flooring).

## 4 | DISCUSSION

In 6 years, there has been a significant uptake of the F-words by researchers around the world. As of December 2018, there were 157 citations of the F-words paper, with 36 *integrated/informed* sources. These numbers provide evidence that researchers are incorporating the F-words into their work.

In the original F-words paper, the authors stated that they hoped clinical and research colleagues would incorporate the F-words into their work. This is reflected in the results of this study, as the target audiences have included service providers, researchers, parents, stakeholders, and policy-makers. However, it is important to highlight that a significant number of sources ( $n = 17$ , 47.2%) focused on PA and rehabilitation interventions. We need to understand how to improve the uptake by other health care provider groups, such as occupational therapists, speech language pathologists, recreational therapists, social workers, physicians, and psychologists.

The F-words were described in the context of children with any neurodevelopmental disability. This inclusivity was also represented in the results as 19 (55.9%) of the *integrated/informed* sources focused on multiple childhood disabilities or referred to unspecified physical/neurodevelopmental disabilities. Although Rosenbaum and Gorter (2012) were generally inclusive of multiple

**TABLE 6** Application and measurement of quality of life

First author (Date of publication)	Country of first author	Target audience and population	Focus of source	Context of the "F-words" citation	Supporting quotes from sources
Acharya et al. (2017)	United States	Service Providers providing transition care to youth with disabilities.	Explores life course outcomes (medical care, health insurance, self-care skills, and postsecondary education or employment), QoL, and disparities in transition-aged youth with disabilities, including ASD, Down syndrome, and CP.	Uses the F-words as an organizational framework for the paper to explore life course outcomes and disparities in transition-aged youth with disabilities.	"This article explores life course outcomes and disparities in transition-age youth with disabilities (YWD), with a special focus on youth with ASD, Down syndrome (DS), and cerebral palsy (CP). To achieve this, we use the 'F-words' organizing framework developed by Rosenbaum and Gorter."
Davis et al. (2017)	Australia	Service Providers working with children with CP and their families/parents.	Identifies 11 important domains of QoL for children and adolescents with CP including physical health, communication, independence and autonomy, body comfort, access to services, behaviour and emotion, social connectedness, nature and outdoors, and a variety of activities.	Uses the F-words to organize the 11 domains of QoL and ICF into one of four categories—"function," "fitness," "fun," and "family/friends" that were viewed as "essential life domains necessary for professionals to consider when counselling and supporting these children and their families."	"The 11 QoL domains identified as important for children with CP and ID aligned with concepts described in the International Classification of Functioning, Disability and Health model of disability (World Health Organization, 2001) and their associated F-words (Fitness, Function, Family, Friends, and Fun; Rosenbaum & Gorter, 2012) as illustrated in Figure 1."
Davis. (2018)	Australia	Clinicians working with children with a range of disabilities and their parents.	Identifies the best instrument to measure the QoL of children with disabilities.	States that the F-words are simple to use and that similar to the ICF, QoL encompasses the F-words. Suggests to integrate the F-words into an instrument for measuring QoL of children with disabilities with a focus on their strengths.	"As Rosenbaum and Gorter discussed, childhood disability has traditionally been viewed through a biomedical lens, with measurement tools aligning with this approach to health and QoL. An instrument aligned with the F-words (fitness, function, friends, family, future, and fun) approach would enable children with a disability to report strengths in their life and achieve high QoL if it exists for them. Further work needs to address these issues."

Note. *n* = 3.

Abbreviations: ASD: autism spectrum disorder; CP: cerebral palsy; ICF: International Classification of Functioning, Disability and Health; QoL: quality of life.

TABLE 7 F-words' research team projects

First author (Date of publication)	Country of first author	Target audience and population	Focus of source	Context of the "F-words" citation	Supporting quotes from source
Cross et al. (2018)	Canada	Family members (i.e., parents), clinicians, educators, stakeholders and individuals with disabilities.	Reports on the development and pilot evaluation of a web-based knowledge translation (KT) resource, the F-words Knowledge Hub that was created to inform people about the F-words and to provide action-oriented tools to support the use of the F-words in practice.	Describes the development and pilot evaluation of CanChild's F-words Knowledge Hub. The purpose of the knowledge hub is to disseminate information on the F-words and provide various tools and resources to support the implementation of the F-words in practice by families and service providers.	"This paper reports on the development and pilot evaluation of a Web-based knowledge translation (KT) resource, the "F-words" Knowledge Hub that was created to inform people about the 'F-words' and to provide action-oriented tools to support the use of the "F-words" in practice."
Cross et al. (2015)	Canada	Parents, service providers, educators, people with physical disabilities.	Reports on the knowledge mobilization initiative designed to spread awareness of the F-words through an online video.	A video on the F-words was created to spread awareness and was evaluated by viewers through survey responses, such as the extent to which they liked the F-words ideas. The source mentions that the 'F-words' are based on the ICF framework.	"This paper reports on a knowledge mobilization initiative designed to spread awareness of the 'F-words' ideas."
Longo et al. (2017)	Brazil	Researchers, clinicians, educators, health care managers, social services administrators, community agencies and children with disabilities and their families.	Brings to attention the need to minimize the delay in translating knowledge into clinical practice specifically in childhood disability rehabilitation.	Uses the F-words as an example of a stakeholder-driven strategy and describes them as addressing the needs of children in rehabilitation.	"One example of a stakeholder-driven strategy is the implementation of the "F-WORDS in childhood disabilities". The F-WORDS is composed by six key outcomes in childhood rehabilitation (Function, Family, Fitness, Friends, Fun and Future). The F-words address the context of the child in rehabilitation, and change it using strategies developed in conjunction with professionals, family members and patients."
Miller and Rosenbaum (2016)	Canada	Service providers, researchers, policy-makers, and educators with respect to children with neurodisabilities.	Argues for an explicit recognition of both disease and disability perspectives across all clinical services, research, policy-making, and professional and public education.	Informs about the collaborative development of the F-words Knowledge Hub to make the ideas easily accessible (online) and useable. Describes the F-words concepts as strengths-based, family-friendly, and comprehensive approach that can be individualized to best fit the needs and goals of the person with an impairment.	"As current examples of "work in progress" one of us (Peter Rosenbaum), in collaboration with PhD students, is presently working on developing and evaluating modules for parents of children with CP to introduce these concepts to them, and also on developing an "F-words" hub, along with parent members of the research team, to make ideas about the "F-words in childhood disability" easily

(Continues)



TABLE 7 (Continued)

First author (Date of publication)	Country of first author	Target audience and population	Focus of source	Context of the "F-words" citation	Supporting quotes from source
Phoenix et al. (2018)	Canada	Researchers engaging patients (and their caregivers) in the research process.	Generates a theoretical and methodological ideas that can researchers can use to better engage patients in research.	A knowledge translation research program that was conducted at <i>CanChild</i> to support the uptake of the F-words was an example used to describe how patients can be engaged in research.	accessible and useable. Parents, of course, represent one force by which the system can be changed from the "bottom up."  "To show how these ideas can be applied, we present an example of the 'F-words' integrated knowledge translation research program that began at <i>CanChild</i> in 2014 to disseminate and support the adoption of the 'F-words' in <i>Childhood Disability</i> ."
Rosenbaum (2016)	Canada	Health professionals working with children with neurodevelopmental conditions.	Calls upon leaders in the field of childhood disability and knowledge brokers, that it is time to replace negative ideas about disability (i.e. damage, deficits) with positive and opportunistic actions to enhance well-being of children and youth with impairments.	Explains that the F-words are intended to encourage professionals to identify the positive ways to provide for children and their families. Comments on the international uptake of the F-words by colleagues and the variety of ways they are being used.	"The uptake of the F-words among parents and families, and many colleagues around the world, has been gratifying, and variations of these ideas are now widely used."

Note. n = 6.

Abbreviation: ICF, International Classification of Functioning, Disability and Health.

TABLE 8 Other

First author (Date of publication)	Country of first author	Target audience and population	Focus of source	Context of the "F-words" citation	Supporting quotes from source
Atalla (2016)	Canada	Policy Makers - Members and associates of the WHO, United Nations agencies, NGOs, and national governments.	Stresses the importance of drawing greater attention to support families and children with Congenital Zika Virus in the long-term. The review also highlights the need for inclusion in mainstream health services and education systems and addresses child abandonment.	Uses the F-words as a guide to identify important responses to the Public Health Emergency of International Concern (PHEIC) in response to the Zika crisis.	"Using the 'F-words of childhood disability' – function, fitness, family, friends, fun, and future – as a guide, this article identifies and discusses important responses to the PHEIC that have received little to no attention by any of the organizations self-reporting to the WHO's '4Ws Emergency Portal' as of 18 June 2016."
Green (2018)	UK	Stakeholders with regards to children with disabilities.	Reviews the literature over the past few decades on the dimensions of physical area (i.e., playground) that promote children's health and well-being, support learning and development, and encourage play and creativity.	Recommends to add another F-word: Freedom in which children can be free to "choose," to "be," and to "enjoy the moment."	"A recommendation is therefore made to include a sixth 'F' word in child disability interventions: freedom. This includes the freedom to choose, freedom to be, and freedom to enjoy the moment."
Snyman et al. (2016)	South Africa	Service providers in the field of disability.	Explores how the ICF can serve as a catalyst to foster competencies for interprofessional collaborative practice.	Uses the F-words to "clarify" and "explain" the ICF components. Provides an extended list of ICF F-words to "help explain" health in the context of the ICF.	"In their discussions with children with disabilities and their parents, Rosenbaum and Gorter (2012) use five 'F-words' to explain and clarify the narrative in terms of the ICF components. In Table 15.4 an extended list of ICF 'F-words' is presented to help explain health in context using ICF."

Note.  $n = 6$ .

Abbreviations: NGOs: nongovernmental organizations; WHO: World Health Organization; ICF: International Classification of Functioning, Disability and Health.

neurodevelopmental disabilities, they did describe three of the F-words—function, “family,” and “friends”—in the context of CP. This was reflected in the results as 13 (36.1%) of *integrated/informed* sources focused specifically on children with CP.

One theme that emerged was the application of F-words to support a holistic approach to services. Empowering children through a strengths-based approach and connecting the F-words to interventions were described as facilitators to participation in PA and other rehabilitation interventions. Several sources highlighted the importance of fun interventions to motivate and engage children and youth. This finding has previously been reported and recommended as a strategy to encourage participation of children with CP in rehabilitation-based interventions (Majnemer et al., 2008; Shikako-Thomas, Majnemer, Law, & Lach, 2008).

It is also important to identify the potential misuse of the F-words and the implications thereof. The F-words were deliberately embedded in the ICF framework to illustrate how the ICF could be operationalized in practice. Snyman et al. (2016) incorporated additional F words' (e.g., food, finances, foes, facilitators, and flooring) to provide examples of how each ICF component can be linked to F words. These words, and obviously hundreds more, can easily be situated within the ICF/F-words domains (e.g., food availability will be an environmental factor, food preferences a personal factor, and food as nutrition a body structure factor). However, the authors' intention was to provide their original F-words to illustrate the concepts embedded within the structure of each ICF domain.

The findings of this citation analysis demonstrate uptake and provide initial insight into the use of the F-words in research. We are encouraged by the findings from this citation analysis that the F-words are being adopted by both researchers and service providers. Now that we know how researchers are using the F-words, work is needed to understand the impact of the F-words on families, service providers, and organizations. Such a study exploring international service providers' attitudes on, and behaviours implementing, the F-words into practice is currently underway.

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## CONFLICT OF INTERESTS

The authors disclose no conflicts of interest.

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