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Practice-Based Research in Speech-Language Pathology

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Abstract

Practice-based research is an active and collaborative approach to clinical research that minimizes the research-practice gap. Practice-based research involves collecting data in practice to answer questions that arise from clinical practice. The findings from this research then inform future practices. Though over the past two decades there has been a significant increase in knowledge translation activities, especially the use of collaborative partnerships, the integration of these practices in speech-language pathology is in its infancy. In this thesis, I investigate the role of practice-based research in speech-language pathology. In Chapter 2, I first examine the current role of practice-based research in speech-language pathology through a scoping review. I present a practice-based research Co-Creation Model that characterizes the outcomes of partnerships, and I present the results of the scoping review. The Co-Creation Model outlines capturing practice, changing practice, and creating practice as three potential outcomes of these partnerships. In Chapter 3, I employ two aspects of the model, first capturing practice and then changing practice. In this chapter, I report on a practice-based research partnership between researchers and speech-language pathologists at a school board in Ontario. The clinicians at this school board designed a language and literacy tool and they were interested in determining the effectiveness of the tool. In study 1, we capture the current use of the tool and the results of this study led to a collaborative update of the tool. In study 2, additional data was collected to determine the effectiveness of the updated tool and determine the tool's validity against standardized measures of language. The results of this study demonstrated that the update of the tool was successful. Chapter 4 aims to understand the experiences of researchers and clinicians engaged in a partnership and draws on qualitative data collected during the practice-based study reported in Chapter 3.

Insight from their experiences provided knowledge of barriers and facilitators to partnership, and factors important for partnership initiation and maintenance. Chapter 5 summarizes the findings of these 3 chapters, discusses broader implications of this work, acknowledges limitations of the current work, and outlines considerations for future work in practice-based research.

Keywords

Speech-language pathology, Practice-based research, Knowledge translation, Collaborative partnerships, Barriers, Facilitators

Summary for Lay Audience

Many researchers and clinicians have acknowledged a knowledge gap between research and practice. In other words, the best available evidence is not always being used in clinical practice. One suggested approach to reduce the gap between research and practice is called practice-based research. In practice-based research, researchers and clinicians work together to gather research findings from clinical practice. This reduces the research-practice gap because the research findings are specific to clinical practice and can be integrated back into practice immediately. For example, if the researchers and clinicians determine that an assessment being used is not collecting the data they want it to, they can work together, make changes to the assessment, and then gather data to determine if the assessment is now gathering the intended data. The goal of this thesis was to understand the role that practice-based research can play in speech-language pathology.

In study 1, I complete a review to understand how practice-based research partnerships currently exist between researchers and speech-language pathologists. I also present a model for researchers and clinicians who are interested in working in partnership. In my doctoral work, I had the opportunity to engage in a practice-based research partnership with speech-language pathologists at a school board. The speech-language pathologists at this school board created a tool that they use to assess language skills. Chapter 2 describes the steps we took to evaluate the tool. We make changes to the tool and demonstrate the tool's effectiveness. In this partnership, it was also important that we examine the experiences of researchers and speech-language pathologists throughout this project. Collaborative partnerships are being used to minimize the research-practice gap, but more information is needed to understand the potential of these partnerships. Chapter 4 reviews

facilitators and barriers that were experienced by those in the partnership and lists factors important at the beginning of the partnership and to sustain the partnership. Overall, this research adds to our understanding of partnerships between researchers and speech-language pathologists. I present a practice-based research partnership that resulted in meaningful changes to clinical practice and explore the experiences of working in a partnership.

Co-Authorship Statement

Chapters 2, 3, and 4 of this dissertation are being prepared for submission to scientific journals. All three projects were designed and conducted in collaboration with other researchers and speech-language pathologists. My collaborators are co-authors as outlined below for each manuscript. Each co-author was given the opportunity to provide feedback on completed manuscripts. My supervisor, Dr. Lisa Archibald, provided feedback on each chapter of this dissertation.

Chapter 2: Vollebregt, M., Archibald, L.M.D., Theurer, J., & Cardy, J.O., (2022). Exploring practice-based clinical-research partnerships in speech-language pathology: A scoping review. (Accepted). *Canadian Journal of Speech-Language Pathology and Audiology*.

Chapter 3: Vollebregt, M., Sarlo, N., Punnoose, A., & Archibald, L.M.D. (2022). Practice-based research with speech-language pathologists: A case study determining the effectiveness of an evidence-informed language and literacy tool. (Submitted).

Chapter 4: Vollebregt, M., Sarlo, N., Punnoose, A., & Archibald, L.M.D. (2022). Practice-based research with speech-language pathologists: A qualitative investigation of partnership experience. (Submitted).

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Chapter 1

1 Introduction

Speech-language pathologists (SLPs) work diligently to provide evidence-based care in the prevention, assessment, and treatment of patients in the areas of speech, language, social communication, cognitive communication, and swallowing and dysphagia (American Speech-Language-Hearing Association, 1997). Researchers in the field of speech-language pathology devote their time to the development of new knowledge, assessments, and treatments for clinicians to use to provide care based on the best possible evidence. However, due to a variety of research-to-practice barriers faced by researchers and clinicians the movement of research to practice is slow, time-consuming, and demanding (Glasgow & Emmons, 2007). This discrepancy between research and practice has been acknowledged in many fields and has been termed the "research-practice gap" (Kerner et al., 2005). The acknowledgement and concern for this gap led to the introduction of the field of knowledge translation (KT), which seeks to understand the exchange, synthesis, and application of research, and the interactions among researchers and knowledge users (Canadian Institutes of Health Research, 2020). One approach to KT is practice-based research (PBR) that minimizes the research-practice gap by developing research questions that come from clinical practice in partnership with clinicians (Esptein, 2002; Westfall et al., 2007). PBR and other KT approaches are being utilized in fields such as nursing (Harrison et al., 2007), policy (Kothari et al., 2009), and business (Choi & Johanson, 2012), and more recently in speech-language pathology (Crooke & Olswang, 2015). My research seeks to examine the current role of PBR in speech-language pathology, provide insight into conducting a PBR study in partnership with SLPs, and add to the literature understanding the social and interactional

aspects of PBR partnerships. In this chapter, I will describe evidence-based practice and the role it plays in speech-language pathology. I will then describe knowledge translation, practice-based research, and the importance of collaborative partnerships in these approaches to research. Finally, I will briefly outline the role of SLPs in education and describe school-age language outcome measures.

1.1 The Standard of Evidence-Based Practice

To understand the call for knowledge translation it is necessary to define and review the components of evidence-based practice. In the early 1990's an overall standard of practice was established to ensure the use of evidence to provide effective and efficient care that was of the best quality. Originating in medicine the term 'evidence-based medicine' was coined, however many iterations of this term have been used to make this term broad enough for other fields (Gray, 1997). This includes evidence-based guidelines, evidence-based decision-making, evidence-informed practice, etc. Likely the most common term used today is evidence-based practice (EBP) (Sackett et al., 1996). EBP is the judicious use of best available evidence to inform a decision about the care of a patient (Sackett et al., 1996). The call for EBP was clear and responses were apparent in increased funding and infrastructure across the world (Rycroft-Malone et al., 2004). In Canada, the Canadian Patient Safety Institute (CPSI) was formed to act as a leader in advancing a safer health care system in Canada. The role of this organization was to provide funding for policymakers, organizations, and health care providers to work together to provide the best quality of care possible, giving patients confidence in their health care system. Shortly after, the benefit of evidence-based practices (EBPs) was identified in educational settings (Odom et al., 2005; Slavin, 2002). Similar to health care settings, the goal of introducing EBPs into education was to provide a high quality of education. Implementing EBPs as the standard in education

also ensures the progressive improvement in the quality of education for future generations (Slavin, 2002).

The introduction of EBP acknowledged that making decisions about individuals' care is complex, includes a variety of factors, involves uncertainties, and is continuously changing (McKibbon, 1998). In recognition of this, one of the most influential models of EBP recognizes the need to integrate three components: the best available external research evidence, individual clinical expertise, and patient preferences (Sackett et al., 1996). Sackett and colleagues defined external research evidence as clinically relevant research often originating from basic sciences. Research most applicable will be patient centred and focus on diagnostic accuracy, effective and safe rehabilitation, and preventative therapies. Including research evidence can both provide evidence to de-implement or remove outdated practices and provide evidence for current or new clinical practices. Clinical expertise refers to the knowledge and judgement that clinicians acquire through their clinical experiences and clinical practice. Clinicians demonstrate this knowledge and their expertise through efficient and accurate identification of diagnoses (Sackett et al., 1996). Unlike research evidence that is often propositional knowledge derived from formal research, clinician expertise is non-propositional knowledge derived predominantly from experience in practice. Where research evidence is generalizable, clinical knowledge is not as likely to be transferable (Rycroft-Malone et al., 2004). Patient preference is the final component identified in Sackett's model. Distinct from clinical expertise and best evidence, patient preference influences clinical care because clinicians must understand a patient's preference for their care and, from a place of compassion, accommodate those decisions (Sackett et al., 1996). In some cases, a patient's preference will misalign with the best available evidence or a clinician's expertise, and it will be the clinician's responsibility to consider the evidence, their judgement, and the patient's

preference to provide the best possible quality of care. One additional component to EBP that was introduced later is the local context and environment where the clinical care occurs (Rycroft-Malone et al., 2004). Described as ‘internal evidence’ because the data come from local contexts (Stetler, 2001), it refers to other knowledge that clinicians might draw from including performance data from other patients, information they have gathered from interacting with clients, and knowledge of the culture of the organization and professional networks they are exposed to in that context (Rycroft-Malone et al., 2004). Drawn together, it is these four components: research evidence, clinical expertise, patient preferences, and local contexts and environments that clinicians must merge to provide EBPs.

For SLPs, providing evidence-based care is a central principle to the clinical services they provide (Reilly, 2004; Vallino-Napoli & Reilly, 2004). Professional associations including the American Speech-Language-Hearing Association (ASHA) and Speech-Language-Audiology Canada (SAC) have recognized the importance of EBP by releasing policy documents and other statements on the role of EBP in guiding clinical decision making (ASHA, 2005; SAC, 2019; Ebbels et al., 2018). There is some EBP literature that seeks to understand how clinicians integrate client preferences (Pollens, 2012), and the local context (Weisner & Hay, 2015) with their clinical expertise, but much of the research in this area seeks to understand the process of integrating research into clinical practice (Ratner, 2006). Though each component of EBP is necessary to provide the best patient care, the remainder of this section will focus on integrating research evidence into practice.

Clinicians, SLPs in this case, are expected to continue to learn throughout their career to keep their clinical practices up to date (Ratner, 2006). It is predicted that research evidence doubles every 10 years and consequently it is impossible for clinicians to learn in graduate

school everything needed for their career. Further, it is implausible that research evidence discussed in graduate school would be the most up to date later into a clinician's career (Hess, 2004). Clinicians are required to seek and integrate new information to ensure patients are receiving the most effective clinical services (Ratner, 2006). For SLPs to integrate research, they must be able to identify the clinical need of a client and turn this need into an answerable research question. Clinicians must then be able to search through research and find the information to their question, then critically appraise the strength of the research, and assess the relevance of the research to their clinical question. Next, they must apply the results of the research to their clinical practice. Finally, clinicians should reflect on the results of the practice and determine if the practices are leading to the desired results (Sackett et al., 1996). In summary, engaging in EBP helps to improve clinical service, holds clinicians accountable to a high degree of service provision, and reduces variation in the quality of services provided, but is incredibly complex (Schlosser, 2003).

1.2 Barriers to Integrating Research into Practice

SLPs recognize the significance of EBP and, in one study, 97% of all clinicians reported the importance of research findings shaping their practice (O'Connor & Pettigrew, 2008). However, although SLPs see the benefit to EBP, implementing EBPs is a cumbersome process and many have reported significant barriers to EBP (McKenna et al., 2003; Meline & Paradiso, 2003; Metcalfe et al., 2001; Newman et al., 1998; O'Connor & Pettigrew, 2008; Plante, 2004; Rapp et al., 2010; Thompson et al., 2005; Vallino-Napoli & Reilly, 2004; Zipoli & Kennedy, 2005). Likely the most reported barrier across studies is a lack of time to engage with research (Metcalfe et al., 2001; Thompson et al., 2005). This included both a perceived lack of time to seek out and read research as well as integrating research into practice (O'Connor & Pettigrew, 2008; Vallino-Napoli & Reilly, 2008). Other frequently

reported barriers include an inability to evaluate the research (e.g., statistical analyses are not understood, lack of skills to implement EBP) (Metcalfe et al., 2001), methodological inadequacies (O'Connor & Pettigrew, 2008), difficulty accessing relevant literature (Zipoli & Kennedy, 2005), the large amount of literature (Mckenna et al., 2003), results that were not easily transferrable (Mckenna et al., 2003), not having the literature complied in one place and literature with conflicting results (Mckenna et al., 2003; Metcalfe et al., 2001).

Importantly, these barriers exist at an organizational level and cultural level (Newman et al., 1998). Organizational barriers include EBP as a low priority for management, inadequate systems for professional development, difficulties within the team inhibiting personal and professional growth, and inadequate resources for an EBP initiative. Cultural barriers include individual and group motivations to change practice and competing interpretations of the role of clinician and/or research (Newman et al.,1998). Various barriers have been reported for those working in different environments (Mckenna et al., 2003). For example, for nurses working in a hospital, barriers included limited applicable research for practice and difficulty searching for evidence-based information, and for nurses working in community clinic settings the main barriers identified were poor patient compliance and lack of facilities with computers (Mckenna et al., 2003).

In addition to the numerous barriers faced by clinicians, there are several factors that impact the movement of research to practice relating to how research is disseminated (Olswang & Prelock, 2015). One significant barrier impacting the speed at which new findings can move into practice is the time lag from discovery to publication. This is a result of the traditional research pipeline where research moves from basic sciences, to being tested in controlled clinical settings and then applied to clinical settings. Certainly, this efficacy and

effectiveness research is needed, but it should be acknowledged that this further disrupts the implementation of new evidence (Robey, 2004). A second concern is that research findings are only published in academic journals and as alluded to previously, this places the responsibility on the clinician to interpret and integrate the findings. Without a high relevance to clinical practice the results will not be useful to clinicians (Olswang & Prelock, 2015). Finally, if sufficient details are not provided for new findings (e.g., treatment procedures or dosage) then clinicians will not be able to implement the protocol with high fidelity. For example, in speech-language pathology, without clearly defined 'active ingredients' of an intervention, concrete manuals or training outlining procedures of an intervention, and specific tools to support documenting fidelity (e.g., log sheets), increased variability and deviation from the research protocol and findings may occur (Olswang & Prelock, 2015).

Reported barriers across organizational and professional settings highlights both the enormous effort required to implement EBPs and the unique challenges that organizations and clinicians face when integrating research into practice. Addressing these barriers becomes complex because the barriers are the result of interactions between social, organizational, economic, and cultural factors (O'Connor & Pettigrew, 2008; Rapp et al., 2010). Further, the challenges that stem from the research dissemination process add complication to the movement of research to practice (Coulter et al., 2014). Given the dynamic nature of clinical practice, research, and the interaction between the two, it is clear that even with a concerted effort, integrating research into practice remains a challenge for speech-language pathology as well as other disciplines (Olswang & Prelock, 2015). Putting the responsibility of EBP solely on clinicians contributes to a gap between research and

practice. The need for a more active approach that brings researchers and clinicians together has been identified (Greenhalgh et al., 2004).

1.3 The Need for Knowledge Translation

The acknowledgement of the continued gap between research and practice led to the introduction of the knowledge translation movement (Graham et al., 2006; Green et al., 2009; Harrison & Graham, 2021; Morris et al., 2011). In 2006, the Canadian Institutes of Health Research (CIHR), added knowledge translation to their funding mandate with the goal to support the understanding of research findings and the use of those findings (CIHR, 2015). Many terms have been used to describe knowledge translation over the years including knowledge mobilization, knowledge utilization, knowledge transfer, etc., but knowledge translation is the most common. Knowledge translation (KT) has been defined as "a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge to improve health, provide more effective services and products and strengthen the health care system" (CIHR, 2015). As outlined in the definition, KT includes the synthesis, or integration, of research from individual research projects that contribute to a large body of knowledge. It includes the dissemination, or sharing, of information in a way that is appropriate for different and specific audiences. Also, KT includes the exchange of information between researchers and the individual(s) who use or implement the knowledge, referred to as the knowledge user(s) (i.e., clinicians, managers, policymakers, etc.). The result is a partnership whereby the researchers and knowledge users engage and knowledge is shared equally resulting in mutual benefit. Lastly, KT includes the application of a process to support the movement of the findings into practice (Harrison & Graham, 2021).

The point at which knowledge exchange occurs and a partnership between researchers and knowledge users is developed can vary depending on the reason for partnership engagement. This closely aligns with discussions of whether the research-practice gap is the result of knowledge transfer or knowledge production (Bowen & Graham, 2015). If the gap is a result of transfer, then the proposed paradigm is rather linear and is based off a unidirectional flow of information from researchers to knowledge users (Bowen & Graham, 2013; Bowen & Graham, 2015). This has also been referred to as the *push* where the goal is for research driven findings to be implemented into practice (Smits & Denis, 2014). In this case, one KT possibility is end of grant partnership engagement where research findings are synthesized, best practices are established, and the next step is to disseminate and implement findings (Barwick, 2019). Partnerships will be established between researchers and knowledge users to support the implementation of the new findings in practice and may continue beyond the project to assist encourage use of the new findings.

Demonstrating the push from research and tied to the incorporation of EBPs is implementation research which is considered the 'science of KT' (Harrison & Graham, 2021). Implementation research, or implementation science, is the study of methods that promote the uptake of research findings into practice (Eccles & Mittman, 2006). Implementation science is concerned with methods that promote the uptake of clinical research for patient care, and includes efforts to support other service providers, the organization, and policies informing healthcare (Bauer et al., 2015). Several theories, models, and frameworks have been developed for implementation science (see Nilsen, 2015 and Nilsen & Bernhardson, 2019 for a review of determinant frameworks), and at the same time, implementation strategies have been identified to address facilitators and barriers to this research (Bauer & Kirchner, 2020; Powell et al., 2017; Proctor et al., 2013). When used

together, the frameworks contribute to the identification of specific elements in practice that should be targeted and monitored to support implementation (Bauer & Kirchner, 2020). Consistent with KT broadly, researchers in implementation science take a transdisciplinary approach and work in partnerships both with those who make decisions regarding the use of a specific practice (i.e., administrators, policymakers) and/or those using it in their work (i.e., clinicians) (Bauer et al., 2015). Implementation science partnerships typically begin when a gap is recognized between knowledge and practice resulting in lack of use of an EBP. Implementation science is used to address the reason the EBP is not integrating into practice and make the necessary adjustments so it can be implemented sustainably and with ease (Baurer et al., 2015). Curran et al. (2020) offers non-scientific language to define implementation science: *the thing* is the intervention. Implementation research aims to understand how to help people do the thing, and implementation strategies are the things that we do, or perhaps things that we remove to help people do the thing.

On the other hand, if the research-practice gap is a consequence of knowledge production then the suggested response is an engagement paradigm that requires active participation from researchers and knowledge users (Bowen & Graham et al., 2015). This concept has also been referred to as the *pull* from practice where the research projects are driven by practice and practice goals (Crooke & Olswang, 2015). In these instances, partnerships are initiated from the point of idea formulation and continue through to after the findings of the project are implemented. In these partnerships, the knowledge exchange is continuous and decisions regarding the project are made mutually between the researchers and knowledge users (Canadian Foundation for Healthcare Improvement, 2019). Through these partnerships, researchers and knowledge users co-construct applied knowledge and conduct relevant research that is meaningful for both researchers and knowledge users (Smits

& Denis, 2014). Most widely, this co-production has been termed integrated knowledge translation (IKT) and has become a universally used guide for collaborative research (Gagliardi et al., 2016; Kothari & Wathen, 2013; Kothari et al., 2017). By adopting an IKT approach, project ideas, project design, data collection, data analysis and interpretation, and implementation of the findings are all completed in the ongoing relationship between researchers and knowledge users.

IKT, and the bidirectional communication that is created between researchers and knowledge users supports the movement of research into practice in several ways (Harrison & Graham, 2021). Both knowledge users and researchers bring complementary knowledge to the partnership and can share unique perspectives that are important to the research project. Knowledge users can share insights into research that is needed and feasible in practice or policy. Researchers bring knowledge pertaining to research methods and analyzing or interpreting data, as well as experience in disseminating findings (Keown et al., 2008). Further, knowledge users benefit from engaging with researchers and thinking about their work with a research lens, and researchers benefit from gaining an understanding of the clinical environment. This complementary knowledge leads to research knowledge with more real-world applicability and joint interpretation of the data allows for more rich discussions of the results and consequently more impact of the findings (Gagliardi et al., 2016).

There are numerous models of KT that outline the process of synthesizing, dissemination, and implementation of findings into clinical practice [e.g., the Knowledge-to-Action Cycle (Straus et al., 2013), the Ottawa Model of Research Use (Graham & Logan, 2004), CAN-IMPLEMENT (Harrison et al., 2014)]. The most frequently cited framework is the Knowledge-to-Action (K2A) Framework (Skolarus et al., 2017). This model consists of a

knowledge creation phase and an action cycle (Straus et al., 2013). In the K2A framework, a problem or a gap between research and practice is identified. In the knowledge creation phase, knowledge is synthesized and tailored for the specific need, either the problem or the identified gap between research and practice. Any tools or products required are designed or developed. Then in the action cycle the new knowledge is adapted to the local context, barriers and facilitators to implementation are assessed, knowledge use is monitored, outcomes are evaluated, and the sustainment of this new knowledge is assessed. In this dynamic and iterative process, researchers and knowledge users may move between the knowledge creation phase and the action cycle phase as necessary. This framework, in addition to providing a theoretical grounding for KT, also serves as an educational tool for knowledge users when undertaking a KT project. It both outlines the stages and processes that will be required and emphasizes the time and effort to move knowledge into practice (Harrison & Graham, 2021).

Figure used with permission.

Reference: Graham, I.D., Logan, J., Harrison, M.B., Straus, S.E., Tetroe, J., Caswell, W. et al. (2006). Lost in knowledge translation: Time for a map. *Journal of Continuing Education in the Health Professions*, *26*(1), 13-24. https://doi.org/10.1002/chp.47

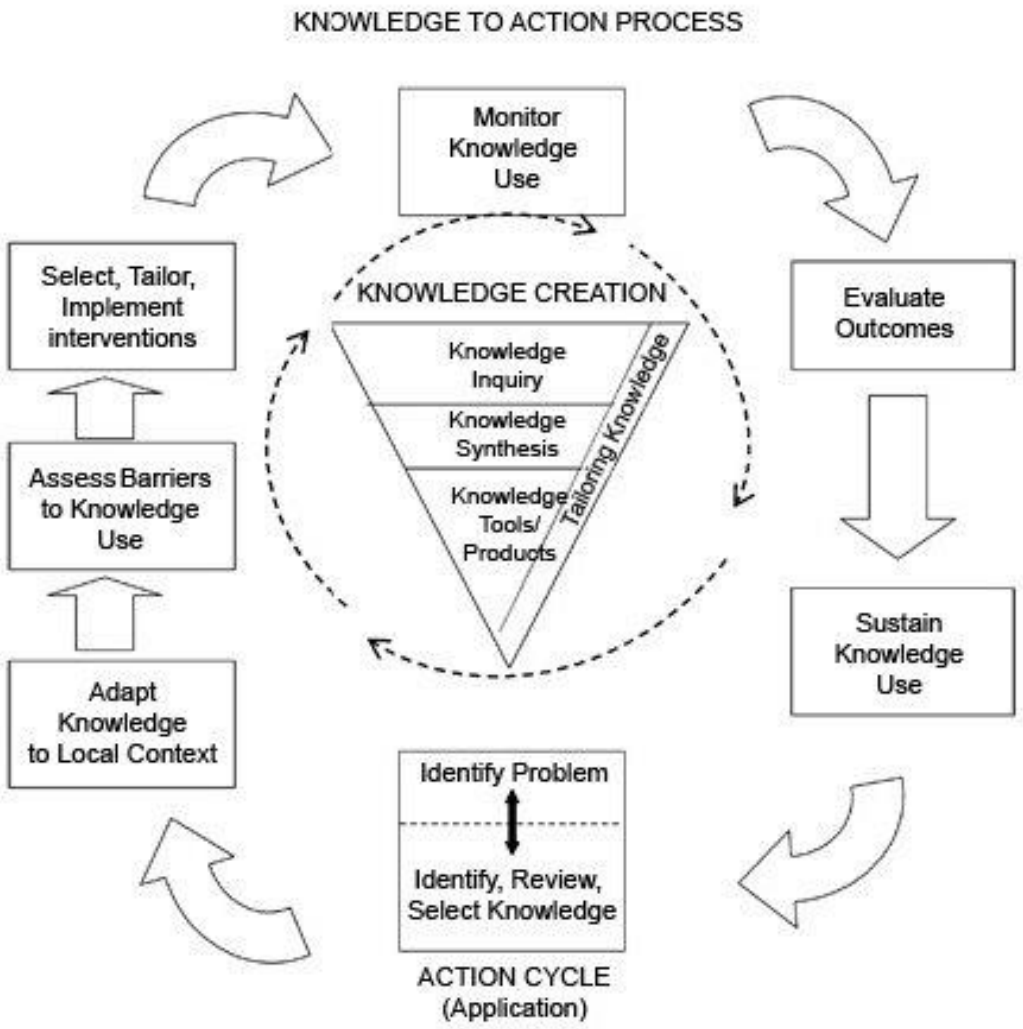

Figure 1-1 The knowledge to action process

To summarize, EBPs are established so patients receive the best possible care and to ensure a higher degree of care is maintained across organizations, settings, and healthcare providers. The discrepancy between the best available evidence and current practice was concerning and an approach to minimize this knowledge to practice gap was needed.

Dependent on the need, different KT approaches aim to minimize this gap by addressing the gap as a knowledge transfer or knowledge production issue. The introduction of KT partnerships answered the call for a more active approach to bridge the gap between knowledge and practice and support the use of EBPs in practice. This active approach is cultivated through partnerships between researchers and knowledge users pertinent to the research questions, methodologies, and implementation. Several theories, frameworks, and models have been proposed for those interested in engaging in collaborative research between researchers and knowledge users.

1.4 Collaborative Partnerships

An integral piece to KT is the partnership between those traditionally creating knowledge and those implementing and/or using the knowledge. However, the idea that partnerships support knowledge utilization has been voiced for many years. First introduced by Havelock (1971) in an education setting and refined by Caplan (1979), The Two Communities theory posits that researchers and knowledge users work in distinct worlds resulting in conflicting values, terminology, and motivations (Caplan, 1979). This initial theory identified instrumental problems to research relating to how research findings were being used in practice and conceptual problems connected to the applicability of research findings. The theory suggested that partnerships would help reduce these concerns. This sentiment would later be echoed by Bowen and Graham (2013), who discussed the gap between research and knowledge as relating to knowledge transfer or knowledge production and the role of partnerships in reducing this gap through implementation science or IKT, respectively. Today, the value of partnerships between researchers and knowledge users is discussed frequently and the use of collaborative partnerships is more common (Gagliardi & Dobrow, 2016).

Collaboration between groups of professionals should be based on a shared acknowledgement that working together is the best way to develop or implement new knowledge. In this way, the collaborative partnership is viewed as a collective undertaking where decisions are made together throughout the partnership (D'Amour, 2008). Of course, each individual involved in the partnership brings a unique perspective to the research (Gagliardi & Dobrow, 2016), and these different perspectives should receive equal respect throughout the research process (Karam et al., 2008). Undoubtedly, there are many skills needed to build and sustain a collaborative partnership. This includes practical elements such as the time and resources to engage in a partnership, but also elements such as mutual trust and respect, strong communication skills, cooperation, accountability, and responsibility (Kasperski, 2000). An element especially important for collaborative partnerships, where decision making should be shared, is maintaining balanced power across the partnership (Karam et al., 2018). It has been suggested that by focusing on the evidence and how to use the evidence to improve practice, the discussion within the partnership can focus on the outcomes, which minimizes any conflicts of power (Harrison & Graham, 2021). Strong partnerships result in a synergy between group knowledge and skill (Kasperski, 2000).

Though collaborative partnerships can improve the influence of research on practice and as a result enhance healthcare, policy, or education, developing a partnership to a place where the relationship is synergistic is not without its challenges (Nystrom et al., 2018; Oliver et al., 2019). With the increase in collaborative partnership so too is the need to understand these partnerships in more detail (Sibbald et al., 2014). Both practical concerns (e.g., time, resources etc.) and the social and interaction aspects of partnerships are being explored (Harrison & Graham, 2021). Most often this research is interested in highlighting barriers and facilitators to collaborative partnerships (Sibbald et al., 2014), factors of

collaboration that are likely to enhance knowledge use (Rycroft-Malone et al., 2016), and classifying the types of partnerships between researchers and knowledge users (see Sibbald et al. 2014 for a review). A few models of collaboration have been introduced to help guide those interested in conducting research in partnership. D'Amour (2008) discusses the Structuration Model of Collaboration that can be applied to interprofessional and interorganizational collaborations. The model outlines four dimensions, two of which relate to the relationship between the individuals (i.e., shared goals; vision) and the remaining two, to the organizational setting (i.e., formalization; governance). Together the dimensions highlight factors to consider in the process of engaging in a collaborative partnership. Use of this model supports partners in analyzing the complexity of systems within their partnership. A second prominent model supporting those engaging in partnerships is the IKT Capacity Framework (Gagliardi & Dobrow, 2016). This framework was developed to be used by healthcare researchers and professionals to anticipate challenges they might experience in establishing partnerships. The authors also identify strategies for knowledge users to enhance the success of IKT. This includes strategies at the organizational level (e.g., need for infrastructure and resources to support IKT), professional level (e.g., knowledge to engage in IKT), and individual level (e.g., allotted time to engage in IKT). Nystrom and colleagues (2018) completed a qualitative study analyzing 20 collaborative partnerships and their findings highlight necessary skills for these types of relationships (e.g., project management), the complexities that can arise between competing interests of researchers and other knowledge users and factors partners should consider before engaging. This research is a first step in understanding collaborative research, though more research is needed to understand the process of collaborative work and its usefulness in practice.

In summary, collaborative partnerships have been proposed as a sort of 'golden ticket' to minimize the research-practice gap. The complementary knowledge and skills that researchers and knowledge users bring into a partnership is unique and is not found in the traditional research pipeline. These partnerships have the potential to uncover meaningful findings for those involved; however, there are several obstacles to engaging in partnered research. Building a research-practice partnership can require significant time to be established, also necessary are important factors such as trust, shared mental models and shared goals. Significant and perhaps underestimated efforts are required from all involved in the partnership, and funding and other resources to support partnership maintenance are scarce. While partnerships are recommended as an effective approach to bridging the research-practice gap, more research is needed to understand the best ways to effectively engage in co-production.

1.5 Practice-Based Research

Collaborative partnerships have been identified as a key factor in knowledge production and address the research-practice gap through the co-production of knowledge for both researchers and knowledge users (Van de Ven & Johnson, 2006). These partnerships are initiated prior to development of a research question and maintained throughout a research project. Several research approaches see the value in collaborative partnerships. As previously described, IKT (Gagliardi et al., 2016; Kothari & Wathen, 2013; Kothari et al., 2016; Kothari et al., 2017) is one example of this type of work. A number of other paradigms that fit broadly under the IKT umbrella but focus even more strongly on partnerships and real-world contexts include participatory action research (Baum et al., 2006), design-based research (Collins et al, 2009), community-based participatory research (Kim et al., 2004) and practice-based research (Epstein, 2002). Specific to the field of speech-language pathology

and this dissertation, Crooke and Olswang (2015) first described the utility of practice-based research in the field of speech-language pathology and since then it is moving into the field (Olswang & Goldstein, 2017). On the continuum of KT approaches, from push in to pull out, practice-based research is a fully collaborative approach embedded within a clinical context that pulls clinical questions into research. Certainly, as expressed by Crooke and Olswang (2015), practice-based research does not replace the need for traditional research; however, practice-based research acts as valuable complement to traditional research.

Practice-based research (PBR) is the "use of research-inspired principles, designs and information gathering techniques within forms of practice to answer questions that emerge from practice in ways that inform practice" (Epstein, 2002). In other words, PBR answers clinical questions that arise from practice using data that are collected in practice. These findings then inform future practice. PBR was first identified in the field of social work by Epstein (2002) who recognized that clinical data could be 'mined' to provide information regarding clinical services. By synthesizing data from practice, the findings were relevant to clinical settings and as a result could be implemented quickly and with greater ease than other research findings (Epstein, 2002). To provide a more detailed description of PBR, Epstein (2002) outlines several defining characteristics. PBR in an inductive practice and questions are derived from practice wisdom. Research inspired principles are used to gather data and this research can use either experimental or quasi experimental designs. Findings from the research can include descriptive or correlational knowledge. In PBR, studies can be retrospective or prospective and data may be quantitative or qualitative. While engaged in PBR, participants do not need to be randomly assigned to treatment and control groups. Similarly, standardized assessments can be used within this research, but these instruments can be modified if that is best for the practice. Since the goal of PBR is developing research

that is feasible and sustainable for everyday practice, meeting the needs of the client, clinician and their practice is the main concern for those involved in this type of research. Lastly, PBR is a collaborative science and those involved in this research must remember that practice requirements are of greater importance than research considerations. PBR uniquely demands partnerships between academics and clinicians that allow for the creation of research in a naturalistic setting.

Two aspects of PBR that demonstrate its suitability to clinical sciences such as speech-language pathology are (1) the need for partnership between researchers and clinicians and (2) the importance of the local context in developing knowledge. Both clinician perspectives, and the local context are two components of EBP that are not always included in traditional research development. Of course, as discussed, clinician perspectives in partnered research makes the research findings more meaningful for clinical practice. Researchers offer the knowledge to enhance the scientific rigour of the study design and clinicians have the knowledge of what research is most significant to clinical practice. Researchers can ensure high fidelity is maintained to the new protocol and clinicians can guarantee the new protocol is sustainable in practice and warrants buy-in from other colleagues. For clinicians, the research that is created is directly applicable to practice and is designed to be sustainable for practice. Fewer implementation barriers arise because clinicians are engaged in choosing what is meaningful to study. Mold and Peterson (2005) argue that by including clinicians in the study design, collecting, and analyzing data, clinicians view the results to be more useful and usable. While some internal validity is lost from collecting data in a real-world setting, external validity is improved by generating findings that are more closely suited to practice (Crooke & Olswang, 2015).

Secondly, the development of knowledge that is relevant to the local context helps to create findings that are sustainable for and feasible in practice. Illustrating the importance of sustainable practices is the misuse of standardized assessments in speech-language pathology. It is well acknowledged that standardized assessments are misused within the field (Daub et al., 2019), which can lead to the possible interpretation of a result where a child is not given the necessary care and treatment attention they should receive. Some of these misuses include only using selected items of a test to make treatment decisions, using a test more frequently than recommended (e.g., giving test every 3 months when test should only be given every 6 months), or using incorrect scores to capture growth from treatment (McCauley & Swisher, 1984). In Epstein's work, he outlines several reasons that standardized assessments may be viewed unfavourably by clinicians. This includes being too long and thus too time-consuming to complete in full, and measuring too few variables, which does not allow the assessment of sufficient dimensions of a client. Other critiques identified include assessments being standardized on different populations, not being closely linked to practice concepts, and use of language with a middle-class bias not suitable for some populations. As well, although these tests show psychometric robustness in a testing and development setting, this is often lacking in a clinical setting. Robust psychometric properties refer to the validity and reliability of a specific assessment and if an assessment protocol is not followed these characteristics may be lacking. Specific types of validity are considered when selecting an assessment and more will be discussed about the types of validity at the end of this chapter. It is clear that generating local knowledge is important for implementing suitable EBPs. Local information creates knowledge regarding evidence about the context, the professional setting, and the populations within a clinical setting (Harrison & Graham, 2021).

In summary, traditional research does not always consider clinical perspectives or produce data relevant to a local context. This raises concerns for clinicians who work diligently to implement EBPs but face numerous barriers in doing so. PBR complements traditional research by informing practice through research collected in practice. Research questions and findings are informed by clinical perspectives, and findings are specific to the local context. In considering the 4 components of EBP (i.e., best available evidence, clinical perspective, local contexts and environments, and patient perspectives), PBR reduces the number of factors to consider given clinical perspectives and local knowledge are embedded in the research questions. Most pertinently, best available evidence is integrated into practice through the PBR partnership. Knowledge is gathered and synthesized and moved into practice efficiently and with fewer barriers. Figure 1.2 illustrates the potential of PBR in reducing the load of integrating EBPs into clinical settings.

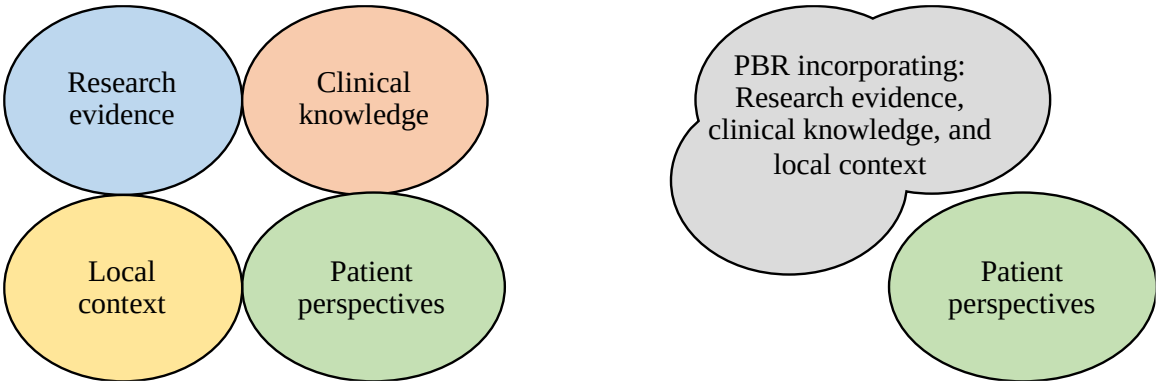

Figure 1-2 Illustrating the potential of PBR in creating evidence and supporting use of EBP. PBR considers the local context and clinical knowledge and incorporates it into the research question.

1.6 PBR: Combining and Reporting Effectiveness Research and Assessing Partnerships

PBR brings together the strengths of working in collaborative partnerships and developing knowledge (e.g., clinical tool or product). Given the importance of PBR but the recognized challenges of collaborative partnerships imperative to PBR, it is important to understand how to establish effective partnerships. Considering that the use of PBR in speech-language pathology is still developing it is important to understand the challenges of partnerships. Reporting the processes, barriers, facilitators, and experiences provides information necessary for those entering partnerships. As a starting point, we can draw on models of collaboration from other similar disciplines that report on both clinical findings and partnership effectiveness.

Curran and colleagues outlined three hybrid approaches for studying implementation science. The authors recognized the need for blending the ability to study clinical effectiveness as well as the implementation strategies used in the research. In hybrid 1, clinical intervention and relevant outcomes are examined while gathering information related to implementation, in hybrid 2, both clinical and implementation strategies are tested, and in hybrid 3, implementation strategies are tested while gathering information related to the clinical intervention (Curran et al., 2012). As an example of hybrid 3, Kwok et al. (2021) completed semi-structured interviews with SLPs who shared their experience in adopting a new tool into clinical practice. Facilitators and barriers to implementation were reported by SLPs and findings supported the development of a new approach to implementing the tool into practice. PBR researchers can employ similar approaches in their research and report on new clinical knowledge as well as on the barriers and facilitators to partnership. Findings related to the knowledge will be similar to traditional effectiveness research, and insights into

partnerships will provide important information regarding how to engage in successful partnerships. Given that reporting on PBR partnerships is a relatively new area, especially in speech-language pathology, it is important to share experiences and make non-propositional knowledge more propositional (Rycroft-Malone et al., 2004). In this dissertation, Chapters 3 reports on the effectiveness of a bespoke clinical tool and the knowledge gained about the tool and Chapter 4 reports on knowledge gained from exploring the PBR partnership between researchers and SLPs working in an education setting. The remainder of this chapter will discuss evaluating clinical-research partnerships, SLPs working in education, and important considerations for language and literacy tools.

1.7 Partnership Evaluation

One way to begin to understand clinical-research partnerships is to use an inductive approach that allows researchers to discover what is occurring in these partnerships. Taking a constructivist approach allows researchers to understand the experiences of participants in their environments and the social interactions that influence experiences (Schifter, 1996). Collecting qualitive data and using a grounded theory approach to interpret these results can provide initial models to support those interested in engaging in partnerships. Qualitative data is used when researchers are interested in gathering information about individuals' experiences, emotions, behaviours, and thoughts. In other words, if the research question seeks to understand the nature of an experience and surrounds an area where there is currently little known about the experiences, then qualitative data is an appropriate choice (Stern, 1980; Straus & Corbin, 1998). Grounded theory, introduced by Barney Glaser and Anselm Strauss, is a commonly used method when analyzing qualitative data (Straus & Corbin, 1998). Grounded theory refers to a theory that comes from systematically gathered data that is then analyzed. The individual analyzing the data does not have a pre-existing

theory of the data but rather lets the theory emerge from the data (Straus & Corbin, 1998). Undoubtedly, the analysis becomes an interplay between the data and the researcher's interpretations of the data (Straus & Corbin, 1998). Developed theories, models, frameworks, since they come from lived experiences, offer insight into the current reality, which then allows for the determination of meaningful actions to move forward.

1.8 Introduction to SLPs in an Education Setting

Speech-Language and Audiology Canada (SAC) outlines the roles and responsibilities of SLPs in schools, the scope of their practice, and advocates for more SLPs in education (SAC, 2019). In schools, SLPs support students of all ages (i.e., kindergarten through high school) with speech, language, social communication, literacy, cognitive communication, and augmentative and alternative communication needs. SLPs have unique expertise in oral language development which they apply to help students be successful in their learning and peer relationships. SLPs have the skills and training to contribute to literacy achievements for struggling learners, and SLPs can provide contributions to the curriculum either through consultation with other educators or co-teaching a lesson with educators (American Speech-Language-Hearing Association, 2012). In a school setting, SLPs are often involved in prevention efforts put in place to mitigate the possibility of academic failure. For any students demonstrating weak language skills, SLPs are responsible for appropriate assessment of language skills and for those identified as needing appropriate intervention. Each aspect of prevention, assessment and intervention should be consistent with current EBPs (American Speech-Language-Hearing Association, 2012). Collaboration with other professionals, educators, researchers, parents, and students is also expected from SLPs. As indicated in SAC's position statement, there are not enough SLPs to meet the demands of their assigned schools, their caseloads are very large, and there are students on

waitlists for services (Kaegi et al., 2002). Given the lack of resources for SLPs in schools, challenging practice choices must be made to meet the demands placed on them (Archibald, 2017; Ukrainetz, 2006). Clinicians rely on their clinical judgement and their own data to make decisions (Cirrin et al., 2010). One example of this is creating bespoke assessments and/or interventions that meet workplace demands and fit the needs of caseloads. This creates an opportunity for PBR to assess the effectiveness of these tools and interventions for meeting practice demands.

1.9 School Age Language Outcomes: Psychometric Considerations

While there are many aspects to language and literacy development, SLPs, educators, and researchers have recognized key components that are powerful predictors of positive language and literacy outcomes. Five key components identified as crucial for development of strong language and literacy skills include phonological awareness, phonics, fluency, vocabulary, and text comprehension (National Reading Panel Report, 2000). Two aspects of language commonly assessed by SLPs in schools and discussed in this dissertation include phonological awareness and narrative language ability.

1.9.1 Phonological Awareness

Phonological awareness is the knowledge of the sound structures of words, or the ability to manipulate parts of words including syllables and phonemes (Gillon, 2004; Schuele & Boudreau, 2008). Identified as an early indicator of reading success, phonological awareness supports a child's ability to link phonemes to graphemes, which is necessary for strong decoding skills (Bus & Van IJzendoorn, 1999; Castles & Coltheart, 2003; Stahl & Murray, 1994; Anthony & Lonigan, 2004; Hogan, Catts, & Little, 2005). Strong decoding

skills subsequently support reading comprehension (National Reading Panel, 2000; Lonigan, 2004). Assessments of phonological awareness typically determine a child's ability to rhyme, both blend and segment at the syllable and word level and identify individual phonemes.

1.9.2 Narrative Language Ability

Narrative ability encompasses a child's ability to understand a story, retell a heard story and make up or share personal narratives (Bishop & Adams, 1990; Justice et al., 2006; Petersen et al., 2008). The ability to understand and produce oral narratives is also linked to academic success, specifically reading comprehension (Feagans & Appelbaum, 1986). An in-depth understanding is gained by assessing both oral narrative comprehension and production of a story (Skarakis-Doyle & Dempsey, 2008; Boudreau, 2008) including the macrostructure of the story (e.g., characters, setting, etc.), the microstructure (e.g., sentence structure, word choice, etc.), and ability to answer questions (Liles et al., 1995; Justice et al., 2006; Boudreau, 2008).

1.9.3 Types of Validity

In addition to selecting key aspects of language to assess, SLPs often need to adapt assessments to fit their practice needs. Potential adaptations may include altering standardized assessments of language or developing new assessments specific to the components they plan to examine. Unfortunately, changes to a standardized assessment means fidelity to the protocol is not maintained and this can affect the validity of the assessment and subsequent interpretations of the results (Kaderavek & Justice, 2010). Similarly, if new assessments are created for practice the validity of the assessments are unknown. Validity provides evidence for the interpretation of the results (Downing, 2003) including content validity, criterion validity, and construct validity. Content validity refers to

the extent that any one item on an assessment is representative of the entire domain or construct that the assessment is thought to be measuring (Salkind, 2010). Criterion validity, or concurrent validity, refers to how well a score on one assessment will predict the score on another assessment. It refers to the strength of the relationship between the two assessments (Salkind, 2010). Construct validity refers to how accurately an assessment measures a specific concept. Measuring the extent that two assessments are correlated provides some evidence of construct validity (Ruel, 2019). Construct validity is particularly important for bespoke clinical tools because this evidence provides confirmation that the SLPs are measuring the construct they intended to measure (Downing, 2003).

1.10 Objectives and Overview

The central objective of this thesis is to examine practice-based research (PBR) in the field of speech-language pathology. To summarize the above discussion, over the last several decades it has become clear that incorporating research into clinical practice is difficult and cumbersome for clinicians and what is now referred to as the research-practice gap was identified. In the past, it has been seen as the clinician's responsibility to move research into practice, however, more recently there has been a call for a more active approach. The introduction of knowledge translation filled the need for this more active approach and within this field, various sub-domains emerged representing the push of research into practice and pull of research findings from practice. The need for collaborative partnerships between various knowledge users and researchers has been identified as central to the success of these more active approaches. PBR is an active approach to research that employs clinical-research partnerships to answer clinical questions that arise from practice. It is suited to clinical sciences because data are collected in practice which makes the research findings specific and meaningful to a clinical setting. The use of PBR and PBR partnerships is relatively new

to the field of speech-language pathology, so in addition to providing evidence for assessing clinical practices, more research is needed to understand the process of building these partnerships and identifying facilitators and barriers to partnerships. Through examining PBR in speech-language pathology, I explore the potential of PBR partnerships, provide a case study of a PBR partnership with SLPs in a school board, and seek to understand facilitators and barriers to these partnerships.

Chapter 2 reports on a scoping review investigating the presence of PBR between researchers and clinicians in speech-language pathology. Given the introduction of these partnerships as an active approach to bridge the research-practice gap, we sought to capture the use of these practice-based partnerships in our field. We present a PBR Co-Creation Model to highlight the potential outcomes when working in these partnerships and report the findings from the scoping review.

In my doctoral work, I had the opportunity to engage in a PBR partnership with SLPs from a school board in Southern Ontario. At the outset of our partnership, the SLPs described an assessment tool they developed to fit their practice needs. The SLPs developed a language and literacy assessment tool that was used to assess phonological awareness and narrative language ability. The group of SLPs were interested in determining the effectiveness of this tool and together we developed PBR questions to address their questions. Chapter 3 presents the findings from this work in the form a case study. The findings outline the results of 2 studies completed to better understand the tool and make necessary adjustments to the tool.

Through the process of engaging in the partnership, it became clear that capturing the process and the experiences of those in the partnership would be valuable for understanding how to create effective partnerships. Chapter 4 reports on themes identified from qualitative

data collected from the SLPs and researchers engaged in the PBR partnership. Previous work has developed models and frameworks of collaborative partnerships and I extend this work by providing a framework that highlights facilitators, barriers, and factors important for partnerships initiation and maintenance.

Together, the findings of this thesis will describe the current use of PBR partnerships in speech-language pathology and present a model of potential outcomes from partnered research. In addition, a case study will demonstrate the utility of PBR in answering clinical questions and making meaningful changes in practice. Finally, this thesis will contribute to understanding the barriers and facilitators to engaging in PBR partnerships.

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Chapter 2

2 Exploring Practice-Based Clinical-Research Partnerships in Speech-Language Pathology: A Scoping Review

2.1 Introduction

It has long been recognized that laboratory-based research findings with presumed clinical relevance may have little impact on practice. Difficulty translating knowledge from research into practice arises for a variety of reasons related to both research pipelines and clinical experiences (Crooke & Olswang, 2015). Practice-based research (PBR) is an approach to systematic inquiry that involves gathering information from clinical practice to answer questions arising from practice in order to inform future practice (Epstein, 2002). As a promising new approach to knowledge creation, PBR addresses many of the limitations discussed in the field of knowledge translation. Crucially, PBR involves practicing research 'without the gap' because the research question is embedded directly in practice. Clinicians and researchers form partnerships to assess clinically relevant questions systematically and in situ. By co-creating knowledge at the point of consumption, PBR has the potential to directly impact practice with little need for knowledge translation. PBR is particularly well suited to the field of speech-language pathology given the importance of applied research questions and objective clinical approaches, however, the extent to which clinicians and researchers are engaged in this type of research is unknown. The purpose of the present study was to examine PBR in the field of speech-language pathology. First, we developed a model of co-creation to describe possible goals of PBR studies including *capturing practice*, *changing practice*, and *creating practice*. We then completed a scoping review of published research broadly consistent with a PBR approach in the field of speech-language pathology and categorized identified studies according to our model.

2.1.1 The Research-Practice Gap

Knowledge generated through systematic research has important implications for service providers whose goals are to improve the health, education, and well-being of individuals. The traditional research pipeline of creating knowledge involves researchers outside of the clinical provision pathway deciding upon a research question, designing a research study, collecting and analyzing data, and sharing results. One problem noted with this knowledge creation process has been that the shared research results often fail to impact practice at the level of service providers (i.e., clinicians, educators, etc.). This failure to use new evidence in practice is seen amongst all health care professionals, policymakers, and the public (Graham et al., 2006; Straus et al., 2009). One often quoted statistic is that it takes 17 years for 14% of original research to be applied to practice (Green et al., 2009; Morris et al., 2011). Observations concerning this research-practice gap gave rise to the field of knowledge translation (Canadian Institutes of Health Research, 2008; Straus et al., 2009), which centers on moving research from the laboratory into practical use. The full knowledge translation cycle is captured in the Knowledge-to-Action framework (Graham et al., 2006; Straus et al., 2009), which specifies both knowledge creation and action cycles. Knowledge creation focuses on the research required to produce and synthesize knowledge for implementation, and the action cycle includes a range of activities needed for knowledge implementation. The Knowledge-to Action framework provides a means of focusing attention on research, practice, and the gap in between them.

Despite nearly two decades of effort, closing the gap between research and practice has proven a perplexing challenge (Olswang & Prelock, 2015). This research-practice gap is maintained by various barriers faced by both researchers and clinicians. These barriers include limited time to engage with research or practice, limited access to resources, a lack of

research usability, and a lack of institutional support. In the knowledge creation cycle, researchers experience delays in producing efficacious and effective research (Ovretveit et al., 2014) and can encounter further delays when publishing their findings (Morris et al., 2011; Olswang & Prelock, 2015). As well, avenues valued by researchers for sharing their findings such as scholarly journals are not necessarily accessible to practitioners. Even common translational activities such as conference or workshop presentations have been found to be only moderately effective in changing practice (Grimshaw et al., 2012). Beyond simply accessing research-based knowledge, additional barriers to the action cycle are commonly reported by clinicians. Scholarly publications are often not written for a practice-based audience, requiring clinicians to interpret the findings and determine the implications for practice (Olswang & Prelock, 2015). Considerable time, resources, knowledge expertise, and motivation are required not only to engage in such interpretative activities, but also to implement potential changes into practice (Green et al., 2009). Although critical, necessary organizational support may not be available to enable such activities within everyday practice.

Beyond the challenge of sharing and translating available research, another barrier in addressing the research-practice gap is a lack of overlap between research priorities and clinical concerns. Researchers and clinicians often operate in relative isolation from one another. As a result, researchers may focus on questions that are not relevant to clinical practice or develop solutions that are not feasible within the economic or contextual constraints of practice (Olswang & Prelock, 2015). Research that ignores the feasibility of implementation may result in knowledge that has no practical applicability in clinical settings. Although clinician scientists present another solution to the research-practice gap by

conducting research as part of practice, the focus of the current review is on the partnership between researchers and clinicians.

2.1.2 Moving Research into Practice

Situated within knowledge translation is the field of implementation science, which has been a recent focus in communication sciences and disorders (Douglas & Burshnic, 2019). Focused on the action cycle, implementation research is the study of methods that promote the uptake and integration of evidence into health policies, health care, and education (Bauer et al., 2015; Eccles & Mittman, 2006; Proctor et al., 2013). Specifically, implementation science systematically addresses barriers that hinder the integration of new research into practice (Eccles et al., 2009; Olswang & Prelock, 2015). It uses methods and techniques to enhance the implementation and sustainability of a practice (Proctor et al., 2013). The specific focus of these strategies is on changing professional behaviours and changing organizational structures to allow for successful implementation and implementation maintenance (Fixsen et al., 2005; Michie et al., 2011). In describing the process of implementation science, Curran (2020) identified three components in the simplest terms: 'the thing', how to do 'the thing', and 'the stuff'. 'The thing' referred to an intervention, practice, or innovation for which the knowledge creation phase of effectiveness research has been completed and the effectiveness established. The question of how best to do 'the thing', on the other hand, is the purview of implementation research, which focuses on applying the product of effectiveness research. Implementation researchers develop and investigate implementation strategies or 'the stuff' that improves uptake of 'the thing'. According to this view, the point of partnership between researchers and clinicians begins after completion of the effectiveness research and at the point of implementing 'the thing' into practice. Thus, although implementation science is aimed at minimizing the research-practice gap

(Greenhalgh et al., 2004), this area of research persists as a framework where researchers *push* their established, scholarly findings into practice for application and integration (Olswang & Prelock, 2015). Implementation science can be expected to be particularly effective when congruency exists between research outcomes, clinical interests, and practice requirements.

Unfortunately, research priorities and clinical practicalities sometimes fail to align (Olswang & Prelock, 2015). A myriad of problems arise when a large gap exists between research outcome requirements and what can feasibly be achieved in practice. For example, an evidence-based intervention may be modified for a clinical setting in such a way that renders it ineffective, or the outcome may find no practical applicability in clinical settings at all. This disconnect between research outcomes and practice is not addressed by approaches to knowledge translation, which have been largely focused on the one-way avenue from research into practice and arguably the main focus of implementation science to date. One solution to this problem is for the point of partnership between researchers and practitioners to begin much earlier and work bidirectionally. In collaborative partnerships, knowledge creators and knowledge users work together to co-create knowledge suitable for practice (Greenhalgh et al., 2016; Jull et al., 2017). By partnering together throughout the knowledge generation process, researchers and practitioners would be able to co-design theoretically sound ‘things’ that are relevant to practice and seamlessly implemented within practice.

2.1.3 The Use of Partnerships

In recognition of the intractability of the research-practice gap, there has been a growing trend in many fields to use partnerships to help align research priorities and clinical needs. Indeed, in knowledge translation approaches, the use of partnerships is widely

acclaimed and seen as a fundamental component of the approach (Gagliardi et al., 2015; Greenhalgh et al., 2016; Jull et al., 2017; Mold & Peterson, 2005; Nguyen et al., 2020). The timing of partnership initiation, however, may vary. According to the Knowledge-to-Action framework (Graham et al., 2006), the boundaries between knowledge creation and action are fluid to allow both for the influence of one aspect on the other and for collaboration among researchers and knowledge users to be initiated at any point in the framework. While collaboration at the action phase can support implementation, engaging in collaborative partnerships earlier in the process better supports rapid creation and integration of evidence (Gagliardi et al., 2015; Jull et al., 2017). In fact, it has been suggested that the research-practice gap is caused by issues in knowledge production rather than knowledge transfer (Bowen & Graham 2013; Jull et al., 2017; Van deVan Johnson 2006). Engaging in partnerships throughout the Knowledge-to-Action framework repairs this issue as collaborators both co-create and apply new and applicable knowledge together.

Co-creation partnerships have been described using terms such as research-practice partnerships (Coburn et al., 2013) and practice-based research networks (Nutting et al., 1999), and are found within paradigms described as design-based research (Penuel et al., 2011), integrated knowledge translation (IKT) (Gagliardi et al., 2016; Kothari & Wathen, 2013; Kothari et al., 2017), community-based participatory research (CBPR) (Jull et al., 2017), organizational participatory research (Bush et al., 2017), and practice-based research (PBR) (Esptein, 2002). As emerging fields under the broad umbrella of knowledge translation, it is clear that considerable overlap exists between terms and paradigms related to partnered research. Although we recognized the need to include a variety of terms when searching for research broadly consistent with PBR, we considered the term ‘evidence-based practice’ to be too general and broad to be useful in focusing the search on PBR. The term

practice-based evidence describes an approach that is particularly important when high quality evidence is lacking, conflicting, does not relate to an individual client, or does not provide clear recommendations (Lemoncello & Ness, 2013). In this case, the clinician scientist generates practice-based evidence by developing, implementing and evaluating treatment systematically often employing single case experimental designs or case studies (Lemoncello & Ness, 2013). Many clinicians have played a dual clinician-researcher role conducting research on their own practice, and have made significant contributions to practice-based evidence in the field of speech-language pathology (Owen et al., 2004; Wright & Miller, 2015). However, our focus was on practice-based research that incorporated a practitioner-researcher partnership, and so only practice-based studies with clear evidence of such a partnership were included in the scoping review.

2.1.4 Creating Research in Practice: Practice-Based Research

Practice-based research refers to a researcher-practitioner partnership where the initiation of partnership starts very early in the knowledge translation process (Epstein, 2002). From the beginning, researchers and practitioners work together to identify a problem currently experienced in practice and design an applicable solution. By situating the knowledge creation phase directly in practice, the action cycle is either reduced or eliminated. By gathering data in practice to later inform that practice (Epstein, 2002), PBR creates research without the need for translation across the gap. Certainly, PBR does not replace the need for traditional research, but it does provide a valuable complement to traditional research with the potential to eliminate the research-practice gap in relevant settings. PBR represents the *pull* from practice by addressing questions that arise from practice (Crooke & Olswang, 2015). Indeed, it is the lived experiences of clinicians, educators, and other knowledge users that influence all aspects of the inquiry including the

development of the research question, the design and evaluation of the intervention, and the application in practice.

The potential power of PBR was first recognized by Epstein (1995), who reported that social workers routinely collected large quantities of clinical information about clients. Most researchers deemed this information as unreliable, but Epstein (2002) argued that these data could be 'mined' to reveal valuable information for that clinical setting. Comparing a randomized control trial (Beder, 1999) and a PBR study (Dobrof et al., 2000) each conducted with end-stage renal dialysis patients, Epstein (2015) showed comparable findings across studies. Importantly, however, the PBR study (Dobrof et al. 2000) also provided insight into service patterns that could not have been captured by the randomized trial. While both Beder and Dobrof et al.'s studies answered questions about clinical practice, Dobrof et al.'s PBR project answered questions without adding to the workload of the clinicians and exposed service patterns that would not have been recognized otherwise. Both evidence of enhanced knowledge outcomes and reduced research-related workload clearly highlight the value of PBR.

A key attribute of PBR is that it uses an inductive rather than deductive approach with key concepts coming from practical insight (Epstein, 2002). PBR approaches can utilize non-experimental or quasi-experimental data designs, include descriptive and correlational findings, be collected retrospectively or prospectively, and include both quantitative and qualitative information. Other important features are that PBR studies employ instruments from practice, and recruit participants from their point of care without random assignment to alternate treatments or control groups. Similarly, unlike research-based practice trials, standardized assessments can be used in an unstandardized way if that is best for clinical

practice. Importantly, PBR is a collaborative science based in practice, and as such, practice requirements are of greater importance than research considerations (Epstein, 2002).

For the most part, PBR is built on partnerships between clinicians working primarily as service providers and researchers working primarily to carry out scientific investigation (e.g., Arcuri et al., 2015), although other models where a clinician scientist carries out both roles undoubtedly exist (e.g., Owen et al., 2004). Given the different expertise the partners bring to the partnership, a willingness to acknowledge the valuable contribution of other members is necessary. Researchers offer knowledge and skills that enhance the scientific rigour of the study design and clinicians possess insight into which research outcomes will be most significant to clinical practice. Further, researchers will ensure high fidelity is maintained to the new protocol and clinicians will guarantee the new protocol is sustainable in practice (Crooke & Olswang, 2015). Engaging researchers and clinicians in a partnership throughout the Knowledge-to-Action Framework (Graham et al., 2006) brings researchers and knowledge users with complementary knowledge together prior to and during implementation. Specifically, by involving clinicians in developing the research question at the point of knowledge creation in PBR, knowledge is created that is highly practical and sustainable for practice settings. It can be expected that PBR partnerships will vary in the degree of engagement between researchers and clinicians. Some partnerships may be more *consultative*, such that partners meet at specific timepoints throughout the process to discuss and make changes but the partnership between the two parties is not constant. Other partnerships might be more *collaborative* with clinicians and researchers working together on an ongoing basis to design, implement, solve problems, and make changes as needed. It has been observed that the extent to which partnerships are fully collaborative is often not reported clearly in the literature (Gagliardi et al., 2016; Viswanathan et al., 2004).

Nevertheless, where possible, we planned to characterize descriptions of partnerships reported in relevant studies of our scoping review as either consultative or collaborative.

2.1.5 A Co-Creation Model: Practice-Based Research Partnerships

Although PBR has a long-standing history, its utility for the field of speech-language pathology has not been fully explored. There is little guidance in the literature for those interested in engaging in collaborative partnerships regarding the types of research that can be conducted using this approach. Further, documentation of partnerships is inconsistent and is not systematic (Drahota et al. 2016), which leads to little consensus on how best to engage in a partnership (Viswanathan et al., 2004). In order for PBR and the use of PBR partnerships to become more widely used and accepted in speech-language pathology, a crucial step is to outline the potential purposes or outcomes of these partnership projects. As a first step and in order to capture our emerging thinking in this area, we created the Co-Creation Model (Figure 2.1) based on our experiences with PBR, the utility of PBR in other fields (Candy & Edmonds, 2018), and attributes described in the literature (Epstein, 2002). This model broadly identifies the potential outcomes for partnership projects in which the goal is to answer clinical questions originating from practice and informing future practice. The creation of the model was informed by the discussions of Epstein (2002), who identified that clinicians gather large amounts of information about their practice and about their clients. This provides the potential to understand current practice, which could, in turn, motivate changes in practice. Further, PBR involves initiating the partnership as a first inquiry step, which could contribute to the design of new practice. The model was also informed by our experiences as practice-based researchers in the areas of preschool (Kwok et al., 2020) and school-age language development (Vollebregt et al., 2019), and motor speech and swallowing (Theurer et al., 2013). Ongoing partnerships and projects provided insight into

the various outcomes achievable through PBR. Compiling these possible outcomes from the literature reinforced our ideas and experiences working in PBR which brought about the Co-Creation Model to represent how these partnerships can produce sustainable clinical practices. Specifically, our PBR Co-creation Model (Figure 2.1) describes three distinct purposes or outcomes related to PBR: (1) *creating practice*, (2) *capturing practice*, and (3) *changing current practice*.

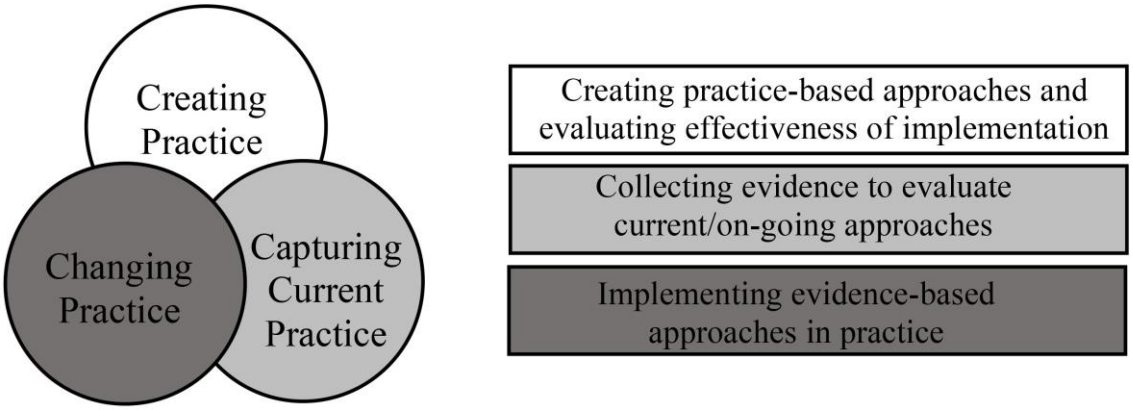

Figure 2-1 The Practice-Based Research Co-Creation Model

Creating practice refers to a co-creation partnership aimed at designing or creating a new practice and evaluating effectiveness. In a practice creation project, clinicians and researchers may work together to create or adapt evidence-based practices from traditional research within the constraints of a particular practice setting. In this way, an evidence-informed practice is created and evaluated. For example, a creating practice study might involve designing a new phonological awareness program incorporating the best available evidence with modifications to suit a particular context, and then evaluating program effectiveness.

Capturing practice describes a co-creation partnership that evaluates ongoing practice to inform both the clinicians and researchers. By studying current practice directly, researchers and clinicians can build the evidence base for effective practices in speech-language pathology across a range of settings and implementation schedules. This purpose aligns most closely with the concept of practice-based evidence, although, the present review focused on studies based on a practitioner-researcher partnership specifically. An example of research designed to capture practice includes the evaluating the effectiveness of a preschool program aimed at building social communication skills in children with autism that is being delivered in a community clinic.

Changing practice describes a co-creation partnership whose goal is to implement evidence-based approaches either arising from practice-based or traditional research activities. This purpose of PBR aligns most closely with the view of implementation science as taking action to move knowledge into practice or studying the implementation process. An example of changing practice would include a researcher working with a clinician to implement an alternative therapeutic approach in their clinical practice.

We used our PBR Co-creation Model to comprehensively explore the extent to which researchers in the field of speech-language pathology are engaged in PBR through the use of a scoping review. Unlike systematic reviews, scoping reviews allow the assessment of emerging evidence, and serve to provide an overview of a broad topic (Peterson et al., 2016). Scoping reviews consider a diversity of relevant and related literature (Pham et al.,2014) and use a systematic methodological approach (Arskey & O'Malley, 2005). As such, scoping reviews are an appropriate alternative to systematic reviews when the literature is vast and complex or when the identified topic is emerging or evolving. Given the emerging nature of

PBR in the field of speech-language pathology, we considered a scoping review to be an appropriate approach to explore the extent of research completed in the area.

2.1.6 The Present Study

We conducted a scoping review to provide an overview of PBR in the field of speech-language pathology broadly. Given that this is a relatively new area of research, no limits were placed on the population or disorder types studied. The aim of this review was to acquire a general sense of the available research that could be broadly defined as using a PBR approach, and consider it in relation to our PBR Co-creation Model. A first goal was to determine whether research involving co-creation partnerships could be identified that corresponded to our three hypothesized purposes of creating, capturing, and changing current practice. Finding studies addressing the three distinct research partnerships would provide validation to the model. A second goal was to categorize these partnerships as either collaborative or consultative to determine how partnership collaboration was being documented and if examples of these partnerships could provide insight into how these partnerships exist. Partnerships were coded as collaborative if there was evidence of an ongoing partnership throughout the research process. Partnerships were coded as consultative if there was some engagement between researchers and knowledge users, but there was no evidence of ongoing partnership. Results of the scoping review were also expected to provide an understanding of the literature necessary for developing more specific research questions regarding the effectiveness of these partnerships (Peterson et al., 2015).

2.2 Methods

2.2.1 Identifying Relevant Studies

Searches were conducted in the following database search engines: Web of Science, PubMed, CINAHL, and PsycINFO. Articles were included if published in English in peer-reviewed journals between 1980 and April 2020. A hand-search was completed on the Journal of Implementation Science. Keywords were selected to reflect the possibility of terms used to describe relevant clinician-researcher partnerships and included *implement* science,* or *knowledge translat*,* or *practice-based research,* or *practice-based evidence,* or *design research,* and *speech language path*,* or *speech therap*,* or *speech path**. Evidence-based practice was excluded as a search term to help focus the search on articles that involved an ongoing partnership between clinicians and researchers. In communication sciences and disorders, the term evidence-based practice is widely used to describe activities of researchers and clinicians alike. The difference between evidence-based practice and PBR is significant, therefore, the term evidence-based practice was not included in the search terms.

2.2.2 Study Selection

Articles were eligible for this scoping review if they were related to the field of speech-language pathology. Articles also needed to describe the movement of scientific knowledge from research to practice or practice to research using one of the following terms: *implementation science*, *knowledge translation*, *practice-based research*, or *practice-based evidence*. The initial search yielded 3510 articles. The titles and abstracts of these articles were independently reviewed by two readers (author MV and an additional, trained research assistant). Any disagreement between which articles should be included were discussed until consensus for included articles was reached (n = 53). At this point, articles were excluded if they were systematic reviews or editorials. Articles meeting the inclusion criteria were read

in full by the first author. An additional 18 articles were excluded upon full text review because these articles outlined the importance of co-creation partnerships but did not present research data. A PRISMA flow diagram outlines the study selection process (Figure 2.2).

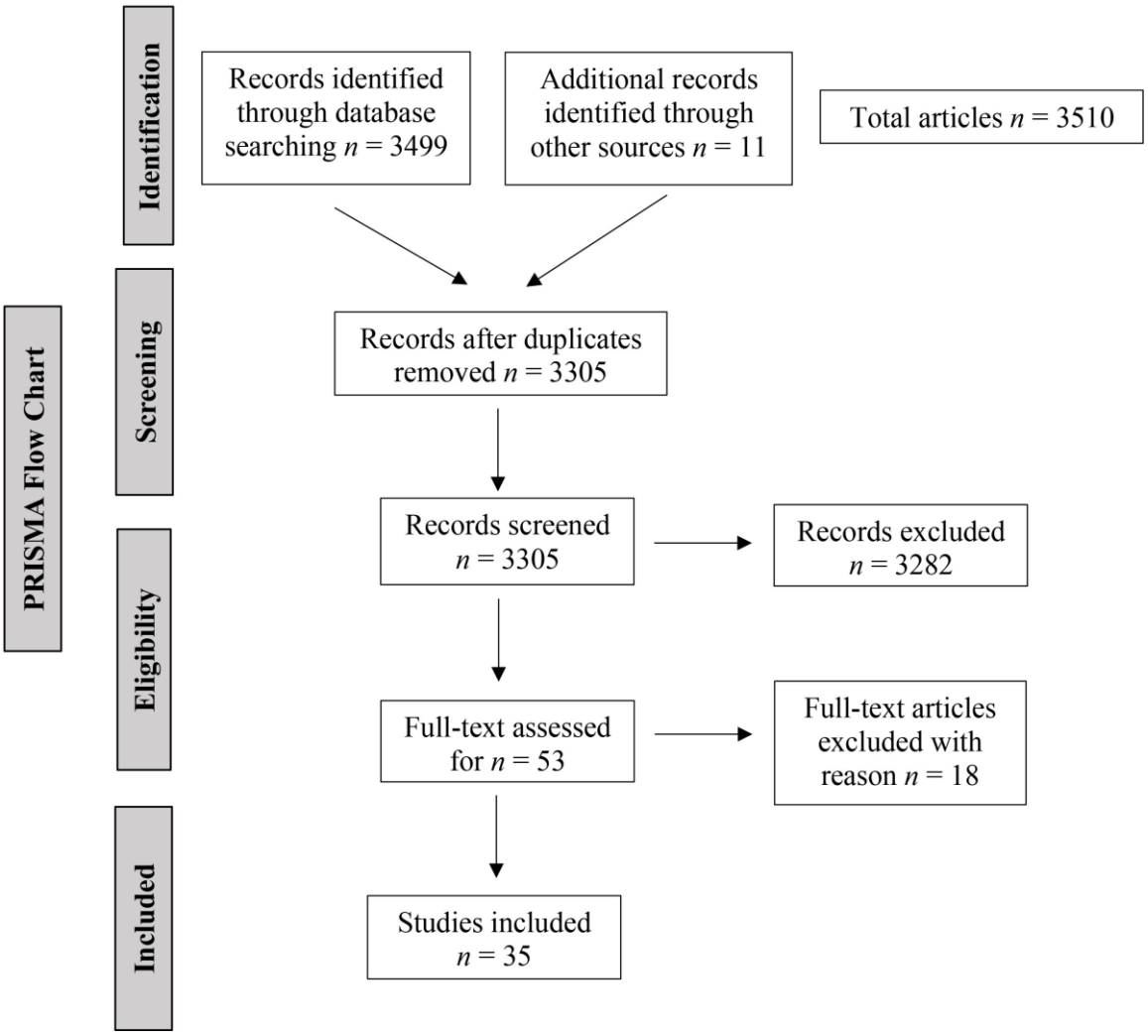

Figure 2-2 PRISMA Flow Chart

2.2.3 Charting the Data

For all studies meeting the inclusion criteria, data were extracted using a Microsoft Excel chart developed by the authors. To develop the extraction sheet one author (MV) completed data extraction of an article using the general extraction inventory outlined by The

Joanna Briggs Institute (2015). Over the course of the data extraction, the four authors met twice to discuss what information should be extracted from the articles. In the first meeting, information regarding the details of the study were discussed (e.g., participants, location, etc.). The second meeting was dedicated to creating consensus amongst the group about how to categorize partnerships using the Co-Creation Model (changing practice, creating practice, or capturing current practice). Data extraction included a chart outlining: journal title, authorship and year, participants, service context, and setting (see Table 2.1). Two additional charts were used for extraction of location of research, study design, data source, type of analysis (see Table 2.2), and level of co-creation and type of partnership (see Table 2.3).

Table 2-1 Scoping review extraction

Articles included in scoping review: Title, year, participants, disorder area, and setting

Author(s)	Article title	Year	Participants	Disorder Area	Setting
Olswang & Prelock	Bridging the gap between research and practice: Implementation Science	2015	S-LPs, occupational therapists, physiotherapists	Children with physical disabilities	Children treatment center
Lavesson et al.,	Development of a language screening instrument for Swedish 4-year-olds	2018	4-year-old children	Child language	Child health centres
Vallila-Rohter et al.,	Implementing a standardized assessment battery for aphasia in acute care	2018	Patients with aphasia, their caregivers, and S-LP assistants	Aphasia	Hospital
Arcuri et al.,	Perceptions of family-centred services in a paediatric rehabilitation programme: Strengths and complexities from multiple knowledge users	2015	Parents and allied health professionals	Children with significant developmental delays	Pediatric rehabilitation centre
Douglas	Organizational context associated with time spent evaluating language and cognitive-communicative impairments in skilled nursing	2016	S-LPs	Cognitive communication impairment	Skilled nursing facility

Author(s)	Article title	Year	Participants	Disorder Area	Setting
	facilities: Survey results within an implementation science framework				
Farquharson et al.,	Using hierarchical linear modeling to examine how individual S-LPs differentially contribute to children's language and literacy gains in public school	2015	S-LPs	Children with language impairment	Public school setting
Foster et al.,	'That doesn't translate': The role of evidence-based practice in disempowering speech pathologists in acute aphasia management	2015	S-LPs	Stroke care (aphasia)	Acute hospital
Hadely et al.,	Speech pathologists' experience with stroke clinical practice guidelines and the barriers and facilitators influencing their use: A national descriptive study	2014	S-LPs	Stroke care	Rehabilitation
Imms et al.,	Improving allied health professionals' research implementation behaviours for children with cerebral palsy: Protocol for a before-after study	2015	Allied health professionals	Children with cerebral palsy	Non-government organizations
Jeng	Clinical decision making in skilled nursing/long term care: Using and generative evidence in the field	2015	S-LPs	Hypokinetic dysarthria	Long-term care
Justice et al.,	Designing caregiver-implemented shared-reading interventions to overcome implementation barriers	2015	Parents and their children	Children with language impairment	Home environment
Miao et al.,	Factors affecting speech pathologists' implementation of stroke management guidelines: A thematic analysis	2014	S-LPs	Stroke care	
Poulin et al.,	Identifying clinicians' priorities for the implementation of best practices in cognitive rehabilitation post-acquired brain injury	2020	Interdisciplinary teams and clinical coordinators, occupational therapists, neuropsychology,	Traumatic brain injury/Acquired brain injury	Stoke rehabilitation centre, inpatient and outpatient rehabilitation centre, acquired

Author(s)	Article title	Year	Participants	Disorder Area	Setting
			special education, S-LP		brain injury rehabilitation centre
Nitsch et al.,	Integrating Spinal Cord Injury - Quality of Life instruments into rehabilitation: Implementation science to guide adoption of patient-reported outcome measures	2020	Allied health professionals	Spinal cord injury	Rehabilitation Institute of Chicago
Greenspan et al.,	Clinician perspectives on the assessment of short-term memory in aphasia	2020	S-LPs	Aphasia	Rehabilitation hospital, acute care hospital with outpatient services, acute care hospital with outpatient services, professional conference, and university speech clinic
Shrubsole et al.,	Barriers and facilitators to meeting aphasia guideline recommendations: What factors influence speech pathologists' practice?	2018	S-LPs	Aphasia	Acute and rehabilitation settings
Cunningham et al.,	Barriers to implementing evidence-based assessment procedures: Perspectives from the front lines in pediatric speech-language pathology	2019	S-LPs	Pediatric S-LP-Children who are deaf and hard of hearing	Pre-school speech and language services
Dada et al.,	Augmentative and alternative communication practices: A descriptive study of the perceptions of South African speech-language therapists	2017	S-LPs	Augmentative and Alternative Communication	

Author(s)	Article title	Year	Participants	Disorder Area	Setting
Hartley et al.,	Practice patterns of speech-language pathologists in pediatric vocal health	2017	S-LPs	Pediatric voice	
Sugden et al.,	Service delivery and intervention intensity for phonology-based speech sound disorders	2018	S-LPs	Phonology based speech sound disorders	
Young et al.,	Factors that influence Australian speech-language pathologists' self-reported uptake of aphasia rehabilitation recommendations from clinical practice guidelines	2018	S-LPs	Aphasia	Inpatient acute, inpatient rehab, outpatient rehabilitation, community rehabilitation, university, nursing home, private practice
Allen et al.,	Implementing a shared decision making and cognitive strategy-based intervention: Knowledge user perspectives and recommendations	2019	Interprofessional teams of stroke rehabilitation hospitals	Cognitive impairments following a stroke	Rehabilitation hospitals
Campbell et al.,	A KT intervention including the evidence alert system to improve clinician's evidence-based practice behaviour – A cluster randomized controlled trial	2013	Allied health professionals	Children with cerebral palsy	Community based cerebral palsy services
Cunningham et al.,	Promoting consistent use of the communication function classification system (CFCS)	2016	S-LPs	Preschool speech and language	Preschool speech and language program
Cunningham et al.,	Moving research tools into practice: The successes and challenges in promoting uptake of classification tools	2018	S-LPs	Infants, toddlers, and school-aged children	

Author(s)	Article title	Year	Participants	Disorder Area	Setting
Dale et al.,	Barriers and enablers to implementing clinical treatment for fever, hyperglycaemia and swallowing dysfunction in the Quality in Acute Stroke Care (QASC) Project – A mixed methods study	2015	Registered nurses, clinical nurse consultants, nurse unit manager, endorsed enrolled nurse	Stroke care	
Molfenter et al.,	Decreasing the knowledge-to-action gap through research-clinical partnerships in speech language pathology	2009	S-LPs	Dysphagia	Rehabilitation hospital settings
Smith et al.,	Memory and communication support in dementia research-based strategies for caregivers	2010	Family members and professional caregivers	Dementia	Home Care
Imms et al.,	Efficacy of a knowledge translation approach in changing allied health practitioner use of evidence-based practices with children with cerebral palsy: A before and after study	2020	Allied health professionals	Children with cerebral palsy	Five disability service organizations
Weiss et al.,	Transdisciplinary Approach Practicum for Speech-Language Pathology and Special Education Graduate Students	2020	4 S-LP participants and master students in special education	Autism Spectrum Disorder	School board
Cunningham & Oram Cardy	Using implementation science to engage knowledge users and improve outcome measurement in a preschool speech-language service system	2020	S-LPs	Pediatric speech-language pathology	Pre-school speech and language services
Boudreau et al.,	Peer-mediated pivotal response treatment for children with Autism Spectrum Disorder: Provider perspectives on acceptability, feasibility, and fit at school	2019	Educators and early intervention providers	Autism Spectrum Disorder	School board
Francis et al.,	The use and impact of a supported aphasia-friendly	2019	Patients with aphasia, their	Aphasia	Inpatient hospital

Author(s)	Article title	Year	Participants	Disorder Area	Setting
	photo menu tool on iPads in the inpatient hospital setting: A pilot study		caregivers, and S-LP assistants		
Wielaert et al.,	ImPACT: A multifaceted implementation for conversation partner training in aphasia in Dutch rehabilitation settings	2016	Rehabilitation professionals	Aphasia	Rehabilitation centres, nursing homes with rehabilitation units
Brebner et al.,	Facilitating children's speech, language, and communication development: An exploration of an embedded, service-based professional development program	2017	Early educators and S-LPs	Pediatric S-LP	Childcare centres

Note: This table outlines title, year, participants, disorder area, and setting from included articles.

Table 2-2 Scoping review extraction

Articles included in scoping review: Location, data source, and type of analysis

Author	Location	Data source	Type of analysis
Olswang & Prelock, 2015	United States	Mixed methods assessed acceptability, adoption, and fidelity	Mixed
Lavesson et al., 2018	Sweden	Child language screening tool	Quantitative, (discrepancies resolved though qualitative information)
Vallila-Rohter et al., 2018	United States	Retrospective medical review	Mixed
Arcuri et al., 2015	Canada	Parent questionnaire responses	Quantitative
Douglas, 2016	United States	Survey responses	
Farquharson et al., 2015	Australia	Questionnaires	Quantitative
Foster et al., 2015	Australia	Interview responses	Qualitative

Author	Location	Data source	Type of analysis
Hadely et al., 2014	Australia	Survey responses	Mixed
Imms et al., 2015	Australia	Survey responses and client outcomes	Mixed
Jeng, 2015	United States	Client performance	
Justice et al., 2015	United States	Interview/survey responses	Mixed
Miao et al., 2014	Australia	Interview responses	Qualitative
Poulin et al., 2020	Canada	Cross sectional electronic survey and focus group	Quantitative
Nitsch et al., 2020	United States	Focus group	Qualitative
Greenspan et al., 2020	United States	Semi-structured interview in focus group	Qualitative
Shrubsole et al., 2018	Australia	Semi-structured interviews	Qualitative
Cunningham et al., 2019	Canada	Online survey	Quantitative
Dada et al., 2017	South Africa	Online survey	Quantitative
Hartley et al., 2017	United States	Online survey	Mixed
Sugden et al., 2018	Australia	Online survey	Quantitative
Young et al., 2018	Australia	Online survey	Quantitative
Allen et al., 2019	Canada	Semi-structured focus group	Qualitative
Campbell et al., 2013	Australia	Change on Goal Attainment Scaling (GAS)	Quantitative

Author	Location	Data source	Type of analysis
Cunningham et al., 2016	Canada	Pre-post-test intervention responses	Mixed
Cunningham et al., 2018	Canada	Pre-post survey responses	Qualitative
Dale et al., 2015	Australia	Pre-post survey responses	Mixed
Molfenter et al., 2009	Canada	Interview responses	Qualitative
Smith et al., 2011	Australia	-	-
Imms et al., 2020	Australia	Data collected during sessions at 6, 12, and 24 months, questionnaires, and check-up tool. Child data collected via health records.	Quantitative
Weiss et al., 2020	United States	Pre-post questionnaires, reflections, and focus groups	Mixed
Cunningham & Oram Cardy, 2020	Canada	Pre-post survey	Quantitative
Boudreau et al., 2019	Canada	Semi-structured interviews	Qualitative
Francis et al., 2019	Australia	Each participant acted as own control switching the menu, questionnaires, reflective logs, and focus groups	Mixed
Wielaert et al., 2016	Netherlands	Data collected from the recruitment administration, questionnaires, consensus notes from meetings with S-LP groups	Mixed
Brebner et al., 2017	Australia	Focus group and individual semi-structured interviews	Qualitative

Note: This table outlines the location, type of data collected, and type of analysis that were identified for each included article.

Table 2-3 Scoping review extraction

Articles included in scoping review: Level of Co-creation and type of partnership

	Level of Co-creation			Type of Partnership	
Author	**Creating Practice**	**Capturing Practice**	**Changing Practice**	**Collaborative**	**Consultative**
Olswang & Prelock, 2015	✓			✓	
Lavesson et al., 2018	✓				
Vallila-Rohter et al., 2018	✓		✓	✓	
Arcuri et al., 2015		✓			
Douglas, 2016		✓			
Farquharson et al., 2015		✓			
Foster et al., 2015		✓			
Hadely et al., 2014		✓			✓
Imms et al., 2015		✓		✓	
Jeng, 2015		✓			
Justice et al., 2015		✓			
Miao et al., 2014		✓			✓
Poulin et al., 2020		✓			✓
Nitsch et al., 2020		✓		✓	
Greenspan et al., 2020		✓		✓	
Shrubsole et al., 2018		✓			✓
Cunningham et al., 2019		✓		✓	
Dada et al., 2017		✓		✓	
Hartley et al., 2017		✓			✓
Sugden et al., 2018		✓			✓
Young et al., 2018		✓			✓
Allen et al., 2019		✓		✓	

	Level of Co-creation			Type of Partnership	
Author	**Creating Practice**	**Capturing Practice**	**Changing Practice**	**Collaborative**	**Consultative**
Campbell et al., 2013			✓	✓	
Cunningham et al., 2016			✓		
Cunningham et al., 2018			✓	✓	
Dale et al., 2015			✓		✓
Molfenter et al., 2009			✓	✓	
Smith et al., 2011			✓	✓	
Imms et al., 2020			✓	✓	
Weiss et al., 2020			✓	✓	
Cunningham & Oram Cardy, 2020			✓	✓	
Boudreau et al., 2019			✓	✓	
Francis et al., 2019			✓		✓
Wielaert et al., 2016			✓	✓	
Brebner et al., 2017			✓	✓	

Note: This table outlines the level of co-creation and type of partnership that were identified for each included article.

2.3 Results

The scoping review yielded 35 articles from six countries. Fourteen articles were from Australia, nine from the United States, nine from Canada, one from Sweden, one from South Africa, and one from the Netherlands. All included articles were published between 2010 and 2020.

2.3.1 Participants, Disorder Area, and Setting

Consistent with our purpose of examining PBR in the field of speech-language pathology, S-LPs were involved in every study except one where S-LPs were invited to participate but none responded to the call for participants (Boudreau et al., 2019). Multiple studies included more than one group of participants. For example, Francis et al. (2019) examined the impact of aphasia friendly menus in a hospital setting and data were collected from patients, caregivers, and S-LPs. In these instances, participants were considered to be all groups who provided data. S-LPs were not always the primary participants, in that they were not always the source of data for the research studies. However, S-LPs were the primary participants in the majority of the included articles (20/35). For example, in one study, S-LPs reported barriers to stroke practice standards and guidelines (Hadely et al., 2014). In other studies, participants were allied health professionals (e.g., occupational therapists, physiotherapists) who provided feedback on the implementation of a specific intervention program (10/35). Other studies included parents and caregivers as participants (4/35), patients (4/35), educators (2/35), nurses (1/35) and Master of Education students (1/35).

A variety of populations, disorder types, and settings were represented across the reviewed articles. Populations included both adults (17/35) and children (18/35). Setting was only collected from each article if explicitly stated in the text. For adult participants, the settings included rehabilitation settings (n = 9), acute hospital settings (n = 5), skilled nursing facilities (n = 2), long-term care settings (n = 1), the home (n = 1), university clinic (n = 1), and community-based programs (n = 1). The disorders examined included stroke (10/35), cognitive communication impairment (2/35), dysphagia (1/35), hypokinetic dysarthria (1/35), dementia (1/35), traumatic brain injury (1/35), and spinal cord injury (1/35). PBR involving children occurred in community-based programs such as pre-school speech and language

programs (*n* = 5), children's treatment centers (*n* = 3), school (*n* = 3), home care (*n* = 1), pediatric rehabilitation centres (*n* = 1), and non-government organizations (*n* = 1). Children in the studies presented with language impairments (4/35), pre-school speech and language needs (4/35), cerebral palsy (3/35), physical disabilities (1/35), significant developmental delays (1/35), Autism Spectrum Disorder (1/35), pediatric voice (1/35), speech sound disorders (1/35), and augmentative and alternative communication (1/35).

2.3.2 Data Source and Analysis

Across the included studies, data collected were related to implementation of the program, current practices, or what needed to be adjusted about a program. Regarding the type of data collected, 11 articles reported quantitative data, 10 articles reported qualitative data, 11 articles reported mixed method data, and 3 articles could not be classified. Multiple means of data collection were reported. The use of surveys (*n* = 13), particularly online surveys, was most frequent. In one study conducted to assess barriers and facilitators to implementing a clinical treatment protocol, clinicians first participated in pre-implementation workshops to identify perceived barriers (Dale et al., 2015). Post-implementation, clinicians completed a mixed method survey to determine what barriers still existed and what barriers were addressed through the pre-implementation workshops. Other commonly reported practices included interviews (*n* = 8), focus groups (*n* = 7), participant outcomes (*n* = 6), and questionnaires (*n* = 5). Foster and colleagues (2015) completed in-depth interviews with S-LPs to gain an understanding of the role of evidence-based practice and its implementation in post-stroke aphasia. Fewer studies reported participant reflections (*n* = 3), patient information (*n* = 3), and collecting information regarding the acceptability and feasibility of implementation (*n* = 2). One article used an existing scale, the Change on Goal Attainment

Scale (GAS) to capture quantitative data about how PBR influenced progress towards achieving goals (Campbell et al., 2013).

2.3.3 Level of Co-creation

The final stage of extraction involved classifying the articles using our PBR Co-Creation Model. We were able to classify all studies based on the model. Three studies were classified as *creating practice*. In one study, clinicians and researchers adopted a series of single-subject feasibility studies and a randomized control trial into a triadic gaze intervention for children (Olswang & Prelock, 2015). As the intervention was adopted into practice, they assessed the clinician's views on acceptability, adoption, and feasibility, and addressed implementation barriers. Nineteen studies were classified as *capturing practice*. As an example, Justice et al. (2015) sought to understand barriers that parents face in using caregiver implemented shared reading interventions. Parents completed weekly logs to document their maintenance to the intervention schedule and also completed an exit interview to discuss implementation barriers. Thirteen studies were classified as *changing practice*. In an example study aimed at standardizing S-LPs' use of a language assessment tool, S-LPs completed a pre-test survey, reviewed online intervention materials, and then completed a post-survey (Cunningham et al., 2016).

Where possible, the level of partnership was also coded as either collaborative (evidence of ongoing partnership) or consultative (evidence of some engagement between researchers and knowledge users). Only 27 of 35 studies could be classified relative to the type of partnership; in the remaining articles, authors did not define the type of partnership or did not provide sufficient information to allow for characterization. Of these 27 studies, 18 studies were classified as incorporating a collaborative partnership, while 9 were classified as

consultative. For example, studies using a collaborative model described their partnerships as ongoing and researchers engaged with clinicians at multiple time points throughout the project to collect implementation data (Olswang & Prelock, 2015). Further, they described their partnerships as collaborative throughout all stages of implementation (Cunningham et al., 2017). As an example of studies using a consultative model, one study (Miao et al., 2017) described an outside organization that received input from knowledge users in their project (e.g., National Stroke Foundation). Articles that were not able to be classified did not mention or describe partnerships between various researchers and knowledge users. For example, one study described a project where kindergarten and first grade students were assessed. It is possible that a partnership may have existed between researchers and the school board, but this was not mentioned in the article (Farquharson et al., 2015).

2.4 Discussion

This scoping review investigated the emerging area of PBR in the field of speech-language pathology. As described by our PBR Co-Creation Model, PBR includes research aimed at creating practice, capturing practice, and changing practice. PBR partnerships were also expected to vary with some being highly collaborative involving researchers and clinicians working together throughout the process and others being more consultative with points of contact at specific junctures only. Our review yielded 35 articles reporting PBR involving S-LPs, other allied health professionals, caregivers, patients, and other professionals. Of these articles three were categorized as creating practice, 19 as capturing practice, and 13 as changing practice. Eighteen studies were classified as collaborative and 9 were classified as consultative. In this discussion, we summarize and provide a broad overview about what we currently know about the use of PBR in speech-language pathology.

Further, we draw attention to existing gaps in the literature and in our understanding of how PBR can support reducing the gap between practice and research.

2.4.1 Levels of Co-creation

We designed the PBR Co-creation Model for this scoping review using our experience with co-creation partnerships, and the existing literature of PBR in health care related fields (Epstein, 2002; Westfall et al., 2007; Davis et al., 2020). The model outlines 3 distinct levels of co-creation that can exist within PBR: creating practice (developing new practice-based approaches and evaluating the effectiveness of implementation), capturing current practice (collecting evidence to evaluate current/on-going approaches), and changing practice (implementing evidence-based approached in practice). One purpose of this review was to examine available PBR in relation to our proposed model. We found that all studies could be classified according to this model. More studies were classified as capturing practice than changing practice. Studies involving capturing practice may be somewhat more straightforward to carry out given that no practice change is required. It is also possible that capturing current practice is the first step to determining if the services are meeting current needs before services are changed or created. It may also be the case that more research involves capturing practice because capturing practice very closely aligns with Epstein's (2002) original work in PBR. This type of capturing practice aligns closely with practice-based evidence where clinicians are acting as dual clinicians and scientists conducting research on their own practice (Lemoncello & Ness, 2013).

PBR involving creating practice seems to be particularly rare given that only three studies were classified as such, and one of the three articles reported the practice creation incidentally as part of a PBR discussion. It is possible that with PBR in its infancy in speech-

language pathology, those engaged in partnerships have not yet envisioned a level of partnership where new practice is being created. Another possibility is that creating practice represents a particularly challenging research purpose. Creating practice might pose very high demands on collaboration given the need to work together on all aspects of both practice and research design. Addressing both clinical concerns and implementation aims in one study requires addressing the priorities and methods specific to each component, which can quickly become a large undertaking. It is not surprising, then, that there are very few articles reporting this type of work (Curran et al, 2012). In an acknowledgement of the difficulty in combining both aspects into one research project, Curran et al. (2012) outlined three distinct hybrid designs to accomplish different goals. Creating practice that involves co-creation and implementation mirrors a *hybrid 2* design involving the dual testing of clinical goals and implementation strategies to support the rapid translation of new information. If focusing on clinical and implementation strategies becomes too cumbersome, it might be better either for researchers to test the effects of a clinical intervention while observing implementation (*hybrid 1*) or to test an implementation strategy while observing a clinical intervention (*hybrid 3*; Curran et al., 2012). Researchers and clinicians may find the flexibility of these approaches helpful in designing projects that aim to create practice within a clinical setting.

Our second goal was to characterize the collaborative nature of PBR partnerships. Several articles reported insufficient information to allow classification of their partnerships as either collaborative or consultative. This finding is in line with reports from other KT approaches that observed the need for more consistent and systematic reporting of collaborative research (Drahota et al., 2016). One reason that reporting partnerships has not become a consistent practice may be due to the lack of common language amongst KT fields and also between clinicians and researchers. One hope for the PBR Co-Creation Model is that

it provides a common language for researchers and clinicians to describe the goals of their partnership. In addition, a common language may support an explicit conversation that identifies the type of partnership, thereby making labelling the partnership in dissemination activities easier (Frisby et al., 2004). Two-thirds of the classifiable studies were coded as collaborative partnerships. This is no doubt due to the strong interest in collaborative partnerships to build co-created knowledge (Greenhalgh et al., 2016; Filipe et al., 2017). It is also possible that successful PBR is facilitated by more collaborative partnerships. Importantly, 12 of the studies classified as collaborative practice were coded using the PBR Co-Creation Model as changing practice. This signifies that the partnerships were ongoing through the research project and as the change was incorporated into clinical practice. Less is known about the six collaborative studies that were coded as capturing practice. Most of these projects only involved taking a snapshot of clinical practice, which made it difficult to know if the collaboration continued after capturing the current practice. Nevertheless, the value of collaborative partnerships is clear and well supported across KT approaches (Nguyen et al., 2020).

Anecdotal evidence from this review provides insight into understanding the terminology that is used in speech-language pathology to describe PBR. From the current review, very few researchers were using the term PBR but instead used terms such as interpretive phenomenology, knowledge translation, implementation science, innovation design process, knowledge to action process, research-practice gap, and practice-based evidence. A common terminology would facilitate reporting and sharing of this work, which would in turn encourage more PBR. Our PBR Co-Creation Model may provide one way of talking about the many research questions addressed in clinician-researcher partnerships.

2.4.2 What areas of Speech-Language Pathology are using PBR most frequently?

Our scoping review includes articles from a wide range of journals and encompasses all areas of speech-language pathology. In our search of the literature, there was equal representation of research articles focusing on adults and children. Partnerships occurred in all areas included within the scope of speech-language pathology, although no substantial number of articles were found in any one disorder area. The majority of this research was occurring in hospitals, treatment centres, and rehabilitation centres. Less frequent locations included public schools, home care, and long-term care centres. It is difficult to interpret (the lack of) differences in disorder areas or settings around which PBR has been reported given that the importance of PBR has been recognized only relatively recently. It is possible that PBR is occurring more frequently in certain disorder areas or settings but not being reported in the literature. With an increase in reporting on composition, types, and purposes of co-creation partnerships, we may gain a better understanding of the practice settings and contexts best suited for PBR. The recency of PBR is illustrated in the publication dates of the included articles in the current review. The earliest article was published in 2010 and the majority of the articles found in this search appeared after 2017. The presence of PBR in speech-language pathology, and the recognition of the value that partnerships bring to research, is a new and unique approach to our field. While there is more discussion about knowledge translation and implementation science, a stronger focus on PBR would allow the field to have a better understanding of how partnerships can propel our field into creating research that fits the needs of researchers and clinicians.

2.4.3 How are Data Collected?

Our review indicated that a variety of qualitative, quantitative, and mixed methods were employed to understand the changes and revisions being made to the various speech, language, and swallowing therapies and protocols under study. The most common method of data collection was through surveys or interviews designed to seek evaluative opinion on the effectiveness of new or changed practice. Typical interviews focused on clinicians' experiences with a specific tool or program, asked questions surrounding clinical decision making, and assessed barriers to providing clinical treatment. In our most recent search year, 2019-2020, there was an increase in the number of studies using participant outcomes (Francis et al., 2019; Imms et al., 2020), whereas prior to 2019, only one PBR study included such a measure (Jeng, 2015). Another relatively new PBR outcome measure is the use of participant qualitative reflections (Weiss et al., 2020).

The challenge of conducting partnered research is well acknowledged (Kothari & Wathen, 2013). Although none of the articles captured in this search focused on conducting a PBR project and the difficulties within this approach, other authors have recognized the challenges using this approach (see Smyth et al., 2020 as an example). Barriers included distance between partners, institutional constraints, and adequate resources to complete such projects. No comments were observed regarding the establishment and maintenance of the partnerships themselves, arguably one of the most crucial aspects of PBR. It is clear that an increase in reporting barriers and facilitators to the creation and maintenance of partnerships and the projects themselves would provide valuable information for others who are engaging in PBR.

2.4.4 Limitations

This scoping review assessed the range of available evidence related to PBR. Our search was limited to research involving a practitioner-researcher collaboration in a knowledge translation framework and situated as a study within the field of speech-language pathology. As a result, practice-based studies without evidence of a practitioner-researcher approach were not included. As well, studies that did not specifically reference speech-language pathology/speech therapy would not have been captured in the search process. In addition, if articles did not include data and only described theories and/or the utility of implementation science, practice-based research, practice-based evidence, etc., they were not included in the review. Further, studies involving program evaluation, quality assurance, and quality improvement would not have been captured in this search. The earliest included study date of 2010 suggests prior practice-based evidence not referencing a knowledge-to-action framework was not represented. In the field of speech-language pathology, we know that practice-based evidence has a long tradition (Wambaugh, 2007). For example, Mecrow and colleagues (2010), consisting of both clinicians and researchers, partnered together to capture evidence for a speech and language program in schools, however, this article did not describe a partnership or identify a knowledge translation approach and therefore would not have been captured in the search. Given that earlier practice-based evidence would align most closely with *capturing practice* in our model, our finding that capturing practice was the most prevalent design is accurate but possibly underestimated. Nevertheless, we were focused on PBR partnerships specifically, and their recent emergence in the field of speech-language pathology, and our scope highlighted the range of evidence currently available.

2.4.5 Conclusions

The goal of the current scoping review was to examine published research broadly consistent with a PBR approach in the field of speech-language pathology. PBR involves intentional collaboration between researchers and clinicians to create research in clinical practice (Epstein, 2002). PBR represents the *pull* from practice whereby knowledge is created in a clinical context and this knowledge informs future clinical practice (Crooke & Olswang, 2015). This scoping review revealed that, to date, research in speech-language pathology involving partnerships between clinicians and researchers using a PBR framework is emerging. We did, however, note inconsistencies in the terminology to define this type of research. We developed a PBR Co-Creation Model to describe the range of research questions addressed using this approach. Specifically, clinician-research partnerships have the potential to contribute knowledge related to (1) creating practice, (2) capturing current practice, or (3) changing practice. Use of this model guided our scoping review and has the potential to bring new terminology to the field of speech-language pathology. Clinicians and researchers alike can use the model to define the goal of their research, align themselves with others using similar methods, and encourage use of PBR to mitigate the gap between research and practice.

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Chapter 3

3 Practice-based Research with Speech-Language Pathologists: A Case Study in Determining the Effectiveness of a Language and Literacy Tool

3.1 Introduction

Knowledge translation (KT) approaches including practice-based research are aimed at closing the gap between practice and research. These approaches have gained traction in speech-language pathology over the last decade (Olswang & Prelock, 2015; Crooke and Olswang, 2015, see also, Chapter 2). Some KT approaches focus on the movement of knowledge from research to practice, and investigations of the best methods for adopting research into practice (Eccles & Mittman, 2006; Proctor et al., 2013; Bauer et al., 2015). Practice-based research (PBR), on the other hand, is an approach to knowledge creation that answers clinical questions in current practice (Epstein, 2001). By focusing on conducting research in practice, PBR promotes active partnerships between researchers and clinicians. Conducting research in practice and applying these findings to practice creates clinical practices that are sustainable, and evidence based. In the present study, we take a PBR approach to knowledge translation by partnering with a school board in southwestern Ontario to answer questions specific to their clinical context. Over the three years of active partnership, the projects examined the utility and validity of a phonological awareness and narrative language assessment tool developed specifically for the clinical context at the school board. By using a PBR approach and engaging in partnership with speech-language pathologists (SLPs), we identified, implemented, and re-assessed needed tool modifications thereby simultaneously creating knowledge and achieving more effective practice.

3.1.1 The Research-Practice Gap

The widely acknowledged discrepancy between the knowledge we have and the practices we use in most health care and education systems has been coined the 'research-practice gap' (Kerner, 2005; Bowen & Graham, 2013; Straus et al., 2013). Despite the resources and funding that are provided for research in health care and education, this gap persists (Graham et al., 2006) with some estimating that it can take upwards of 17-years for new evidence to be incorporated into practice (Balas & Boren, 2000; Grant et al., 2003; Morris, Wooding, & Grant, 2011). One reason for this persistent gap relates to traditional methods of dissemination of novel findings. Conference posters and presentations do not always provide sufficient details for research to be easily integrated. Scholarly publications, as well, often focus on theoretical development, and do not provide guidance on how to implement the findings or how an individual may benefit from the findings (Barac et al., 2014). Another challenge comes from implementing new research into any established practice (Straus et al., 2009). The complexity of new research may require changes to systems and processes that are time-consuming and expensive for those implementing the knowledge. Without considerable support in the process, the changes will likely be unsustainable and unfeasible for practice. Lastly, the new finding(s) might not always be relevant to practice (Barwick, 2016). That is, new knowledge or knowledge products do not always address a problem or concern that knowledge users are faced with in their practices.

In recognition of this research-practice gap, considerable and growing attention as well as financial and labour resources have been devoted over the last two decades to the field of knowledge translation (Barac et al., 2014). Knowledge translation (KT) refers to the synthesis and exchange of knowledge between researchers and knowledge users to improve the effectiveness of health and health related services (CHIR, 2006; Graham et al., 2006).

One branch of KT, knowledge transfer, relates to the movement of new knowledge into practice (Graham et al., 2006; Straus et al., 2013). In a knowledge transfer approach (Graham et al., 2006), information is shared in a unidirectional fashion from the researchers to the knowledge users (e.g., clinicians, decision-makers, policy makers). The other branch of KT is integrated knowledge translation (IKT) (Gagliardi et al., 2016; Kothari & Wathen, 2013; Kothari et al., 2017), also known as knowledge exchange (Graham et al., 2006) or knowledge production (Van de Ven & Johnson, 2006). In an IKT approach, collaboration between researchers and knowledge users is required throughout the research process and information moves in a multidirectional way between the collaborators (Graham & Tertroe, 2009; Kothari & Wathen, 2013). Whereas knowledge transfer refers to translation activities occurring at the end of a project, IKT and knowledge exchange require the integration of knowledge translation activities throughout the research process. Research using KT and IKT approaches conducted within collaborative partnerships has been promoted by funding agencies (CHIR, 2009; Government of Australia, 2009; NIHR, 2009), and universities (Gholami, 2011). Some have argued that collaborative partnerships between researchers and knowledge users are the best way to reduce the research-practice gap and increase the creation and use of effective research (Kothari & Wathen, 2009; Gagliardi et al., 2015; Jull et al., 2017; Nguyen et al., 2020).

3.1.2 Practice-based Research

One approach to KT that uses collaborative partnerships and has high utility in clinical research and clinical practice is *practice-based research* (PBR). In PBR, clinical questions originating from practice are answered in practice using research-inspired principles. The new findings from the clinically specific research questions then inform clinical practices (Epstein, 2002). In the case of PBR, the research interest is led by the

needs of clinical practice, which creates research with high clinical relevance. Designing the research question within the bounds of current practice allows for new knowledge that can be easily implemented into current practice. Building the research study in collaboration with knowledge users (i.e., clinicians within the clinical context) promotes the system changes that will support the sustainability and feasibility of the clinical practices. Through collaborative partnerships, PBR blends efficacy and feasibility to create effective practices that are sustainable in clinical practice (Wells, 1999; Glasgow et al., 2003). Working in partnerships to conduct research in practice allows for rapid change and uptake in procedures that can be assessed in real-time (Curran et al., 2013). Within a PBR partnership, there is multidirectional communication between researchers and knowledge users throughout the research process, aligning PBR with the broader umbrella of IKT. In PBR there is also a mutual benefit for the collaborators whereby a clinician will be able to effectively implement new findings into their clinical practice and researchers can support the production of highly applicable clinical research. In our research program, we have identified three practice-based-research goals addressed by PBR (see Chapter 2) (1) to create practice (creating new approaches and evaluating effectiveness of implementation), (2) to change practice (implementing evidence-based approaches), and (3) to capture practice (collecting evidence to evaluate current practices).

3.1.3 PBR Team

The concept of working in collaboration is not new, but it is a fundamental component to the success of KT generally (Gagliardi & Dobrow, 2016), and particularly in PBR (Epstein, 2002). Indeed, partnerships between those producing and those using the research increases the relevancy and likelihood that the research will be meaningful for practice (Van de ven & Johnson, 2006). Those involved in PBR partnerships, researchers,

knowledge users and other decision-makers, each provide complimentary knowledge and skills needed for a thriving partnership (Nguyen et al., 2020). In the example of a researcher and clinician collaboration, researchers identify what is needed for a tool, product, or clinical practice to be valid and reliable and a clinician identifies what is sustainable and feasible in practice. When working together, the partners can make changes to the tool, product, or practice much faster than research completed in the traditional way. In PBR, the research is highly applicable to practice and uptake of knowledge into practice is significantly faster (Epstein, 2002). When involved in a PBR partnership, all members, or the PBR team, have equal weight in creating and using the research. The outcome is research that is evidence-based and manageable in practice. PBR offers a way to engage in research 'without the gap', and the advantage of working in partnership is that those involved each bring a diverse representation of skill and knowledge to the project.

3.1.4 PBR in Education

The use of PBR originated in health care and medicine (Epstein, 2002), and its application in education has been limited to date (see Weiss, 2020). Nevertheless, PBR remains a possible solution for minimizing the gap between those involved in conducting research for educational purposes and those working in educational settings. In education, teachers, other educators, and clinicians, such as SLPs are responsible for adapting and incorporating evidence-based practices into their practices. For the purposes of this article, we will focus on educational SLPs, that is, SLPs working in school boards. In Canada, educational SLPs have students on their caseloads with a wide range of communication disorders requiring speech, language, voice, and fluency services. In addition to varying caseloads, waitlists and large caseload numbers are often an issue for Canadian SLPs (OAFCCD, 2001; Dube, 2003). The service delivery model also varies between school

boards, driven, to a large extent, by available resources (i.e., time, caseload, number of SLPs). These factors place practical constraints on practice and together with the KT barriers already discussed (e.g., research relevancy and complexity) impose significant challenges for implementing new research into practice. By establishing collaborative partnerships, clinicians and researchers can achieve mutually beneficial goals. Research can be designed to address specific needs arising from clinicians' clinical context, caseload, and service delivery model. At the same time, research outcomes can contribute to the evidence base more broadly by extending our knowledge in specific areas.

One challenge for educational SLPs is that they must often draw on, and adapt, existing evidence to suit their specific practice contexts creating evidence-informed practices that, nevertheless, lack specific evidence themselves. Adjusting assessments and interventions to fit the needs of a clinical context can be potentially problematic: It is often the case that assessments and interventions are developed and tested under rigorously controlled conditions. It is expected that these tools will then be administered with fidelity to the original protocol (Allen et al., 2017). If carried out without the same fidelity, it is unclear if the qualities and outcomes observed in the research context will transfer to the clinical context (Kaderavek & Justice, 2006; Guo et al., 2016). Although evidence-informed, the changes made to fit a practice to a particular service model raise questions regarding the effectiveness of these altered interventions and assessments. SLPs often identify the need to re-evaluate effectiveness in these situations, which provides the well-suited opportunity for a PBR project. In a PBR project, the clinical question is central to the work, and the researcher and SLP work together throughout the stages of the research project to discover new knowledge and apply it to future practices.

3.1.5 PBR in Education: A Case Study

The current project presents a PBR project conducted in an educational setting as a case study of the mutual clinical and research benefits inherent to this approach. The project was initiated by a request from the director of the speech and language department at the school board to the last author of the paper (LA). A PBR team was established to make decisions and set goals regarding the project. The PBR team consisted of the director of the speech-language pathology department, a senior SLP involved in creation of the assessment tool, the first author (MV) who is a doctoral student from Western University, and the last author (LA), principal investigator of the project. Although the PBR team was primarily made up of four individuals, decisions about the project were discussed with the whole group of SLPs working at the school board (n = 24). Details describing the initiation and maintenance of the partnership are described elsewhere (Chapter 4). The PBR team determined that the partnership would evaluate an assessment and intervention service provided for children in kindergarten with weak language skills. Questions regarding the assessment tool were prioritized as a first step on the premise that it was necessary to know the tool captured language differences and language change before it could be used to evaluate the intervention.

With the aim of identifying those children with low language skills and at risk for poor literacy development, the school board SLPs designed a kindergarten assessment tool focused on identified predictors of positive language and literacy outcomes (Castles et al., 2018), namely, phonological awareness and narrative language. Phonological awareness is the explicit knowledge of the sound structures of words, or the ability to manipulate parts of words including syllables and phonemes (Adams, 1990; Gillon, 2004; Schuele & Boudreau, 2008). Even prior to the start of literacy instruction, the early stages of phonological

awareness development is evident suggesting that oral language is important for the development of phonological awareness (Anthony & Francis, 2005). As children are exposed to written language in elementary school, these skills rapidly increase, especially the development of phoneme awareness (Anthony & Francis, 2005). Identified as an early indicator of reading success, phoneme awareness (i.e., knowledge of individual sounds), in particular, supports children's ability to link phonemes to graphemes, which is necessary for strong decoding skills (Bus et al., 1999; Castles & Coltheart, 2003; Stahl & Murray, 1994; Anthony & Lonigan, 2004; Hogan et al., 2005). Strong decoding skills subsequently support reading comprehension (National Reading Panel; NRP, 2000; Storch & Whitehurst, 2002; Lonigan, 2004; Carson et al., 2011). Assessments of phonological awareness typically determine children's ability to rhyme, both blend and segment phonemes at the syllable and word level and identify individual phonemes. Most phonological awareness interventions target segmenting and blending words within syllables, segmenting and blending sounds within words, identifying individual phonemes, and rhyming (Schuele & Boudreau, 2008). Results from a meta-analysis revealed that phonological awareness interventions result in significant improvements in phonological awareness, reading outcomes and spelling outcomes (NRP, 2000). Moreover, phonological awareness interventions have been shown to have a positive effect on phonological awareness and reading outcomes when delivered individually, in small groups, and through classroom-based instruction (NRP, 2000). Evidence that phonological awareness interventions are effective across a variety of delivery options suggests that SLPs can adapt these interventions to fit various service delivery models (Schuele & Boudreau, 2008).

Another skill considered important for language and literacy development is oral narrative ability. Narrative ability encompasses a child's ability to understand a story, retell a

heard story and make up or share personal narratives (Bishop & Adams, 1989; Justice et al., 2006; Petersen et al., 2008). The ability to understand and produce oral narratives is also linked to academic success, specifically reading comprehension (Feagans & Appelbaum, 1986). Narrative language development begins around the ages of 3-4 and becomes an important tool for language and literacy development (Stadler & Ward, 2005). As these skills develop, children progress from labelling and listing items and ideas to more complex skills like sequencing and narrating (Stadler & Ward, 2005). In elementary years, the development of these skills has been demonstrated over an academic year (Orizaba et al., 2019). Children who have language and/or reading difficulties demonstrate significant weaknesses in their oral narrative language skills (Westerveld et al., 2008). Given this, it is not surprising that oral narrative abilities are also common in SLP assessments (Boudreau, 2008). An in-depth understanding is gained by assessing both oral narrative comprehension and production of a story (Skarakis-Doyle & Dempsey, 2008; Boudreau, 2008) including the macrostructure of the story (e.g., characters, setting, etc.), the microstructure (e.g., sentence structure, word choice, etc.), and ability to answer questions (Liles et al., 1995; Justice et al., 2006; Boudreau, 2008). Interventions aimed at improving oral narrative skills can include the explicit teaching of story grammar (Hayward & Schneider, 2000; Nathanson et al., 2007) and the use of scaffolding where parents or teachers help the child remember and interpret the events of a story (Pesco & Gagne, 2017). Narrative interventions have been found to lead to improvements in identifying the structure of narratives (Davies et al., 2004), narrative performances (Swanson et al., 2005), and grammatical structure (Green & Klecan, 2012). Interventions have found to be successful when delivered individually (Gillam, 2018), in small groups (Nielsen & Friesen, 2012; Green & Klecan, 2013; Brown et al., 2014), or through classroom-based interventions (Nielsen et al., 2012; Spencer et al., 2015). These

results suggest considerable potential for modifiability of narrative language assessment and interventions, which makes them good candidates for SLPs to incorporate into different clinical contexts.

The service delivery model that formed the backdrop for our PBR project was an early intervention initiative aimed at supporting struggling kindergarten students. Based on the strong evidence supporting the use of phonological awareness and narrative language assessments in determining the language and literacy needs of school-aged children, and to support the implementation of corresponding interventions (Gillon, 2000; NRP, 2000; Johnston, 2008; Shapiro & Solity, 2008; Westerveld & Gillon, 2008; Spencer et al., 2015), the service was designed around observing and assessing phonological awareness and narrative language in the first term of the school year, providing intervention in the second term, and re-evaluating to assess progress in the third term. Specifically, the SLPs worked collaboratively in classrooms with kindergarten teachers in September and October, evaluating selected ('caseload') students in November and December, completing whole-class and small group interventions between January and April, and administering re-evaluations in May. To meet their needs specifically, the SLPs designed a phonological awareness tool and a narrative language assessment tool for use in the Term 1/Fall (November/December) and Term 3/Spring (May) evaluations.

3.1.6 The Current Study

The purpose of this PBR study was to analyze and provide some validation for a kindergarten language assessment tool that was designed and implemented by educational SLPs. Together, the PBR team determined the goals of the PBR project: (1) is the tool measuring phonological awareness and narrative language skills in a meaningful way (i.e.,

understand the construct validity of the tool), (2) does the tool identify children with language difficulties, and (3) does the tool capture change in skill over time. The team determined that goals 2 and 3 could be addressed in the first school year of the project, and goal 1 in the subsequent year. In study 1, kindergarten children who were either on SLPs' caseload or not completed the assessment tool at 2 or 3 points in the school year. It was expected that both phonological awareness and narrative scores would be lower for those on the SLP caseload group. Further it was expected that scores would be lower at the beginning of the school year compared to the end of the school year. If these differences were not observed for either component of the tool, the PBR team planned to revise the tool. Results of study 1 indicated that the tool needed to be revised. In Study 2, a group of students completed a revised assessment tool at 2 time points in the following year, and other 'gold standard' measures of language abilities. It was hypothesized that the assessment tool would be a valid measure of phonological awareness and narrative language, which would be reflected in significant correlations between the tool components and corresponding standardized measures of language. Similarly, if the tool was found not to be a valid measure, the PBR team would work together to make changes to the tool and establish its validity.

3.2 Study 1 Method

The purpose of study 1 was to capture the SLP's current practice. The SLPs were using a bespoke phonological awareness and narrative language assessment tool to guide intervention decisions in their service to support the kindergarten program. Clinical questions were raised by the clinicians about the accuracy of the tool in identifying children who needed support, and in capturing change in skills over time. The PBR partnership was established to address these questions, and this data was collected over the first year of the partnership.

3.2.1 Study 1 Participants

Participant data were collected from 229 kindergarten children across 133 schools in southwestern Ontario region (Canada) covering one school district. One hundred and eight participants came from SLP caseload (Mean age (years; months) = 5;3, SD = 2.6), and 121 participants were recruited off caseload (M = 5;5, SD = 2.9).

Recruitment details: Prior to the school year, the PBR team determined that all SLPs in the school board (n = 24) would be asked to recruit participants from their assigned schools (approximately 4-6 schools each). Each SLP aimed to recruit about 10 participants who were on their caseload and an equal number of participants not receiving SLP services and assumed to have typical language. The children not on caseload were selected from the same classrooms as caseload children. Written consent was obtained for 108 students who were recruited from the SLPs caseload (caseload group) and 121 students who were not on the SLPs' caseload (non-caseload group). No demographic information other than month of birth was collected. Ethics approvals for all study procedures and materials were obtained by Western University Non-Medical Research Ethics Board and the school board's Accountability and Assessment Department.

3.2.2 Study 1 Procedure

Testing was completed individually in a quiet room with either an SLP or a trained research assistant at the child's school in 20–25-minute sessions. All children completed the assessment tool designed by the SLPs (see Appendix A) to measure *phonological awareness and narrative language*. The caseload group completed the assessment tool three times over the school year (Fall, Winter, Spring) and the non-caseload group completed the assessment tool twice (Fall, Spring). Three timepoints were planned for the caseload group because the

SLP service provision included whole-class and small group interventions between planned Winter and Spring testing sessions. Comparisons between change from Fall to Winter and Winter to Spring might provide pilot data regarding change associated with the intervention.

3.2.3 Study 1 Outcome Measures

Assessment Tool Design: The assessment tool was designed in 2015 and edited once in June 2016 by the SLPs after one year of using the tool to complete assessments. Specific to phonological awareness and narrative language, the tool was designed to be quick and easy to administer and require few materials.

Phonological Awareness component: There were 10 phonological awareness subtests, each containing four items (exception: the rhyme recognition subtest contained six items). Children were given one point for every correct response for a total possible score of 42. The assessment was completed in the order and manner described below.

Subtest 1: Sentence segmentation: Children heard a short sentence that related to a picture on the picture page. They were asked to repeat the sentence while using the counting strip to count the number of words per sentence.

Subtest 2: Syllable blending: Children heard two or three syllable words said slowly with two seconds between syllables and were asked to say the word.

Subtest 3: Syllable segmenting: Children heard a polysyllabic word and were asked to clap the number syllables in the word.

Subtest 4: Onset and rime blending: The administrator said the onset of a word and placed a square Lego block to on the table then said the rime of the word and put

down a second rectangular block. The child was asked to say the whole word. Administrators left a two second delay between onset and rime.

Subtest 5: Onset and rime segmenting: The administrator put two blocks in front of the child and said a word. The child was asked to indicate the onset and rime using the blocks.

Subtest 6: Initial sound correspondences: The participant heard a word and was asked to state the first sound.

Subtest 7: Individual sounds in words – Blending: Five cube blocks were placed on the table. The administrator pointed to a small cube to mark each sound in a word and the child was asked to state the word. A two second delay was left between sounds.

Subtest 8: Individual sounds in words – Segmenting: The child heard a word and was provided with five small cube blocks. The child was asked to point to a block for each sound in the word.

Subtest 9: Rhyme Recognition: The participants heard three words and was asked to indicate if they all rhymed with each other.

Subtest 10: Rhyme Production: Participants heard one word and were asked to produce a rhyming word. Nonwords were acceptable responses.

Narrative Language component: Participants listened to a short story that contained eight sentences. The story was told in five sections with a corresponding image for each section. After the participants heard the story once, the three subtests were administered as described below. Children received a score out of 46 points for the narrative component.

Each subtest of the narrative retell component was transcribed online at the time of the assessment. Children heard one of three different stories at each testing timepoint. These stories and accompanying pictures were created by the SLPs specifically for the assessment tool. All participants heard a story about *Cindy* in the fall testing, *Emma* in the spring testing, and the SLP caseload group who were assessed in the winter heard a story about *Amira*. The SLPs were interested in the CUBED (Petersen & Spencer, 2016), but did not feel that it fit practice needs so the narrative component was inspired by the CUBED and included a narrative retell, personal production, and comprehension questions. The stories and story questions were developed by the SLPs of the school board.

Subtest 1: Narrative Retell: Children were asked to retell the story with picture supports left on the table. The following skills were assessed: (1) narrative language: focusing on story elements (character, setting, events, problem and ending), (2) vocabulary: assessing if the child used appropriate vocabulary in their story retell and the number of vocabulary words, (3) word/sentence structure: including (a) the number of grammatical errors noted in the child's retell, and (b) the range of conjunctions used, (3) connected language: including (a) how fluently the child told the story, (b) if the child gave one sentence per picture, and (c) if the events of the child's retell were logical, and (4) social language made up of (a) the child's ability to stay on topic, and (b) if the child named the emotion word indicated in the story. Every question for each skill was given a point value of two if the SLP judged the skill to be well-developed, one if the skill was judged to be emerging, or zero if there was no evidence that the skill was developed. The narrative retell was out of a possible 18 points.

Subtest 2: Comprehension Questions: Children were asked 10 questions about the story. SLPs awarded one point for each correct answer. Eight questions were factual, one was inferential, and one was a prediction question.

Subtest 3: Personal Retell: After completing the comprehension questions, children were asked "In the story Cindy/Amira/Emma was feeling X (sad/frustrated/upset). Can you tell me a story when you were feeling X?" Personal retells were scored in the same way as the narrative retell.

Study 1 Statistical Analysis

The phonological awareness and narrative language components of the assessment measure were analyzed separately in all cases. Preliminary analysis of variances (ANOVAs) were planned for the caseload group across the three test time points in order to compare change between Fall-Winter and Winter-Spring. To explore group differences across time, ANOVAs were completed to compare groups across Fall-Spring time points. In cases of significant effects, pairwise comparisons with Bonferroni corrections were planned. Mauchly's Test of sphericity was completed prior to each analysis, and G-G correction was used when significant.

3.3 Results

3.3.1 Study 1 Results and Discussion

Table 1 provides descriptive statistics for the Fall, Winter, and Spring testing timepoints for the phonological awareness and narrative retell measures for both participant groups (where available). Although the plan was to complete testing within a one-month time frame at each test point, this proved challenging to execute. As a result, the Fall data

collection spanned from October-December, the Winter data collection occurred in the month of January, and the Spring data collection was completed in May. Given the extended time frame of the Fall data collection, there was considerable variance in the time between the Fall and Winter test points for the caseload group (varying from 1 to 3 months).

Table 3-1 Descriptive statistics *(mean; standard deviation)* for assessment tool

Measure	*Test Time*	*SLP Caseload*	*Non-Caseload (NCL)*
Phonological Awareness	Fall	20.6 (8.6)	33.5 (6.4)
	Winter	23.5 (10.7)	
	Spring	30.8 (8.8)	36.9 (4.1)
Narrative Retell	Fall	31.3 (10.3)	40.0 (6.9)
	Winter	31.7 (8.0)	
	Spring	33.2 (10.5)	40.1 (8.1)

Caseload group

Separate repeated-measures ANOVAs across the three timepoints (Fall, Winter, Spring) for the SLP caseload group were significant for the phonological awareness, $F(2, 206) = 156.18$, $p < .001$, $\eta^2 = 0.6$, but not the narrative raw scores, $F(1.86, 199.12) = 1.87$, $p < .16$, $\eta^2 = 0.017$. For the narrative language component, Mauchly's Test of sphericity indicated that the assumption of sphericity had been violated, $X^2(2) = 8.23$, $p = 0.02$. For the phonological awareness component, pairwise comparisons revealed significantly lower

scores in the Fall than Winter ($p_{bonf} < 0.001$) and Spring ($p_{bonf} < .001$), and significantly lower scores in Winter than Spring ($p_{bonf} < .001$). These findings indicate that the phonological awareness but not narration component of the tools captured change over time in the caseload group. Given the discrepancy in time frames between the three assessment points for the caseload group, it is not possible to compare the change in the phonological awareness or narrative language scores from Fall to Winter and Winter to Spring. No further assessment of the Winter timepoint were completed.

Developmental Change and Group Differences

Repeated-measures ANOVAs were completed on each test component with timepoint (Fall; Spring) and group (SLP caseload; non-caseload) entered as within and between group factors, respectively. Results for the phonological awareness component included significant main effects of group $F(1, 224) = 115.9$, $p < .001$, $\eta^2 = 0.26$, due to higher scores for the non-caseload group, and time $F(1, 224) = 354.58$, $p < .001$, $\eta^2 = 0.13$, due to higher scores in the Spring. These effects were modified by a significant group by time interaction $F(1, 224) = 89.13$, $p < .001$, $\eta^2 = 0.03$. All pairwise comparisons were significant ($p < .05$, all cases), however, an examination of effect sizes indicated that the Fall-Spring change was smaller for the non-caseload group ($d = .65$) and larger for the caseload group ($d = 1.17$).

For the narrative language component, there was a significant main effect of group $F(1, 227) = 67.56$, $p < .001$, $\eta^2 = 0.16$. Remaining effects were not significant (time: $F(1, 227) = 1.62$, $p < .21$, $\eta^2 = 0.002$; interaction: $F(1, 227) = 2.26$, $p < .14$, $\eta^2 = 0.003$). Figure 1 shows the group and time differences for the phonological awareness but not narrative language assessment components.

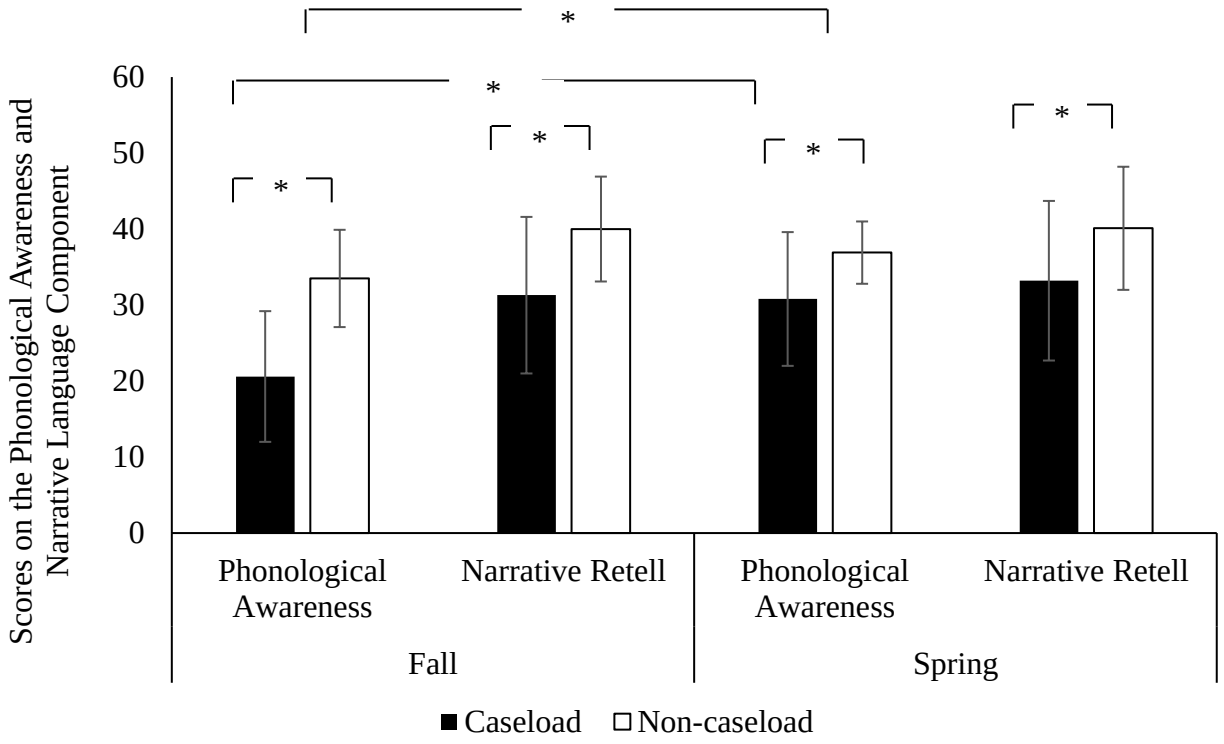

Figure 3-1 Capturing developmental growth and group differences

Study 1 results indicated that the phonological awareness component of the assessment tool captured developmental change in kindergarten across a school year and captured differences between children on or not on the SLP caseload. The children in the non-caseload group preformed significantly better than the caseload group at both Fall and Spring testing, and a significant increase in scores was observed on this component of the tool from Fall to Spring with a larger effect size for the non-caseload group. The narrative language component of the tool, however, was only sensitive to differences between groups. The caseload group performed significantly more poorly than the non-caseload group. The narrative component of the tool was not sensitive enough to detect developmental change over time for either group. The failure of the tool to capture change over time was

problematic because this result suggests that the tool would not be an effective progress monitoring tool.

Given these findings, the tool was reviewed, specifically focusing on how to increase the sensitivity of the narrative portion of the tool. The results of study 1 were presented to the PBR team and all the SLPs from the school board. The PBR team and a selected group of additional SLPs worked together to revise the tool in June before the end of the school year and September of the following school year for implementation by mid-September. Aligning with a PBR approach, this was a collaborative effort to ensure the tool had high utility for clinical practice but would be sensitive enough to be used as a progress monitoring tool. Considering that the tool was developed by the SLPs, the tool's utility was established in their practice, however, capturing the current use of the tool identified areas of improvement that needed to be addressed before continuing with future projects.

3.4 Study 2 Method

During the end-of-year partnership meeting that took place in June, the results of study 1 were discussed with the SLPs. It was determined that the first goal of study 2 would be to revise the narrative component of the assessment tool. The goal of revising the tool was to increase the tool's variability and ability to capture change. The PBR team reviewed the tool and concerns with the scoring rubric were identified. Specifically, the scoring rules were not sufficiently clear to allow for objective scoring practices, and the score range did not allow for enough variability in the data. The scoring rubrics were restructured to create more variability in the sample and include more detail to increase objectivity in scoring. It was expected that these changes to the tool would increase the tool's sensitivity to capturing developmental change over time.

The second goal of study 2 was to assess the tool's validity, a goal identified by the SLPs as the next priority in evaluating the tool's usefulness. As a starting point, the researchers recommended measuring the tool's construct validity, that is, determining whether the tool measured the intended constructs. Given this, the PBR team put together a battery of standardized language measures to compare against the assessment tool. It was hypothesized that the phonological awareness component would be related to other measures of oral language whereas the narrative component would be specifically related to other measures of narrative ability. It was anticipated that all measures would be related to each aspect of language, however we expected closer relationships between tasks testing similar abilities. It was further hypothesized that the phonological awareness component of the tool would be more closely related to subtests assessing structural language from the *Clinical Evaluation of Language Fundamentals-4 (CELF-4;* Semel et al., 2003). The narrative portion of the tool was expected to demonstrate closer relationships to the *Test of Narrative Language (TNL;* Gillam & Pearson 2017*).*

3.4.1 Study 2 Participants

Participant data were once again collected from schools across the same school district. Children enrolled in kindergarten were eligible to participate in the study. Children were recruited from kindergarten classrooms and caseload/non-caseload status was not collected. Thirty-seven participants completed testing at time time-point 1 (M = 6;1, SD = 3.5), and twenty-four of the thirty-seven children completed time-point 2 (M = 6;3, SD = 3.61). Significant attrition was a result of the need to contact families and have parents re-consent to participate in time-point 2.

Recruitment details: It was indicated by the SLPs that recruiting participants was very time consuming in study 1, so for study 2 researchers from the PBR team and two trained research assistants recruited participants and collected data for this project. SLPs first approached families of children and asked if they were interested in hearing more about the research study. If families consented to hear more, their emails, phone numbers, and signatures were collected on a participant collection form and these forms were provided to a Western researcher. The Western researcher then emailed/called these families and provided more information about the study. If families consented to have their child participate, birth month was collected over the phone and parents filled out an online consent form using a Qualtrics survey. No other demographic variables were collected. Collecting data to assess the revised tool and complete the validation analysis was planned for spring of 2019, however due to difficultly recruiting participants and hiring research assistants only one time-point, instead of two, was completed. The second data collection time-point was completed in the fall of 2019. Given that the study was planned to be completed by the end of school year, families needed to re-consent to have their child participate in the second data collection time-point. Twenty-four of these families re-consented to have their children participate in the fall of 2019. To gather re-consent, families were emailed and/or called and then they completed a re-consent form on Qualtrics.

3.4.2 Study 2 Procedure

At time-point 1, participants completed the revised assessment tool along with measures of narrative language and general oral language, and other measure not reported in this paper. Individual testing was completed in a quiet space in the child's school by the first author or a trained research assistant. Completing the battery of assessments took between 2-3 hours/participant. Two predetermined breaks were taken throughout the testing and the

participants were encouraged to ask for additional breaks if needed. At time-point 2, participants completed the revised assessment tool. Individual testing took place in a single session in a quiet room in the child's school. All testing was completed by a trained researcher assistant.

3.4.3 Study 2 Outcome Measures

Phonological Awareness component: The phonological awareness component used in the present study was identical to study 1.

Revised Narrative Language component: In June and September of 2018 the SLPs and researchers revised the scoring of the narrative language component of the tool. Materials previously used in the assessment remained the same as in study 1. During the spring testing participants heard the story of *Cindy*, and in the fall, they heard the story of *Emma*. Each participant completed the narrative retell, comprehension/vocabulary questions, and then the personal retell. Similar to study 1, responses were transcribed online for each subtest of the revised narrative language component.

Subtest 1: Narrative Retell: Participants were asked to retell the story they heard. The following skills were assessed: (1) narrative language: in the revised tool participants were given a score for character, setting, problem, feeling word used, attempt, consequence and ending, (2) vocabulary: participants were given one point if they indicated five of the listed vocabulary words, and two additional points if they listed 10 vocabulary words, (3) word/sentence structure: including questions of auxiliary verb 'be'/past tense verbs, use of pronouns, and use of conjunctions, (4) connected language: including story fluency, story completing, and story sequencing, (5) social language: including topic maintenance, and information sharing. Each question could be scored as either a two, one, or zero based on

explicit examples provided on the scoring sheet (see Appendix B). The revised narrative retell was out of a possible 34 points.

Subtest 2: Comprehension Questions: Participants were asked six comprehension questions and each question was given either a two, one, or zero based on explicit answers provided on the scoring sheet. Five of the comprehension questions were factual and one was inferential.

Subtest 3: Vocabulary Questions: Participants were asked two vocabulary questions about words used in the story. Each answer was scored based off the accuracy of the definition they provided, and whether they required a forced choice to answer the question (e.g., does scraped mean scratched or bumped?).

Subtest 4: Personal Retell: As in study 1, participants were asked to tell their own story about a time they felt similarly to the character in the story. The personal retell scoring rubric was updated to mirror the updated narrative retell scoring rubric. This is one task where many children did not respond to the question (n = 13). It was later suggested that reframing this question may be beneficial.

Oral language measures:

Clinical Evaluation of Language Fundamentals-4 (CELF-4; Semel et al., 2003): The CELF-4 is a standardized, omnibus measure of oral language, and is one of the tests most frequently used by SLPs to identify language disorders (Betz et al., 2013). The Composite Language Score is based on four measures for kindergarten students. In the *Concepts and Following Directions* subtest, students point to aspects of a picture following an instruction. In the *Word Structure* subtest, participants provide a single word to finish a sentence spoken

by the administrator about a picture (e.g., those shoes are yours and these shoes _____). In the *Recalling Sentences* subtest, the child hears a sentence and is asked to repeat the sentence verbatim. In the *Formulating Sentences* subtest, the child sees a picture and is asked to create a sentence about the picture.

Test of Narrative Language (TNL; Gillam & Pearson 2017*):* The TNL is a standardized measure of narrative language commonly used by SLPs. In this test, children hear several stories, some without pictures, some with sequenced pictures and others with a scene picture. Children are asked to retell the stories, answer questions, and make up their own stories.

Statistical Analysis: Revised Tool

To evaluate whether the revised assessment tool captured significant change over time, data from the 24 participants who completed the updated assessment tool in the Spring (time-point 1) and Fall (time-point 2) was analyzed. A series of paired *t* tests were completed to compare Spring and Fall scores on both the phonological awareness and narrative retell components. Bonferroni adjustments were used to control for Type 1 error within each analysis. Shapiro-Wilk test were completed on the groups to ensure normality of the sample. To evaluate construct validity, correlations between the assessment tool data at time point 1 (Spring) and the standardized measures completed at the same time were calculated (n = 37).

3.5 Results

3.5.1 Revised Tool Results and Discussion

Capturing Developmental Change: Revised Assessment Tool

Table 2 provides descriptive statistics for the Spring and Fall testing timepoints for the revised assessment tool. Analysis of the revised assessment tool indicated that performance on the tool was significantly higher in the Fall (time-point 2) compared to the Spring (time-point 1) for the phonological awareness component $t(23) = -4.38$, $p < .001$, $d = -0.89$. For the overall narrative language component, a Shapiro-Wilk test showed a significant departure from normality, $W(23) = 0.89$, $p = 0.02$, however the Wilcoxon signed-rank test demonstrated significantly higher scores in the Fall (time 2) compared to the Spring (time 1), $Z = 40$, $p = 0.009$, Hodges-Lehmann estimator = -0.65.

Table 3-2 Descriptive statistics *(mean; standard deviation)* for revised assessment tool

Measure	*Test Time*	*Group Mean (SD)*
Phonological Awareness	Spring	34.4 (6.5)
	Fall	36.3 (4.7)
Total Narrative Component	Spring	46.13 (16.6)
	Fall	54.67 (11.9)

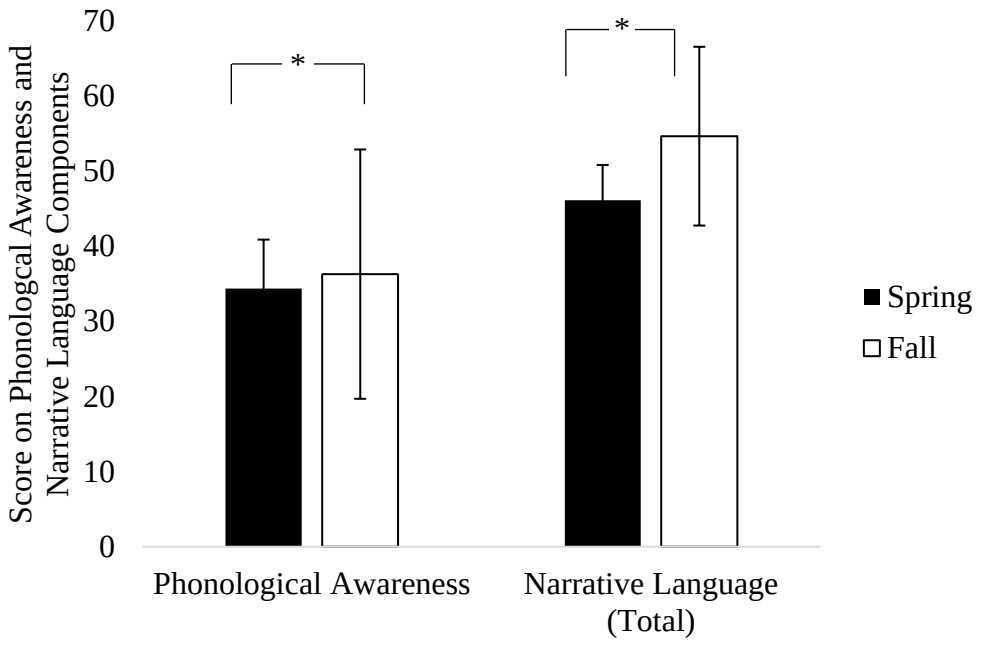

Figure 3-2 Capturing developmental growth on the revised assessment tool

The first aim of study 2 was to determine if the revised tool captured developmental change over an academic year. The complementary knowledge of the PBR team allowed for a rapid change in clinical practice and the re-assessment of the revised tool. Results of study 2 revealed that both components of the tool captured significant growth over a 5-month period. Significant growth was seen from the Spring (time-point 1) to the Fall (time-point 2) for both the phonological awareness and narrative components of the tool, indicating the tool's sensitivity in detecting change over a school year. Significant results on both aspects of the tool indicate a successful adjustment to the narrative tool and further demonstrates the tool's utility as an appropriate measure of these skills.

Validation Analysis: Revised Assessment Tool's Relationships to Standardized Measures of Language

Table 3 provides the ranges of scores for the CELF-4, TNL, and the revised assessment tool. Table 4 provides correlation coefficients for the revised assessment tool and the standardized measures of language. The phonological awareness component demonstrated moderate-strong positive relationships with each subtest of the CELF-4: concepts and following directions, r, (35) = .72, $p < .01$, word structure, r, (35) = .77, $p < .01$, recalling sentences, r, (35) = .74, $p < .01$ r, (35) = .66, $p < .01$, and formulating sentences, r, (35) = .74, $p < .01$. The phonological awareness component also showed moderate positive correlations with the TNL: comprehension score r, (35) = .49, $p < .01$, but not the TNL: production or Composite Language Score (CLS) of the CELF-4. The narrative language component of the tool demonstrated a moderate positive correlation with the TNL: Comprehension score, r, (35) = .45, $p < .01$, and the TNL: Production score r, (35) = .57, $p < .01$, as well as the Formulating Sentences and CLS score.

Table 3-3 Range of scores for CELF-4, TNL, and revised assessment tool

Measure	*Mean of raw scores*	*Standard deviation of raw scores*	*Range in raw scores*	*Mean of scaled scores*	*Standard deviation of scaled scores*	*Range in scaled scores*
CELF-4 Core Language	95.8	37.3	24-150	X	X	X
Concepts and following directions	26.2	11.0	7-44	9.8	3.4	4-15
Word structure	18.5	5.3	4-26	9.2	2.9	2-13
Recalling sentences	34.6	16.0	2-68	9.5	3.8	1-17
Formulating sentences	16.5	9.13	0-34	9.5	3.6	1-15
Test of Narrative Language	51.9	18.4	21-87	X	X	X

Comprehension score	23.2	6.9	8-37	10.8	2.3	5-16
Production score	28.6	13.4	0-57	10.2	3.6	3-18
Phonological awareness	34.4	6.5	3-41	X	X	X
Narrative language	46.1	16.6	11-42	X	X	X

X = Not available

Table 3-4 Correlation matrix for revised assessment tool and standardized measures of language

Measure	*Phonological Awareness*	*Narrative Language (Total)*
TNL: Comprehension Score	0.49**	0.45**
TNL: Production Score	0.33*	0.57**
CELF-4 Core Language	0.30	0.34*
Concepts and Following Directions	0.72**	0.31
Word Structure	0.74**	0.16
Recalling Sentences	0.66**	0.30
Formulating Sentences	0.74**	0.38*

* $p < .05$, ** $p < .01$,

Moderate correlation +0.50

Strong correlation = +0.70

The second goal of study 2 was to demonstrate the tool's construct validity as a measure of phonological awareness and narrative language ability. Results revealed strong correlations between the phonological awareness component and the four subtests of the CELF-4 (concepts and following direction, word structure, recalling sentences, and formulating sentences). Results also revealed moderate to strong correlations between the

narrative component of the tool and the TNL. These moderate to strong correlations indicate that this aspect of the tool is accurately assessing the intended skill. Together these results demonstrate good construct validity of the assessment tool, both the phonological awareness and narrative language components. Study 2 illustrated that a board-designed assessment tool fitting the needs of a specific clinical context can be a valid measure of language development. The use of a PBR partnership supported the use of a clinical tool designed for a specific practice.

3.6 Discussion

This practice-based research project involved a clinical-research partnership between university researchers and educational SLPs from a school board in southwestern Ontario. The partnership was initiated in 2017 and over three years of active partnership, the utility of a language and literacy tool was assessed. The assessment tool was designed by SLPs to fill a need within their clinical context. In the SLPs' service delivery model at the time of the study, SLPs and kindergarten teachers worked collaboratively to identify children demonstrating low language abilities in the classroom. These children then received phonological awareness and narrative language interventions between January and April of an academic year. When the partnership was established, the PBR team determined that the first goal of the partnerships was to understand if the bespoke tool (1) identified children needing support from those with typical language development and (2) captured developmental language growth over time. A second goal of the partnership was to assess the tool's construct validity as a measure of phonological awareness and narrative language ability. Results of study 1, revealed that the phonological awareness component of the tool captured differences between the groups of participants (SLP caseload; non-caseload), and captured developmental growth across the two testing time points (Fall; Spring). The

narrative portion of the tool captured differences between the two groups of participants but did not capture growth over time. After these results were shared with the SLPs, the PBR team and a selected group of SLPs revised the narrative portion of the tool. In study 2, results from the revised tool revealed that both the phonological awareness and the revised narrative language components captured developmental growth across the two time points (Spring; Fall). As well, moderate to strong positive correlations were observed between the phonological awareness component and standardized tests of oral language and similarly moderate correlations between the narrative language component of the tool and a standardized test of narrative language. These correlations with 'gold standard' measures of language skills provide an indication of the construct validity of the assessment tool.

3.6.1 Capturing Developmental Growth and Differences Between Groups of Participants

Study 1 included one group of participants from the SLPs' caseload and a second group of participants who were from the same classrooms but were not on the SLPs' caseload. The goal was to administer the tool in the Fall (~ October) and Spring (~ May) to the non-caseload group in order to capture typical language development over the year. For the caseload group, the goal was to administer the tool three times throughout the year to align with the intervention timeline. The intervention was administered from February to April, and the assessments were planned to be administered in Fall (~ October), the Winter (~ January) prior to intervention beginning, and after the intervention in the Spring (~ May). Assessing at these three timepoints would allow us to capture developmental growth from Fall to Winter and additional growth from the intervention as a preliminary look at intervention effectiveness. Due to staffing constraints, the Fall data collection was not completed until late November/early December, and the Winter data collection was

completed in the month of January. For over 1/3 of the caseload sample there was less than one month between Fall and Winter testing. Given this, the Winter timepoint could not be used to address the intended question and preliminary data regarding the intervention could not be interpreted. Fall and Spring timepoints were available for both the caseload and non-caseload groups and study 1 results revealed that only the phonological awareness component demonstrated developmental change over the academic year. However, the initial narrative component of the tool did not capture growth over the year. When results indicated that the tool did not capture growth, the tool was revised. In study 2, it was demonstrated that the revised tool was now sensitive enough to capture change over time. Revisions to the scoring rubric made the tool more sensitive to capture growth over time. The finding that narrative skills change over a kindergarten year is consistent with findings from the CUBED, which inspired the assessment tool (Peterson et al., 2020).

The SLPs and PBR team were also interested in determining if the tool captured differences between the caseload group and the non-caseload group. The initial tool demonstrated that the non-caseload group preformed significantly better than the caseload group at both the Fall and Spring testing. Similar results were found once the tool was revised, the caseload group preformed significantly better than the non-caseload group. These results are consistent with other tools demonstrating that children with language weakness have difficulties with tasks assessing phonological awareness and narrative retell (Hogan et al., 2005; Swanson et al., 2005).

3.6.2 The Tool as a Valid Language Measure

The results of study 2 provided some validity for the assessment tool. The phonological awareness tool demonstrated moderate to strong relationships with subtests of

the CELF-4 (Concepts and following directions, Word structure, Recalling Sentences, and Formulating Sentences), indicating that the phonological awareness component assessed similar abilities to these subtests. The total score for the narrative language component of the tool demonstrated a moderate positive correlation with the TNL: Production score, and a weak positive correlation with the TNL: Comprehension Score. Although the tool demonstrated positive relationships to other standardized measures of language, it should be noted that these relationships were modest.

3.6.3 Clinical Utility of the Tool

Service delivery models vary considerably amongst school boards depending on resources, caseloads, and waitlists, and often this requires SLPs to adapt and/or create tools that are going to be useful for their clinical contexts. The goal of this partnership was to assess a board-designed tool to determine its utility for SLPs to use in their assessment. In this specific school board, it was decided that a phonological awareness and narrative language intervention would be provided in the form of small group and whole class instruction. To identify children needing support from a language intervention and to capture growth from the intervention, the current tool was developed. It was important the tool being used required few materials, was quick and easy to administer and score, and provided information specific to phonological awareness and narrative language. Given the large amount of research that has identified phonological awareness and narrative language abilities as predictors of future language and reading outcomes (Castles et al., 2018; Gilliam et al., 2018), the board-designed tool was indeed evidence-informed, but the PBR partnerships created the potential to provide objective evidence for the tool. The present research supports the use of the tool to accomplish the needs set out by the SLPs. Additional work determining the effectiveness of the tool may revisit the narrative component of the tool

and consider the equivalency of the narrative stories. The SLPs developed the stories to have similar sentence structure and complexity, however, the equivalency of the stories has not been objectively tested.

3.6.4 Partnership Development

At the centre of this project is the collaboration between the researchers and SLPs. The goals of this PBR partnership were selected from clinical questions that arose in practice, then together the clinicians and researchers determined how to gather data from practice to answer the questions (Epstein, 2002). The data were used to inform future practice, and in this project, changes were made to improve the effectiveness of a clinical tool. Most pertinently, this collaboration allowed for rapid interpretation of the data and incorporation of the findings into practice (Coburn & Penuel, 2016). Interpreting the data together made the findings meaningful for partners and discussion surrounding making changes to practice could be had immediately.

KT is often described as a dynamic process whereby the movement between knowledge creation and action is fluid and iterative (CIHR, 2015). This interplay between knowledge creation and action was evident in this partnership when the results of study 1 led to the revision of the clinical tool within a very short time frame so that the revised tool could be implemented a few short months later in the new school year. In this revision process, it was the complementary knowledge of the SLPs and researchers that ensured the tool remained appropriate for their clinical context but was sensitive enough to capture developmental language growth.

The use of PBR in speech-language pathology, especially in education, is relatively new but holds value for researchers and clinicians willing to engage in this research. Broadly,

it is important to understand the nature of these partnerships before becoming involved in this type of research (e.g., facilitators and barriers to KT). And moreover, it is important to have discussions regarding specifics of the partnership (e.g., role definition, decision making, motivations). Often suggested is a memorandum of understanding (MOU) to outline key components of the partnership including methods of communication, key contacts, funding allocation, timelines, etc. This helps to set the partnership up for success prior to the start of a project. Maintaining communication throughout the project is also crucial as the dynamic nature of this research requires flexibility. For example, in study 1 of the current project, the SLPs were responsible for collecting consent forms but when we, as the researchers, learned that this was too demanding, a different method of recruitment was needed. This work also requires and understanding of the time and resources that each partner can bring to the partnership. For example, in study 1 the SLPs collected the data at Fall and Spring timepoints because this was part of their current service delivery, however because collecting data at the Winter timepoint was outside of the SLPs routine, additional help was needed to collect these data. Similarly, additional support was needed to administer the standardized measures of language in study 2 because this was outside of SLPs typical data collection.

The use of PBR introduces complexities to the research process given the nature of the partnership. The project required ethics approval from both Western University and the school board, and in order to collect data within the constraints of practice, not all demographic details could be collected from participants including sex, home language, and any other details regarding language development. By virtue of the research being a PBR study, it also introduces a level of bias as those who developed the tool are also involved in the data collection and scoring. This is unavoidable in PBR research and rather than being seen as a weakness, is viewed as part of the trade-off between rigorous methodologies and

findings that lead to optimal and easily integrated results. Though PBR introduces some limitations, these results demonstrate the value of PBR collaborations resulting in evidence-based materials specific to practice.

3.6.5 Limitations

This PBR work represents a relatively new area to speech-language pathology that includes researchers and SLPs working collaboratively to assess and/or develop feasible tools for practice. Limitations of the current project concern the participant groups and timing of assessments. Although the participant groups for study 1 are of adequate size, the sample size of study 2 is small, including only 24 participants to reassess the tool and 37 to complete the validation analysis. Larger participant groups may have contributed to stronger relationships between the assessment tool and standardized measures of language and narrative ability. Methodological concerns also arose throughout the project where in study 1 data collection for the Fall time-point lasted 2+ months leaving an insufficient amount of time between the Fall testing time-point and the Winter testing time-point. Similarly in study 2 the data collection for the revised tool was intended to take place Fall for time-point 1 and then again in the Spring for time-point 2. However, data collection for time-point 1 was not completed until early Spring leaving insufficient time to collect time-point 2. Data collection for time-point 2 then took place in the fall of the following school year. This required parents to re-consent leading to attrition in the sample and including the summer months where children are not in school was not in the research plan. In future PBR work, hiring research assistants to support with recruiting participants, gathering consent forms, and collecting data may be beneficial.

3.6.6 Conclusions

The importance of knowledge translation and the success of such activities have been documented in many fields. In speech-language pathology, the possibilities of using a PBR approach have been described, but few studies have detailed the steps taken to complete a PBR project or discussed the development of the partnership. In the current study, researchers from Western University and SLPs from a school board partnered together and employed a PBR approach to provide evidence for and validate the use of a tool designed to assess intervention specific targets. In the first year of the partnership, it was found that the tool was not capturing data the way it was intended. However, over the second and third year of the partnership, results revealed that the updated tool captured data in a meaningful way for the clinicians' practices and some validity for the tool was provided. This work exemplifies how researchers and clinicians can engage in PBR partnerships to capture and change current practice. It provides one example of a PBR partnership where the collaborative nature of the partnership led to the identification of a limitation within current practice, and the necessary change implemented in a sustainable manner for clinicians without any delay from research to practice.

3.7 References

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Chapter 4

4 Practice-Based Research Involving Speech-Language Pathologists: A Qualitative Investigation of Facilitators, Barriers, and Partnership Experience

4.1 Introduction

4.1.1 Collaborative Partnerships

As recognized in The Two Communities Theory, researchers and knowledge users typically operate in different settings with different languages, context specific rules, and timelines making a mutually beneficial partnership difficult to accomplish (Caplan, 1979). The theory posits that working in a collaborative partnership to create a reciprocal relationship will align differences and support research-practice integration (Caplan, 1979). The use of collaborative partnerships in research has been acknowledge as one of the best ways to support rapid integration of research findings into practice and as a result has been recognized as important by funding agencies across academic and government settings (Bucknall, 2012; CIHR, 2015; Gagliardi et al., 2015; Jull et al., 2017). Research involving knowledge users changes the approach to knowledge generation by establishing a collaborative partnership for researchers and knowledge users to work together and make joint decisions throughout the research process (Gagliardi et al., 2016). By engaging together in each aspect of the research process (i.e., identifying the research problem, determining methodology, tool development, data collection and interpretation, application of findings), the findings are timely, relevant, and address the needs of the knowledge users. The aim of collaborative partnerships is for researchers and knowledge users to be equal partners in the research, and correspondingly a secondary benefit of collaborative partnerships is the

reduction in power differentials between researchers and knowledge users (Harrison & Graham, 2021).

Though these collaborative partnerships are being praised and highly recommended as an effective way to bridge the research-practice gap, these partnerships do not exist without costs and huge efforts from researchers and the knowledge users (Oliver et al., 2019). Oliver and colleagues (2019) outlined six domains for consideration when engaging in collaborative partnerships: practical costs (e.g., monetary expenses, physical space, administrative personnel), personal costs to researchers (i.e., collaboration can create interpersonal conflicts which can be difficult if researchers feel this places their funding at risk), professional costs to researchers (i.e., some see collaborative and coproduced research and lower quality (Flinders et al., 2016), costs to research (i.e., findings from coproduction may not be as generalizable), costs to knowledge users (e.g., time, resources, sharing personal experiences), and costs to the research profession (i.e., negative experiences in coproduction could leave knowledge users/participants thinking negatively about engaging with research). In addition to the numerous costs, the use of collaborative partnerships is still relatively new and there is little research that has attempted to evaluate these partnerships and determine the impact of the partnership over the project (Oliver et al., 2019). Similarly, more research is needed to understand the best way to engage in these partnerships and ensure researchers and clinicians benefit from the work partnerships (CIHR, 2016; Gardner, 2005).

It is suggested that a cautious approach to coproduction be considered to maximize the benefits of the collaboration and reduce costs to all involved. Prior to engaging in these partnerships, a two-step process of reflection is encouraged with a focus on these questions (Oliver et al., 2019): (1) will coproduction be useful to help meet the aims of those involved

and (2) are other methods more appropriate than coproduction. This conscious reflection prior to starting a project should be considered by all partners along with additional questions specific to the individual researchers or funders (e.g., what is everyone contributing to the partnership?), and the research institution (e.g., how can we support the infrastructure and leadership?) (see Oliver et al., 2019 for a review). Collaborative partnerships require considerable effort from partners, and in addition, these partnerships are difficult to initiate and sustain (Gagliardi & Dobrow, 2016). Significant barriers have also been reported including time needed, lack of support, and lack of resources, to list a few (Gagliardi et al., 2008; Lavis et al., 2003).

Given the costs and barriers of partnered research, recent research has focused on understanding the dimensions of effective collaboration. Unique to these partnerships, these researcher-clinical partnerships are not only interprofessional, but most often also interorganizational. This requires aligning partners who are likely from different fields and aligning goals across institutions. Within healthcare, the literature focusing on interprofessional collaboration has emphasized the importance of creating a shared mental model amongst partners (McComb & Simpson, 2013). The more partners can interact, the more their mental models will be similar, and this contributes to sharing similar views of the project, creating consistency in the partnership, and accomplishing the task (McComb & Simpson, 2007 as reported in McComb, 2013). In a systematic review, Karam and colleagues identified factors important for success specific to interprofessional collaboration, interorganizational collaboration and factors overlapping both types of partnership (Karam et al., 2018). Factors necessary for interprofessional collaboration were specific to the internal environment and included the relationship between the team, individuals, and the need for role flexibility. Specific to interorganizational collaboration, important factors included the

formalization of the partnership and personal role clarification. Overlapping factors specific to the external environment included factors such as communication, shared goals, patient centeredness, trust, power mutual acquaintanceship and shared outcomes (Karam, et al., 2018)

A final general model, The Four-Dimensional Model of Collaboration (D'Amour et al., 2008), offers a typology to collaboration and provides a structural model for interprofessional and interorganizational collaboration. The model outlines two dimensions that involve relationships with individuals (i.e., shared goals and vision, and internalization and awareness of interdependencies between the professions) and two involving the organizational setting (i.e., formalization of expectations and responsibilities, and governance for having leaders to support the collaboration). Each of these dimensions influence one another to capture the intricate process of collaboration so no one domain can be considered independently (D'Amour et al., 2008). The typology considers the stage of partnership development, which influences all dimensions. However, strategies to aid in the development of the dimensions to strengthen the partnership are not specified.

More specific to partnerships between the researchers and knowledge users, Gagliardi and Dobrow (2016) developed the Integrated Knowledge Translation (IKT) Capacity Framework to support IKT in health service research and aid partners in anticipating challenges that may occur. Three broad components relevant for IKT capacity were identified including (1) organizational (e.g., philosophy of IKT), (2) professional (e.g., identifying collaborators and initiating IKT), and (3) individual (e.g., time for IKT). Also outlined is the importance of assessing IKT readiness (Ward et al., 2012). Although this model begins to outline the complexity of engaging researchers and knowledge users in collaborative

partnerships, it may not capture all of the components of practice-based research (PBR) partnerships given the grounding of PBR in practice and the comprehensive timeline of the partnership from project conception to completion. Important barriers and facilitators to PBR partnerships, and key aspects in partnership initiation and maintenance need to be examined in depth.

To understand collaborative partnerships in more detail, qualitative methodologies would be particularly useful. A qualitative approach would provide a detailed understanding of knowledge users' experiences in a partnership (Strauss & Corbin, 1998). Qualitative methods allow us to explore an area about which we are still learning (Stern, 1980), and provide participants the opportunity for self-expression (Clark, 2010). When collecting qualitative data, multiple methods of data collection have been suggested to allow for possible triangulation of the data (Baxter & Eyles, 1997; Palakshappa & Gordan, 2005). The triangulation of data from multiple sources strengthens the construct validity and accuracy of the results (Bonoma, 1985; Ravenswood, 2011). Two approaches used in the current project to collect qualitative data included a perceptual mapping activity and semi-structured interviews. Perceptual mapping activities offer a unique opportunity for researchers and knowledge users to reflect and engage in a discussion of their partnership because a perceptual mapping activity creates a visual representation of all the factors that have influenced the partnership (Huff, 1990). Semi-structured interviews provide an open framework for participants to answer questions with the aim of encouraging depth and understanding of a particular topic (Dearnley, 2005).

Entering and engaging in collaborative research is a difficult undertaking and requires a balance of generating mutual goals while allowing for some autonomy amongst partners

(D'Amour et al., 2008). Research has begun to understand the complexities of engaging in these partnerships but has focused primarily on health care settings. Additional work highlighting these partnerships in different clinical settings is needed given the environmental context in which these partnerships exist likely influences the partnership. Education settings, in particular, can be expected to be a challenging context in which to establish collaborative researcher-clinical partnerships. Given the number of partners potentially included in a project (i.e., grade one teachers board wide), highly distributed knowledge users across schools, wide geographic areas, different schedules than research institutions, and administration differences across researchers and knowledge users establishing these partnerships will require significant effort. Research identifying barriers to partnerships is becoming more frequent (Cunningham et al., 2019), however continued exploration of facilitators and barriers and further exploration of factors important for partnership initiation and maintenance would add the literature. Employing a qualitative approach in the area of PBR where researchers and knowledge users are emersed in a collaborative partnership will contribute to our understanding of how to build successful partnerships.

4.1.2 Partnership Development and Current Partnership

The current project reports on a PBR partnership that was developed between researchers at Western University and SLPs working at a school board in southern Ontario. The researchers were conducting a PBR project with a group of 24 school based SLPs. The last author of the project (LA) was asked to join the partnership by the director of the speech and language department at the school board at the time. The researchers and clinicians were engaged in an active partnership for three years and within the three years completed a PBR project focused on a kindergarten language assessment tool. The PBR lead team consisted of a doctoral student (MV), the principal investigator of the project (LA), the director of the

speech and language department, and a senior SLP involved in the creation of the language assessment tool. The goals of the PBR project were to understand the validity of the assessment tool, and determine if the tool was capturing change over time and could identify children with language difficulties (see Chapter 3).

The purpose of this study was to understand factors influencing the success of a PBR partnership in an educational context by exploring the experiences of those engaged in such a partnership. The study employed qualitative methods in order to understand the perspectives of both the researchers and clinicians engaged in the partnership. Specifically, the current project was designed to answer two questions: (1) what facilitators and barriers were experienced by researchers and clinicians engaged in a collaborative PBR partnership and (2) what factors were seen as important for partnership success. This study used a perceptual mapping activity and semi-structured interview to gather information regarding partner experiences. The perceptual mapping activity was completed two years into the partnership with the PBR lead team and additional SLPs from the school board. The semi-structured interview was completed at the end of the active partnership. It was expected that results of the study would map onto pre-existing models of collaboration as well as add to the literature by identifying components and facilitators for collaboration specific to practice-based partnerships between speech language pathologists and researchers.

4.1.3 Methodology

Taking a constructivist approach to this research, we sought to understand the experiences of the researchers and clinicians engaged in the PBR partnership (MacKenzie & Knipe, 2006). Given this, a grounded theory approach was taken to explore the data and a theory was derived from the data (Strauss & Corbin, 1998). Using a grounded theory

approach allowed for greater insight and understanding for those engaged in collaborative research. The Big Tent criteria was consulted when developing the aim of this research to ensure its value to the field (Tracy & Hinrichs, 2017). It is our opinion that this research meets the criteria outlined by the model and adds to the collaborative research literature. Perceptual mapping activities have several benefits including the visual representation that serves as a memory trigger for participants and reveals gaps in thinking and information as the participants engage in the activity, the activity leads to a discussion of how the factors influence one another which can be important for understanding the role of the system, organization, and person in the partnership, and the resulting map can serve as a model of collaboration for the specific context (Palakshappa & Gordon, 2006). A semi-structured interview was also selected because an interview allows some freedom for the participant to highlight areas of interest for themselves (Horton et al., 2004) and capture a social phenomenon (Damico & Simmons-Mackie, 2003). Further, semi-structured interviews provide the opportunity for participants to expand on ideas adding depth to the experience (Dearnley, 2005). Findings from both the perceptual mapping activity and semi-structured interview were analyzed qualitatively. The coding process began without the existence of pre-determined factors following a grounded theory methodology (Strauss & Corbin, 1998). The transcripts were coded by the first author for open codes (theme, topic, concept, idea, opinion, or experience) and cases (person, place, site, or organization). Given the nature of the project and small sample size, both transcripts were coded in their entirety since a traditional qualitative saturation was not possible. The perceptual mapping activity was coded first, and factors, or themes, were identified throughout the entire transcript. The semi-structured interview was coded second. Factors identified were used if they aligned with themes in the interview and additional codes were added when new factors were identified

(Phase 1). Once factors were identified in both transcripts, axial coding was used to add structure to the data set (Gorra & Kornilaki, 2010). Whereas open coding separates and divides the data, axial coding aligns components of the data and assembles the data in a way that adds depth and structure to the factors to create themes (Scott & Medaugh, 2017). To move from open codes to axial coding, all the factors (i.e., subthemes) were exported into an excel document. From there the definitions were reviewed and factors were grouped into categories reflecting the same themes (Phase 2). These categories were then organized within five larger themes reflecting different aspects of partnership (Phase 3). The first author of this research, who coded the data sets, was a participant in the PBR project. She completed this research as part of her doctoral dissertation and had a professional relationship with the other members of the PBR team. She also completed a clinical speech-language pathology placement with one of the members of the PBR team during the project.

4.2 Method

Both the perceptual mapping activity and the semi-structured interview were completed with SLPs working in a school board education setting. Ethics approvals for the project were obtained from Western University's Non-Medical Research Ethics Boards and the school board's Accountability and Assessment Department.

4.2.1 Participants

This study was completed alongside a PBR project where researchers and clinicians were examining the utility of an assessment tool that was designed by school board SLPs to use in clinical practice. In addition to the PBR project, all SLPs were invited to participate in the present study where the partnership was examined. After the second year of the partnership, participants were invited to participate in a final study activity that included a

perceptual mapping activity the purpose of which was to reflect on the research partnership. Six SLPs from the school board participated in this final partnership meeting. The clinicians had a range of experience. In addition to the SLPs, two researchers from Western University participated in the activity. Both researchers, the first author (MV), a doctoral student, and the principal investigator (LA) were involved in both years of the PBR partnership. SLP members from the lead team were also invited to participate in a semi-structured interview at the end of the active partnership. Both SLPs had worked for more than 15 years in the field of speech-language pathology. No other demographic information was collected. Consent was collected at the beginning of the partnership and participants verbally reconsented prior to the activities.

4.2.2 Procedure

Perceptual Mapping (see Appendix C). Participants including researchers and clinicians completed the perceptual mapping activity in the same room around a table. To begin the meeting the first author reviewed the objectives of the partnership and explained that the goal of the activity was to discover and discuss factors that supported or hindered the partnership, that is facilitators or barriers influencing the success of the partnership. The perceptual mapping activity was explained broadly to the group and each step was explained after the completion of the previous step (Palakshappa & Gordon, 2006 based on work from Gordon et al., 1999). In step one, each participant received a stack of post-it notes and was asked to write down each factor they felt influenced their performance in the partnership. Participants were given 10-minutes and asked to write one factor per post-it note. After everyone had finished listing factors they felt had influenced the partnership, each participant provided a definition of the factor in their own words and definitions were recorded on the post-it note. Participants also indicated if each factor was viewed as a facilitator to the

partnership, indicated with a (+), or a barrier to the partnership, indicated with a (-). The group then categorized the post-it notes based on perceived similarities. Once all post-it notes were organized into a group based on similarities, a superordinate title was given to each group of post-it notes to represent the theme. Each group of post-it notes were put onto a white board to begin creating a visual representation of the facilitators and barriers. Next the participants discussed how the groups of post-it notes influenced each other and influenced the success of the partnerships. Arrows were drawn between the groups of post-it notes to indicate how the different themes influenced each other. Lastly, the group discussed the visual model as a whole, discussed if the visual representation accurately represented their experience in the partnership, and participants were given the opportunity to add any post-it notes to the different themes. This activity lasted approximated 2 hours and 30 minutes. Pictures were taken to capture the visual representation of the model and audio was also captured.

Semi-structured Interview (see Appendix D). Interview questions adapted from Palakshappa and Gordon (2006) were used to guide the development of the semi-structure interview questions for this partnership work. The first author conducted the interview with the two SLPs. The interviewer worked closely with the SLPs and collected data for the research project at the school board.

The in-depth interview was conducted with the SLPs using video conferencing technology (Zoom software) at a time that was convenient for the participants. The interviewer first explained the purpose of the interview to the participants and explained how data would be collected through the interview process. They were told that the focus of the interview would be to understand their perceptions of the development, functioning and

outcomes of the collaborative partnership. Participants were told that the interview would be recorded and transcribed and that they could refuse to answer any question or ask that their response be removed from the transcript. Participants were informed that their names, and locations would be removed from the transcript. Participants checked information and provided feedback on the manuscript. Some notes were taken by the interviewer to support any follow up questions. The interview was conducted in November 2020 and lasted for 1 hour and 10 minutes.

4.2.3 Research Design

This study was conducted in an exploratory manner and applied a grounded theory approach to the data. The researchers acknowledge that the data was collected from a small group of participants. One set of data (perceptual mapping activity) was collected from a group of SLPs from the school board. The second set of data was collected from the two SLPs that were part of the PBR lead team. These two groups of participants were chosen as it was necessary to have SLPs involved in the projects to answer questions regarding the partnership and the PBR project. The comparative analysis of comments made by participants in the perceptual mapping group and the semi-structured interview demonstrated overlapping themes contributing to the validity of the various themes. The research design allowed for the opportunity to gather data from SLPs who were involved in the lead PBR team and from SLPs who were involved in the broader PBR project.

4.2.4 Data Analysis

The perceptual mapping data were transcribed from an audio recording and the semi structured interview was transcribed from an audio and visual recording. Open and axial

coding as described in the Methodology section was completed in the Qualitative Data Analysis Software NVivo (QSR International, 2018) for coding.

4.3 Results

Table 1 outlines the open codes that were identified in the transcripts. Table 2 outlines the axial codes and corresponding open codes. Each new axial code represented a common theme for several similar open codes. The next phase, phase 3, involved grouping the categories into themes. Five themes were identified in the data. As expected, facilitators and barriers were revealed in the data. Factors important to different stages of partnership, partnership initiation and maintenance, were recognized in the data and finally a project specific theme was identified. Table 3 outlines the five themes and corresponding subthemes, and the axial codes contributing to each broader theme. Glossed illustrative quotes are included throughout the text results and verbatim illustrative quotes with comment number in brackets can be found in the supplemental material (Table S1).

Table 4-1 Phase 1: Codes and definitions

Perceptual Mapping Activity			
Unique codes		**Definition**	**Number of occurrences in transcript**
1.	Availability	Available time for the lead team from both school board and Western to be in contact with one another	2
2.	Collaborative spirit	School board felt that when looking for a university with which to collaborate, Western appeared to be most willing to collaborate	5

3.	Managing expectations from both groups	Managing expectations regarding the goal of the project, in particular, managing the expectations from both partners, and understanding the mutual goal, the common goal for both groups.	6
4.	Importance of objectivity in data collection	Collecting data without biases from clinicians or researchers	2

Semi-Structured Interview

Unique codes		**Definition**	**Number of occurrences in transcript**
1.	Clear roles within partnership	Importance of having well defined roles within the partnership to ensure the functionality of the partnership	5
2.	Closure of projects	Sending results back to the school board partners so that the group has closure of the project	11
3.	Confidence in researchers	School board SLPs having confidence in the researchers, and trusting them to make decisions about the project	5
4.	Credibility to engage in project	SLP lead team feeling a sense that they were credible to engage in a PBR project	8
5.	Current state of partnership	Reflecting on the state of the partnership and growth in partnership	7
6.	Engaging researchers	School board lead team determining who/what researchers they need to engage in the partnership	3
7.	Enhancing research capacity	Thinking about how the partnership relates positively to the school board's interest in research and overall research capacity	8
8.	Establishing structure to the working group	School board lead team creating a structure to the partnership to help move the project forward	3
9.	Evaluation of partnership	Thinking about how the partnership was evaluated or how best to evaluate the partnership moving forward	4

10	External motivations to engage in PBR	School board lead team motivations outside of the tool/partnership to participate in a PBR project	4
11.	Factors to consider prior to engaging	Factors the school board lead team considered prior to engaging in partnership	7
12.	Feeling pride in work	School board SLPs feeling pride in the work	4
13.	Implementing on-going evaluation	Need for more on-going evaluation throughout the partnership	3
14.	Inclusivity in project	Refers to including other professionals who overlap with SLPs	6
15.	Mutual respect	Both SLPs and researchers respecting their partners' expertise within the partnership	2
16.	Need for PBR partnership	Describing the need that the school board had for the PBR partnership	2
17.	Need for tool	Describing the need for the tool prior to the partnership	3
18.	Pace of partnership	Need to ensure that everyone has the support needed to continue the partnership	2
19.	Service model prior to partnership	This is describing the service model the school board was offering prior to the project	3
20.	Steps to further establish partnership	Reflecting on the steps took to further establish the partnership after the initial partnership initiation was complete	7
21.	Transparency of goals	Describing the reason for, and goals of, partnership to SLPs to reduce concerns of a hidden agenda.	5
22.	Understanding the school board	Importance of researchers gaining understanding of the practices that go on at the school board	6
23.	Diminish us vs. them mentality	Referring to the divide between the decision makers at the school board and the SLPs in the board	3

Overlapping codes	**Definition**	**Number of occurrences**

			in transcripts
1.	Assumed knowledge	Referring to an instance where either partner (university or school board) assumed something that the other partner was not aware of	10
2.	Challenges over the project	Any challenge faced and acknowledged by researchers or clinicians	40
3.	Champions	Need for school board lead team to motivate project at school board	3
4.	Changes over the years	A change from year 1 and year 2 of the partnership	19
5.	Communication between partners	Importance of communication between researchers and the SLPs	28
6.	Communication outside of partners	Communication outside of SLPs and researchers i.e., communication to others in the school board or to schools (principals, teachers, CERTS, families)	18
7.	Decision makers	Referring to who made the decisions between researchers and clinicians	19
8.	Decision making	Referring to how decisions were made in the partnership	14
9.	Enthusiasm	Referring to enthusiasm for the partnership / for the project from both SLPs and researchers	9
10.	Establishing relationships between partners	Establishing a close relationship between the SLPs and the researchers in the beginning of the relationship	11
11.	Feeling overwhelmed	Clinicians dealing with feelings of overwhelm throughout the project because of the project and additional workload	8
12.	Finances	Referring to monies that were needed to carry out the project	6
13.	Flexibility among group	Flexibility of the partners to adapt and make changes throughout the partnership	5
14.	Future possibilities	Referring to ideas/future possibilities that were not done but could be done in future partnerships	13

15.	Barrier	A general barrier to the partnership	18
16.	Geography	Physical distance between partners	12
17.	Investment in project	Referring to the amount of investment that any person feels for the project	6
18.	Individual benefit/Personal motivations/personal goal	Referring to personal motivations to engage in the project	13
19.	Knowledge of oral language	This is referring to how the SLPs are using the tool and their knowledge of oral language	3
20.	Larger group engagement	Referring to engaging with the larger group of SLPs, not only the kindergarten committee	27
21.	Key contact people	Individuals from the school board including administrators and those who were part of the lead team	9
22.	Motivation to engage in partnership	Referring to ideas, thoughts, interests that the partners had prior to the partnership beginning	29
23.	Mutual benefit	Referring to both partners benefitting within the partnership	5
24.	Negative moment	Issues/negative moment between clinicians and researchers	17
25.	Result of partnership	Referring to an outcome of the partnership from which the partners benefitted	4
26.	Importance of partnership	Partners recognizing the value and importance of the partnership	23
27.	Partnership goal	Shared overall goal of the partnership	6
28.	Potential problems from partnership	Potential problems that may have arisen from the partnership	6
29.	Problem solving/learning from mistakes	Problems that had to be resolved collaboratively between researchers and clinicians	30
30.	Questioning clinical soundness	Referring to some SLPs questioning the validity and usefulness of the tool	8

31.	Research methodologies	Importance of collaboratively discussing the research methodologies of the project, the how the project was going to be completed in a school board	9
32.	Research minded clinicians	SLPs who are interested in research questions, and interested in PBR	10
33.	Resistance to change	Referring to difficulty changing or implementing something new into an existing practice	8
34.	Successful moments	Indicate a moment in the partnership that either an SLP or researcher felt was a success	5
35.	Supportive administration	Continued support from the school board administration	12
36.	Facilitator	General facilitator of the partnership	15
37.	Staff turnover	Referring to staff turnover in the lead team and the resulting challenges	6
38.	Well defined practice	Well defined practice that allowed us to ask questions, collect data, make changes to that practice	5
39.	“What’s in it for me?”	Beyond investment into the project (seeing it as something worthy) - if I'm going to invest my time, what do I get in return?	15

Table 4-2 Phase 2: Axial coding and groupings

Axial Codes	**Open codes**
Team	Collaborative spirit, clinically minded researchers, research minded clinicians, champions, enthusiasm, strong lead team, flexibility
Communication	Communication between partners, clear roles within partnership, managing expectations between groups, decision making
External support	Finances, supportive administration, availability
PBR problem	Well defined practice, mutual benefit, partnership goals

Establishing initial partnership	Investment in project, expected outcome of partnership, understanding the school board
Motivations from SLPs to engage in PBR projects	External motivations: motivation to join partnership project, connections beyond partners, personal goals
	Internal motivations: Questioning clinical soundness, need to diminish us vs. them mentality, "what's in it for me?", service delivery model prior to partnership
Negative feeling	Feeling overwhelmed
Lack of communication	Larger group engagement, communication outside of partners, assumed knowledge
Geography	Distance between partners
Tool specific knowledge	Knowledge of oral language
Adapting to change	Resistance to change, challenges over the project, changes over the years, staff turn over
Need for partnership	Need for tool, need for PBR partnership, questioning clinical soundness, diminish us. vs. them mentality
Building partnership relationship	Goal transparency, mutual respect for defined roles, establishing relationship between partners
Partners' confidence (SLP)	Credibility to engage in project, confidence in researchers, feeling pride in work
Steps prior to partnership	School board: Engaging researchers, establishing structure to working group, identifying decision makers, factors considered prior to partnership
Recognizing value	Recognizing value of partnership
Long-term engagement	Implementing on-going evaluation, evaluation of partnership, future possibilities for partnership, inclusivity in project, reporting progress, enhancing research capacity
Sustainability	Pace of partnership, evaluating current partnership & steps to further establish partnership, identifying potential problems that may arise from partnership
Closure of project	Celebrating successes

Research methodologies	Importance of objectivity in data collection, research methodologies

Table 4-3 Phase 3: Identification of themes

Themes	Subthemes
1. Facilitators	1.1 Team
	1.2 Communication
	1.3 External Support
	1.4 PBR Problem
	1.5 Establishing Initial Partnership
	1.6 Partner Confidence (SLP)
2. Barriers	2.1 Negative feelings
	2.2 Lack of Communication
	2.3 Geography
	2.4 Adapting to Change
3. Initiation	3.1 Recognized need for partnership
	3.2 Building partnership relationship
	3.3 Motivations from SLPs to engage in PBR project
	3.4 Steps prior to partnership
4. Maintenance	4.1 Recognizing Value
	4.2 Long-term engagement
	4.3 Measuring sustainability
	4.4 Reporting progress and closure of project
5. PBR Project Specific	5.1 Research concerns

4.3.1 Themes

Axial codes, or subthemes, were grouped into 5 themes identified from the data. Table 3 illustrates the five themes and corresponding subthemes. Given the aim of the perceptual mapping activity and guiding semi-structured interview questions, it was expected that facilitators and barriers to PBR partnership would be identified in the data. The first theme identified *Facilitators* to the partnership and included the importance of a strong team, communication amongst partners, the need for external support, identifying a PBR problem, establishing the initial partnership, and confidence in the partnership from the SLPs. The second theme identified was *Barriers* to the partnership which included negative feelings in the partnership, lack of communication, geography, and the difficulty of adapting to change. In addition to general facilitators and barriers to partnership, it was clear that specific factors were important at different stages of the partnership. Further analysis of the data identified themes three and four, *Initiation* and *Maintenance.* Subthemes within *Initiation* included recognizing the need for partnership, building a strong partnership relationship, SLPs' motivation to engage in PBR project, and identifying steps taken prior to partnership. Within *Maintenance,* subthemes included recognizing value in the partnership, necessary components of long-term engagement, measuring sustainability, and reporting progress. The last theme to emerge was specific to the *PBR project* including tool specific knowledge, and research concerns.

4.3.2 Theme 1: Facilitators to the Partnership

Arising from both the perceptual mapping activity and semi-structured interview, participants, SLPs and researchers identified several facilitators that supported the PBR partnership. While creating the visual representation of the perceptual mapping activity (see Appendix E), one clinician noted "I feel like this is the happy face side. This is the feel-good

side. We like this partnership!" (Clinical SLP). This statement refers to factors identified in the perceptual mapping activity as supporting the partnership and beneficial to the SLPs and researchers. Six subthemes aligned with the theme of facilitators.

Subtheme 1.1 Importance of a strong team. Clinicians and researchers recognized the need for a committed lead team. This included having enthusiasm for the project and being flexible when faced with challenges throughout the project and partnership. In the perceptual mapping activity, the terms 'research minded clinicians' and 'clinically minded researchers' were used to describe the qualities needed for a PBR team. The SLPs on the PBR team reported partnering with Western because they recognized that Western was going to offer the collaborative spirit that they were looking for in a partner.

> I thought why not connect with people who are in there, who are doing their thing, and people with a good track record. We did invest some time in different Universities and different departments but the collaboration and the true collaborative spirit I felt was with Western and in particularly like with X[researcher]. (PBR team SLP 1)

Researchers involved in the partnership identified that it was necessary to have champion SLPs amongst the PBR team to motivate other clinicians at the school board to engage in the PBR project and be available to communicate with researchers at Western University.

> Oh, champions at the school board, well these guys are our champions! We knew if we needed to know what was going on we could find out from you, and you could get the answers from [SLP]. And then having those key contact people was so important. (Researcher 2)

Champions or change champions have been discussed by IKT researchers (Gagliardi & Dobrow, 2016; Thompson et al., 2006) and implementation scientists (Kitson & Harvey, 2016) and are known to play an important role in creating a successful partnership where commitment and dedication to the partnership is observed. Though the illustrative quotes only demonstrate the importance of a champion at the school board, we would also argue having a champion or lead member from the university was an important facilitator to the partnership.

Subtheme 1.2 Importance of communication. Participants reported that on-going and frequent communication between partners was supportive to the partnership. One SLP acknowledged how important communication was to the partnership stating, "It always comes back to communication. We try to do something, and then after the fact you see where the communication broke down, but it is hard to predict from the outside." (Clinical SLP). This statement recognizes both the importance of communication and how quickly a lack of communication can be the reason that something breaks down. Additionally, this quote highlights how difficult it is to anticipate when communication is required from a partner. Researchers and clinicians acknowledged that timely communication was crucial especially during data collection because occasionally the project could not continue until questions were resolved. From the activities, it was clear that communication was essential for establishing clear roles within the partnership and equally as important for managing expectations amongst members of the partnership.

> I never had to worry about that with your group. Your ability to listen to what the people who are working with you can do, what can they realistically do. (Clinical SLP)

> It feels like a barrier in a sense that everyone has their own goal, and I agree and I'm not sure if you can really change that, but maybe it's important that in the end to have one mutual goal that most people can agree on. (Clinical SLP)

Establishing and communicating the shared goal of the project to the group immediately in the partnership was important to manage expectations amongst the group members. In the first meeting with the SLPs, the PBR lead team presented the chosen goal of the project to the larger SLP group. At each subsequent meeting, the overall goal was reviewed to manage expectations as well as remind the group of the goal. Between year 1 and 2 of the partnership, SLPs and researchers determined the goal for the second year and similarly the goal for the year was reviewed at the end of year meeting.

Subtheme 1.3 External support. External support was acknowledged from both researchers and clinicians as essential for engaging in a PBR partnership. Prior to establishing the PBR partnership, the school board had received support from their department and support staff at the school board.

> From your perspective you were saying okay we have this established practice, and we are going to check with our own administration, and then start to talk to researchers about a potential project. So then after you had support from those within your board, researchers outside of your board and supportive administration within your board. (Researcher 1)

Beyond the department supporting the project, secretarial help was provided to researchers who were going into the school to test the students, research ethics support was provided to the researchers when completing the ethics protocols for the school board, and physical space

was provided at the school board to house assessments and consent forms. Financial support was available from a research grant for research assistants to help collect data which was important for reducing the workload on the SLPs and provided housing for the research assistants and researcher who needed to stay in the city while working on the project. Not only did this support data collection, but it was an opportunity for one researcher to spend an extended amount of time at the school board collecting data and working with an SLP.

Subtheme 1.4 Well defined PBR problem. PBR requires that the research question comes from practice. In the case of this school board, their clinical research questions surrounded a tool that was being used in daily practice. One researcher summarized this stating "Here the questions were about a tool that everyone was asking about. You had a well-established clinical practice that then it was easy to wrap questions around that practice". Asking questions around an established practice allows for the results of the research to influence practice in a meaningful way for the clinicians. Implementation of the results is also faster than implementing findings from the traditional research pipeline because the results are specific to a practice currently being implemented and feasible in practice. In the case of a well-defined practice problem, establishing a partnership goal is relatively simple because the outcome will benefit the clinicians in their practice and add to the researchers' knowledge of tools with high clinical utility.

Subtheme 1.5 Establishing initial partnership. From the beginning of the partnership, there was a strong investment from both groups. The SLP participants expressed being interested in understanding more about their tool and if the tool was accurately capturing the information for which it was designed. Given that the expected outcome of the partnership

was to receive feedback on the phonological awareness and narrative language tool, the SLPs were interested and invested in the project.

> I think that everybody had an invested interest in wanting to know if this tool was effective, what changes needed to be made to make it better. Everybody had a vested interest in findings out those answers, and I think that when Western came in and you took the time to look at the tool with the committee and helped us to sort out what was going on. (Clinical SLP)

The researchers had previously received funding to complete the project and were also invested in supporting the SLPs' clinical practice at the school board. A second factor important in establishing the initial partnership was that the researchers had a good understanding of the school board. One researcher completed a placement at the school board and worked with an SLP while collecting data for the project, all of which allowed the researcher to understand more about the speech and language department at the school board, the service delivery model at the school board, and hear more from the SLPs about how the tool was being used in practice.

> I think you doing your internship or whatever it was, your placement was really an amazing piece because you got to have a little peak into the window of education and what it looks like to be in a classroom and how to navigate a school. (SLP)

Though strengthening the establishment of the partnership was not a reason for completing a placement at the school board, it brought substantial value to the partnership showing commitment to the partnership and demonstrated a desire to understand the school board.

Subtheme 1.6 Partner confidence. The SLPs involved in the PBR team expressed that they had confidence in the researchers early on in the partnership. They felt that the researchers' willingness to travel to the school board and discuss the project with the large group of SLPs left them and the larger group feeling confident in the project and partnership. Similarly, the SLPs on the lead team felt confident in the skills that they were bringing to the partnership. The two lead SLPs expressed that they both worked as an SLP for 15 years and had interests in oral language development. Their experiences and expertise allowed them to feel credible and knowledgeable within the partnership. The partnership and project also gave the SLPs a sense of pride in their work. Throughout the partnership the researchers shared the work at conferences, and similarly the SLPs shared results at conferences and meetings. Providing scientific evidence for their clinical tool gave the SLPs a sense of accomplishment in their work.

> There was a sense of accomplishment, and I think it's important in terms of our own profession, letting people know we are scientifically based. (PBR team SLP 2)

Each of these subthemes were factors in facilitating the success of the partnership and the subsequent success of the broader PBR project.

4.3.3 Theme 2: Barriers to the Partnership

Participants reported barriers to the partnership throughout the perceptual mapping activity and semi-structured interview. Barriers were described as any factors that hinder the success of the partnership or project. Four subthemes were identified as barriers.

Subtheme 2.1 Negative moments. SLPs revealed that during the first year of the partnership many felt overwhelmed with the additional tasks that the project added to their

workload. A researcher summarized the issue noting, “recruitment was a huge burden for SLPs … that was a number one thing is trying to collect consents.” In the first year of the partnership, the SLPs were responsible for collecting consent forms from participants, as well as completing additional assessments on children who would not typically be on their caseload. This was burdensome during the first year of the partnership and would not have been sustainable had the SLPs continued to be responsible for these aspects of the project.

Subtheme 2.2 Lack of communication. SLPs and researchers reported that although communication was a facilitating factor, there were also times that a lack of communication became a barrier to the partnership. One SLP stated, “we figured out how communication needed to happen, we solved some problems and we learned about new problems.” This highlights the on-going nature of partnerships especially in the first year of a partnership. It seems that especially in early partnership more investment is needed to establish a strong foundation. This is similar to D’Amour and colleagues (2008) who identified different types of partnerships and acknowledged that the requirements of early partnership are different from established partnerships. Areas that were identified as lacking included communicating with those indirectly involved in the partnership such as school principals and classroom teachers, and with the larger SLP group. Data collection occurred in the child’s school and often the principal/classroom teacher were aware of the project but occasionally they were not, and this would raise questions as to why the child was being pulled from class. Other times, the parents of the child were confused as to why the child was receiving another assessment from an SLP.

> It was all part of communication with schools and what is going on as a project. I heard some little snips and I mean sometimes I would be calling a parent and they

> were kind of confused because unfortunately we are in a system where we have SLPs that are coming in for many reasons so here we had another SLP coming in kind of confusing our parents. They were thinking "Oh, what are these SLPs doing here now?" (Clinical SLP).

More effective communication was needed between the researchers and the schools and parents whose children were involved in the research. Communication between researchers and the larger group of SLPs was also an area that needed improvement. Since most meetings and decisions were made between a small committee of SLPs and the researchers, some small updates were not shared with the larger group of SLPs. We learned that this led the group to feeling disconnected from the partnership and project. One SLP noted "I think either if you asked people who were not in the kindergarten community; "What the research going on at Western is" they would not know what it is." After the perceptual mapping activity, it was clear that the large group needed to feel more engaged in the partnership with one researcher stating, "engagement of the larger group for this particular project is something that we need to pay more attention to moving forward." An additional area where a lack of communication was acknowledged was when we, the researchers, made assumptions about what information needed to be shared with the SLPs. For example, when hiring research assistants to help collect data we did this without asking the SLPs what information they would like or needed to share with the research assistants. This led to breakdowns in data collection because the SLPs were unaware what we shared with the research assistants and the research assistants were missing information that needed to come from the SLPs.

> We made the assumption because we were hiring the research assistants that they would come with more knowledge but because they did not work in the school board

> context, they did not have information they needed. Which was an error or learning on our part. (Researcher 1)

Subtheme 2.3 Geography. SLPs expressed the distance between the university and the school board made it difficult to stay as connected as might have been helpful throughout the partnership. SLPs indicated that when the researchers were at the school board it was easier to ask questions because they saw them in person but staying connected through email was more difficult. Similarly, for those SLPs not involved in the working group that made decisions about the project, they could go for a very long time without having to think about the project.

> Trying to keep up throughout the year but having that distance between us, the SLPs really forget about what is going on. Then when they hear about it again those questions of why it is important become even bigger because well it seems like I have not heard about it for months and months. And now this thing still exists. (Clinical SLP)

This quote illustrates that for some SLPs at the board they would not hear about the project for months and since researchers were not present at the school board it was easy to forget about the project. More attempts by the researchers to stay connected would have been beneficial for the partnership.

Subtheme 2.4 Adapting to change. SLPs reported that changing and or adopting new practices were difficult and they often questioned why the changes should be made. In addition to having to change an established practice, some clinicians did not like the clinical

tool or established practice. As a result, they found it frustrating that they were being asked to do more with a tool in which they all did not see value.

> I think when you are doing your job a certain way and someone asks you to do something a bit different it is difficult. Change is very difficult so if it happens people have a tendency to be a bit more well why, why, why! (Clinical SLP)

> Yes, I want that answer about the tool but that means I am going to have to invest more into something that I am not already super in love with. I do not know if I really want to do that and that is the problem. (Clinical SLP)

An additional challenge where both the researchers and SLPs had to adapt was a change in director of the speech and language department at the school board. This required the researchers to build a new relationship with the new director of the department and adapt to any changes in the SLPs' service delivery model.

4.3.4 Theme 3: Initiation of Partnership

Subtheme 3.1 The need for partnership. The need for a clinical-researcher partnership was recognized by the SLPs of the PBR team prior to engaging in the partnership. Years before engaging in the partnership, the SLPs created the assessment tool for their particular service delivery model, which involved working with kindergarten students and early identification and detection. The tool was developed to acquire a 'snapshot' of students with potentially weak language skills. Amongst the group of SLPs, not everyone felt the tool was adding value to the practice.

> I think that the tool, some of our other people do not have confidence in this tool and so it was perfect for you folks to come in and say “well let’s use this tool and do some research”. (PBR team SLP 1)

A second SLP felt that not only were SLPs questioning the tool, but potentially the service delivery model.

> I think if you are thinking about buying into the research, I do not think that is the issue, it is really the buy into the delivery model is not there, so you can't have buy into research. (Clinical SLP)

It was the hope that the establishment of a PBR partnership and collection of data regarding the tool would reduce questions surrounding the effectiveness and value of the clinical tool. For the researchers involved in the partnership, they were seeking out clinicians interested in contributing to the evidence-based service practices adopted by SLPs in school boards.

Subtheme 3.2 Building partnership relationship. Establishing investment in the project and a shared goal in the partnership was an important facilitator, but beyond the project, the theme of building the partnership relationship was identified as important in the early stages of the partnership. Lead team SLPs recognized that involving researchers in clinical practice may raise questions amongst other SLPs:

> I do think structure is really an important piece, structure, and transparency because when you bring things like this into the school board, there is always like these big questions: why is this happening, is there something wrong with what we are doing right now, is there a problem with funding? (PBR team SLP 2)

By recognizing this potential concern prior to introducing the partnership to the broader group, the SLPs on the PBR team worked diligently to ensure that goal transparency was discussed as a group. Similarly, when the researchers first met the large group of SLPs, they were aware of this concern. In an attempt to reduce the concern of a 'hidden agenda', the researchers discussed their role on the project and reiterated the partnership goals, which laid the important foundation for mutual respect and trust amongst the researchers and SLP group (see D'Amour et al., 2008). It also seemed that building a strong partnership foundation at the beginning of the project was important to both the SLPs and researchers and solidified commitment to the project. One researcher noted, "Establishing this close link at the very beginning helped us to build the partnership," and SLPs agreed stating, "Like because the relationship was good and established, it offset the distance problem and the logistical problem." These quotes demonstrate the importance of investing time into the development of the partnership relationship, in addition to project goals and outcomes. As researchers, arriving to the partnership with humility and a willingness to learn from the clinicians establishing an equal partnership was crucial for building a strong relationship for the partnership (see Nguyen et al., 2020).

Subtheme 3.3 Motivations from SLPs to engage in PBR project. SLP participants reported both clear internal and external motivations to engage in the project. Internal motivations reflected the theme "What's in it for me?". In discussing motivations to support the project, SLPs reported:

> I think it is people's interest, they must know why and how does it affect me? What is in it for me. Until people see it as "yeah this will be helpful maybe as information for our department or maybe it will help us in later on years". (Clinical SLP)

In year 2 of the partnership, researchers assessed children using a standardized assessment, however because these data were being collected as a part of the research study and not clinical practice, researchers could not share the results of the assessments with the SLPs due to constraints in the research ethics approval. It was voiced that having access to the assessment results would be beneficial for clinicians and be a motivating factor in the partnership. External motivations included the opportunity to connect with other SLPs involved in other PBR partnerships and hear about projects going on in other school boards. Beyond hearing about other interventions or assessments that the SLPs could implement in practice, hearing about successful PBR projects increased investment in their own project.

> It was just nice to see and to hear other research projects being successful. And it made me feel more invested in the project, like "oh, we're not the only one doing something like this". (Clinical SLP)

Researcher motivations to participate in a PBR project included supporting clinical practice, facilitating the development of a tool with high clinical value, and providing evidence relevant to SLP services in schools.

Subtheme 3.4 Step prior to partnership. The SLP director of the department from the PBR team reported that prior to the current partnership they were seeking potential partners to support this research. Their group was aiming to establish a working group amongst the SLPs that would be decision makers in this research. The director of the department acknowledged that they wanted to connect with a Canadian university who was conducting local research and felt that establishing the working group would allow them to be very involved at the beginning of the research project, and as needed throughout the partnership.

> The fact that we were moving ahead with the project, and it was a done deal, and so then it was like how do we support everybody that is in this project? The committee was formed and then we would, I [PBR team SLP] would meet almost twice a week at first, and then we adapted to once a week, and then moved on. Initially I was very involved with each of the decisions that were made and then later I kind of backed out. (PBR team SLP)

This highlights areas to consider prior to engaging in a partnership. For the SLPs, it was important to them to align themselves with researchers who conducted research that they viewed as important. Further establishing a working group to carry out the project ensured it would not fall to one individual but rather have the support of a committee. This related to this group of SLPs being research-minded and wanting to connect with researchers who are conducting research they see as valuable.

4.3.5 Theme 4: Maintenance of Partnership

Subtheme 4.1 Recognizing value. Themes relating to the maintenance and longevity of the partnership were also identified from both activities. The first pertained to recognizing the value of the partnership. Clinicians reported the value of evidence-based tools in clinical practice, and the value in partnership with Western University to answer questions regarding the clinical tool. SLPs reported that in the first meeting with the researchers and large group of clinicians it was clear that both the school board was lucky to have the support of the researchers, and the researchers were grateful to engage in the project. Without maintaining the value of the partnership throughout the project it would have been unlikely that the project was successful. One researcher expressed the importance of maintaining value commenting, “I think we were both treating the project as a priority which is really helpful in

the long run." Continued communication and efforts throughout the project were a result of the retained value that was felt from both groups. Retaining value in this discussion referred to the idea that both parties felt that there was significant value in the partnerships, both groups were continuing to benefit from the partnership and as a result both groups felt the partnership should be maintained. In addition, each group felt valued by the other group and because their respective value was being recognize, the partnership was something that remained a priority for each group. Recognized and retained value, although similar to balancing power between partners as discussed by Karam and colleagues (2018), is a new dimension has been identified as important for partnership maintenance.

Subtheme 4.2 Long-term engagement. Ideas reported relating to long-term engagement included the need for implementing on-going evaluation of the project, evaluating the partnership, reporting progress frequently, and enhancing research capacity. It was suggested that concrete goals and timelines be shared with the SLPs to monitor the progression of the project. Similarly, end of year surveys or interviews were acknowledged as one possibility for evaluating how partners are feeling about the partnership. The need for researchers to report progress more frequently was discussed. One SLP stated,

> Maybe we should have had more updates between us. From the beginning you know June, September now later on in June is a long time in between updates. (PBR team SLP 2).

During the second year of the project when the SLPs were no longer responsible for collecting consent forms or collecting data, there appeared to be fewer reasons to contact the SLPs, however as a result this led to very few updates regarding progress of the project. It

was clear that to keep engagement from both groups, frequent updates were important, in this case specifically more updates from the researchers to the clinicians.

Subtheme 4.3 Measuring sustainability. Measuring sustainability is an important theme to emerge from partnership work (Harrison & Graham, 2021). Specific to this project, pace of the partnership and workload were important factors to emerge. The partnership began very quickly in the summer and data collection began in the fall. One of the SLPs from the PBR team wondered if the initial pace of partnership was a barrier for those involved in the project.

> I think our own department was like hit in the head because when I initially presented the idea they were probably thinking "oh this is something they are thinking about and they are not going to be going at it for another year or two" and then it was like boom, now, start. Getting moving so quickly may have become a bit of a barrier. (PBR team SLP 1)

The biggest factor regarding sustainability involved the additional workload that was required from the SLPs. In the first year of the partnership, the SLPs were very involved in the project, however in the second year the workload significantly decreased because research assistants were hired. This was a relief for the SLPs but also reduced engagement in the project. Finding a balance between workload and level of engagement remained an area of improvement throughout the project.

> When we think about the SLPs being involved in the study in the first year and then not so much in the second year but in the proposal we have for next year, there will be

> a little bit more involvement so maybe there is a cycle to that which allows for some relief in some involvement but keeps this connection going. (Clinical SLP)

Subtheme 4.4 Closure of the project. In the semi-structured interview, the importance of closure and celebrating successes arose from the conversation. SLPs from the lead team acknowledged that in addition to the SLPs, supports from the department, staff at the school board, parents who consented to have their children participate in the research also needed to be acknowledged.

> Also like where you know, where is all this going, why are we doing this and what do we hope to get at the end so again that's why the closure of this project is really important to send that information back to them. (SLP lead team)

This demonstrates the importance of acknowledging the end of the project and celebrating what was accomplished as a group.

4.3.6 Theme 5: PBR Project Specific

Subtheme 5.1 Research methodologies. The final theme to emerge was specific to the clinical tool. The tool was developed to assess phonological awareness and narrative language to provide a brief assessment of a child's oral language skills. Some SLPs raised concerns about the items on the tool, and the use of the tool as a measure of change. A second concern was regarding the objectivity of the data being collected for the research study. Questions of clinician biases were raised for those SLPs who were assessing children on their caseload as they would have already had a pre-established relationship with the child and knowledge of their oral language skills. This discussion contributed to the decision to hire research assistants to assess the participants in the second year of the project. Though

this subtheme is not specific to the partnership it was maintained in the analysis to highlight the balance among researchers and clinicians in decision making throughout the partnership. A shared mental model of the project and partnership goals eased the complexities in decision making that come with collaborative work (Bridges et al., 2011). It can be expected that the nature of the project itself is not generalizable to other themes.

4.4 Discussion

The current research describes the experiences of both researchers and knowledge users (i.e., clinicians) in the field of speech-language pathology involved in a PBR partnership in an educational setting. There is some guidance in the literature on how to effectively engage in collaborative partnerships (Gagliardi & Dobrow, 2016), but additional research is needed to understand the complexities of this work, especially relating to PBR. Using models of collaboration, such as PBR, in speech-language pathology is relatively new (Crooke & Olswang, 2015; Cunningham et al., 2019) and clinicians and researchers have had to navigate through these partnerships with minimal direction from the field. The establishment of the partnership between Western University and SLPs at a school board provided the opportunity to examine a PBR partnership in an educational setting. It was our expectation that the data from qualitative measures would both overlap with existing models of partnership but also highlight factors that have not yet been discussed as important for these partnerships. We anticipated that themes relating to barriers and facilitators would be identified. Unexpected themes of initiation and maintenance were recognized in the data and identified factors overlap and supplement existing models of collaboration. Our analyses identified factors related to the team, communication, external support, the partnership goal, establishing initial partnership, and clinician confidence as facilitators to the partnership. Explored barriers included an increase in workload, instances where communication lacked,

distance between partners, and difficulty adapting to change throughout the partnership. Factors deemed important in the initiation stage of partnership included recognizing the need for the partnership, building a relationship between the partners and motivation from the SLPs to engage in the partnership and project. Factors relevant to partnership maintenance included a continued value in the partnership, considerations for long-term engagement including partnership evaluation and enhancing research capacity, measuring sustainability and reporting progress and closure of the project. Finally, factors specific to the PBR project were identified and included knowledge of the tool and collecting data with objectivity. We highlight four findings from this work that contribute to the development of strong PBR partnerships.

Collaborative spirit: A important finding from this research is the need for a collaborative spirit from both partners. In a PBR partnership, researchers bring rigour and insight of appropriate research methodologies into the project, and clinicians provide valuable knowledge pertaining to the clinical need of practice and feasibility of implementation in practice. Though this division of knowledge exists, it is particularly important that equal value be placed on both specialties; that research evidence and clinical knowledge be given equal weighting in the partnership. If both the researchers and clinicians can enter the partnership without excessive pride in their own domains and hold equal value in their partners' expertise than this collaborative spirit can be honed. This humility should be considered especially when making decisions within the partnership and provides support for joint decision-making throughout the partnership. Indeed, a completely collaborative partnership is the goal of most models such as IKT (CIHR, 2016) and PBR (Epstein, 2002), however fostering this environment requires commitment on an individual and team level. In

the current project it was important to the SLPs that this collaborative spirit was present prior to the beginning of the PBR project.

Adapting to change: Our findings indicated that adapting to change in practice was a barrier to the partnership. This was experienced by the clinicians who were required to make changes to their clinical practice. This finding of difficulty with change has been reported often (Cunningham et al., 2019) and has received attention from behaviour change theorists (Abraham & Michie, 2008; Michie & Johnston, 2012). Through witnessing these difficulties, we reflected on behaviour change techniques to determine if any techniques could be applied to this type of research. Based on Abraham and Michie (2008), the following change techniques were identified as potentially useful in PBR partnership: provide feedback on performance, reinforce effort and progress towards behaviours, explain consequences, and provide clear instructions. Each of these are techniques that as researchers we could have implemented as potential ways to reduce any resistance to change. This highlights the importance of frequent communication between partners to propel the partnership forward. For example, we could have provided more appreciation to the whole group of SLPs for their work with data collection and explicitly acknowledge the additional time and effort that it placed on their workload demands.

Establishing initial partnership: A third finding from this work was the importance of establishing a strong initial partnership. This involved an awareness of the shared investment in the project between partners, having goal transparency regarding the reason and role of the partnership, establishing mutual respect, and gaining an understanding of the school board. For the SLPs at the school board, engaging in a discussion of goal transparency was revealed to be an important way that trust was built in the researchers early in the partnership.

Undeniably, having an outside party come into a school board to ‘evaluate’ a current clinical tool is nerve-wracking. It was crucial that the SLPs were made aware and reassured that in a PBR partnership, the partnership was to answer questions they had about practice and not to question their clinical practice. In addition, having the researchers learn about the school board by spending time at the school board in-person and interacting with staff outside of the SLPs supported the partnership. For more mature partnerships, spending time in person or interacting with staff may not be as important, but could be essential for partnership success while establishing the partnership. Research has demonstrated that partnerships within their first two years have different indicators of success compared to more vintaged partnerships, for example: some early partnership indicators of success include clear leadership and respect to leaders and exposure to organization structures (Kothari et al., 2011). As described, exposure to the school board and the school board systems was pertinent to the early establishment of the current partnership.

Partnership evaluation: Lastly, a key finding in this research was the role of evaluation within the partnership. Within a PBR partnership, there exists separate entities: the project and the partnership. The outcomes of the project directly impact the clinicians’ practice and so it is expected that the outcomes of the project be evaluated and implemented. However, in general the partnership itself receives less attention and is less frequently is the partnership evaluated. Although collaborative research models are being used more frequently, an evaluation of the partnership is often missed in favour of a focus on barriers to change or partnership. This evaluation could include questions surrounding if goals were met, and if partners (i.e., researchers and clinicians) were satisfied with the partnership. Additional queries may include the impact of the partnership on the institution and what outcomes were achieved (e.g., increased research capacity, increased comfort working in

partnerships). Reporting this information to inform others interested in PBR would add to the literature surrounding the topic of evaluation.

Discussion and reflections of these data led to the development of the PBR Partnership Framework to provide recommendations for engaging in PBR (Figure 4.1). Drawing on the themes and data from the current study, the framework identifies facilitators or enablers that are specific to the initiation or maintenance phase of the partnership, or apply to the partnership overall. The PBR Partnership Framework captures the importance of establishing a strong partnership initially, and assessing partnership readiness. For maintenance, the prioritizing of communication and recognizing value is represented. Overall facilitators include establishing clear roles and responsibilities and having needed supports available.

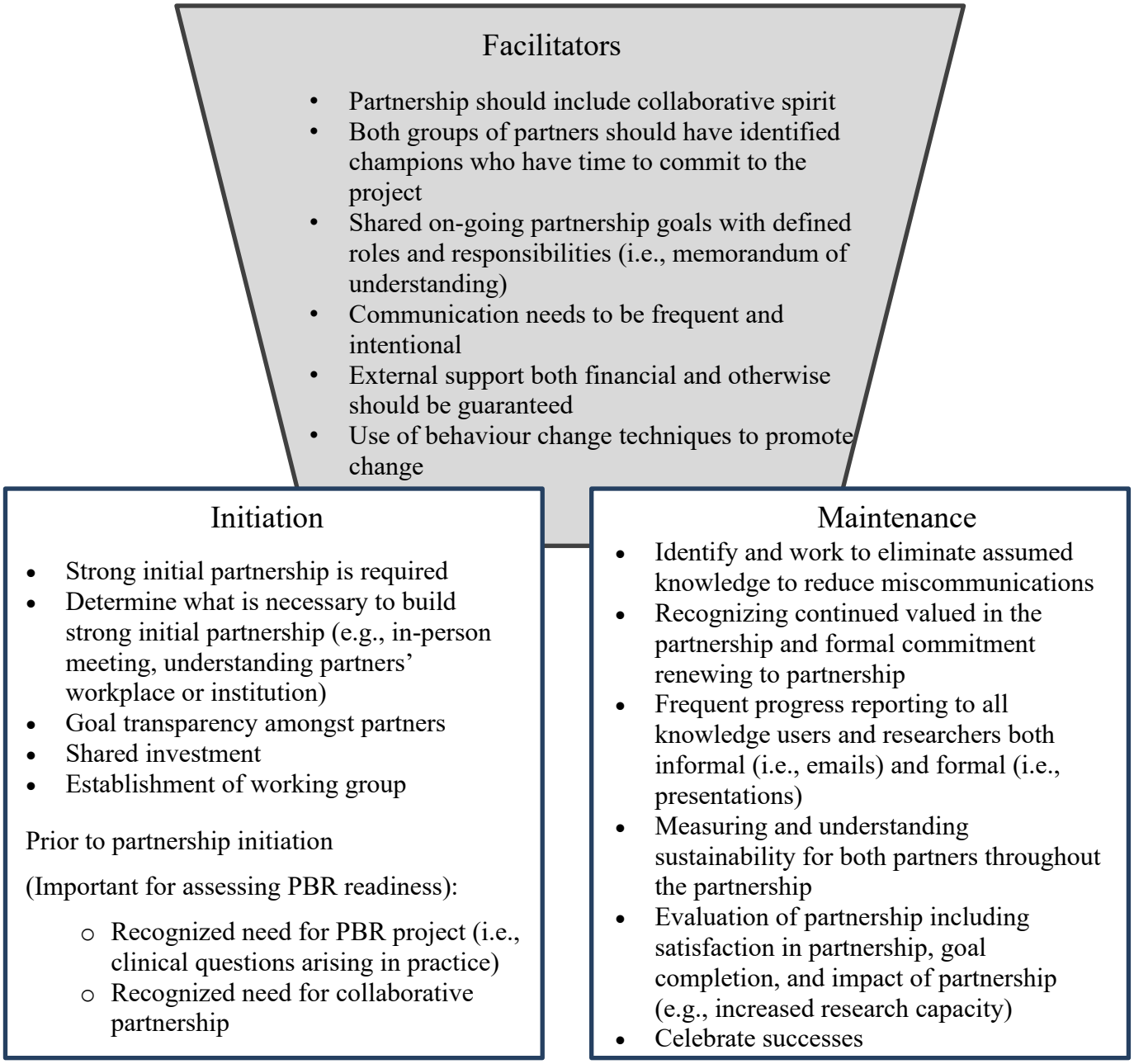

Figure 4-1 The Practice-Based Research Partnership Framework

Note: This figure presents recommendations pertaining to overall facilitation of PBR partnerships, and initiation and maintenance stages.

4.4.1 Limitations and Future Directions

Notably, there was several limitations in this study. The first being that the project is limited to one school and has a small sample size. The activities were completed with SLPs from one school board, and though this offers a case study of a PBR partnership, it may lack generalizability to other settings, and potentially other school boards considering context plays a large role in partnership research (Oliver et al., 2019). Within the current data, only six SLPs participated in the perceptual mapping activity and two in the semi-structured interview. The SLPs who participated in the perceptual mapping activity volunteered to participate and most were heavily involved in the PBR project potentially introducing some selection bias into the sample. Nevertheless, the findings to represent the experiences of those involved in this research study and project, which is consistent with the goal of qualitative research. The semi-structured interview asked questions relating to experience in the field, length of time working at the school board, etc., however this information was not collected for the SLPs involved in the mapping activity. Though unlikely to influence the data, details about participants adds depth to qualitative research.

We did not complete a semi-structured interview with the researchers skewing the representation of SLPs to researchers in the data. The researcher perspective in these data is equally as important as the SLP perspective and collecting in a semi-structured interview with the research team would add more depth to the data. The first author (MV) was a participant in the perceptual mapping activity and completed the semi-structured interview with the SLPs. In each of these instances, being a part of these activities could have introduced biases and caused the SLPs to be less objective in their evaluation of the partnership. Having a non-biased third party lead the mapping activity and facilitate the interview would have reduced these biases. Though there is the potential for biases, this

research highlights the experiences of those involved in the partnership and can be applied to future partnerships.

Engaging in PBR partnerships is an effective way to eliminate the professional silos that can exist between researchers and clinicians. This work is a step in understanding crucial components to collaborative PBR partnerships. Future work should test the proposed framework and identify additional factors supporting successful partnership. Exploring partnerships at different stages would be beneficial to gaining a better understanding of the necessary components and how these component change over the duration of a partnership. Additional work needs to examine how partnerships should be evaluated, and how the effectiveness and impact can be measured. PBR is still underutilized in speech-language pathology, and reporting PBR experiences provides important guidelines for those looking to enter this work.

4.4.2 Conclusions

Engaging in PBR partnerships is complex, and guidance or recommendations is lacking. The current research describes qualitative data collected from a PBR partnership between researchers and SLPs in a school board setting. The results outline facilitators and barriers to partnership and highlight factors important for partnership initiation and maintenance. The PBR Partnership Framework was developed to serve as recommendations for those engaging in a PBR partnership. It is expected additional factors may be identified for partnership success depending on specific contexts. Partnered research is demanding and requires concerted effort but has the potential to have valuable outcomes for all involved.

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4.6 Supplemental Material

Table 4-4 Themes and subthemes with illustrative quotes

Supplemental 1: Themes and subthemes with illustrative quotes

Themes & subthemes	Illustrative quotes
1. Facilitators	
1.1 Team	*Collaborative spirit*: So I thought wow why not connect with people who are in there, who are doing their thing and people with a good track record so um like I said I did it, um we did invest some time in different Universities and um different departments um the collaboration the I don't know the true collaborative spirit I felt was with Western and in particularly like with X[researcher] and I mean I'm really indebted to her for that and I mean I learned so much from her. (PBR team SLP 1; quote 1) *Research minded clinicians*: I should say that you know, people like X[SLP] and X[SLP] sat down and I remember going through with them and saying 'okay let's change this' and by then there was just so much information that you guys all had together that yeah it got, it got changed very quickly but then we could come back to you to say 'what do you think if we change it this way, is it working better' and are we going to get our data so definitely I think the guidance that you gave was good and I think I'd like to use the word guidance versus directions because you never really directed us in a in an autocratic way so that was good. (PBR team SLP 2; quote 1) *Identifying champions*: It seems to me that this went to these two and then we identified the champions when we thought "oh, yes we got something going here" So it doesn't feel to me like we identified the key contacts until we explored potential partners. (Researcher 1; quote 1) *Enthusiasm*: and and you know networking wise and in the world just like encouragement too it held I think I think like 2 or 3 presentations were done you know to other boards as well as um at OSLA uh and I went to SAC and presented so I mean putting it out there um for other professional um partners to say 'look this is what we're doing and this is where we're going' I personally I personally was very excited about that and it just gave that chance for people to go out of our board out of our board um comfort and be able to present that and feel good about ourselves that wow and I I remember I actually think it was you and X[SLP] and X[clinician] who presented at OSLA and

		I remember at the end of the presentation they both were like 'oh my god we've worked so hard". (PBR team SLP 1; quote 2) *Committed lead team*: I do think that having key contact people like X[researcher] being the you know a lot of her attention and having X and knowing that you two were in contact whenever you need and knowing that you both responded pretty quickly to each others questions. I think is a big, sort of underlying that but I think having key kind of people for whom the project was a reasonable priority also had that down, was something we felt the whole group was interested in. (PBR team SLP 1; quote 3) *Flexibility*: So I was going to mention the flexibility, and to retell the story of you know coming in September and telling you about the lack of growth we saw in the narrative retell data and you know people said "okay", and they got to work before we left the meeting and they were in touch with X for the next week and they had it implemented by the end of the month and that whole sequence was hugely impressive to us. And it made us go "wow, look at the research our impact was having" and that we can see a clinical response to the research that quickly and so that flexibility I think really solidified things for us. (Researcher 1; quote 2)
	1.2 Communication	*Communication between partners*: I think one of the, one of the things X[researcher] like you always answered your emails right away which was really nice. If we had, we had questions or concerns I I knew that if I sent something to you, you'd answer in a really good, it was a good response rate. And I I would say equally from our board as well, like if any one of us were involved with you, if you had something because I remember initially even with the research department and stuff, there was a lot of back and forth so I I I would I would hope you would feel the same way I don't know I tried as best as I could to be responsive immediately and I think our teams, the kindergarten committee team as well as the chair people were really good at getting back to you as soon as possible whenever you guys had concerns and and and that's a really important piece and its part of that relationship building too. (PBR team SLP 1; quote 4) *Clear roles within partnership*: I never had to worry about that with your group, I just, I think those are pieces that in terms of future collaboration too that that ability to listen to what what can the people who are working with you do, what can they realistically do and it was a struggle because it was a whole new um project for our people and just you know anytime you bring new things to people it's changed right and also they were dealing with a new change with a new [director of department] and all of that so there were so many things happening and I think that um part of that collaboration with any research department also has to be the functionality, how are we

		going to make it so that everybody has a role in it and everyone functions (Clinical SLP; quote 1) *Managing expectations*: I think everyone is aware but we all come at it from different approaches. As the kindergarten committee we know what our goal was, and [school board] has their goal because they thought you know what "this sounds good". I'm not sure but I think everyone comes in with something different. I guess it feels like a barriers in a sense that everyone has their own goal, and I agree and I'm not sure if you can really change that but maybe it's important that in the end to have one mutual goal most people can agree on so that we can have that motivation to do this project and not another project. (Clinical SLP; quote 2) I think it's fair that we kind of have one common goal with different motivation behind it. We should all be looking sown the same road and trying to get to the same place. Because it is does fulfill a number of different goals with different motivations in pursuing that goal. And do you think we all had the same goal with different motivations? Because the goal was clearly stated. (Clinical SLP; quote 3) *Decision making*: When I reflect on the whole partnership is the decision makers along the way. So what we appreciated early on was that the kindergarten committee was ready to make decisions. (Researcher 1; quote 3) - That came from a lot of discussion seriously from the whole group like sometimes painful discussion, right. It came from the whole group and then you know I think the ability to be able to take that information and synthesize it and get guidance from you guys was very helpful. (Clinical SLP; quote 4)
	1.3 External Support	*Supportive administration*: I think it has to be that way. Like we might be interested in this but before we go out to others we have to make sur that the organization is okay with what we want to do. Yeah we always think about this when we think about the kindergarten model. We always first think about this as who are our stakeholders. And then we move to our administrations. (Clinical SLP; quote 5) - Well I think we had a supportive administration. I felt I we were able to have the ear of the research guy, there is only one guy here rather than the whole committee and I felt like X [SLP PBR team] felt supported beyond her, and also above that kind of thing, and that I think was super great. (PBR team SLP 2; quote 2) - And this building partnership which is about how to do this research. We expected that some school boards might say well is that really research that we need done in our school

		board. You know we need answers about the tool but he was very supportive and they are companion studies, so you know one goes with the other. I felt that the administration here was very supportive. (Researcher 1; quote 4) - I think being able to have an Airbnb. You know that was part of the dollars, but it really was so beneficial. (Researcher 2; quote 1)
	1.4 PBR Project	*Well defined practice*: This group had quite specific research questions around the tool and then you were keen to answer them. (Researcher 1; quote 5) *Partnership goal*: Yeah, and even though it had been the idea for all of this came out of the groups questions and concerns, so this was a way to answer some of these questions and concerns (Clinical SLP; quote 5) - Here the questions were about a thing that everyone was asking about. So you had a well-established clinical practice that then it was easy to wrap questions around because it was already established that so that kind of facilitated the project. (Researcher 2; quote 2)
	1.5 Establishing Initial Partnership	*Investment in project*: In time, anecdotal responses from our staff and so I think that everybody had an invested interest in wanting to know uh is this tool good, what are the changes, that will, that need to be done to make it better. So everybody had invested interest in that and I think that when you guys came in and you looked and you you came in with the inner committee if you will or the smaller committee and sorted out what was going on and then and then gave helpful directions or helpful guidance. (PBR team SLP 1: quote 5) - I think there is a point where we can just hopefully get the buy in but then some decisions (PBR team SLP 2; quote 3) *Expected outcome:* Feedback on the phonological awareness and narrative language scoring tool was expected (Clinical SLP; quote 6) *Understanding the school board*: I want to go a step back I think X [researcher] you doing your internship or whatever it was, your placement was really an amazing piece because you got to have a a little peak into the window of education and what it looks like to be in a classroom and how to navigate a school and all of those pieces I think was really key. (PBR team SLP 2; quote 3) - I agree fully. That was one of the most valuable things and I'm so thankful it happened early on um because I think that really set me up to at least feel one included in the group, you know it was nice that I recognized faces and they could recognize my face, and then to you know have a little bit of a

		sense as to what happened at [school board]. (Researcher 2; quote 3)
	1.6 Partner Confidence in others and themselves	Confidence in researchers: and I think, I think your willingness to always, come to staff meetings, and explain, and answer tough questions that were thrown at you, and I think that that gave you, it wasn't this far away research, you were very present and you were part of the project. I think that was very important. SLP lead team: You gave them confidence. (PBR team SLP 1; quote 6) *Feeling pride in work*: but it was there was there was a sense of accomplishment and I think it's important right because and and and again in terms of our own profession, letting people know we are scientifically based. (PBR team SLP 1; quote 7)
	2. Barriers	
	2.1 Negative Feelings	*Feeling overwhelmed:* I think the kindergarten project within itself we were talking about kind of became overwhelming for almost everybody because of the volume of people that we have been seeing so it is sort of just a straw that breaks the camel's back, like it is great information to have if you maybe only had a few people that you had to worry about that for but when you feel like you just have this crushing weight of other responsibilities. (Clinical SLP; quote 6) - And part of the feedback from the year previous was we need less of this to take up our brain so that inevitably means less involvement. (Clinical SLP; quote 7) - Well it does lead to this confusion between there saying "why do they have to do this" and now were saying "we will get you this" (laughing) but they do not actually want that either. They felt overwhelmed by the additional requirement. (Clinical SLP; quote 8)
	2.2 Lack of Communication	*Lack of communication*: I do not know if it has to be said but maybe we should have had more between us as our lead here maybe there are times, we … "Okay this is the update this is what is happening so far does anyone wants any comments". I think you know from the beginning you know June, September now later on in June is a long time. (PBR team SLP 2; quote 4) *Communication outside of partners*: When Western contacted parents but there was a breakdown because the school SLPs were not aware (Clinical SLP; quote 9) - I do feel that was like you said it was all part of communicative schools and what is going on as a project. I

		heard some little snips and I mean sometimes I would be calling a parent and they were kind of confused because unfortunately we are in a system where we have SLP's that are coming in for…(too many things) so here we had another SLP coming in kind of confusing are board "they were thinking oh what are you doing here now?" (Clinical SLP; quote 10) *Larger group engagement*: Yeah and that might have been when we were saying at our school meetings "like the researchers are still doing this and they only have 20 referrals, they need more names and like here are some forms." So we were doing that repeatedly brought it up at our SLP meetings and it was hard to get more names [because it wasn't communicated from the researchers] (Clinical SLP; quote 11) - But you know I think that a lot of information was presented but it may not have been processed. I think that you were clear and you got the information but they weren't ready to receive it or they were dealing with their own stuff. (PBR team SLP 2; quote 5) - We missed a step there with getting the group invested somehow, and I do not know whether it is possible maybe you cannot escape having some decisions made maybe. I was trying to decide. My impression from that very first group meeting was that feeling that decisions had already been made and they rather needed to carry it out. (Researcher 1; quote 6) *Assumed knowledge*: And we probably made the assumption because we were hiring actually SLPs in this case that they would come with more knowledge but because they weren't working in this context they maybe didn't. Which was an error, or learning on our part. (Researcher 1; quote 7) - We were aware that when we hired the contract staff that we had missed some steps there, and clearly we missed a step there [and didn't inform the group]. (Researcher 2; quote 4)
	2.3 Geography	*Distance between partners*: Yes, more available to answer questions, when something just pops into someone's mind and they brush it off because it's a whole email rather than just seeing someone at their desk (Clinical SLP; quote 12)
	2.4 Adapting to Change	*Resisting change*: I think you know when your doing your job a certain way and someone asks you to do something a bit different. Change is very difficult so anything that comes about where people have a tendency to be a bit more well why, why, why! What is the goal for me. (Clinical SLP; quote 13) - When it came to committing and kind of figuring that out you know if we are going to be honest some things about the

		kindergarten program are kind of frustrating and this became anther thing to add on. Yes, I want that answer but it means I am going to have to invest more into something that I am not already super in love with. I do not know if I really want to do that it is a problem. (Clinical SLP; quote 14) *Staff turn over*: Well, yes, we got that email about X [director of department] retirement around the time that we were saying well we don't have any staff to collect this data and so a number of things were going wrong. (Researcher 2; quote 5) *Changes over the years*: I do think, when we think about intensive SLPs being involved in the study in the first year and then not so much in the second year but in the proposal we have for next year, there will be a little bit more involvement so maybe there is a cycle to that which allows for some relief in some involvement but keeps this connection going. (Clinical SLP; quote 15) - I wouldn't say it took away all the problems but it was helpful um and then there were some some concerns around new outside people coming into the board to do these things as well and some you know growing pains in that way. So yeah, very helpful I think but definitely it's it's um again something we always had to work out problems, right. (PBR team SLP 1; quote 8)
	3. Initiation	
	3.1 Recognized need for Partnership	Need for partnership: So I don't know how much I don't how much you you'd have in any of that but like I think honestly going back to those days when we were a bit of a struggle for that reason and so if we had them, if we had some some base questions that we could answer with research uh partnership but then could we, just to build a common concept and a common um what do you call like uh uh you know A: a framework B: so many pre-conceived ideas so could we make it so that this is what where we're going and all the commonalities to start with like right and um that might be something that you'd have to partner with whoever you're working with to start that from the beginning. (PBR team SLP 1; quote 9) - I think that the tool that then some of our other people didn't have confidence in this tool and so that was perfect for you folks to come in and and say "well let's use this tool and do some research". (PBR team SLP 1; quote 10) - I put that it was really helpful for us to receive your feedback on that part of the tool because I think before we made those changes and still now I don't always feel like I was necessarily getting the information that I needed from it and I didn't really know why and that wasn't a question that I could answer so it was nice to have someone from the outside come

		in and say "well this may be one reason why you're not getting enough of a spread or you're not evaluating all these different elements that you're actually working on and I had never realized that before. (Clinical SLP; quote 16) *Need for tool:* You probably realize that at the very very beginning because when we moved into kindergarten and we had so many kindergarten like some SLP's had 21 kindergarten classrooms and um there were so many needy students that we were looking at well how can we develop a tool that would give us a snapshot of the student in terms of key areas that we knew would predict academic success and we knew from research that um that uh phonological awareness and narrative narrative storytelling would be those 2 snapshots. (PBR team SLP 2; quote 6)
	3.2 Building Partnership Relationship	*Goal transparency*: So then beginning the liaison really for whoever I needed to connect with to make sure this was all going to go but I I do think structure is really an important piece, structure and transparency um because when you, when you bring things like this in there's there's always like these big questions and big organizations why is this happening, is there something wrong with what we are doing right now um is there a problem with funding you know, am I going to lose my job? These are these are all functional things that are separate and different from the research but will impact the research and and the collection of data so um I think for my recollections, that structure was so important and it was it was difficult to put it in place, structure and also giving people the confidence right, the in their uncertainties because I think whenever there's change um and like I said even, even doing this research was new for people and so there was always these hidden questions, hidden agenda questions of what why are we doing this, what's the need for this and is it going to affect me in a good way or is is, is this somebody else's agenda. (PBR team SLP 1; quote 11) *Mutual respect:* Whenever I reflect on the partnership that's immediately what comes to mind right like that I always felt that you know our opinions were respected and I hope you guys felt the same way and you know what you guys were bringing to that tool was so valuable. (Clinical SLP; quote 17) *Establishing relationship*: It was establishing this close link at the very beginning helped us to build the partnership. (Researcher 2; quote 6) - I think that one offset the other. Like because the relationship was good and established. It offset the distance problem and the logistical problem. (PBR team SLP 2; quote 7)

	3.3 Motivations from SLPs to engage in PBR Project	*Internal motivation*: Something particular with this group is that they need why. With enthusiasm they need to know why and I think they are missing something within the established practice then it trickles into the why of the research. But I'm not sure the why think is as much of a research thing as much as it is an established practice thing. So, I don't know if that's you guys particularly or in a back in step 1 thing around the buy in to the practice. (Clinical SLP; quote 18) - I guess it kind of goes into what the plan is for next year, and I am always kind of a long term thinker, and I like to have a long term objective so I'm wondering what the next step is, or if we would be involved in developing what the next step would be and I know that what came out of the first year was the need to kind of validate this tool but then going forward and especially if we will be making changes to the kindergarten program knowing what is coming down the pipeline and knowing how much involvement we are going to have in terms of choosing what that would be. And one of the things that might have been a buy in, in the last round is some of the growth of students that were assessed if those results could have been shared with the SLP's you would have had great buy-in because some of them were saying this is turning into a tier three child I am going to have to do an assessment if not now next year, "why can I not use the results of this great assessment now". (Clinical SLP; quote 19) *External motivation*: Not even just from the research perspective but it was interesting to hear about that tool, and somebody was doing research on story champs and I was like "oh, that's really interesting", and something that I would think about incorporating into my own practice. And it was just nice to see and to hear other research projects being successful. And it made me feel more invested in the project, like "oh, we're not the only one doing something like this. This could be something that's ongoing. (Clinical SLP; quote 20)
	3.4 Steps Prior to Partnership	*School board seeking partners*: My role to to to stort of um spear head the project, make sure we had the right people pushing and then to really lobby across to uh our um you know to our partners in education and partners in the community and um in my mind I really wanted uh a university research uh support because I felt in education we often are left out and often we don't have good research, good Canadian research to say to our people 'this is research that's being done in our local environments' uh and also I think another piece was that we were looking for some sort of a localized um assessment tool. (PBR team SLP 1; quote 12)

		Establishing working group: The fact that we were moving ahead with the project was a done deal and so now it was like how do we, how do we support everybody that's in this project and so that committee was formed um and then we would, I would meet particularly almost twice a week first, and then we'd adapt to once a week, and then moved on and initially I was very involved with each of the um the uh decisions that were made and then later I kind of backed out, not backed out completely but you know I I felt the group had confidence to move forward and that they were partnered with you guys as well so that they could take it on and then I would just come in as um as needs basis. (PBR team SLP 1; quote 13)
	4. Maintenance	
	4.1 Recognizing Value	*Value in partnership*: I think you [SLP] led well with that where you said "this is unusually, this is hard to get" at the first staff meeting – X [SLP] really promoted and underlined the fact that we're pretty darn lucky to have this partnership and so we're going to continue it and so I think that was a nice statement to the whole group that was positive. (Clinical SLP; quote 21) - And I kept feeling of like with everyone even if they are not research minded likes the idea of doing things that have research behind it that shows what we are doing is worth it. I do not think that anyone would ever question that. (Clinical SLP; quote 22)
	4.2 Long-term Engagement	*On-going evaluation of partnership*: Yeah so that that would be a really important piece and I think the other thing is like this was a project that that happened so really quickly right it happened, it came so quickly. So, when you look at evaluation maybe down the road if you had some of those research questions maybe you know um some timelines of what we were going to evaluate when and I I don't know that we had the luxury of that because we were like honestly it was structured and it had great integrity, but we were often flying off the, you know, flying off the seat of the bench (Researcher 2: quote 6) *Evaluate impact of partnership*: that would be a very good follow up question for our group like knowing now that this that the university was involved and we did these measures and we found this out, are you more comfortable using this tool to gather information about, you know. That's an interesting way to check. (PBR team SLP 1; quote 12) *Enhancing research capacity:* I also want to say I think that it it um it sparked that and I think, I think our people would do this anyway but it sparked even more of an interest to really be um uh, strong about

		looking at research and reading research and understanding how it fits into our world. (PBR team SLP 2; quote 7) - Sometimes you are so in the process of trying to get the work and you're not really critically evaluating the tool you are using and I think that's really helpful because I don't know if that's something we would have arrived at [without the partnership]. (Clinical SLP; quote 23)
	4.3 Measuring Sustainability	*Pace of partnership*: I think uh maybe moving so quickly into it may have become a bit of a barrier like maybe I wonder like everybody if they you know everybody's concept- you know, conceptual basis are so different so if we had a bit of time to like uh I'm just wondering like for us for us it was a bit of a um no choice situation because we had to move in we were already one year late on this, on this movement of this program and then and then it was like it was like me saying 'okay we need to have some research based on this' as well but if if we were to go forward now on new projects um spending a little bit more time on staff to say 'okay this is where we're going' and having uh you know, a couple of those initial meetings together so that there is no, not ever a feeling, like there's more of a confidence builder that we're all part of this and that we're moving toward something that's going to help. (PBR team SLP1; quote 13)
	4.4 Reporting progress and closure of the Project	*Celebrating success*: One hundred percent and that'll be great to share back to people. You know, even in our other research with parents and kids you know we, we think about thanking those parents and those kids the board and we need to thank the research department and celebrate the accomplishment with the SLPs. (Researcher 2; quote 7)
	5. Project Specific	
	5.1 Research Concerns	Knowledge of oral language: Sometimes I think just the whole understanding of oral language and what we're looking at. I think we talked about that to and you know "why aren't we seeing a change in that, what are we evaluating, what are we looking at". I think we said there are so many factors involved, but I think some people we just assuming or I going to take this story and see what happens but realizing the value of that story and realizing the emotion, the child's background. And I think that is different for some people. (Clinical SLP; quote 24) - I think as I reflect back, and think about grad school, depending on what your school focuses on there's not always a lot about phonological awareness or literacy. I think a lot of us were in that growth of understanding and concepting and thinking about how much we really can contribute. And maybe it's something where you have some familiarity but

		aren't really sure. I get my test, I do my test and I get my score and that should be enough. But instead you can look at things more qualitatively (Clinical SLP; quote 25) *Objectivity in data collection*: It brings the subject of objectivity. Because it brings in more objectivity to have someone who does not know or who is not invested in the system to coming in and collecting the data. (Researcher 1; quote 8)

Chapter 5

5 General Discussion

Integrating research evidence into practice is necessary to ensure patients receive the best possible care. However, integrating evidence-based practice (EBP) into practice is time-consuming, requires significant effort, and is subject to many barriers related to accessing and incorporating findings among other factors (Greenhalgh et al., 2016). These constraints have led to a disconnect between research and practice, that has been coined the research-practice gap (Kerner, 2005). Up until the realization of this gap, it was predominantly the responsibility of clinicians to integrate research evidence, however the acknowledgment of this gap led to a call for more active approaches to bring practice and research together (Graham et al., 2006). Many of these identified active approaches make use of collaborative partnerships between researchers and knowledge users (i.e., clinicians, educators, administration, etc.) to bridge this gap (Gagliardi et al., 2016; Kothari et al., 2017). Then, instead of knowledge creators (i.e., researchers) and knowledge users (i.e., clinicians) operating in separate 'silos', they can partner and create knowledge together. Practice-based research (PBR) is a collaborative approach to knowledge creation where research is grounded in clinical practice (Epstein, 2002). In PBR, researchers follow the clinicians lead in identifying clinical practice questions and data are gathered from practice. Researchers and clinicians interpret the data together, and the findings are implemented into practice. The use of clinical-research partnerships is relatively new to speech-language pathology and although a popular approach to bridge the research-practice gap, more information was needed regarding the use of partnerships, and potential facilitators and barriers. In this thesis, I extended the literature on PBR by first understanding the current use of PBR in speech-language pathology and providing a model of potential outcomes for those interested in

pursuing partnership research. Additionally, I presented a case study of PBR in a school board setting and demonstrated PBR's utility in changing practice. Lastly, I explored the experiences of those involved in this work and presented facilitators, barriers, and factors to partnership initiation and maintenance. In this chapter, I will summarize the main findings from chapters 2, 3, and 4, discuss overall implications of this work, and discuss recommendations for future research.

5.1 Relevant Findings

5.1.1 The Current Use of PBR in Speech-Language Pathology

Collaborative partnerships have been identified as a highly effective way to bridge the research-practice gap (Gaglidardi & Dobrow, 2016). Many approaches make use of the complementary knowledge that various researchers and knowledge users bring to a partnership. These partnerships are seen in community-based participatory research (Jull et al., 2017), integrated knowledge translation (Kothari & Wathen, 2013), design-based research (Penuel et al., 2011), organizational participatory research (Bush et al., 2017), and pertinent to this dissertation, PBR (Epstein, 2002). Although this collaborative research has become more common and is supported by national funding agencies (Canadian Institutes of Health Research, 2008; Social Sciences and Humanities Research Council, 2021), the use of these partnerships in speech-language pathology was not well known. I was interested in examining the current use of partnerships in speech-language pathology and providing a model that outlined potential outcomes of partnerships for those interested in engaging in partnered research.

The PBR Co-Creation Model was developed considering Epstein's seminal work as well as the experiences of the authors constructing the model. Our experiences and current

evidence revealed three possible outcomes of PBR partnerships including capturing practice, changing practice, and creating practice. Capturing practice describes a co-creation partnership that evaluates ongoing practice to inform both clinicians and researchers. This aligns closely with practice-based evidence, which recognizes the pull from practice and our ability to mine clinical data to uncover important findings (Green, 2008). Changing practice outlines a partnership whose goal is to implement evidence-based findings into practice. These finding may come from practice, as demonstrated in Chapter 2. However, these findings might also come from traditional research activities. In these cases, the purpose of the partnership may be a focus on implementation science and the movement of research into practice (Eccles & Mittman, 2006). In these cases, research is being incorporated into practice and the partnership is established to support the integration and sustainability of this research in practice (Smits & Denis, 2014). Creating practice refers to a partnership aimed at designing or creating new practice and evaluating effectiveness. This component of the model relates closely to integrated knowledge translation (IKT; Gagliardi et al., 2016; Kothari et al., 2017) where a collaborative partnership engages in knowledge synthesis, dissemination, exchange, and application (i.e., knowledge translation (KT); CIHR, 2015).

It was important that the PBR Co-Creation Model was outcome focused to provide an understanding of the possibilities for researchers and clinicians interested in partnership. It was expected that this model would provide common language for those engaging in this type of work. To provide evidence for this model, a scoping review was completed and retrieved articles were categorized as either capturing practice, changing practice, or creating practice. We were also interested in understanding the level of partnership to understand the type of partnerships in the field, that is, we sought to understand if current partnerships were fully collaborative or more consultative. Therefore, when possible, each partnership was

coded as either collaborative or consultative. Of the 35 articles reported in the review, three were categorized as creating practice, 13 were categorized as changing practice, and 19 as capturing current practice. Only 27 articles provided some information regarding the type of partnership and 18 were classified as collaborative and nine as consultative. Importantly, these results demonstrated that there was representation of partnership research in each of the three outcomes suggested in the model. Patients, disorder areas, and setting were also extracted in the review. Results revealed equal representation of research focusing on the adults and children. Partnerships occurred across disorder areas (e.g., stroke, preschool speech and language) and across treatment settings (e.g., hospitals, rehabilitation centres). This result highlights the potential power of partnerships across all areas of speech-language pathology.

One concern regarding this review was the terms used in the search criteria. There are several terms used to describe this type of partnership research, and we acknowledge that some additional terms could have been included (e.g., quality improvement, participatory research). However, we feel that the findings represent the current state of PBR in speech-language pathology with the majority of partnerships capturing current practice, followed by changing practice, and then creating practice. Given the role of a scoping review to assess emerging evidence and provide an overview of a broad topic (Peterson et al., 2016), we feel this result both gives us an understanding of current partnerships and provides some evidence for the use of the model. Future work may expand this research by completing a more thorough systematic review looking at partnerships, type of partnership, and outcomes of partnerships.

5.1.2 Engaging in PBR with SLPs: A Case Study of a Language and Literacy Tool

Chapter 3 demonstrated the potential of PBR in a case study representing a partnership between researchers and SLPs working in a school board. The PBR team consisted of 2 SLPs, and Dr. Archibald and me. Due to resource, time, and other practice constraints, SLPs adapt best practices to meet the practice demands placed on them (Dube, 2003; Ukrainetz, 2006). This includes adapting assessments to fit time constraints and creating new assessments that assess the aspects of language they consider necessary. Though these decisions are evidence-informed, fidelity of implementation influences outcomes and subsequent treatment decisions (Guo et al., 2016). The SLPs in this partnership developed a language and literacy tool that assessed phonological awareness and narrative language ability. These areas of language assessment and intervention were selected as areas of interest for program development because they are known to be positive predictors of language outcomes (Castles et al., 2018). Phonological awareness is the explicit knowledge of sound structures of words and the ability to manipulate parts of words including syllables and phonemes (Gillon, 2004; Schuele & Boudreau, 2008; Stahl & Murray, 1994). Phonological awareness plays a key role in the development of strong reading skills and interventions focusing on phonological awareness have resulted in significant improvements in reading outcomes and spelling outcomes (National Reading Panel, 2000). Narrative language ability refers to a person's ability to understand and retell a story and produce their own narrative story (Bishop & Adams, 1989; Justice et al., 2006; Petersen et al., 2008). Interventions aimed at oral narrative skills have led to the improvement of identifying structures of narratives, narrative performances, and grammatical structures (Davies et al., 2004; Green & Klecan, 2012; Swanson et al., 2005). Jointly the SLPs, Dr. Archibald and I recognized the need for a

PBR partnership in determining the effectiveness of the tool. I was interested in capturing the potential of this partnership work in a school board.

Chapter 3 outlined the results of two studies completed with the SLPs at the school board. The aim of study 1 was to determine if the tool captured developmental change over an academic year and captured differences between the groups of participants. Results of study 1 revealed that the phonological awareness component of the tool captured differences across the two groups of participants and captured developmental growth across the school year. The narrative language component of the tool captured differences between groups, but it did not capture growth across the school year. This result was shared with the SLPs, and it was decided that the first aim of study 2 would be to update the tool and reassess the tool. The second aim was to complete an analysis comparing the tool to standardized measures of language to provide some validation for the tool. Results of study 2 revealed that both the phonological awareness and narrative language components of the revised tool captured developmental change over time. This result demonstrated that SLPs could use the tool in practice to effectively capture changes in language over the school year and more reliably identify children with language skills of concern. This would support the SLPs in making decisions regarding which students would benefit from additional language and literacy interventions. Comparisons between standardized assessments of language and the tool offered some evidence of the tool's construct validity. Results revealed strong correlations between the phonological awareness component and subtests of the *Clinical Evaluation of Language Fundamentals-4 (CELF-4;* Semel et al., 2003), and moderate to strong correlations between the narrative component of the tool and the *Test of Narrative Language (TNL*; Gillam & Pearson, 2017). This result provided some evidence that the tool was measuring the constructs of language that the SLPs intended to measure. Engaging in this partnership

allowed us, the PBR team, to explore the effectiveness of the tool and understand the current limitations of the tool. As one of the researchers in the partnership, I turned to the literature and determined ways to increase the tool's effectiveness and the SLPs identified ways the tool could be altered while maintaining its suitability and feasibility in practice.

This case study provides an example of the role PBR can have in changing and improving clinical practice for SLPs. Certainly, there are some limitations in interpreting these data. Sample size for study 2, including the tool reassessment and the validation analysis, is small. In addition, the post-assessment data collection for study 2 was completed after the summer months compared to study 1 where both the pre- and post-assessment data were completed in one school year. Though the results demonstrate that the tool captures significant changes in growth, a follow-up study where pre- and post-assessments are completed within one school year is warranted. Additionally, the correlation completed between the standardized assessments of language and the tool provides some evidence of validity which is an important first step, however further comparing the assessment to other measures of language would be beneficial. In particular, comparing the tool to a standardized measure of phonological awareness would help to strengthen our understanding of the tool's validity. This chapter outlined a PBR partnership that both captured and changed practice. Future work in this partnership could explore creating new practices that are suited to working in a school board.

5.1.3 Engaging in PBR with SLPs: Facilitators, Barriers, Initiation, and Maintenance

It is well understood that partnerships between researchers and clinicians can support the movement of research into practice (e.g., implementation science) and the development or creation of knowledge (e.g., IKT, PBR). As a result, the use of these collaborative models

has been steadily increasing (Alpert et al., 1992; Drotar, 2002; Rycroft-Malone et al., 2011). A clinician's knowledge about their practice including facilitators and barriers to implementation complements a researcher's knowledge of the scientific process (Feuerstein et al., 2017). Even though partnerships receive an abundance of praise, the success of these partnerships has much to do with those engaged in the partnership (Oliver et al., 2019). A great deal of effort and a variety of costs (i.e., practical, personal, professional, etc.) are associated with successful partnerships. Oliver and colleagues recommended a cautious approach to this research. I would add that if we are considering this type of work then we need to be informed of the costs associated and take on the responsibility to inform potential collaborators of them. In recognizing the costs and barriers associated with this work, researchers have begun to understand the dimensions of effective collaboration. Several models exist describing factors important to interprofessional collaboration (McComb & Simpson, 2013), interorganizational collaboration (Karam et al., 2018), and dimensions and components necessary for collaboration (D'Amour et al., 2008; Gagliardi & Dobrow, 2016). Employing qualitative methodologies in this research contributes to our understanding of collaborative partnerships because these methods allow for the collection of data relevant to lived experiences (Clark, 2010). I was interested in extending this work into PBR and speech-language pathology through collecting the experiences of the SLPs and researchers engaged in the PBR partnership described in Chapter 3. In addition, I was interested in using the findings of this work to build a framework that highlighted factors supporting partnership success.

Chapter 4 presented five themes that were identified from the data. The first theme identified general facilitators to the partnership and included: a supportive team, strong communication skills, the need for external support, the identification of a PBR problem,

establishing an initial partnership, and the SLPs having confidence in the researchers. The second theme identified was barriers to partnership success and included: negative interactions, lack of communication, physical distance between partners, and difficulty adapting to change. Two additional themes established from the data included factors important for initiation and maintenance. Factors associated with initiation included: the recognized need for the partnership, building a relationship between partners, motivations from SLPs to engage in the PBR project, and important steps prior to starting the partnerships. Factors associated with partnership maintenance included: recognizing value, commitment to long-term engagement, measuring sustainability, reporting progress and closure of the project. Finally, a theme regarding the project was recognized and included concerns specific to the research. Arising from the themes identified in the model, I constructed the PBR Partnership Framework that in addition to highlighting facilitators to partnerships, outlines factors for initiation and maintenance. While other models describe factors supporting collaboration (D'Amour, 2008) or factors related to participants in the partnership (i.e., the organization, the individual) (Gagliardi & Dobrow, 2016), the PBR Partnership Framework explicitly outlines factors important at various stages of partnership. For example, when initiating a partnership, goal transparency, shared investment, and the establishment of a working group are important. To ensure the maintenance of a partnership, reducing assumed knowledge, evaluating partnership satisfaction, and celebrating success together are important.

Undoubtedly, there are some limitations to the study. The present data were informed by one small group of SLPs and researchers. Though this still offers value in understanding the experiences of collaborative partnerships, a larger sample size may have revealed further facilitator, barriers, and other important factors to partnerships. Future work should look to

include more of those who were engaged in the partnerships. Additionally, the current data are also slightly skewed in that there is more representation of SLPs experiences compared to researcher experiences. Further work would strongly benefit from more representation of researcher perspectives regarding the clinical outcomes of the partnership and their experiences and potential barriers they faced. Finally, the described framework suggests the importance of evaluating partnership effectiveness and satisfaction. Further work is needed to understand how these can be assessed and the role they play in partnership maintenance.

5.2 Implications

5.2.1 Supporting Knowledge Creation

One of this dissertation's main contributions is presenting a case example of a PBR clinical-research partnership. Chapter 2 outlined that in speech-language pathology there is some partnership work taking place, but more is needed. Specifically, more research is needed to demonstrate changing practice and creating practice. Chapter 3 first presents a partnership that captured current practice which is the most common partnership research completed in speech-language pathology. The chapter then presents how the initial results were incorporated to change practice. Results from Chapter 2 outlined that changing practice was less common but has become more frequent in the past 2 years (i.e., more research from 2019). The case study provides an example of capturing practice and changing practice for researchers and clinicians in speech-language pathology.

Specific to the researcher-SLP partnership described in Chapter 3 and the language and literacy tool, this partnership updated a clinical tool and as a result the tool became a more effective tool for use in practice. It also provided some validation of the tool allowing the SLPs to be more confident in assessing phonological awareness and narrative language

and making subsequent treatment decisions. Shortly after the completion of study 2 the director of the speech and language department, and a member of the PBR team, retired resulting in a change in leadership at the school board. The focus of the SLPs and the kindergarten programming in the school board was expected to change and it was unlikely that the tool would continue to be used. Though unfortunate that the tool is no longer being used, many important lessons can be taken away from this work. Key takeaways include following the clinicians lead in identifying PBR questions that support their clinical practices, how to support data collection in a school board, and engaging in discussions surrounding sustainability to ensure the clinicians are not overloaded when involved in a partnership.

Given the need for research in the field that is sustainable, feasible, and easily implemented, PBR provides the opportunity to create this research evidence. This is especially true in clinical settings such as school boards where clinicians are required to make evidence-informed decisions to accommodate waitlist and demanding caseloads (Kaegi et al., 2002). The current impact of the COVID-19 pandemic adds additional considerations for many clinicians who have had to switch to providing online therapy. The adaptation to provide online services creates potential to explore PBR questions related to online assessments and interventions. Moving forward, creating more evidence-based knowledge for online services will be beneficial for any instances that require online services (i.e., pandemic, geography, etc.).

5.2.2 Supporting Clinical-Research Partnerships

In addition to providing evidence for PBR as a method to develop clinical knowledge, this dissertation adds to the conversations concerning the various outcomes that can come from partnership work in speech-language pathology and how to build successful

partnerships. A key contribution of this work is the development of the PBR Co-Creation Model (Chapter 2). The model provides language for researchers and clinicians interested in pursuing collaborative research. In the scoping review, evidence revealed several terms being used to describe this type of work and a general lack of partnership disclosure. Research articles did not always list the extent of partnership (i.e., collaborative or consultation) and at times it was not possible to make any judgement on the type of partnership. This is not dissimilar to other KT research where a failure to explicitly report how decision makers were involved in the research process is common (Gagliardi et al., 2016). Without labeling the partnership outcomes, the extent of the partnership, and how decisions are made, these details are left unknown to readers. If we are to move forward and expect others to engage in active partnerships, outlining these details becomes an important step in being transparent in our research approach.

A second contribution of this work is the acknowledgment that a strong partnership is imperative for co-production. The development of co-production is social and political in nature (Campbell & Vanderhovern, 2016) and does not follow a linear trajectory (Beckett et al., 2018). Partnership is a central component of PBR and to engage in partnered work without exploring the experiences of this work is ignoring a key aspect of the work. Engaging in these active partnerships is an effective way to reduce the research-practice gap, but without adequate attention to experienced barriers, we risk overloading clinicians and researchers just the same as clinicians were overloaded with integrating evidence-based practice. As we see the increase in co-production, so too do we need to see an increase in our understanding of how to effectively engage in partnerships. We know that there are specific skills, time, and resources required for co-production (Beckett et al., 2018), and at this current time, there is an underestimation of what is needed to support partnerships (Oliver et

al., 2019). The use of collaboration models built on partners' experiences in partnerships can help to support those engaging in this work. The Structuration Model of Collaboration (D'Amour) presents dimensions that support interprofessional and interorganizational collaboration. The IKT Capacity Framework (Gagliardi & Dobrow, 2016) outlines strategies to support partnerships at the organizational, professional, and individual level. However, missing from these models was factors that would support partnership initiation and maintenance. Especially, in settings and with knowledge users who are not familiar with working in partnerships, the PBR Partnership Framework (Chapter 4) presents organized factors that are beneficial for partners to consider at specific times in their partnership.

Together, the PBR Co-Creation Model and the PBR Partnership Framework provide the language for clinicians and researchers to discuss their partnership goals and gain insight into how they can set up their partnership for success. Used as resources, they can help align goals, views, and build a strong foundation for partnership, which is necessary for collaboration (Rycroft et al., 2016).

5.3 Directions for Future Research

The findings of the current thesis add to existing literature supporting the use of co-production and collaborative partnerships to reduce the research-practice gap. Though this thesis provided a model and framework to support researchers and SLPs engaging in co-production, more research is needed to understand how to effectively engage in partnered research. Specific to the models presented in this thesis, one suggestion is to examine different barriers and facilitators associated with the different outcomes outlined in the PBR Co-Creation Model (i.e., capturing, changing, and creating practice). As outlined in Chapter 4, there are key factors that contribute to partnership initiation and maintenance, and it is

possible that there are key factors associated with the different partnership outcomes. Linking factors associated with various outcomes may provide important information for different outcomes.

An additional area for further research is understanding how to effectively measure and evaluate partnerships. Most generally, those engaged in this work need to be more diligent in reporting aspects of their partnership (Gagliardi et al., 2016). This should include the overall goal of the partnership (i.e., creating, changing, capturing practice), but also include a report of impacts. Possible impacts may include outputs (i.e., products, journals), uses (i.e., how outputs are used), and outcomes (i.e., changes resulting from the outputs) (Beckett et al., 2018). Other reportable areas within impact includes scale of impact (i.e., bigger is not always better), process of impact, serendipity of impact (i.e., not all impact is planned; unexpected impacts are valuable) etc. (see Campbell & Vanderhoven, 2016). Another aspect of partnered research that requires more attention is the role of evaluation. The results from Chapter 4 highlight the need of partnership evaluation as an important factor in maintenance but more research is needed to understand what partnership evaluation involves. This can include evaluating the value of the co-produced knowledge as experienced by researchers and knowledge users, and the experiences of being in the partnership. Through explicit descriptions of partnership type, impact assessments, and a better understanding of how to evaluate partnerships, we can gain more insight into the workings of co-production.

Approaches to co-production such as PBR and other IKT are still relatively new to speech-language pathology but as the use of these models increase, a secondary review to understand the use of partnerships in the field may be warranted. Chapter 2 provides a first glance at the use of partnerships, but future research should include additional terms when

analyzing the literature (i.e., IKT & co-production) to allow for a broader scope. Further, taking a more systematic approach to the review and examining partnership outcomes, impact, and evaluation would provide additional information surrounding the utility of partnerships in speech-language pathology. In Chapter 2, 35 papers were identified as including a partnership and only 3 focused on creating practice. A second review would reveal any overall increase in partnered research and provide updated trends as to how clinicians and researchers are engaging in this work.

Finally, I think the term "dark-side" of this research is an important area to continue to explore (Oliver et al., 2019). The goal of collaborative research is to create meaningful knowledge for research and practice, and to ease the burden of integrating research and practice. If the benefits of the partnerships are outweighed by the burden, then it might be necessary to reconsider the goals of the partnership. By continuing to understand potential barriers and facilitators to partnership and incorporating this information into the research reports (i.e., journal articles, research reports) we can share this knowledge with others as they enter partnerships (e.g., hybrid 2 approach as found in Curran et al., 2012). Indicating the amount of time a partnership project required is one way to advocate for appropriate funding for projects (Beckett et al., 2018). Of course, funding does not completely mitigate barriers (Gagliardi et al., 2016), but it is important to provide appropriate compensation for partners. The outcome of collaboration can be very powerful but it a social process and the demands of this work are still being understood (Beckett et al., 2018).

5.4 Conclusions

In practice-based research, clinical-research partnerships blur the boundaries of knowledge creation and implementation (Campbell & Vanderhoven, 2016). This leads to the

development of new knowledge that is not created by one for another, but rather is developed to support both researchers and clinicians in providing the best to those whom they serve. As this thesis explored, these partnerships can bring forth new knowledge in various ways depending on shared partnership goals. My work provides a case example to those interested in engaging in this work, provides a model of potential partnership outcomes, and a framework to support building successful partnerships. The rewards of co-creation can be great but the need to understand the costs associated with partnered research remains. In many ways, co-creation in speech-language pathology is just beginning, and as researchers and clinicians move with excitement and caution into this area of knowledge creation, the result will be sustainable research that has a positive impact on practice.

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Appendices

Appendix A. Phonological awareness and narrative language tool used in Chapter 3, study 1

Appendix B. Revised narrative language tool used in Chapter 3, study 2

Appendix C. Perceptual mapping instructions

Appendix D. Semi-structured interview questions using in Chapter 4

Appendix E. Visual representation of perceptual mapping activity that was constructed by the speech-language pathologists and researchers

Appendix F: Ethics approval for Chapter 3 from Western University

Appendix G: Ethics approval for amendment to Chapter 3 from Western University

Appendix H: Ethics approval for second amendment to Chapter 3 from Western University

Appendix I: Ethics approval for Chapter 3 from school board

Appendix J. Ethics approval for extension for Chapter 3 from school board

Appendix K: Ethics approval for Chapter 4 from Western University

Appendix L: Ethics approval for Chapter 4 from school board

Appendix A. Phonological awareness and narrative language tool used in Chapter 3, study 1

ASSESSMENT OF PHONOLOGICAL AWARENESS SKILLS – KINDERGARTEN

Student:	DOB:	DDSB Student#:
School:	Classroom Educators:	
Assessment completed by:	Date:	
What story for narrative:	Previous assessment:	
□ Year 1 □ Year 2		

Phonological Awareness Skill	Initial Date:	Follow-up Date:
Sentence Segmentation		
Rhyme Recognition		
Syllable Segmentation		
Syllable Blending		
Onset and Rime (blending)		
Onset and Rime (segmenting)		
Initial Word Sound		
Sounds in Words (segmenting)		
Sounds in Words (blending)		
Production of Rhyme		

Targeted Area for Guided Practise:

Scoring: For each section a score of 3/3 (or 6/6 for rhyme awareness) indicates that the student has acquired the skill. All other scores indicate that the student requires some guided practice in the area for skill development.

1. **Sentence Segmentation** (use the attached picture page and blocks)

Educator's Directions: "I'm going to say a sentence about this picture and every time I say a word

I'm going to put a block down. Watch and Listen."

Demonstration: "The bear is brown" (place blocks beside the picture to represent each word).

"Now it's your turn."

"Bananas are yellow." Correct/Incorrect/NR

"I hurt my finger." Correct/Incorrect /NR

"The boy is running fast." Correct/Incorrect /NR

2. **Rhyme Recognition**

Educator's Directions: "I'm going to say some words that rhyme, *hat, cat, fat, mat.* Let's say them together, *hat, cat, fat, mat."*

Demonstration: "Let's practice. Listen to these words, big, up, walk. Do they rhyme?" Correct the students if they say that the words rhyme.

"Now it's your turn to tell me if these words rhyme."

"fun, run, sun"	Correct/Incorrect/NR
"run, jump, walk"	Correct/Incorrect/NR
"bag, rat, and"	Correct/Incorrect/NR
"pan, fan, van"	Correct/Incorrect/NR
"dig, pig, big"	Correct/Incorrect/NR
"dog, cow, horse"	Correct/Incorrect/NR

3. **Syllable Segmentation**

Educator's Directions and Demonstration: "I'm going to say the word '*Mommy.*' It has 2 parts.

Listen and watch. I'm going to clap the parts. Mo-mmy (clap each syllable as you say it.) Now, I want you to say '*Mommy*' and clap the parts. Now, let's practise clapping the parts in your name."

(Clap with the student.)

"Now it's your turn to clap the parts in these words."

Teacher	Correct/Incorrect/NR
Elephant	Correct/Incorrect/NR
Dog	Correct/Incorrect/NR

4. **Syllable Blending**

Educator's Directions and Demonstration: "I'm going to say a word slowly, like a robot (one part at a time*). Listen to the parts *SUN….SHINE.* I said, *SUNSHINE.*

Let's practise….. HOT… DOG….What word did I say? (If the student does not blend the word tell him/her the correct answer.)

"Now it's your turn to tell me what word I am saying."

Ice-cream	Correct/Incorrect /NR
Pa-per	Correct/Incorrect/NR
Com-pu-ter	Correct/Incorrect/NR

5. **Onset and Rime- Blending** (Use blocks to represent the word parts as you say them. Move the blocks together to represent the blended word.)

Directions and Demonstration: "I'm going to say a word in parts* and then I'll say the word as a whole. Listen, f – ish, fish." Let's practise….m –ouse, mouse. "Now it's your turn to tell me the word."

Sh-eep Correct/Incorrect/ NR
C-ow Correct/Incorrect/NR
D- uck Correct/Incorrect/NR

6. **Onset and Rime – Segmenting** (Use blocks to represent the word parts.)
   Educator's Directions and Demonstration: "I'm going to break a word into two parts*. Listen, the word is "cat, c…at." Let's practice with the word "dog, d…og." "Now it is your turn to break a word into 2 parts."
   Sit Correct/Incorrect /NR
   Cup Correct/Incorrect /NR
   Foot Correct/Incorrect /NR
   If the student can independently segment and blend onsets and rime she/he may be ready to segment and blend words at the phoneme level.
   *For each item, leave a one-second pause between word parts.
7. **Initial Word Sound**
   Directions and Demonstration: "I'm going to say a word and tell you the sound we hear at the beginning. The word is…..*MAT*……The beginning/first sound is /m/." "Let's practise with the word SAM…..what sound do you hear at the beginning of SAM?"
   "Now it's your turn to tell me the sound you hear at the beginning of these words:"
   Fish Yes/No/NR
   Pig Yes/No/NR
   Apple Yes/No/NR

8. **Sounds in Words – Segmenting** (Use blocks to mark each sound.)
   Directions: "I'm going to say all the sounds in the word *CAT* and every time I say a sound I'm going to put a block down. Watch and Listen."
   Demonstration: "/c/ /a/ /t/" (place a block down for each phoneme as you say it).
   "Now it's your turn to tell me the sounds in the word:"
   Me Correct/Incorrect /NR
   Sun Correct/Incorrect /NR
   Dog Correct/Incorrect /NR

9. **Sounds in Words - Blending** (Use blocks to mark each sound and then push the blocks together to represent the blended word.)
   Educator's Directions: "I'm going to say a word in parts*. Then I will say the words as a whole. Watch and Listen."

Demonstration: "/k-u-p/, cup. Let's practise, /m-a-t/. What word did I say?" Provide the student with the correct answer if she/he is having difficulties blending the word sounds.

"Now it's your turn to tell me the word."

/s-oa-p/ Correct/Incorrect /NR
/f-i-sh/ Correct/Incorrect /NR
/m-ea-t/ Correct/Incorrect /NR

10. Production of Rhyme

Educator's Directions and Demonstration: "I'm going to say some words that rhyme…CAT, RAT, BAT. Can you tell me another word that rhymes with… CAT, RAT, BAT? If the student does not respond provide another word, CAT, RAT, BAT, HAT."

"Now it's your turn to tell me a rhyming word:"

Man Correct/Incorrect /NR
Pup Correct/Incorrect/NR
Look Correct/Incorrect /NR


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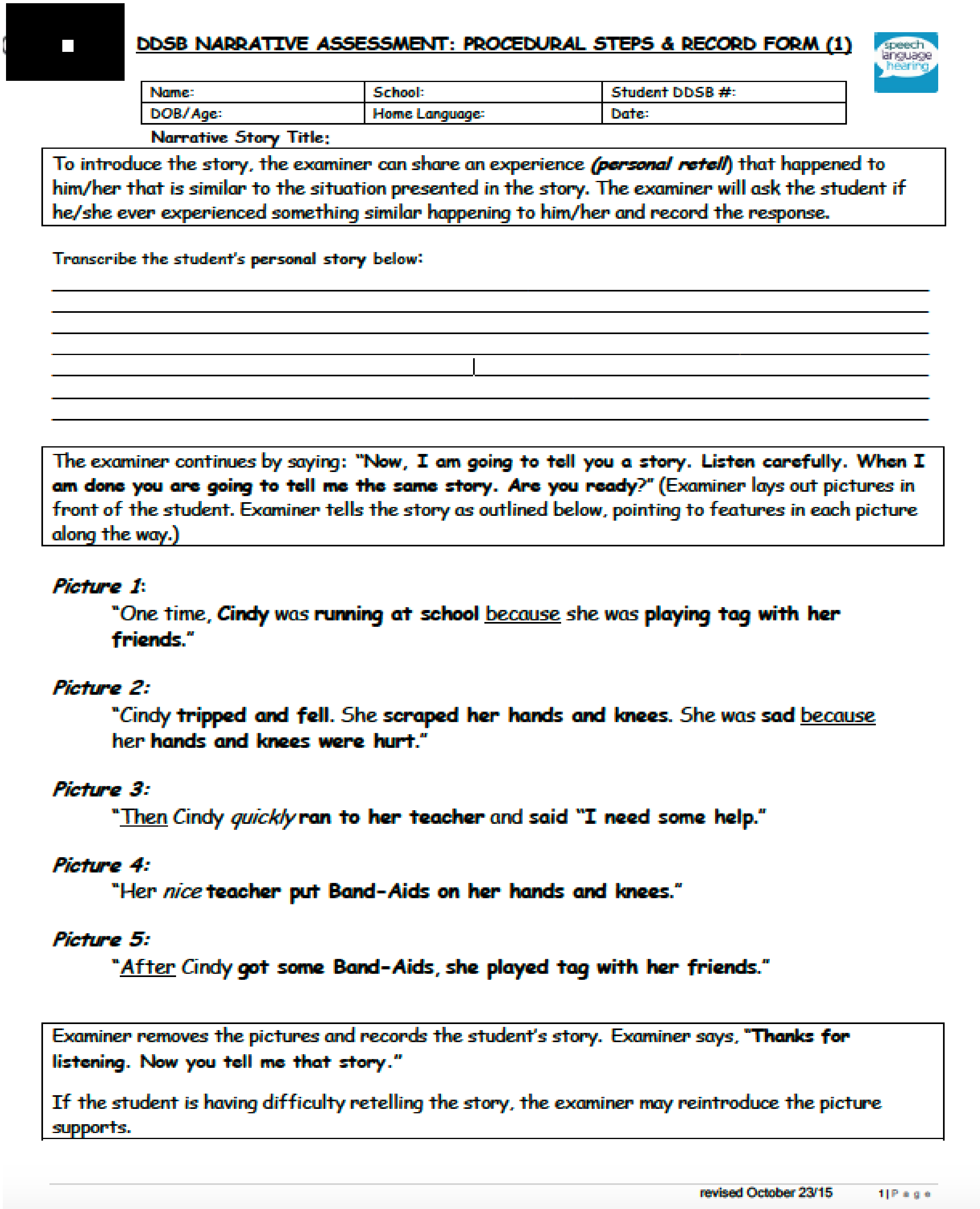

[redacted]

DDSB NARRATIVE ASSESSMENT: PROCEDURAL STEPS & RECORD FORM (1)

Name:	School:	Student DDSB #:
DOB/Age:	Home Language:	Date:

Narrative Story Title:

To introduce the story, the examiner can share an experience ***(personal retell)*** that happened to him/her that is similar to the situation presented in the story. The examiner will ask the student if he/she ever experienced something similar happening to him/her and record the response.

Transcribe the student's personal story below:

The examiner continues by saying: **"Now, I am going to tell you a story. Listen carefully. When I am done you are going to tell me the same story. Are you ready?"** (Examiner lays out pictures in front of the student. Examiner tells the story as outlined below, pointing to features in each picture along the way.)

***Picture 1*:**

"One time, **Cindy** was **running at school** because she was **playing tag with her friends.**"

Picture 2:

"Cindy **tripped and fell**. She **scraped her hands and knees**. She was **sad** because her **hands and knees were hurt**."

Picture 3:

"Then Cindy *quickly* **ran to her teacher** and said **"I need some help."**

Picture 4:

"Her *nice* **teacher put Band-Aids on her hands and knees.**"

Picture 5:

"After Cindy **got some Band-Aids, she played tag with her friends.**"

Examiner removes the pictures and records the student's story. Examiner says, **"Thanks for listening. Now you tell me that story."**

If the student is having difficulty retelling the story, the examiner may reintroduce the picture supports.

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Transcribe the **student's story retelling** below:

Examples of : WELL DEVELOPED responses	Examples of EMERGING SKILLS responses
CHARACTER ☐ Cindy /any name **SETTING** ☐ running/playing tag at school **EVENTS** ☐ *tripped and fell ☐ *scraped her hands and knees ☐ *hands and knees hurt ☐ ran to her teacher for help ☐ said "I need some help" **ENDING** ☐ teacher helped her ☐ teacher put on band-aides ☐ played tag with friends *Refers to PROBLEM	**CHARACTER** ☐ a girl **SETTING** ☐ running/ at school /playing with friends **EVENTS** ☐ *got hurt ☐ *fell down ☐ *tripped ☐ got help ☐ asked teacher **ENDING** ☐ helped her ☐ got band-aides ☐ played again

Examiner waits 10-15 seconds before providing encouragement.

- If the student is reluctant, examiner encourages by saying "*It's okay, just do your best.*"
- If the student asks for help, examiner says "*I can't help. But you can just tell me the parts you remember.*" Examiner listens and makes only neutral comments such as "uh huh" and "okay". Examiner may not repeat the story or any part of it, but can repeat the directions and provide encouragement as needed.

When the child appears to be finished, the examiner says "Are you finished?"

- If the child is not finished, the examiner should let the child continue.
- If the child does not tell a story even after encouragement the examiner says " *That's okay. Thanks for listening to my story.*"

After retell, Examiner to ask story comprehension questions on page 3

Story Comprehension Questions

QUESTIONS	CHILD's RESPONSE
Who is the girl in the story?	
Where was Cindy?	
What was Cindy doing?	
Who was she playing with?	
What happened to Cindy?	
How do you think Cindy was feeling when she fell? (I)	
Why did Cindy fall?	
Who did she ask for help?	
Why did she need a Band-Aid?	
What do you think Cindy will do when she gets home? (P)	

I= inferential, P= Prediction types of question

Speech Sound Production Skills

CHILD'S CURRENT AGE	SOUNDS THAT SHOULD BE DEVELOPED (Circle error speech sounds)	PROCESSES/PATTERNS THAT SHOULD NO LONGER BE USED (Circle applicable patterns)
Up to 3 years	p, b, m, t, d, n, h, w, vowels	• Final consonant deletion • Initial consonant deletion • Medial consonant deletion • Assimilation (gog/dog)
3 - 3 ½ years	k, g f, s, z s-blends	• Voicing (p,k,t) • Fronting (k/g/ing) • Stopping (f,s,z) • Cluster Reduction (s-blends)
3 ½ - 4 years	sh*, l, y	• *Stridency deletion (t/sh) • Gliding (w/l or y/l)
4 - 5 years	l-blends, ch, j	• Cluster reduction (l-blends) • Deaffrication (t/ch, d/j)
Over 5 years	s, z, s-blends r, r-blends, th, v, sh*, ng	• Frontal lisp (th/s, th/z) • Lateral lisp (slushy/noise s,z) • */s/ for /sh/

The administrator ticks the comment boxes that best describe the student's narrative. For each of pillars, place a tick in only 1 column,

DDSB Narrative Language Assessment - Story 1 · Pictures · **No Pictures**

	WELL DEVELOPED SKILLS Tick in this column = 2 points	EMERGING SKILLS Tick in this column = 1 point	NOT DEVELOPED SKILLS Tick in this column = 0 points	TOTAL
NARRATIVE	☐ Provides most story elements (4-5) • Character • Setting • Events • Problem • Ending	☐ Provides **some** story elements (2-3)	☐ Provides **limited** or no story elements (0-1)	/2
VOCABULARY	☐ Appropriate vocabulary used e.g. Cindy, tripped, fell, tag, school, hurt, hands, knees, teacher, Band-Aid, help. *(5 or more of above words used)*	☐ Non-specific vocabulary used e.g. thing, it, she. that	☐ Very limited vocabulary / marked difficulties labelling objects and actions	/2
WORD/SENTENCE STRUCTUE	☐ A few minor or no grammatical errors noted e.g. irregular forms	☐ Some consistent grammatical errors e.g. word order, tense	☐ Poor sentence structure- many grammatical errors.	/2
	☐ Uses a range of conjunctions e.g. and, but, so, then, because.	☐ Only uses 'and' or "and then' to join sentences	☐ No conjunctions used	/2
CONNECTED LANGUAGE	☐ Tells story fluently, without hesitations and revisions	☐ Tells story with some hesitations or revisions (e.g. 'um') which affect story presentation	☐ Frustrations/difficulties apparent when telling story. Frequent pauses or revisions. Looks to adult for prompts.	/2
	☐ Gives at least 1 sentence for each picture	☐ Refers to most pictures when telling the story	☐ No recognizable story-gives single words or phrases only	/2
	☐ Logical sequencing of events	☐ Omission of events/ poor sequencing	☐ No sequence of events	/2
SOCIAL LANGUAGE	☐ No difficulty staying on topic	☐ Some redirection needed to stay on topic	☐ Marked difficulty staying on topic	/2
	☐ Names a concrete emotion (sad, mad)	☐ Uses vague vocabulary to describe the emotion (didn't like it, cried)	☐ Does not make any reference to emotions.	/2
				___ Total out of 18 (A)
COMPREHENSION	*To score the comprehension section below : 1 point for each correct response to story comprehension questions on page 3 then use column descriptions to rate*			
	☐ Understands a variety of factual (Who, Where) and inferential/prediction questions (Why, How) *(At least 7 factual questions And 2 inferential/prediction)*	☐ Understands basic WH-questions/facts but not inference *(At least 5 questions correct)*	☐ Does not appear to understand basic WH-question (Who? What?)	___ Total out of 10 (B)

Overall Impression Rating (C) : *Add the scores (A + B) =* ☐

___ Total out of 28 (C)

WELL DEVELOPED SKILLS	EMERGING SKILLS	NOT DEVELOPED SKILLS
☐ Total Score = **18- 28**	☐ Total Score = **10 - 17**	☐ Total Score = **0- 10**

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Appendix B. Revised narrative language tool used in Chapter 3, study 2

SPEECH-LANGUAGE PATHOLOGY SERVICES

KINDERGARTEN ORAL LANGUAGE ASSESSMENT FOR LEARNING

Student:	DOB:	DDSB #:
School:	Assessment Completed by:	
Classroom educators:		
Initial Date:	Follow-up Date:	

2018-19 INITIAL

1. **Story Retell**

The examiner says**: "Now, I am going to tell you a story. Listen carefully. When I am done you are going to tell me the same story. Are you ready**?" (Examiner lays out all pictures in the correct order, in front of the student. Examiner tells the story as outlined below, pointing to features in each picture along the way.)

Picture 1:

Last week, Emma was at the store. She was getting some ice cream because she helped her dad clean the garage.

Picture 2:

When Emma was eating her chocolate ice cream cone, she wasn't careful. It toppled to the ground. She was disappointed because her ice cream was ruined.

Picture 3:

Emma politely said, "My ice cream fell. Can I get another one?"

Picture 4:

Then Emma's dad bought her another one.

Picture 5:

She carefully ate her ice cream cone. It was delicious.

Say, "**Thanks for listening. Now you tell me that story."**

Continue to have the story pictures available for the story retell.

Wait 10-15 seconds before providing encouragement.

- If the student is reluctant, encourage by saying, "**It's okay, just do your best.**"
- If the student asks for help, say, "**I can't help. But you can just tell me the parts you remember.**" Listen, and make only neutral comments such as "uh huh" and "okay." Do not repeat the story or any part of it, but you can repeat the directions and provide encouragement as needed.

When the child appears to be finished, say, "**Are you finished?**"

- If the child is not finished, let the child continue.

If the child does not tell a story even after encouragement say, "**That's okay. Thanks for listening to my story.**"

Transcribe the **student's story retelling** below:

____

____

____

____

Continue to have the story pictures available. If the student points to the pictures in response to any of the questions, repeat the question, emphasizing the key word.

COMPREHENSION QUESTIONS	**2 points**	**1 point**	**0 points**	
1**. Who** was the story about?	Emma	A girl **or** any proper name	A pronoun **or** NR	/2
2. Where was Emma in the story?	At the ice cream store **or** at the store	Outside **or** with her dad	Any other response **or** NR	/2
3. **Why** was Emma disappointed?	She dropped her ice cream cone **and** it was ruined	She dropped her ice cream **or** her ice cream got ruined	Any other response **or** NR	/2
4. **What did they do** to solve the problem?	**Asked** (her dad) for **another** ice cream **or** her dad/he/they **bought** her **another** ice cream	She got another ice cream	No attempt to fix problem **or** NR	/2

5. How did the story **end?**	She **ate** her ice cream cone **carefully or** she **ate** it and it was **delicious**	She didn't drop it **or** It was good	Any other response (e.g., she was happy) **or** NR	/2
6. What will Emma do the **next time** she is eating an ice cream cone?	Logical, clear answer **or** any reference to being careful	Reference to eating slowly	Any response that is not relevant or logical	/2
TOTAL				/12

VOCABULARY QUESTIONS	**3 points**	**2 points**	**1 point**	**0 points**	**Total**
1 a) Emma's ice cream **toppled** to the ground? What does *toppled* mean?	fell	dropped			
<u>ONLY</u> proceed to 1 b) if the student doesn't answer or gets an incorrect response. **Proceed to 2 a) if the student provides a 3 or 2 point response.** 1 b) Does toppled mean *fell* or dripped? (fell)					/3
2 a) Emma was **disappointed** because her ice cream cone was ruined. What does *disappointed* mean?	sad **or** upset	mad			
<u>ONLY</u> proceed to 2 b) if the student doesn't answer or gets an incorrect response. 2 b) Does disappointed mean *upset* or *confused*? (upset)					/3

TOTAL	**/6**

2. **Personal Narrative**

To elicit the personal narrative, say, "**In this story, Emma dropped her ice cream and was disappointed. Tell me a story about a time when you were disappointed.**" Transcribe the **student's personal story** below:

_____
_____
_____
_____
_____
_____

2018-19 FOLLOW-UP

1. **Story Retell**

The examiner says**: "Now, I am going to tell you a story. Listen carefully. When I am done you are going to tell me the same story. Are you ready**?" (Examiner lays out all pictures in the correct order, in front of the student. Examiner tells the story as outlined below, pointing to features in each picture along the way.)

Picture 1:

One time, Cindy was running at school. She was going fast because she was playing tag with her friends.

Picture 2:

Cindy tripped and fell. She scraped her hands and knees. She was upset because she got hurt.

Picture 3:

Then, Cindy ran rapidly to her teacher. She said, "I fell. I need some help."

Picture 4:

Her kind teacher put band-aids on her hands and knees.

Picture 5:

After Cindy got some band-aids, she played tag again.

Say, "**Thanks for listening. Now you tell me that story.**"

Continue to have the story pictures available for the retell.

Wait 10-15 seconds before providing encouragement.

- If the student is reluctant, encourage by saying, "**It's okay, just do your best.**"
- If the student asks for help, say, "**I can't help. But you can just tell me the parts you remember.**" Listen, and make only neutral comments such as "uh huh" and "okay". Do not repeat the story or any part of it, but you can repeat the directions and provide encouragement as needed.

When the child appears to be finished, say, "**Are you finished?**"

- If the child is not finished, let the child continue.

If the child does not tell a story even after encouragement say, "**That's okay. Thanks for listening to my story.**"

Transcribe the **student's story retelling** below:

____
____

Continue to have the story pictures available. If the student points to the pictures in response to any of the questions, repeat the question, emphasizing the key word.

COMPREHENSION QUESTIONS	**2 points**	**1 point**	**0 points**	
1. **Who** was the story about?	Cindy	A girl **or** any proper name	A pronoun **or** NR	/2
2. Where was Cindy in the story?	At school	Outside **or** yard	Any other response **or** NR	/2
3. **Why was** Cindy upset?	She fell **and** got hurt **or** scraped her hands and knees **or** was bleeding	She fell **or** got hurt **or** scraped her hands and knees **or** was bleeding	Any other response **or** NR	/2

4. **What did they do** to solve the problem?	Asked her teacher for band-aids	Went to the teacher **or** got band-aids	No attempt to fix problem **or** NR	/2
5. How did the story **end**?	She played tag again.	She ran **or** she played with her friends.	Any other response (e.g., she hurt herself, she was happy) **or** NR	/2
6. What will Cindy do **the next time** she is playing tag?	Logical, clear answer **or** any reference to being careful	Reference to not playing tag	Any response that is not relevant or logical	/2
Total				**/12**

VOCABULARY QUESTIONS	3 points	2 points	1 point	0 points	
1 a) Cindy **scraped** her hands and knees. What does *scraped* mean?	Cut **or** scratched	Bleeding **or** hurt			
<u>ONLY</u> proceed to 1 b) if the student doesn't answer or gets an incorrect response. **Proceed to 2 a) if the student provides a 3 or 2 point response.** 1 b) Does scraped mean *scratched* or *bumped*? (scratched)					/3
2 a) Cindy ran **rapidly** to her teacher. What does *rapidly* mean?	Quickly **or** fast	Not slow			/3

<u>ONLY</u> proceed to 2 b) if the student doesn't answer or gets an incorrect response. 2 b) Does rapidly mean *carefully* or *quickly*? (quickly)					
TOTAL					**/6**

2. **Personal Narrative**

To elicit the personal narrative, say, "**In this story, Cindy fell down and was upset. Tell me a story about a time when you were upset.**" Transcribe the **student's personal story** below:

_____
_____
_____

PHONOLOGICAL AWARENESS SKILLS – ASSESSMENT FOR LEARNING

<u>Scoring</u>: For each section a score of 4/4 (or 6/6 for rhyme recognition) indicates that the student has acquired the skill. All other scores indicate that the student requires some guided practice in the area for skill development.

****If a student is unable to answer the trial item correctly, do not administer that subtest.**

<u>Ceiling Rule</u>: You may choose to **discontinue testing if a student obtains a score of zero on three consecutive subtests.**

7. **Sentence Segmentation** (use the provided picture page and sentence strip)

<u>Educator's Directions & Demo</u>: "I'm going to say a sentence about this picture and every time I say a word I'm going to point to a square. Watch and listen. 'I LIKE PIZZA'. (point to a square on the sentence strip as you say each word). Let's practice. You try: 'SHE IS VERY TALL.' " (Provide support if the student does not do this correctly.)

<u>Trial</u>: "Now it's your turn – 'THE BEAR IS BROWN'… ** Let's try some more."

	Initial	Follow-up

"Bananas are yellow."	Correct/Incorrect/NR	Correct/Incorrect/NR
"I hurt my finger."	Correct/Incorrect/NR	Correct/Incorrect/NR
"Turn the lights on."	Correct/Incorrect/NR	Correct/Incorrect/NR
"The boy is running fast."	Correct/Incorrect/NR	Correct/Incorrect/NR

8. **Syllable Blending**

Educator's Directions & Demo: "I'm going to say a word slowly, like a robot (one part at a time). Listen to the parts: SUN….SHINE. I said, SUNSHINE. Let's practice. You try it: the word is 'HOT…DOG'." (Provide support if the student does not do this correctly.)

Trial: "Now it's your turn. COW… BOY….What word did I say? …** Now let's try some more."

	Initial	Follow-up
Bed-room	Correct/Incorrect/NR	Correct/Incorrect/NR
Pa-per	Correct/Incorrect/NR	Correct/Incorrect/NR
Com-pu-ter	Correct/Incorrect/NR	Correct/Incorrect/NR
Kit-ten	Correct/Incorrect/NR	Correct/Incorrect/NR

9. **Syllable Segmenting**

Educator's Directions & Demo: "I'm going to say the word '*Mommy.*' It has 2 parts. Listen and watch. I'm going to clap the parts. MO-MMY (clap each syllable as you say it.). Let's practice. You try clapping the parts in your name." (Provide support if the student does not do this correctly.)

Trial: "Now it's your turn. WINDOW…** Now let's try some more."

	Initial	Follow-up
Teacher	Correct/Incorrect/NR	Correct/Incorrect/NR
Elephant	Correct/Incorrect/NR	Correct/Incorrect/NR
Dog	Correct/Incorrect/NR	Correct/Incorrect/NR
Pillow	Correct/Incorrect/NR	Correct/Incorrect/NR

10. **Onset and Rime Blending** (Use the plastic blocks to represent the word parts as you say them. Move the blocks together to represent the blended word.)

Educator's Directions & Demo: "I'm going to say a word in parts – the first sound, and the rest of the word – and then I'll say the word as a whole. (For each item, leave a one-second pause between word parts.) Listen, F-ISH, FISH. Let's practice. You try it: the word is 'M-OUSE'." (Provide support if the student does not do this correctly.)

Trial: "Now it's your turn. P-IG. ** Now let's try some more."

	Initial	Follow-up

Sh-eep	Correct/Incorrect/NR	Correct/Incorrect/NR
B-all	Correct/Incorrect/NR	Correct/Incorrect/NR
D-uck	Correct/Incorrect/NR	Correct/Incorrect/NR
H-op	Correct/Incorrect/NR	Correct/Incorrect/NR

11. **Onset and Rime Segmenting** (Use plastic blocks to represent the word parts.)
Educator's Directions & Demo: "I'm going to break a word into two parts – the first sound and the rest of the word. Listen, the word is 'CAT', C…AT. Let's practice. You try it: the word is 'PEN'." (Provide support if the student does not do this correctly.)

Trial: "Now it's your turn. BAG. ** Now let's try some more."

	Initial	Follow-up
Sit	Correct/Incorrect/NR	Correct/Incorrect/NR
Cup	Correct/Incorrect/NR	Correct/Incorrect/NR
Foot	Correct/Incorrect/NR	Correct/Incorrect/NR
Car	Correct/Incorrect/NR	Correct/Incorrect/NR

12. **Initial Word Sound**

Educator's Directions & Demo: "I'm going to say a word and tell you the sound we hear at the beginning. The word is…..MAT……The first sound is /M/. Let's practice. You try it: the word is 'COMB'. What sound do you hear at the beginning of 'COMB'?" (Provide support if the student does not do this correctly.)

Trial: "Now it's your turn. SIP. ** Now let's try some more."

	Initial	Follow-up
Fish	Correct/Incorrect/NR	Correct/Incorrect/NR
Pig	Correct/Incorrect/NR	Correct/Incorrect/NR
Apple	Correct/Incorrect/NR	Correct/Incorrect/NR
Tail	Correct/Incorrect/NR	Correct/Incorrect/NR

13. **Sounds in Words - Blending** (Use wooden blocks to mark each sound and then push the blocks together to represent the blended word.)

Educator's Directions & Demo: "I'm going to say a word in parts. Then I will say the words as a whole. Watch and listen, '/P-A-N/'… PAN. Let's practice. You try it: listen… 'B-OO-T'. What word did I say?" (Provide support if the student does not do this correctly.)

Trial: "Now it's your turn. C-U-P. ** Now let's try some more."

	Initial	Follow-up
/s-oa-p/	Correct/Incorrect/NR	Correct/Incorrect/NR
/f-i-sh/	Correct/Incorrect/NR	Correct/Incorrect/NR
/m-ea-t/	Correct/Incorrect/NR	Correct/Incorrect/NR
/b-e-d/	Correct/Incorrect/NR	Correct/Incorrect/NR

14. **Sounds in Words – Segmenting** (Use wooden blocks to mark each sound.)
Educator's Directions & Demo: "I'm going to say all the sounds in the word 'SIT' and every time I say a sound I'm going to put a block down. Watch and listen, "S…I…T" (Place a block down for each phoneme as you say it). Let's practice. You try it: Place a block down for each sound in the word 'POT'." (Provide support if the student does not do this correctly.)

Trial: "Now it's your turn. Place a block down for each sound in the word 'DAD'. ** Now let's try some more."

	Initial	Follow-up
shoe	Correct/Incorrect/NR	Correct/Incorrect/NR
top	Correct/Incorrect/NR	Correct/Incorrect/NR
sun	Correct/Incorrect/NR	Correct/Incorrect/NR
fog	Correct/Incorrect/NR	Correct/Incorrect/NR

15. **Rhyme Recognition**
Educator's Directions & Demo: "I'm going to say some words that rhyme, HAT, CAT, FAT, MAT. Rhyming words sounds the same at the end. Let's say those words again: HAT, CAT, FAT, MAT. Let's practice. Listen to these words: 'BIG, UP, WALK'. Do they rhyme? (Provide support if the student does not respond correctly).

Trial: "Now it's your turn to tell me if these words rhyme. PEN, TEN, DEN. ** Now let's try some more."

	Initial	Follow-up
fun, run, sun	Correct/Incorrect/NR	Correct/Incorrect/NR
run, jump, walk	Correct/Incorrect/NR	Correct/Incorrect/NR
bag, rat, and	Correct/Incorrect/NR	Correct/Incorrect/NR
pan, fan, van	Correct/Incorrect/NR	Correct/Incorrect/NR
dig, pig, big	Correct/Incorrect/NR	Correct/Incorrect/NR
dog, cow, horse	Correct/Incorrect/NR	Correct/Incorrect/NR

10. Rhyme Production

Educator's Directions & Demo: "I'm going to say some words that rhyme…LAKE, RAKE, CAKE. Another word that rhymes with LAKE, RAKE, CAKE… is BAKE. Let's practice. Tell me a word that rhymes with PIN, DIN, SHIN." (Provide support if the student does not respond correctly.)

Trial: "Now it's your turn to tell me a rhyming word. Tell me a word that rhymes with… FOG. ** Now let's try some more."

	Initial (indicate response in first column)		Follow-up (indicate response in first column)	
tan		Correct/Incorrect/NR		Correct/Incorrect/ NR
mitt		Correct/Incorrect/NR		Correct/Incorrect/ NR
look		Correct/Incorrect/NR		Correct/Incorrect/ NR
red		Correct/Incorrect/NR		Correct/Incorrect/ NR

SPEECH-LANGUAGE PATHOLOGY SERVICESASSESSMENT FOR LEARNING: SUMMARY 2018-2019

Student:	**DOB:**	**DDSB #:**
School:	**Assessment completed by:**	
Classroom Educators:		
Initial Date:	**Follow-up Date:**	

Age of Acquisition	Phonological Awareness Skill	Initial	
4 years	1. Sentence Segmentation		
4 years	2. Syllable Blending		
4 years	3. Syllable Segmenting		
5 years	4. Onset and Rime Blending		
5 years	5. Onset and Rime Segmenting		
5 years	6. Initial Word Sound		
5 years+	7. Sounds in Words Blending		
5 years+	8. Sounds in Words Segmenting		
3-5 years	9. Rhyme Recognition		
4-6 years	10. Rhyme Production		

Speech Sound Production Skills

Initial		Follow-Up	
Speech sound development		**Speech sound development**	

Stimulability		**Stimulability**	
Overall intelligibility		**Overall intelligibility**	
Ability to coordinate/produce multisyllabic words		**Ability to coordinate/produce multisyllabic words**	
Fluency		**Fluency**	
Voice		**Voice**	

		Tick in this column = 2 points	Tick in this column = 1 point	Tick in this column = 0 points	TOTAL
NARRATIVE	Character	☐ Emma **or** Any similar sounding proper name, e.g. Emily	☐ A girl **or** the girl	☐ She/he/they **or** NR	/2
	Setting	☐ at the ice cream store **or** at the store	☐ outside **or** with her father	☐ any other location **or** NR	/2
	Problem	☐ Her ice cream cone fell **and** was ruined	☐ Her ice cone fell **or** her ice cream cone was ruined	☐ Any other response	/2
	Feeling *Feeling word used*: _____	☐ Disappointed **or** sad **or** upset	☐ Cried **or** mad **or** didn't like it	☐ Any other response **or** NR	/2
	Attempt	☐ Asked (her dad) for another one	☐ She got another ice cream cone (no reference to asking)	☐ Any other response **or** NR	/2
	Consequence	☐ Her dad bought her another one	☐ She was happy	☐ Any other response **or** NR	/2
	Ending	☐ She **carefully ate** her ice cream cone **or** she **ate** her ice cream cone and it was **delicious**	☐ She didn't drop her ice cream cone **or** it was good	☐ She was happy **or** she hurt herself **or** any other response **or** NR	/2
VOCABULARY	Story vocabulary used (store, ice cream, dad, helped, clean, garage, chocolate, toppled /fell, ground, disappointed, careful/ carefully, ruined, another, bought, delicious,)	☐ 5 or more story vocabulary items used	☐ Less than 5 story vocabulary items used	☐ Very limited vocabulary used **or** marked difficulties labelling objects and actions **or** vague vocabulary (thing, it, she, that)	/2
	Bonus Story vocabulary	☐ 10 or more story vocabulary items used			/2
WORD/SENTENCE STRUCTURE	Auxiliary verb 'be' / past tense	☐ **Consistently** used both auxiliary verb 'be' (e.g., was getting, was eating her ice cream) **and** used past tense correctly (e.g., fell, helped, toppled)	☐ Used **either** auxiliary verb 'be' **or** past tense correctly (does not need to be consistent)	☐ **Did not** use auxiliary verb 'be' **or** past tense correctly	/2
	Pronouns / Possessives	☐ **Consistently** used pronouns (e.g., she, her) **and** possessives (e.g., her dad, my ice cream) correctly	☐ Used **either** pronouns **or** possessives correctly (does not need to be consistent)	☐ **Did not** use pronouns **or** possessives correctly	/2
	Conjunctions	☐ Used a range of conjunctions (3 or more) e.g. and, but, so, then, because.	☐ Only used 'and' or 'and then' to join sentences	☐ Did not use conjunctions	/2
CONNECTED LANGUAGE	Story fluency	☐ Told story fluently without hesitations and revisions	☐ Told story with some hesitations or revisions (e.g. 'um') which affect story presentation. Some prompting required.	☐ Frustrations/difficulties apparent when story was told. Frequent pauses or revisions. Frequent prompting required.	/2
	Story completion	☐ Provided a sentence or phrase for each picture	☐ Provided a sentence or phrase for most pictures when telling	☐ No recognizable story. Single words or phrases	/2

			the story	unrelated to the story	
	Story sequencing	☐ Logical sequencing of events	☐ Poor sequencing	☐ No sequence of events	/2
SOCIAL LANGUAGE	Topic maintenance	☐ No difficulty staying on topic	☐ Some redirection needed to stay on topic	☐ Marked difficulty staying on topic	/2
	Information sharing	☐ Communicated readily, shared information freely, appropriate response time	☐ Some prompting required to elicit responses	☐ Substantial prompting required to elicit verbal responses or limited communication	/2
	TOTAL				**/34**

COMPREHENSION QUESTIONS	☐ Understood a variety of factual (Who, Where) and inferential questions (Why) (Score 9-12)	☐ Understood some wh-questions/facts (Score 5-8)	☐ Showed limited understanding of wh-questions. (Score 0-4)	**/12**
VOCABULARY QUESTIONS	☐ Able to define words within a context (Score 5-6)	☐ Some ability to define words within a context (Score 3-4)	☐ Limited / no ability to define words within a context (Score 0-2)	**/6**

		Tick in this column = 2 points	Tick in this column = 1 point	Tick in this column = 0 points	TOTAL
NARRATIVE	Character	☐ Used first-person pronoun (e.g., I, me, my) **and** clearly introduces other characters (e.g., 'my mom')	☐ Used first-person pronoun **but** other characters are not introduced and are only referred to using pronouns (e.g., She wouldn't let me…)	☐ No reference to self **or** NR	/2
	Setting	☐ Clearly referenced a setting (e.g., park, school)	☐ Vague reference to setting (e.g., 'there') **or** required a prompt to state setting	☐ No reference to setting **or** NR	/2
	Problem	☐ Clearly stated a problem	☐ Vague reference to a problem / problem not clearly stated (e.g., *something* happened, I forgot *it*) **or** required a prompt to state problem	☐ No reference to problem **or** NR	/2
	Feeling *Feeling word used:* _____	☐ Clearly stated a feeling	☐ Vague reference to feelings (e.g., cried/ didn't like it) **or** required a prompt to state a feeling	☐ No reference to feelings **or** NR	/2
	Attempt	☐ Clearly stated an attempt to solve the problem	☐ Vague reference to an attempt to solve the problem **or** required a prompt to state an attempt to solve the problem	☐ No reference to an attempt to solve the problem **or** NR	/2
	Consequence	☐ Clearly stated a consequence	☐ Vague reference to a consequence **or** required a prompt to state a consequence	☐ No reference to a consequence **or** NR	/2
	Ending	☐ Clearly included a relevant/logical ending	☐ Included an ending that was vague, or not relevant/logical **or** required a prompt to include an ending	☐ Did not include an ending **or** NR	/2
VOCABULARY	Incorporated vocabulary related to their personal story	☐ 5 or more specific content words used	☐ Less than 5 specific content words used	☐ Very limited vocabulary used **or** marked difficulties labelling objects and actions **or** vague vocabulary (thing, it, she, that)	/2
	Bonus Story vocabulary	☐ 10 or more specific content words used			/2
WORD/SENTENCE STRUCTUE	Auxiliary verb 'be' / past tense	☐ **Consistently** used both auxiliary verb 'be' (e.g., was running, was playing tag) **and** used past tense correctly (e.g., fell, tripped)	☐ Used **either** auxiliary verb 'be' **or** past tense correctly (does not need to be consistent)	☐ **Did not** use auxiliary verb 'be' **or** past tense correctly	/2
	Pronouns / Possessives	☐ **Consistently** used pronouns (e.g., I, me, she, her) **and** possessives (e.g., her hands, my teacher) correctly	☐ Used **either** pronouns **or** possessives correctly (does not need to be consistent)	☐ **Did not** use pronouns **or** possessives correctly	/2
	Conjunctions	☐ Used a range of conjunctions (3 or more) e.g. and, but, so, then, because.	☐ Only used 'and' or 'and then' to join sentences	☐ Did not use conjunctions	/2

CONNECTED LANGUAGE	Story fluency	☐ Told story fluently without hesitations and revisions	☐ Told story with some hesitations or revisions (e.g. 'um') which affect story presentation. Some prompts required.	☐ Frustrations/difficulties apparent when story has told. Frequent pauses or revisions. Frequent prompting needed.	/2
	Story completion	☐ Provided at least 5 sentences/phrases	☐ Provided fewer than 5 sentences/phrases	☐ No recognizable story, provided single words or phrases unrelated to the story	/2
	Story sequencing	☐ Logical sequencing of events	☐ Poor sequencing	☐ No sequence of events	/2
SOCIAL LANGUAGE	Topic maintenance	☐ No difficulty staying on topic	☐ Some redirection needed to stay on topic	☐ Marked difficulty staying on topic	/2
	Information sharing	☐ Communicated readily, shared information freely, appropriate response time	☐ Some prompting required to elicit responses	☐ Substantial prompting required to elicit verbal responses or limited communication	/2
TOTAL					**/34**

		Tick in this column = 2 points	**Tick in this column = 1 point**	**Tick in this column = 0 points**	**TOTAL**
NARRATIVE	Character	☐ Cindy **or** Any similar sounding proper name, e.g. Sandy	☐ A girl **or** the girl	☐ She/he/they **or** NR	/2
	Setting	☐ At school	☐ Outside **or** in the yard	☐ Playing tag **or** any other location **or** NR	/2
	Problem	☐ Fell **and** got hurt	☐ Fell **or** got hurt	☐ Any other response **or** NR	/2
	Feeling *Feeling word used:* _____	☐ Upset **or** sad	☐ Cried **or** didn't like it	☐ Any other response **or** NR	/2
	Attempt	☐ Asked (her/the teacher) for help	☐ She got band-aids (no reference to asking)	☐ Any other response **or** NR	/2
	Consequence	☐ Teacher put on band- aids	☐ **Teacher** helped her **or** she got **band-aids**	☐ Any other response **or** NR	/2
	Ending	☐ She played tag again	☐ She played again	☐ She was happy **or** she hurt herself **or** any other response **or** NR	/2
VOCABULARY	Story vocabulary used (e.g., running, school, tag, friends, tripped, fell, hurt/scraped, hands, knees, upset, rapidly/fast, teacher, help, kind, band-aids)	☐ 5 or more story vocabulary items used	☐ Less than 5 story vocabulary items used	☐ Very limited vocabulary used **or** marked difficulties labelling objects and actions **or** vague vocabulary (thing, it, she, that)	/2
	Bonus Story vocabulary	☐ 10 or more story vocabulary items used			/2

WORD/SENTENCE STRUCTURE	Auxiliary verb 'be' / past tense	☐ **Consistently** used both auxiliary verb 'be' (e.g., was running, was playing tag) **and** used past tense correctly (e.g., fell, tripped)	☐ Used **either** auxiliary verb 'be' **or** past tense correctly (does not need to be consistent)	☐ **Did not** use auxiliary verb 'be' **or** past tense correctly	/2
	Pronouns / Possessives	☐ **Consistently** used pronouns (e.g., she, her) **and** possessives (e.g., her hands, Cindy's teacher) correctly	☐ Used **either** pronouns **or** possessives correctly (does not need to be consistent)	☐ **Did not** use pronouns **or** possessives correctly	/2
	Conjunctions	☐ Used a range of conjunctions (3 or more) e.g. and, but, so, then, because.	☐ Only used 'and' or 'and then' to join sentences	☐ Did not use conjunctions	/2
CONNECTED LANGUAGE	Story fluency	☐ Told story fluently without hesitations and revisions	☐ Told story with some hesitations or revisions (e.g. 'um') which affect story presentation. Some prompting required.	☐ Frustrations/difficulties apparent when story was told. Frequent pauses or revisions. Frequent prompting required.	/2
	Story completion	☐ Provided a sentence or phrase for each picture	☐ Provided a sentence or phrase for most pictures when telling the story	☐ No recognizable story, provided single words or phrases unrelated to the story	/2
	Story sequencing	☐ Logical sequencing of events	☐ Poor sequencing	☐ No sequence of events	/2
SOCIAL LANGUAGE	Topic maintenance	☐ No difficulty staying on topic	☐ Some redirection needed to stay on topic	☐ Marked difficulty staying on topic	/2
	Information sharing	☐ Communicated readily, shared information freely, appropriate response time	☐ Some prompting required to elicit responses	☐ Substantial prompting required to elicit verbal responses or limited communication	/2
TOTAL					**/34**

COMPREHENSION QUESTIONS	☐ Understood a variety of factual (Who, Where) and inferential questions (Why) (Score 9-12)	☐ Understood some wh-questions/facts (Score 5-8)	☐ Showed limited understanding of wh-questions. (Score 0-4)	**/12**
VOCABULARY QUESTIONS	☐ Able to define words within a context (Score 5-6)	☐ Some ability to define words within a context (Score 3-4)	☐ Limited **or** no ability to define words within a context (Score 0-2)	**/6**

	Item	Tick in this column = 2 points	Tick in this column = 1 point	Tick in this column = 0 points	TOTAL
NARRATIVE	Character	☐ Used first-person pronoun (e.g., I, me, my) **and** clearly introduces other characters (e.g., 'my mom')	☐ Used first-person pronoun **but** other characters are not introduced and are only referred to using pronouns (e.g., She wouldn't let me…)	☐ No reference to self **or** NR	/2
	Setting	☐ Clearly referenced a setting (e.g., park, school)	☐ Vague reference to setting (e.g., 'there') **or** required a prompt to state setting	☐ No reference to setting **or** NR	/2
	Problem	☐ Clearly stated a problem	☐ Vague reference to a problem **or** problem not clearly stated (e.g., *something* happened, I forgot *it*) **or** required a prompt to state problem	☐ No reference to problem **or** NR	/2
	Feeling *Feeling word used:* _____	☐ Clearly stated a feeling	☐ Vague reference to feelings (e.g., cried/ didn't like it) **or** required a prompt to state a feeling	☐ No reference to feelings **or** NR	/2
	Attempt	☐ Clearly stated an attempt to solve the problem	☐ Vague reference to an attempt to solve the problem **or** required a prompt to state an attempt to solve the problem	☐ No reference to an attempt to solve the problem **or** NR	/2
	Consequence	☐ Clearly stated a consequence	☐ Vague reference to a consequence **or** required a prompt to state a consequence	☐ No reference to a consequence **or** NR	/2
	Ending	☐ Clearly included a relevant/logical ending	☐ Included an ending that was vague, or not relevant/logical **or** required a prompt to include an ending	☐ Did not include an ending **or** NR	/2
VOCABULARY	Incorporated vocabulary related to their personal story	☐ 5 or more specific content words used	☐ Less than 5 specific content words used	☐ Very limited vocabulary used **or** marked difficulties labelling objects and actions **or** vague vocabulary (thing, it, she, that)	/2
	Bonus Story vocabulary	☐ 10 or more specific content words used			/2
WORD	Auxiliary verb 'be' / past tense	☐ **Consistently** used both auxiliary verb 'be' (e.g., was running, was playing tag) **and** used past tense correctly (e.g., fell, tripped)	☐ Used **either** auxiliary verb 'be' **or** past tense correctly (does not need to be consistent)	☐ **Did not** use auxiliary verb 'be' **or** past tense correctly	/2

	Pronouns / Possessives	☐ **Consistently** used pronouns (e.g., I, me, she, her) **and** possessives (e.g., her hands, my teacher) correctly	☐ Used **either** pronouns **or** possessives correctly (does not need to be consistent)	☐ **Did not** use pronouns **or** possessives correctly	/2
	Conjunctions	☐ Used a range of conjunctions (3 or more) e.g. and, but, so, then, because.	☐ Only used 'and' or 'and then' to join sentences	☐ Did not use conjunctions	/2
CONNECTED LANGUAGE	Story fluency	☐ Told story fluently without hesitations and revisions	☐ Told story with some hesitations or revisions (e.g. 'um') which affect story presentation. Some prompting required.	☐ Frustrations/difficulties apparent when story has told. Frequent pauses or revisions. Frequent prompting required.	/2
	Story completion	☐ Provided at least 5 sentences/phrases	☐ Provided fewer than 5 sentences/phrases	☐ No recognizable story, provided single words or phrases unrelated to the story	/2
	Story sequencing	☐ Logical sequencing of events	☐ Poor sequencing	☐ No sequence of events	/2
SOCIAL LANGUAGE	Topic maintenance	☐ No difficulty staying on topic	☐ Some redirection needed to stay on topic	☐ Marked difficulty staying on topic	/2
	Information sharing	☐ Communicated readily, shared information freely, appropriate response time	☐ Some prompting required to elicit responses	☐ Substantial prompting required to elicit verbal responses or limited communication	/2
TOTAL					**/34**

Appendix C. Perceptual mapping instructions used in Chapter 4

Perceptual mapping preamble:

Our aim is to discover factors that influence outcomes in collaborative partnerships. In this exercise, we'd like to examine the factors you feel have influenced the partnership, and how they fit together to achieve performance.

1. Record any suggested factors on separate post-it notes.

2. Explore terms on individual post-it notes asking respondents to give explanations, determine more or less important factors, and identify measurement factors. Add responses to the post-it notes using the code for explanations (bullet point), importance (+/-), and measurement (M).

3. Ask respondents to categorize post-it notes based on perceived similarities, and then to provide each 'pile' of post-it notes with a title. At the same time, encourage respondents to place the piles on a large paper according to how they have influenced each other and outcomes, and to add arrows on the map between factors in order to demonstrate, visually, their influence on each other, and on the relationship outcomes.

4. If factors identified in the project to this point do not appear on the map (a list will be provided when relevant), ask respondents to consider each one. Should respondents choose to add these factors to the map, write them on different coloured post-it notes to signal that it was a prompted factor.

Appendix D. Semi-structured interview questions used in Chapter 4

Semi-structured Interview / Focus Group Guide for School Board Partnerships

Discussion preamble: The purpose of this study is to gain insight into the process of collaborative partnership development and maintenance across diverse settings contributing to the delivery and evaluation of effective, evidence-based services for children.

During this session, we'd like to understand your perceptions of the development, functioning, and outcomes of our collaborative partnerships.

1. Introductions: What is your professional background? What is your connection to the project?

2. Background: Describe your work setting, and the reasons you were interested in joining in a collaborative practice-based research project?

3. Formation: What steps were taken to establish the partnership? When did these steps occur?

Who was involved in these steps, and what action was taken? How effective were these actions?

4. Evolution: What further steps were involved in establishing the partnership?

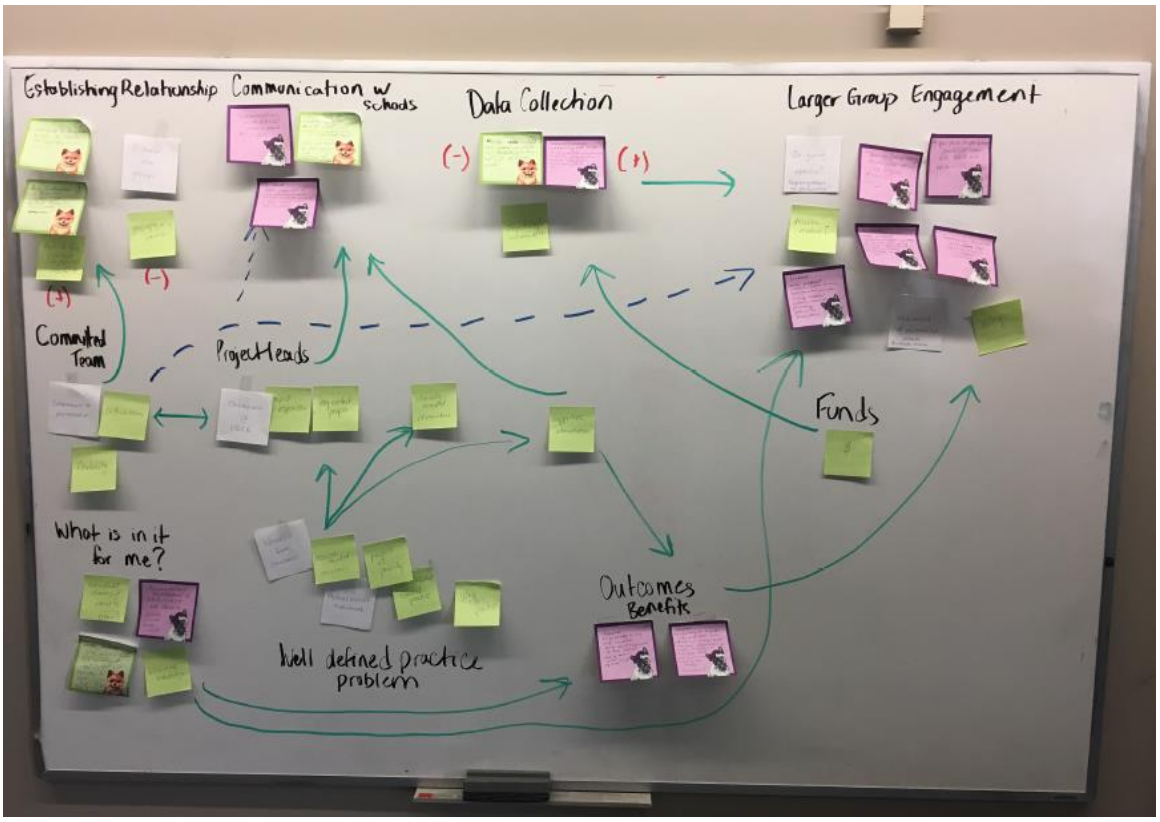
5. Current structure: What is the current structure of the partnership?

6. Dynamics: How are changes made within the partnership? What mechanisms are in place to detect the need for change? How is information exchanged between partnership members?

7. Performance: What goals have been accomplished by the partnership? What goals have yet to be accomplished? How is performance of the partnership evaluated? What outcome measures are used? How do you know whether a job is complete, or completed well?

8. Reflection: How has this collaboration enhanced your organization's research capacity? What challenges have you or are you facing in this collaboration?

Appendix E. Visual representation of perceptual mapping activity constructed by the speech language pathologists and researchers



Appendix F. Ethics approval for Chapter 3 from Western University

Western Research

Date: 24 September 2018

To: Lisa Archibald

Project ID: 109664

Study Title: A language and literacy kindergarten screening tool

Application Type: NMREB Amendment Form

Review Type: Delegated

Full Board Reporting Date: 05/Oct/2018

Date Approval Issued: 24/Sep/2018 16:37

REB Approval Expiry Date: 10/Oct/2019

Dear Lisa Archibald,

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the amendment, as of the date noted above.

Documents Approved:

Document Name	Document Type	Document Date	Document Version
CELF_DataCollectionForm&Images	Other Data Collection Instruments	06/Jul/2018	1
EmailRecruitment_ExtensionStudy2018	Recruitment Materials	13/Aug/2018	1
InPersonRecruitment_ExtensionStudy2018	Recruitment Materials	10/Sep/2018	1
LOI_ExtensionStudy2018_CLEAN	Written Consent/Assent	13/Aug/2018	1
SharingContactInformationForm	Other Data Collection Instruments	10/Sep/2018	1
Shortened Token Test_DataCollection Form&Image	Other Data Collection Instruments	06/Jul/2018	1
TelephoneRecruitment_ExtensionStudy2018	Recruitment Materials	13/Aug/2018	1
TNL_DataCollectionForm&Images	Other Data Collection Instruments	06/Jul/2018	1
Updated Narrative Retell Measure	Other Data Collection Instruments	18/Sep/2018	1
UWO Cover Letter_Amendment Clean	Written Consent/Assent	06/Jul/2018	1
WesternProtocol_ExtensionStudy2018_CLEAN	Protocol	10/Sep/2018	1
Word Associations Subtest_CELF-4	Other Data Collection Instruments	18/Sep/2018	1
WRAML2_DataColletionForm&Images	Other Data Collection Instruments	06/Jul/2018	1

REB members involved in the research project do not participate in the review, discussion or decision.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario

Appendix G. Ethics approval for amendment to Chapter 3 from Western University

Western Research

Date: 13 December 2018

To: Lisa Archibald

Project ID: 109664

Study Title: A language and literacy kindergarten screening tool

Application Type: NMREB Amendment Form

Review Type: Delegated

Full Board Reporting Date: 11/Jan/2019

Date Approval Issued: 13/Dec/2018 15:01

REB Approval Expiry Date: 10/Oct/2019

Dear Lisa Archibald,

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the amendment, as of the date noted above.

Documents Approved:

Document Name	Document Type	Document Date	Document Version
LOI_Amendment_December2_CLEAN	Written Consent/Assent	10/Dec/2018	1
WesternProtocol_Amendment_December2_CLEAN	Protocol	10/Dec/2018	1

REB members involved in the research project do not participate in the review, discussion or decision.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Sincerely,

[redacted]

Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).

Appendix H. Ethics approval for second amendment to Chapter 3 from Western University

Western Research

Date: 30 September 2019

To: Lisa Archibald

Project ID: 109664

Study Title: A language and literacy kindergarten screening tool

Application Type: NMREB Amendment Form

Review Type: Delegated

Full Board Reporting Date: 01/Nov/2019

Date Approval Issued: 30/Sep/2019 13:17

REB Approval Expiry Date: 10/Oct/2019

Dear Lisa Archibald,

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the amendment, as of the date noted above.

Documents Approved:

Document Name	Document Type	Document Date	Document Version
Attachmentfor Principals_September2019	Information Update Letter	24/Sep/2019	1
DDSB_TT_FWS_Revised2019_CLEAN	Other Materials	16/Sep/2019	1
EmailtoParents_September2019	Information Update Letter	24/Sep/2019	1
EmailtoPrincipalsand Parents_September2019	Information Update Letter	24/Sep/2019	1
LOI_Amendment_September2019_NEW	Written Consent/Assent	24/Sep/2019	1
WesternProtocol_Amendment_September2019_CLEAN	Protocol	16/Sep/2019	1

REB members involved in the research project do not participate in the review, discussion or decision.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Sincerely,

[redacted]

Appendix I. Ethics approval for Chapter 3 from school board

[redacted] [redacted]

October 12, 2017

Dr. Lisa Archibald
Associate Professor, School of Communication Sciences and Disorders
Western University
Elborn College
Room 2597
LONDON, ON N6G 1H1

External Research Proposal: ***A language and literacy kindergarten screening tool***

We acknowledge receipt of your external research application dated September 1, 2017. Permission is hereby granted to conduct educational research in the [redacted]d, as outlined in your application. Please note the following:

- You must initially approach the Principal of the school where you wish to conduct your research in order to obtain permission for the school to participate in your study.
- All teacher and student participation is voluntary.

We request that you reference the following number in all future correspondence:

Research Proposal 18-001

In this way, we can accurately and efficiently respond to any inquiries related to your research that may arise.

On behalf of the External Research Committee, we congratulate and wish you well in your research endeavours. We look forward to receiving a copy of the results of your study.

Yours truly,

[redacted]

Appendix J. Ethics approval for extensions for Chapter 3 from school board

October 11, 2018

Dr. Lisa Archibald
Associate Professor, School of Communication Sciences and Disorders
Western University
Elborn College
Room 2597
LONDON, ON N6G 1H1

Ethics Revision 2018-2019 – "A language and literacy screening tool", Research Proposal 18-001

This letter will confirm that the ethics revision to research proposal 18-001 has now been approved by the External Research Committee.

If you have any questions or wish to discuss this further, please do not hesitate to contact me directly at 905-666-6026, or by email at

Appendix K. Ethics approval for Chapter 4 from Western University

Western Research

Date: 9 October 2018

To: Dr. Lisa Archibald

Project ID: 112222

Study Title: Building Partnerships in Practice and Research

Application Type: NMREB Initial Application

Review Type: Delegated

Full Board Reporting Date: 02/Nov/2018

Date Approval Issued: 09/Oct/2018 15:26

REB Approval Expiry Date: 09/Oct/2019

Dear Dr. Lisa Archibald

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the above mentioned study, as of the date noted above. NMREB approval for this study remains valid until the expiry date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

This research study is to be conducted by the investigator noted above. All other required institutional approvals must also be obtained prior to the conduct of the study.

Documents Approved:

Document Name	Document Type	Document Date	Document Version
EmailRecruitmentScript	Recruitment Materials	21/Jun/2018	1.0
InterviewGroupGuide_Partners	Focus Group(s) Guide		
InterviewGroupGuide_Partners	Interview Guide	22/Jun/2018	1.0
InterviewGuide_ParentChildYouth	Interview Guide		
LOI_Partnership_Assent7-14_Aug1	Written Consent/Assent	01/Aug/2018	1.0
LOI_Partnership_CYDC_ParentsChildYouth_Oct1	Written Consent/Assent	01/Oct/2018	1.1
LOI_Partnership_CYDC_Primary_Oct1	Written Consent/Assent	01/Oct/2018	1.1
LOI_Partnership_CYDC_Youth_Oct1	Written Consent/Assent	01/Oct/2018	1.1
LOI_Partnership_SchoolBoard_DiscussionForum_Aug1	Written Consent/Assent	01/Aug/2018	1.0
LOI_Partnership_SchoolBoard_Primary_Oct1	Written Consent/Assent	01/Oct/2018	1.1
LOI_Partnership_SchoolBoard_Survey_Aug1	Implied Consent/Assent	01/Aug/2018	1.0
LOI_Partnership_VerbalConsent	Verbal Consent/Assent	22/Jun/2018	1.0
Questionnaire	Online Survey	21/Jun/2018	1.0
RecordsDatabase	Other Data Collection Instruments		
RecruitmentScript_Partnership_1.1	Oral Script	01/Oct/2018	1.1
RecruitmentScript_Partnership_1.1	Recruitment Materials		1.1

No deviations from, or changes to the protocol should be initiated without prior written approval from the NMREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Appendix L. Ethics approval for Chapter 4 from school board

[redacted]

October 11, 2018

Dr. Lisa Archibald
Associate Professor, School of Communication Sciences and Disorders
Western University
Elborn College
Room 2597
LONDON, ON N6G 1H1

External Research Proposal: *Building Partnership in Practice and Research*

We acknowledge receipt of your external research application dated September 12, 2018. Permission is hereby granted to conduct educational research in the [redacted], as outlined in your application. Please note the following:

- You must initially approach the Principal of the school where you wish to conduct your research in order to obtain permission for the school to participate in your study.
- All teacher and student participation is voluntary.

We request that you reference the following number in all future correspondence:

Research Proposal 19-001

In this way, we can accurately and efficiently respond to any inquiries related to your research that may arise.

On behalf of the External Research Committee, we congratulate and wish you well in your research endeavours. We look forward to receiving a copy of the results of your study.

Yours truly,

[redacted]

Curriculum Vitae

Meghan Vollebregt, B.A

Education

In progress	Ph.D Health and Rehabilitation Sciences, University of Western Ontario Advisor: Dr. Lisa Archibald
In progress	M.Cl.Sc Speech-Language Pathology, University of Western Ontario
2015	Bachelor of Arts, Psychology, Brescia University College, University of Western Ontario Thesis: The role of executive function on the homophone suppression mechanism

Honours Awarded

2020-2021	Teaching assistantship award, Communication Sciences and Disorders, University of Western Ontario
2019-2020	Ontario Graduate Research Scholarship
2018-2019	Dr. Benjamin Goldberg Research Grant Competition, Schulich Medicine and Dentistry, University of Western Ontario
2016-2021	Western Graduate Research Scholarship (awarded annually)
2015	Brescia Honour Society, Brescia University College, University of Western Ontario
2015	Valedictorian, Brescia University College, University of Western Ontario
2014	Sister Arlene Walker Award, Brescia University College, University of Western Ontario

Peer-Reviewed Publications

1. Vollebregt, M., Archibald, L., Theurer, J., Oram Cardy, J. (under review). Exploring practice-based clinical-research partnerships in speech-language pathology: A scoping review.
2. Youngson, N. L., Vollebregt, M., & Sutton, J. E. (2019). Individual differences in cognitive map accuracy: Investigating the role of landmark familiarity. *Canadian*

Journal of Experimental Psychology/Revue canadienne de psychologie expérimentale, *73*(1), 37-46.

3. Archibald, L. & Vollebregt, M. (2019). Collaboration in speech–language therapy. In J. Damico & M. Ball (Eds.), *The SAGE encyclopedia of human communication sciences and disorders* (pp. 418-422). Thousand Oaks,, CA: SAGE Publications, Inc. 10.4135/9781483380810.n141

Invited Talks

1. Vollebregt, M. Practice-Based Research: Co-creating Knowledge Without the Gap. Faculty Health Sciences-School of Biomedical Engineering Research Day. Western University. London, ON, June 3, 2019.
2. Vollebregt, M. Practice-Based Research in Education: Investigating a Language Assessment Tool. Child Health Symposium Rapid Session. Children's Hospital LHSC. London, ON, May 22, 2019.

Peer-Reviewed Talks

1. **Vollebregt, M**., & Archibald, L. Does your kindergarten language and literacy assessment effectively capture change: Partnership with Researchers, ASHA, July 2021. International (online).
2. **Vollebregt, M**., & Archibald, L. Practice-based research: A kindergarten language and literacy tool, Theory to Therapy, Toronto, Ontario, June 2021. Provincial (online).
3. **Vollebregt, M.,** & Archibald, L. Practice-based research involving speech-language pathologists: A language and literacy assessment tool for school-aged children, Developmental Disabilities Research Day, London, Ontario, June 2021. Institutional (online).
4. **Vollebregt, M**., & Wood, E. Assessing Phonological Awareness and Oral Narrative Skills in Kindergarten Student, ResearchED, Toronto, ON, May 2020. National. (oral accepted; conference cancelled).
5. Daub, O., **Vollebregt, M**., Theurer, J., Archibald, L., Oran Cardy, J. Research for Practice: Embracing the Power of Partnership, SAC, Ottawa, ON, May 2020. National. (oral accepted; conference cancelled).
6. **Vollebregt, M**., & Archibald, L., Practice-based research: A perceptual mapping activity, HRSGRC, London, ON February 2020. Institutional.
7. **Vollebregt, M**., Raffalovitch, S., Leggett, J., Archibald, L. Reading for All: A Tier 1 Reading Intervention, SSSR, Toronto, ON, July 2019. National.
8. **Vollebregt, M**., & Archibald, L. Practice-based research in education: Investigating a language tool, Child Health Symposium, London, ON, May 2019. Institutional.
9. **Vollebregt, M**., Kuiack, A., & Archibald, L. Partnerships for Practice-based research in educational speech and language services, Faculty Research Partnership Day, London, ON, April 2019. Institutional.
10. Sutton, J. E., **Vollebregt, M**., Nantais, M. Building a cognitive map in a laboratory: Do instructions to participants matter, Canadian Society for Brain, Behaviour and Cognitive Science, Regina Saskatchewan, June 2017. National.

Peer-Reviewed Posters

1. **Vollebregt, M**., Drake, L., Sarlo, N., Archibald, L., Engaging Speech-Language Pathologists in Practice-Based Research, International KT Conference in Rehabilitation, Montreal, Quebec, June 2021. National (online).
2. **Vollebregt, M**., Drake, L., Sarlo, N., Punnoose, A., Archibald, L. Engaging in practice-based research in a school setting: A qualitative analysis, SRCLD, Madison, Wisconsin, June 2021. International (online).
3. **Vollebregt, M**., Drake, L., Sarlo, N., Archibald, L., Engaging Speech-Language Pathologists in Practice-Based Research, International KT Conference in Rehabilitation, Montreal, Quebec, June 2020. National. (poster accepted; conference cancelled).
4. **Vollebregt, M**., Durham District School Board, & Archibald, L. Engaging in Clinical-Research Partnerships: A Perceptual Mapping Activity, SRCLD, Madison, Wisconsin, May 2020. International. (poster accepted; conference cancelled).
5. **Vollebregt, M**., & Archibald, L. Practice-based research in speech-language pathology, SRCLD, Madison, Wisconsin, May 2020. International. (poster accepted; conference cancelled).
6. **Vollebregt, M**., & Archibald, L. Practice-based research with school-based partnerships. SRCLD, Madison, Wisconsin, June 2019. International.
7. **Vollebregt, M**., Raffalovitch, S., Leggett, J., Archibald, L. Reading for All: Implementation of a Tier 1 Reading Intervention, SRCLD, Madison, Wisconsin, June 2018. International.
8. **Vollebregt, M**., Archibald, L., Theurer, J., Oram Cardy, J. A scoping review to examine practice-based clinical-research partnerships, SRCLD, Madison, Wisconsin, June 2018. International.
9. Sutton, J. E., **Vollebregt, M**., & Grogan, B. Self-guided exploration of a novel environment results in a more accurate cognitive map than learning via route integration, Psychonomics, Boston, Massachusetts, November 2016. International.
10. **Vollebregt, M**., Youngson, N., & Sutton, J. E. Increased familiarity does not improve cognitive mapping in a novel virtual environment, Spatial Cognition, Philadelphia, Pennsylvania, August 2016. International.
11. **Vollebregt, M**., Grogan, B., & Sutton, J.E. Exploration method in a virtual environment and cognitive map accuracy, Canadian Society for Brain, Behaviour and Cognitive Science, Ottawa, Ontario, June 2016. National.

Professional Experience

2021	Student clinician (speech-language pathology), Wise Words, London Ontario
2021	Teaching assistant for Acquired Language Disorders, School of Communication Sciences and Disorders, University of Western Ontario

2020	Teaching assistant for Fluency Disorders, School of Communication Sciences and Disorders, University of Western Ontario
2019	Student clinician (speech-language pathology), Bluewater Health Hospital, Sarnia Ontario
2019	Teaching assistant for Swallowing and Dysphagia, School of Communication Sciences and Disorders, University of Western Ontario
2018	Student clinician (speech-language pathology), Durham District School Board, Durham Ontario
2018	Teaching assistant for Anatomy and Physiology, School of Communication Sciences and Disorders, University of Western Ontario
2018	Student clinician (speech language pathology), H.A. Leeper Speech and Hearing Clinic – Voice Disorders, London Ontario
2017	Student clinician (speech-language pathology) H.A. Leeper Speech and Hearing Clinic – Preschool Speech and Language, Tyke Talk Services, London Ontario
2017	Student clinician (speech-language pathology) H.A. Leeper Speech and Hearing Clinic – Fluency Disorders, London Ontario
2017	Student clinician (speech-language pathology) H.A. Leeper Speech and Hearing Clinic – Neurogenic Disorders, London Ontario
2015-2016	Research assistant for Dr. Jennifer Sutton, Brescia University College, University of Western Ontario
2015-2016	Lab manager for Dr. Marc Joanisse, University of Western Ontario
2015	Research Assistant for Dr. Lisa Archibald, FDK Screening of Early Childhood Learning, University of Western Ontario

Professional Service

2019-current	Student representative for the Child Health Symposium, University of Western Ontario
2017	Panelist for preview day, Communication Science and Disorders, University of Western Ontario

2017	Student representative for Four-Lab retreat organization team, University of Western University
2017	Student representative for May Better Speech and Hearing Month, Communication Sciences and Disorders, University of Western Ontario
2017-2018	Student council, Communication Sciences and Disorders, University of Western Ontario
2016-2018	Operations smile student volunteer, Communication Sciences and Disorders, University of Western Ontario