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Barriers and Facilitators to Implementation of a Preschool Outcome Measure: An Interview Study with Speech-Language Pathologists

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3 **Barriers and Facilitators to Implementation of a Preschool Outcome Measure: An**
4 **Interview Study with Speech-Language Pathologists**

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35
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1 **Barriers and Facilitators to Implementation of a Preschool Outcome Measure: An**
2 **Interview Study with Speech-Language Pathologists**
3 **Abstract**

4 *Introduction:* The Preschool Speech and Language Program in Ontario, Canada implemented the
5 *Focus on the Outcomes of Communication Under Six (FOCUS)*, an outcome measure, in 2012.

6 This study aimed to investigate commonly experienced facilitators of and barriers to
7 implementing the FOCUS in clinical practice from the perspectives of speech-language
8 pathologists (SLPs).

9 *Methods:* Thirty-seven SLPs participated in semi-structured interviews to share their experiences
10 adopting the FOCUS in clinical practice. A deductive content analysis of interview transcripts
11 was conducted using the Theoretical Domains Framework (TDF), followed by an inductive
12 analysis to identify sub-themes within each domain.

13 *Results:* SLPs frequently encountered barriers within three TDF domains: Environmental
14 Context and Resources (e.g., difficulties integrating the FOCUS into assessment sessions and
15 intervention schedules), Beliefs about Consequences (e.g., beliefs that data collected using the
16 FOCUS lack relevance to clinical practice), and Social Influences (e.g., administration of the
17 FOCUS harmed rapport with families). Commonly reported facilitators were found in the
18 Behavioural Regulation (e.g., reminder system) and Environmental Context and Resources (e.g.,
19 availability of administrative personnel and technology support) domains.

20 *Conclusions:* SLPs identified barriers and facilitators to implementing an evidence-based
21 outcome measure into practice. Insights drawn from SLPs' perspectives will support the design
22 of new methods to improve the implementation of functional outcome measurement tools within
23 programs.

24 *Keywords:* Theoretical domains framework, implementation factors, knowledge translation,
25 evidence-based practice, practice-based research
26

1 **1. Introduction**

2 Outcome measures are tools that assess patients' progress over time (e.g., over the
3 duration of an intervention) (John & Enderby, 1999). Data collected using outcome measures
4 add value to the healthcare system in a variety of ways (National Institute for Health Research,
5 2015; Weinstein et al., 1996). For policy makers, these data provide a basis to evaluate the
6 effectiveness (cost and otherwise) of the healthcare system (Sanders et al., 2016; Weinstein et al.,
7 1996). For healthcare professionals, these data can be used to demonstrate treatment
8 effectiveness and support clinical decision-making (American Speech-Language-Hearing
9 Association, 2017). Patient- or caregiver-reported outcome measures, in particular, have been
10 linked to better quality of care (Black, 2013; Kotronoulas et al., 2014). When a consistent
11 outcome measure is used within a delivery-of-care system, it enables clinicians and researchers
12 to compare the effectiveness of different interventions (Black, 2013).

13 For speech-language pathologists' (SLPs), an initial challenge to the implementation of
14 outcome measures was the lack of functional, reliable and sensitive measures (Mullen &
15 Schooling, 2010). This led to the development of Therapy Outcome Measures (TOMs) in the
16 United Kingdom (John & Enderby, 1999, 2000), the National Outcomes Measurement System
17 (NOMS) in the United States (Mullen, 2004), and the Australian Therapy Outcome Measures
18 (AusTOMs) in Australia (Perry et al., 2004). While SLPs in these countries have been
19 encouraged to use these tools, it is unclear whether and to what extent they have been adopted
20 into practice (e.g., see report from American Speech-Language-Hearing Association, 2017).

21 In Canada, a national outcome measurement system for preschoolers with communication
22 disorders is lacking, but a provincial outcome monitoring tool was introduced by the Ontario
23 Ministry of Children, Community and Social Services' Preschool Speech and Language (PSL)

1 Program in 2012. In this publicly-funded Program, 400 SLPs provide services to over 60,000
2 preschoolers at 30 regional sites each year. The Ontario PSL Program provides services to
3 children with a wide range of speech, language, and communication difficulties (e.g., global
4 developmental delay, pragmatic communication disorder, childhood apraxia of speech, late
5 talkers, autism spectrum disorder) from birth to school-entry (age 4 or 5 years in Ontario).
6 Families can self-refer to the program or they can be referred by other service providers (e.g.,
7 paediatrician, daycare teachers). Typically, children and their parents or caregivers attend an
8 hour-long assessment appointment where a SLP determines the child's eligibility for services. In
9 some cases where children are known to have complex needs, SLPs will conduct this assessment
10 as part of a multidisciplinary team. Eligible children are placed on a waitlist for intervention
11 services. The length of the waitlist depends on multiple factors including the child's age, type of
12 speech-language impairment, and intervention program availability. Intervention services vary
13 based on the needs of the child and family and can include parent training, childcare visits and
14 consultation, and group and individual intervention.

15 Since 2012, the Ontario PSL Program mandated the use of the *Focus on the Outcomes of*
16 *Communication Under Six (FOCUS)*, a parent-report tool that measures change in
17 communication within the Activities and Participation components of the World Health
18 Organization's International Classification of Functioning (ICF), Disability and Health
19 framework (Thomas-Stonell et al., 2010). The ICF framework considers health from biological,
20 individual, and social perspectives, and describes health conditions as interactions between three
21 components (Body Functions & Structures, Activities, and Participation) and two contextual
22 factors (Environmental and Personal) (World Health Organization, 2001). The Activities
23 component describes children's abilities to perform different tasks or actions. An example item

1 from the *FOCUS* that evaluates children’s skills in the Activities component is “My child uses
2 new words”. The Participation component describes children’s involvement in life situations. An
3 example item from the *FOCUS* that measures children’s skills in the Participation component is
4 “My child is included in play activities by other children”. Children’s outcomes within the
5 Participation component have been reported to be most meaningful and important to parents
6 (Lindsay & Dockrell, 2004; Roulstone et al., 2013) and the *FOCUS* is one of the few tools
7 available to SLPs to measure these outcomes (Cunningham et al., 2017). Validation studies
8 conducted within real-world SLP clinics across Ontario and Canada showed that the *FOCUS* has
9 good test-retest and interrater reliability, as well as strong content and construct validity
10 (Thomas-Stonell et al., 2010, 2013). As an outcome measure, the *FOCUS* provides validated
11 criteria that indicate whether meaningful change was observed during a period of intervention
12 (Oddson et al., 2013; Thomas-Stonell et al., 2010, 2013; Washington et al., 2013). Importantly,
13 these criterion scores have external validity as they were determined based on parents’ and SLPs’
14 impressions of when important functional change had occurred (Thomas-Stonell et al., 2013). As
15 such, collecting data using the *FOCUS* allows SLPs to interpret whether clinically meaningful
16 change in children’s communication skills occurred during the time the child was in intervention.
17 When evaluated using the COnsensus-based Standards for the selection of health Measurement
18 INstruments (COSMIN), an international standard to appraise quality of outcome measurement
19 tools (Mokkink et al., 2018), the *FOCUS* was judged to be developed with sufficient research
20 rigour and can be recommended for use in practice (Kwok et al., 2021).

21 Since 2012, SLPs working in the Ontario PSL Program were required to collect and
22 report outcome data using the *FOCUS* for all children accessing services. Initial efforts to
23 implement the *FOCUS* within the Program included having SLPs (i) review papers about the

1 development of the FOCUS, (ii) independently complete an online training video and (iii) attend
2 an online videoconference group training session where they listened to live presentations and
3 had opportunities to ask questions. SLPs also had access to a user manual that explained how the
4 FOCUS was developed, how it should be administered, and how data can be interpreted
5 (Thomas-Stonell et al., 2015). Despite the research rigour of the FOCUS and nearly eight years
6 of mandated use, inconsistent implementation within the Ontario PSL Program has been reported
7 (Cunningham et al., 2018; Kwok et al., 2019; Smyth et al., 2020). Retrospective chart review of
8 one clinical site involved in the PSL Program found 22-70% of expected FOCUS data were
9 missing (Kwok et al., 2019).

10 The implementation of the FOCUS offers a unique opportunity to investigate factors that
11 may hinder or enable the adoption of outcome measures at a system/population scale. An
12 essential first step towards further supporting implementation is understanding the facilitators
13 and barriers from the perspective of those using the tool every day (Graham et al., 2006). The
14 implementation science literature offers several frameworks to guide the investigation of factors
15 influencing implementation (Moullin et al., 2015). Of note, the *Theoretical Domains Framework*
16 (*TDF*) was developed through a comprehensive review of behavioural change theories in the
17 social and behavioural sciences (Cane et al., 2012; Michie et al., 2005). This 14-domain
18 framework integrates 128 theoretical constructs across 33 theories to offer a comprehensive
19 foundation for identifying barriers and facilitators to implementation (Atkins et al., 2017; Cane et
20 al., 2012). An example domain in the TDF is *Knowledge*, defined as “awareness of the existence
21 of something (e.g., about procedures, rationales, environment etc.)” and has been reported as a
22 barrier to evidence-based practice (Cane et al., 2012). Aside from being evidence-based and
23 comprehensive, the TDF may be particularly suitable for the current study for two reasons. First,

1 the TDF is designed specifically to understand factors that influence health professionals' uptake
2 of evidence-based practices (Atkins et al., 2017). Second, the TDF provides guidance on
3 selecting behaviour change techniques, which are evidence-informed strategies, to address
4 barriers within each TDF domain (Cane et al., 2015). In addition, consistent use of an
5 implementation framework allows data collected across studies to be aggregated, moving our
6 understanding of implementation forward in a systematic way (Nilsen, 2015).

7 This study describes one step in a long-term collaboration with the PSL Program to help
8 improve the implementation of the FOCUS. In this study, we used the TDF to understand the
9 facilitators and barriers to implementing the FOCUS in clinical practice from the perspective of
10 SLPs. Specifically, an interview approach followed by deductive content analysis was used to
11 answer the following research question: What factor(s) do SLPs perceive to facilitate or hinder
12 implementation of the FOCUS in real-world clinical practice? Findings from this study will be
13 used to inform the co-design of implementation strategies with clinic managers and SLPs (e.g.,
14 develop practical ways to remove the barriers SLPs identified in this study).

15 **2. Methods**

16 *2.1. Ethics information*

17 This study was completed as part of a larger Ontario government Program Evaluation and
18 Quality Improvement project that was reviewed by the University Research Ethics Board (REB).
19 After review, the REB concluded that the project was not a research study as described in the
20 Canadian Tri-Council Policy Statement V.2 (Research Exempt from REB Review, Article 2.4)
21 and therefore it was not considered to fall under the purview of the REB.

1 2.2. *Study setting and participant recruitment*

2 The province of Ontario in Canada is geographically large (size: 1.076 million km²) and
3 ethnically diverse (36.5% of the population self-identify as visible minorities) with 68% of
4 residents living in large urban centres, 18% in small-medium urban centres, and 14% in rural
5 regions. The PSL Program is divided into 30 geographic regions across the province, with some
6 regions having a single service site and others having multiple sites depending on population
7 density of the region. Understanding users' experiences across these contexts is critical to
8 implementation planning (Wensing et al., 2009), therefore we used snowball sampling
9 supplemented with purposive sampling techniques to recruit SLPs working in the different
10 regions of the Program. These sampling approaches were used because we did not have access to
11 the contact information of SLPs working within the PSL Program, but we were able to contact
12 managers responsible for services within each region. To recruit SLP participants from across the
13 province, we asked the managers in each of the 30 regions to forward a recruitment email to
14 SLPs in their region (i.e., snowball recruitment). In the email, SLPs were asked to contact the
15 first author if they were interested in participating in the study and to schedule a telephone
16 interview. After two weeks, a reminder recruitment email was sent to all managers to be
17 forwarded to SLPs. After this initial recruitment effort, we tallied the SLPs who volunteered to
18 be interviewed and sent an additional reminder email to managers in regions where no SLPs had
19 volunteered (i.e., purposive recruitment). To gather a full range of opinions, we did not set any
20 additional screening criteria for participants' eligibility. All SLPs who volunteered were
21 interviewed.

1 2.3. *Participants*

2 Thirty-seven SLPs participated in this study. Participants had a median of nine years of
3 clinical experience within the PSL Program (range: 1-24 years). Through purposive sampling,
4 we were able to interview at least one SLP from each of the 30 program regions to gain some
5 insights into the unique challenges faced by clinicians working in different contexts. Assuming
6 that our email invitations went to all SLPs in each region, we estimate an approximate response
7 rate of nine percent (there were approximately 400 SLPs working in the Ontario PSL program).

8 2.4. *Data collection*

9 Qualitative descriptive methods (Sandelowski, 2000) based on semi-structured interviews
10 and focus group data are commonly used in studies that use the TDF framework because factors
11 affecting implementation are often not well described using quantitative methodologies (e.g.,
12 surveys) (Atkins et al., 2017). Within speech-language pathology, little is known about the
13 implementation of participation-based outcome measures, so a qualitative descriptive interview
14 approach was well-suited for the exploratory nature of this study. During the telephone
15 interviews (ranging from: 25-60 minutes depending on SLPs' availability), SLPs were asked to
16 describe their practice setting, and their experience and roles within the PSL Program. SLPs then
17 described the current context for implementation of the FOCUS in their practice, and the barriers
18 and facilitators they had encountered with using the FOCUS. The interview script was developed
19 collaboratively between all authors of this study, who are clinician-scientists in Communication
20 Sciences and Disorders (see Interview Script in Appendix 1). The team of authors also had
21 extensive clinical and research experience to support this project. The first (a doctoral student)
22 and third author (a researcher) were SLPs who had experience administering the FOCUS within
23 the PSL program, the second author (a researcher) is an Audiologist who had experience with

1 qualitative methodologies and had used the TDF to identify implementation factors in
2 audiologists' practices; the third and the final author (a SLP and a researcher) had been involved
3 in multiple research projects within the PSL Program. Specifically, the first and second authors
4 created a semi-structured interview script which included several open-ended broad questions
5 followed by some prompts for more specific information. As all authors had clinical and research
6 experience with the PSL program, the interview script was designed using terminologies familiar
7 to clinicians in the program. The interview script was then reviewed by the third and fourth
8 authors to ensure specificity and comprehensibility (i.e., to ensure that SLPs would be able to
9 understand the questions and provide relevant information). All interviews were conducted by
10 the first author. SLPs participated in the interviews over the phone from their workplace. With
11 participants' verbal consent, phone interviews were recorded using a handheld audio recorder.
12 Field notes were taken during the interviews.

13 *2.5. Data Analysis*

14 With the exception of identifying information (e.g., names of individual SLPs and PSL
15 Program regions), which were replaced with pseudonyms, all interview recordings were
16 transcribed verbatim by undergraduate research assistants in the health studies program at
17 Western University. Next, a research assistant, who was not involved in transcribing the
18 interviews, listened to each interview and read each transcript to verify that: (a) there were no
19 errors (e.g., typos or word substitutions) in the transcripts; (ii) all identifying information was
20 replaced; and (iii) that correct punctuation was used. Discrepancies were resolved through
21 discussion with the first author.

22 Similar to other qualitative descriptive studies using the TDF, a deductive and inductive
23 analytical approach to data analysis was undertaken in a two-stage process. Extracted barriers

1 and facilitators were (1) deductively coded using content analysis and pre-existing domains
2 based on the TDF (Cane, 2012), and (2) analyzed using inductive content analysis for emergent
3 themes within each domain (Atkins et al., 2017). Deductive content analysis seeks to
4 operationalize findings according to pre-existing knowledge and frameworks in the literature,
5 whereas inductive content analysis seeks to describe patterns in the data using general statements
6 (Elo & Kyngäs, 2008). Weatherson et al. (2017) described a combination of deductive and
7 inductive thematic analysis approaches as a “simple method for summarizing findings in the
8 context of focused evaluation questions, while allowing exploration of unanticipated factors
9 associated with implementation...” (p.3). Conducting a deductive content analysis also allowed
10 us to quantify the frequency with which different TDF domains were reported as facilitators or
11 barriers, which provided an index for identifying significant factors (Vaismoradi et al., 2013), a
12 common practice in other studies that used the TDF framework (e.g., Patey et al., 2012;
13 Weatherson et al., 2017). Three phases were involved in our analysis (Elo & Kyngäs, 2008): (i)
14 preparation; (ii) organization; and (iii) analysis and reporting. The coders in all analysis phases
15 were the first author and a research assistant, who were speech-language pathology graduate
16 students and had completed clinical placements in the PSL Program.

17 *2.5.1. Preparation phase:* The aim of this phase was for coders to become fully immersed
18 in the data (Elo & Kyngäs, 2008). To do so, the coders read each transcript several times and
19 used these practical experiences to make sense of each interview. From their clinical placements,
20 both coders had experience administering the FOCUS with families and were familiar with the
21 purpose and the items of the FOCUS. The coders also knew how the FOCUS data was being
22 collected in real-world practices (i.e., SLP typically invite parents to complete the parent version
23 of the FOCUS, but SLPs can also complete the clinician version in cases where parents are

1 unavailable, FOCUS data were then entered into an electronic database) and the expected
 2 administration schedule of the FOCUS (i.e., completed at initial assessment and re-administered
 3 within 6 months or following a major change in services). Their clinical experiences allowed the
 4 coders to better understand the context and the perspectives of SLPs. While reading the
 5 transcripts, ambiguities were discussed amongst the two coders.

6 2.5.2. *Organizing phase*: This phase aimed to categorize the interview data based on a
 7 pre-existing framework in the literature (Elo & Kyngäs, 2008). To do so, first, a preliminary
 8 coding framework was generated by the first author through reviewing the literature on the TDF.
 9 The first author and second author (a researcher with experience using the TDF) evaluated the
 10 coding framework by independently using it to code two transcripts with the aims to: (a)
 11 operationalize the definitions of each of the TDF domains for the current study (see Table 1), and
 12 (b) add example quotes from the transcripts to contextualize each TDF domain (Patey et al.,
 13 2012). To reduce ambiguity and overlap between domains, definitions, example quotes, and
 14 specific inclusion and exclusion criteria were added to the coding framework (see examples in
 15 Appendix 2). The clarity and specificity of this updated coding framework was tested on two
 16 additional transcripts.

17 **Table 1. TDF domains and definitions (operationalized for the current study)**

Constructs	Definition (operationalized for the current project)
Knowledge	Awareness of the FOCUS and related procedures
Skills	Ability/proficiency/perceived control over completing/collecting FOCUS data
Professional Identity	Impacts from completing the FOCUS on the behaviors/beliefs/qualities that define the role of the SLPs
Beliefs about capabilities	Opinions regarding SLPs' abilities to complete/collect FOCUS data
Optimism	SLPs' confidence implementing the FOCUS
Beliefs about consequences	Expected outcomes related to implementation of the FOCUS
Reinforcement	Rewards/punishments contingent on implementing of FOCUS

Intention	Conscious effort to implement the FOCUS, related to stages of change model
Goals	Mental representations of what SLPs want to achieve, related to setting goals regarding implementation of the FOCUS
Memory, attention, decision	Ability to retain information on and attend selectively to aspects of the environment
Environmental context	Circumstances of SLPs' surroundings that impact their ability to collect/complete the FOCUS
Social influences	Interpersonal relationships that influence SLPs' thoughts and behaviors related to the FOCUS
Emotions	SLPs' feelings/affect towards the FOCUS
Behavioral regulation	Actions/systems in place that aim directly to change/adjust/monitor completion of the FOCUS

1

2 The two coders were then trained to use the updated coding framework. During the

3 training, the coders first familiarized themselves with the literature on the development of the

4 TDF framework (Atkins et al., 2017; Cane et al., 2012; Michie et al., 2005). They also watched a

5 training video about the framework developed by the TDF research team (Michie, 2013). Then

6 the coders familiarized themselves with the coding framework developed for this project (see

7 Appendix 2). Finally, the two coders practiced using the project-specific coding framework to

8 code several randomly selected excerpts from the interview transcripts and discussed their

9 analysis. After training, the two coders independently applied the coding framework to one

10 transcript then met to calculate their coding reliability and discuss any coding discrepancies. The

11 two coders exceeded the *a priori* threshold of reliability (i.e., $k \geq 0.61$, which was considered

12 substantial agreement (Landis & Koch, 1977)). Based on their discussions, the coders discussed

13 and added seven specific coding steps to improve consistency in coding (see Appendix 2). After

14 this, the coders independently coded all the transcripts using NVivo 12 software (QSR

15 International, Burlington, MA) then met to calculate their inter-coder reliability (agreement =

16 79%, $k = 0.72$, agreement = 79%, which was considered substantial agreement). Any

17 disagreements in coding were resolved through discussion until consensus was achieved.

1 Analysis of the final coding data revealed that item saturation was reached at the 30th interview,
2 and no new TDF domains or themes were identified after that interview. This suggested that our
3 participant sample provided sufficient data to understand the implementation facilitators and
4 barriers present within the Program.

5 *2.5.3. Reporting phase:* This phase aimed to describe the data analysis
6 process and to report the content identified from the interview data (Elo & Kyngäs,
7 2008). The coders calculated the frequency with which each of the TDF domains was
8 reported as a facilitator or barrier by participants, providing a quantitative index of
9 the relative prevalence of each barrier and facilitator. To describe the content within
10 each TDF domain, major themes were identified and discussed between the two
11 coders. This additional step to inductively identify themes within each TDF domain
12 is a common practice (see for example, Heslehurst et al., 2014; Atkins et al., 2017;
13 Weatherson et al., 2017; Istanbulian et al., 2019) because it contextualizes factors to
14 the implementation problem under investigation.

15 *2.6. Rigor*

16 Specific strategies were used to improve the rigor of this study. First, we interviewed
17 SLPs who were already familiar with the FOCUS tool to ensure they had the experience to speak
18 to the context, facilitators, and barriers related to implementation. All interviews were conducted
19 by the first author, who had experience using the FOCUS tool within the PSL Program. During
20 the data collection process, the first, second, and third author held meetings to discuss the
21 interview data. These discussions functioned as reflexivity practices to help the first author
22 monitor her personal biases. The discussions also identified gaps in the collected data to inform
23 questions in subsequent interviews.

1 During data analysis, two coders were involved who independently analyzed each
2 interview transcript to further reduce personal biases and to improve dependability of the results
3 (Elo et al., 2014; Henderson & Rheault, 2004). To further enhance trustworthiness of the
4 analysis, all authors independently reviewed the interview quotes within the most commonly
5 reported TDF facilitator and barrier domains. All authors agreed that the results accurately
6 represented the coded text. To enhance transferability, which refers to the extent to which the
7 study findings can be 'transferred' to other contexts and other populations (Braun & Clarke,
8 2013; Lincoln & Guba, 1985), we tried to understand and describe the relevant context,
9 participants' experiences, and the circumstances of practice so that the reader could decide
10 whether their own circumstances were similar enough to warrant a consideration of
11 transferability (Braun & Clarke, 2013).

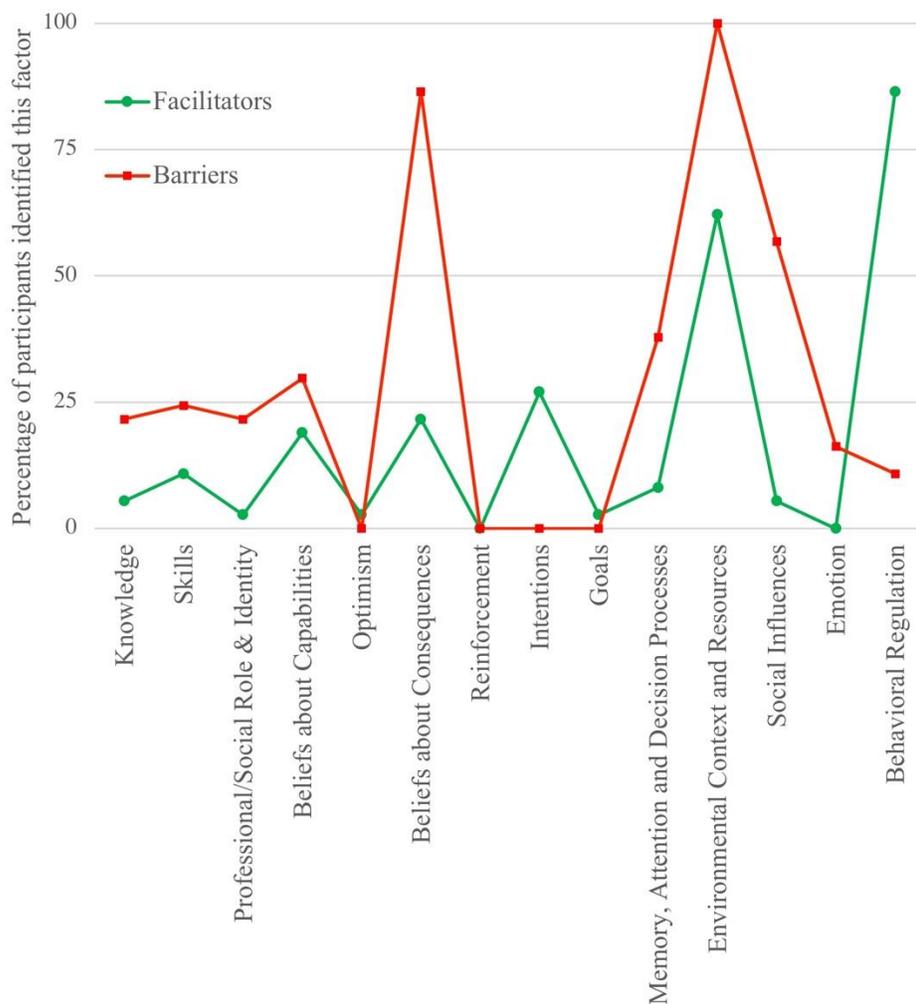
12 To enhance credibility, member checking was completed with three SLPs working in the
13 PSL Program. Sandelowski (1986) suggested findings from a qualitative study could be viewed
14 as *credible* when “people having that experience would immediately recognize it from those
15 descriptions (Sandelowski., 1986 p. 30)”. Three SLPs were recruited to complete the member-
16 checking step because they were participants in other ongoing research being conducted by
17 members of our team (i.e., convenience sampling). One of these SLPs participated in our
18 interview and two did not. All three SLPs had clinical experience administering the FOCUS.
19 Member checking in this study involved an iterative process which aimed to ensure findings
20 resonate with individuals with similar experiences (Birt et al., 2016). To this end, the three SLPs
21 received a written report of the results (i.e., the result section, which include descriptions of the
22 TDF domains identified as facilitators and barriers, themes within each domain) and were asked
23 to provide written comments on whether the results accurately represented their experiences.

1 SLPs were encouraged to suggest modifications to help clarify and enrich the reported results.
2 All three SLPs provided written feedback on the results. SLPs reported the identified themes
3 resonated with their experiences and provided more context to help describe some of the
4 identified themes (e.g., the SLPs indicated that the theme “Damaging rapport with families” was
5 exacerbated in families of children with complex needs). This feedback was then incorporated
6 into a revised results section and returned to the three SLP participants for further feedback. The
7 revised results section (presented here) was approved by all three SLP participants.

8 Quality considerations were also enhanced through the use of the Consolidated Criteria
9 for Reporting Qualitative Research (COREQ; Tong et al., 2007) checklist to guide the reporting
10 of this study's methods and results (see Supplementary Material).

11 **3. Results**

12 Overall, SLPs reported more barriers than facilitators when describing their
13 experiences implementing the FOCUS, and this was true across almost all TDF
14 domains. Figure 1 shows the proportion of participants reporting factors in each TDF
15 domain. All relevant TDF domains, themes and representative quotes are
16 summarized in Table 2 (for facilitators) and 3 (for barriers, both tables were
17 organized by the frequency of participants that reported each domain as a facilitator
18 or a barrier).



1
 2 Figure 1. Proportion of SLP participants reporting facilitators and barriers across the 14 TDF
 3 domains
 4

3.1. Most frequently reported facilitators

5 In terms of facilitators, two TDF domains were identified by the majority of participants.
 6 These include *Behavioral Regulation* ($n = 32, 87\%$) and *Environmental Context and Resources*
 7 ($n = 23, 62\%$).

8 Within the *Behavioral Regulation* domain, SLPs reported modifying their habits to ensure
 9 collection of the FOCUS data. These behavioral modifications occurred at all steps of data
 10 collection. Some SLPs adjusted their behavior *before* meeting with parents, such as by setting a

1 reminder on the electronic booking system to administer the FOCUS. Some adjustments
2 occurred *during* SLPs' interactions with families, such as ensuring that the FOCUS form was
3 always available and providing parents time to complete the FOCUS within the clinical session
4 (see Table 2, "Keeping resources available in sessions" theme). Some behavioral modifications
5 happened *after* SLPs' interactions with the families, such as the SLP completing the clinician
6 version of the FOCUS when families could not or did not complete the parent version during the
7 assessment session (see Table 2, "Adjusting as needed" theme).

8 Within the *Environmental Context and Resources* domain, SLPs identified personnel and
9 technology support in their clinical practice as facilitators. SLPs explained that since the FOCUS
10 was available only in a paper format, after collecting data there was a need for them to calculate
11 the scores in order to record the data for the child. As such, the availability of personnel or
12 technology resources reduced SLPs' workload for data-entry and eased the process of data
13 collection.

14 *3.2. Most frequently reported barriers*

15 Three TDF domains were reported by the majority of participants as a barrier to FOCUS
16 implementation. These included: *Environmental Context and Resources* ($n = 37$ SLPs, 100% of
17 participants), *Beliefs about Consequences* ($n = 32$, 86%), and *Social Influences* ($n = 21$, 57%).

18 Several themes were identified from SLPs' descriptions of barriers within these domains.

19 Within the *Environmental Context and Resources* domain, several themes emerged. SLPs
20 reported particular difficulties completing the FOCUS during assessment because there were
21 organizational restrictions on the duration of assessment sessions (e.g., typically 1 hour) and
22 additional required tasks to complete during the assessment sessions (e.g., paperwork,
23 assessment tasks, and priorities from different professionals on the assessment team). SLPs also

1 reported that the administration schedule of the FOCUS (i.e., no later than every 6 months) did
2 not align with the existing intervention schedule within SLPs' practice environments, which
3 operated in blocks of therapy (when families visit the clinic) and consolidation (when families
4 practice skills at home). This created significant barriers for connecting with families to collect
5 FOCUS data. Furthermore, the procedures of data collection using the FOCUS involved some
6 redundant steps, and occasionally involved several personnel, which introduced significant
7 workload burden.

8 Within the *Beliefs about Consequences* domain, SLPs reported thinking that data
9 collected using the FOCUS were not relevant to their clinical practice or program-level
10 decisions. SLPs questioned the validity of the FOCUS data because some families were reported
11 to have struggled to comprehend items on the FOCUS and sometimes the FOCUS was
12 completed by different parents. These appeared to be major reasons behind SLPs' lack of belief
13 in the relevance of the FOCUS data.

14 Within the *Social Influences* domain, SLPs recounted experiences of some parents
15 reacting adversely to the FOCUS, noting that parents of children with complex communication
16 disorders found the FOCUS particularly upsetting. As a result, SLPs felt that completing the
17 FOCUS damaged their professional relationship (or clinical rapport) with some families.

18 **4. Discussion**

19 Collecting outcome measurement data can benefit children, families, clinicians, and
20 healthcare systems in many ways, but the successful implementation of outcome measures
21 requires an understanding of the factors that influence the uptake of these innovations into
22 practice (Graham et al., 2006). This study investigated the barriers and facilitators to
23 implementing an outcome measurement tool, the FOCUS, into one publicly-funded preschool

1 speech-language program in one Canadian province. Using the Theoretical Domains Framework
2 (TDF) to comprehensively examine factors associated with behavior change, we summarized the
3 perspectives of 37 SLPs.

4 *4.1. Facilitators to outcome measures implementation*

5 Participants frequently identified facilitators to implementation in two TDF domains:
6 *Behavioral Regulation* and *Environmental Context and Resources*. The identification of themes
7 within the Behavioral Regulation domain suggests that many SLPs developed strategies to
8 monitor and modify their behavior (e.g., setting up a reminder system) in order to ensure the
9 FOCUS was administered. Identified themes within the Environmental Context and Resources
10 domain suggest that some program regions also had resources in place (e.g., administrative
11 personnel and technology) to facilitate the data collection process, which reduced the workloads
12 of SLPs. These facilitators provide some insights into implementation planning of the FOCUS
13 tool.

14 These findings also suggest that one way to support the implementation of the FOCUS
15 may be to design a digital format of this outcome measure to ensure all program regions will
16 have the technological capabilities to make full use of FOCUS data in practice (e.g., accessing,
17 calculating, and interpreting scores). Having the FOCUS tool in a digital format may also make
18 it easier for clinicians to use reminder systems, which was reported as a facilitator within the
19 Behavioral Regulation domain. Broadly speaking, having resources such as information
20 technology to reduce the burden on frontline clinicians has been identified as a key facilitator to
21 the successful implementation of outcome measures (Trauer et al., 2006).

1
2 Table 2. Description of SLPs' perspectives of implementation facilitators for the FOCUS across TDF domains

TDF domains ^a	(N) ^b	Themes	Sample quote(s)
Behavioral Regulation	32	Creating a reminder system	'We do put a reminder in our booking. So the therapist does have to remember that [to input the reminder into the booking system]. But in the booking, we set a reminder to booking. It's noted and it comes up on the day's log sheet. So when they walk into a session, it says the time the date, and the FOCUS. And so she [the SLP] knows they [the family] need to have the FOCUS done.' (SLP18)
		Keeping resources available in sessions	'But I always have a copy [of the FOCUS forms] on me during the assessment, so if they didn't bring in their own, they can fill it out during that time.' (SLP01)
		Adjusting as needed	'I complete the clinicians form and in other cases I make that judgement call as to whether this is a tool that is helpful for the family to fill out or if I feel that they may have concerns or if it maybe a challenge to fill out. Um, then I will do the clinician form.' (SLP31)
Environmental Context & Resources	23	Personnel support	'When it first started, we were tallying the scores ourselves, there were lots of errors. So then they employed other people to do that where that was their only thing to do. I think they were volunteers but still they only had to focus on the scores and they think they are satisfied with the outcome of that. So from getting the scores standpoint that's been a huge saviour and also takes a lot of time off of us because you know it's very time consuming to sit there and score.'(SLP34)
		Technology support	'Well what have helped is we have created spreadsheets in our electronic... oh sorry, flowsheets in our electronic records so it's now one of the things we can input into that record as we're doing our assessments. Also creating of the spreadsheet that just calculates the score has been helpful. It makes it faster.' (SLP08)

Intention	10	Internalized intention	‘I feel like at our site we do it [the FOCUS] a lot more because we have to rather than finding it useful.’ (SLP29) ‘And it’s also been reiterated to us how important it is to have it completed.’ (SLP3)
Beliefs about Consequences	8	FOCUS as a tool to gather parents’ perspectives	‘I think the FOCUS, as a tool, is really useful to glean information from the caregivers perspective. I really like that about it. Even though ‘I have other criticisms about the FOCUS, I think its such a great opportunity for clinicians to glean un-pressured information from the caregivers.’ (SLP21)
Beliefs about Capabilities	7	Not an “onerous” task	‘when we have the parents here, they [the FOCUS] are completed during the assessment. I don’t think there’s a lot of barriers to that.’ (SLP11)
Skills	4	Developing skills	‘I think a lot of it kind of comes with experience. You like we have... when you’ve given it like so many times you tend to know certain questions... so I think one of things that I do and I think a couple of other senior clinicians that have worked there for a while do’ (SLP09)
Memory, Attention and Decision Processes	3	Associating FOCUS with an assessment	‘It’s easy to remember to do, if it’s part of your assessment every time you do an assessment, you get it completed, you submit it to admin.’(SLP15)
Knowledge	2	Awareness of importance and its limitations	‘it’s important to have outcome measures so I understand the importance of it [the FOCUS], I just, you know, and things have to be done a certain way so, you know, I understand that aspect of it. I do, again, there’s 34 questions, like it’s pretty lengthy in terms of what the family has to fill out um, but I understand why they[the FOCUS tool developers] can only reduce it so far’ (SLP37)

Professional/ Social Role & Identity	1	FOCUS corroborated clinical findings	‘Then you get the completed FOCUS from the parent and in fact the parent responses on the FOCUS was way more matching the assessment.... And then the clinician can go “I have finished my assessment; this is what it indicates and I see that... its lovely to see that your comments on this questionnaire kind of match what my assessment has found”. And this is so validating for parents. You know... you know because they [parents] feel like they have been an active participant in the assessment of their child. I like that.’ (SLP21)
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Goals	1	No theme identified (only 1 quote).	
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^a.The domain Reinforcement was not reported as a facilitators or barrier by SLPs.
^b. *N* = number of SLPs (total *N* = 37)

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1 Table 3. Description of SLPs’ perspectives of implementation barriers for the FOCUS across TDF domains

TDF domains ^a	N ^b	Themes	Sample quote(s)
Environmental Context & Resources	37	Integrating FOCUS into already busy assessment sessions	‘Well basically time during our sessions. Biggest hurdle, major hurdle. It [the FOCUS] is not the only thing that is filled out. Here there, for toddlers we are doing a research project and we have to think about that, also and our sessions are an hour to an hour and a half. Really if you want to do a good full assessment initially, if you have a toddler coming in with signs of social communication issues autism and all that. We feel like that there is no time’ (SLP09)
		Incompatible schedule between FOCUS and clinic visits	‘We've been told that in order for it [the FOCUS] to be valid, it needs to be done uh every six months um and no more than every six months. But we also run our programs in blocks so they [the clients] get three months worth of services and then three months on a consolidation period. And, by the time they come back from their consolidation period for the next round of services, it's usually over six months’ (SLP14)’
		Workload burden due to complex and redundant steps	‘Yeah and the data, like the way it works here, it’s almost like we got 3 people inputting the same data because the parents are filling out the FOCUS and the SLP is filling out the scoring sheet, and then we have a program assistant that is inputting the data in the system so we have 3 people collecting the data’ (SLP18)
Beliefs about Consequences	32	FOCUS data did not impact clinical practice	‘It’s mostly what, what most of the SLPs feel that way. Very few of us use it [the FOCUS], at all really. It doesn’t drive our therapies it doesn’t drive our strategies we will recommend, it doesn’t really drive anything we do at this point so, so then is really is, it becomes administrative’ (SLP07)

		FOCUS data were not used to make system-level decisions	<p>‘SLP: We have... we’ve discontinued using the FOCUS probably within this last year, we made the decision to discontinue its use. Researcher: And why would... can I ask the reason why? SLP: So what we found was that the only outcomes that’s really being reported to the Ministry was what percentage of children was having the FOCUS done. They weren’t really seeing the effectiveness of individual intervention.’ (SLP12)</p>
		FOCUS data were not valid	<p>‘there were a couple clinicians that said this, that they didn’t necessarily find the score valid in the sense that, I would sort of question it, it’s valid for the parent if that’s how they see the client but these clinicians were indicating that they felt that sometimes the parents were very different on the views of their child’s skills’ (SLP06)</p>
Social Influences	21	Damaging rapport with families	<p>‘Um, so there are a number of issues, but I would say the biggest one is that the impact that it [the FOCUS] has for a lot of the parents that I work with. And I have parents cry when they are filling out, which is... it’s not funny. It’s quite... it’s hard and I don’t want to expose undue stress on my families, they have enough challenges that they are facing, and they are working through’ (SLP31)</p>
Memory, Attention and Decision Processes	14	Forgetting to administer the FOCUS	<p>‘...from a therapist point of view, the general cognitive overload. We ask a lot of our therapists. The FOCUS is not the only thing they have to do.’ (SLP18)</p>
Beliefs about Capabilities	11	Not feeling confident in answering specific questions	<p>‘Some of them[SLPs] said, that some of the questions that were on the clinician’s FOCUS they did not feel prepared to answer, like how is this child communicating with peers.’ (SLP06)</p>
Skills	9	Uncertain how to interpret and explain items on the FOCUS	<p>‘you can have the speech pathologist explain it to parents but I think it then needs to be more clear to the speech pathologist who is working with those level four and five kids.’ (SLP04)</p>

Knowledge	8	Not knowing administrative schedule	'... sometimes I'm not sure when to give it, when is tricky between the 6 months period, where I am like I can give it to them now like three or four months, but then when they go on a break and come back it will be seven or eight months. So is it better to do it sooner or later?' (SLP01)
Professional/ Social Role & Identity	8	FOCUS contradicted professional roles	'They [parents] already feel terrible about, before they come to see me. So, my job is to say, "Hey look what he did today", or "wow, he never used to be able to that little thing, and now he can do it a little better than he could". That's my job. It's to bring them up and to get them excited about their small achievements. But, that tool[the FOCUS] really does emphasis the huge gap, like chasm, like its immense, between what a typical kid that a preschooler should be achieving and what the kids that I see are achieving. It's really monumental differences that no parent should have their nose rubbed in.' (SLP05)
Emotion	6	Negative emotions	'I think a lot of people are frustrated with the FOCUS' (SLP19) 'And then you feel really uncomfortable asking them[parents] to do it, yet again.' (SLP14)
Optimism	1	No theme identified (only 1 quote).	

^a.The domain Reinforcement was not reported as a facilitators or barrier by SLPs.

^b. *N* = number of SLPs (total *N* = 37)

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1 The implementation science literature further stresses the importance of ensuring that these
2 resources, particularly any computer software, be user-friendly so they can be easily learned and
3 used by clinicians (Damschroder et al., 2009; Michie, 2013; Trauer et al., 2006). One way of
4 ensuring user-friendliness is to engage end-users (e.g., parents and SLPs) in the design of these
5 types of technological support.

6 *4.2. Barriers to outcome measures implementation*

7 The majority of participants identified barriers to implementation in three TDF domains:
8 *Environmental Context and Resources, Beliefs about Consequences, and Social Influences*. SLPs
9 reported many practical challenges with incorporating administration of the FOCUS into clinical
10 practice. Finding strategies to address these specific barriers will be important because these
11 factors affect implementation fidelity (Fixsen et al., 2005; Weatherson et al., 2017), and in the
12 case of the current study, considerably limit the benefits of having a consistent outcome
13 measurement tool.

14 The challenges of implementing clinical outcome measures are not unique to the
15 Canadian context nor to the speech-language pathology profession. The lack of uptake of
16 outcome measures has been reported for SLPs in other countries (Roulstone et al., 2015) and in
17 other allied healthcare professions (Blenkiron, 2005). A systematic review summarized the
18 literature on the facilitators and barriers to routine use of outcome measures in allied health and
19 identified four major themes: 1) clinicians' knowledge about and perceived value for the
20 outcome measure; 2) organization priority; 3) practical constraints including time and resources;
21 and 4) patient considerations (e.g. perceived relevancy to patients care) (Duncan & Murray,
22 2012). Some of the barriers identified in the present study mirrored those reported in the
23 literature. For example, SLPs frequently reported barriers associated with a lack of time and

1 personnel resources to support the implementation of the outcome measure, and a lack of belief
2 in the value of FOCUS data for informing patient care. Unlike what has been reported in the
3 literature, organizational priority and clinician knowledge were not identified as major barriers of
4 implementation in our study. This may be due to the fact that the FOCUS is government-
5 mandated (i.e., high in organizational priority), and the implementation efforts to-date have
6 focused on improving SLPs' knowledge of the tool (Cunningham & Oram Cardy, 2020).
7 Alternatively, this difference in findings may be due to our use of an explicit theoretical
8 framework, which allowed for an objective way to describe and understand the barriers to
9 implementation.

10 *4.3. Methodological implications*

11 In their systematic review, Duncan and Murray (2012) identified a potential bias within
12 the existing literature, namely, that many studies focused heavily on examining barriers to
13 implementation at the level of clinicians. This approach assumes clinicians are at fault for poor
14 implementation and neglects organizational-level barriers. This bias has the potential to result in
15 the selection of ineffective implementation strategies such as audit and feedback on clinicians'
16 practice and educational outreach, which are, incidentally, some of the most commonly selected
17 implementation strategies. These strategies target barriers to behavior change in clinicians but
18 may be inappropriate for organizational barriers (Boaz et al., 2011; Davies et al., 2010). The use
19 of explicit theory can minimize these biases and errors (Eccles et al., 2005). Using a theoretical
20 framework to guide our analysis, we found that clinician-level factors such as those within the
21 Behavioral Regulation domains were, in fact, facilitators to implementation of the FOCUS. In
22 contrast, the barriers to implementation involved factors beyond the control of the clinicians
23 (e.g., the complex procedure of FOCUS data collection). These barriers reflected implementation

1 challenges at the organizational and systems level or related to the outcome measurement tool,
2 which can only be effectively addressed by individuals other than clinicians.

3 Findings from this study highlight the value of using an interview approach followed by
4 analysis using an explicit framework to understand implementation factors. In the current study,
5 SLPs' experiences across Ontario were gathered to contextualize the barriers and facilitators
6 commonly experienced within the broad domains of the TDF. For example, the Environmental
7 Context and Resources domain was identified by many SLPs as both a facilitator and a barrier to
8 FOCUS implementation. The interview approach allowed us to identify themes within this
9 domain to clarify which aspects of the domain were facilitators (e.g., personnel and technology
10 support) versus barriers (e.g., restrictions around assessment sessions). Additionally, the themes
11 identified will inform the design of specific strategies to improve implementation of the FOCUS.
12 This work will be supported by the TDF framework literature, which links each TDF domain to
13 theory-informed implementation strategies that have been effective at improving real-world
14 implementation (Cane et al., 2015; Connell et al., 2018). A major future direction of this work is
15 the development of an implementation plan. To maximize the effectiveness of the
16 implementation plan, relevant stakeholders (e.g., SLPs, families, policy makers, the FOCUS tool
17 developers) will be engaged to discuss strategies to resolve the barriers to FOCUS
18 implementation identified in this study (Powell et al., 2019).

19 *4.4. Limitations of the current study*

20 Beyond the context of Ontario, Canada, the facilitators and barriers reported by SLPs in
21 this study may provide a useful reference for implementation planning in other large, programs
22 (e.g., for anticipating necessary resources for implementation). However, it should be
23 emphasized that implementation challenges are often influenced by the local context

1 (McCormack et al., 2002), so our findings may not directly generalize to other clinical practice
2 environments or to the implementation of clinical tools other than the FOCUS. As well, this
3 study did not consider implementation factors from the perspective of parents or administrative
4 staff involved in FOCUS implementation. As such, the current findings should not be interpreted
5 as a comprehensive investigation into all implementation factors, but rather, an overview of
6 implementation factors experienced by SLPs.

7 The current study was also limited by practical constraints. Although we were able to
8 recruit volunteers from across all program regions as a way to gather diverse perspectives from
9 SLPs working in different implementation contexts across the province, self-selection biases may
10 have limited the representativeness of our sample. We were unable to verify, for example,
11 whether our participants represent the range of data collection fidelity across the program (e.g.,
12 FOCUS data collection rate). In part, this was because data on FOCUS implementation fidelity
13 were not available at the level of individual SLPs. In addition, the majority of SLPs within the
14 PSL program provide services to a diverse caseload, and offer a variety of service types and
15 durations. These practical constraints have prohibited us from investigating questions such as
16 whether some (or a combination of) facilitators/barriers played a larger role in implementation
17 outcomes (i.e., fidelity of adoption), or whether specific clinical service contexts (e.g., types of
18 interventions) underlined specific implementation factors. In addition, while the framework
19 chosen for this study allows for the identification of facilitators and barriers to FOCUS
20 implementation, it does not investigate any interaction that may exist between factors. A
21 narrative or grounded theory approach might be better suited to fully describe the complexity and
22 nuances in SLPs' experiences. The factors identified in this study can be a useful foundation for

1 our field to begin to understand clinicians' decision-making with regards to implementation of
2 evidence-based practice or a population-level outcome monitoring system.

3 **Conclusions**

4 Using a theoretically driven approach, we examined SLPs' perspectives of the facilitators
5 and barriers to implementing an outcome measurement tool. Identifying these factors was a first
6 step toward improving implementation of the FOCUS in Ontario's PSL Program (Graham et al.,
7 2006). A future direction of this work is to develop implementation materials and strategies to
8 directly address the barriers identified by SLPs.

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