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# Program Evaluation of a Low-Intensity Parent-Implemented Intervention for Young Children Late to Talk: How Much Is Enough?

# Évaluation d'un programme d'accompagnement parental de faible intensité destiné à de jeunes enfants qui commencent à parler tardivement : quelle intensité est suffisante?

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**KEYWORDS**

PRESCHOOL SPEECH AND LANGUAGE

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FOCUS

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## Abstract

There is a high prevalence of late talkers, many of whom catch up to their peers without intervention. As publicly funded programs often have long wait times, evidence is needed to inform intervention intensity for this population. The aim of the study was to evaluate a low-intensity (three session, 4 hr) parent-implemented intervention based on parent and child outcomes. Parents and children were recruited during the initial assessment for a pre–post quasiexperimental study. At initial and reassessment, parents ($n$ = 67) completed a survey developed to measure confidence and behaviour and children's ($n$ = 89) communicative participation outcomes were measured using the Focus on the Outcome of Communication Under Six. Participants were grouped based on different intervention intensity that resulted from family attendance: experimental (all three sessions), partial control group (some sessions), and full control group (no sessions). Paired $t$ tests and analysis of variance were used to identify differences across time (pre–post) and group. In parents, paired $t$ tests detected statistically significant increases in the experimental and partial control groups. Similarly, clinically and statistically significant differences in Focus on the Outcome of Communication Under Six scores were observed pre- and postintervention in the experimental and partial control groups in children. Analysis of variance revealed no significant differences between experimental, partial control, or full control groups. Although no treatment effect for the low-intensity parent-implemented intervention model was found, this study raises important considerations of future research needs and current program decision-making for clinicians, service providers, and researchers.

## Abrégé

Il y a une forte prévalence d'enfants qui commencent à parler tardivement et plusieurs d'entre eux rattrapent leurs pairs sans qu'aucune intervention leur soit offerte. En raison des temps d'attente importants pour accéder aux programmes financés par le public, des données probantes sont nécessaires pour déterminer l'intensité des interventions devant être offertes à cette population. L'objectif de cette étude était d'évaluer l'effet du programme d'accompagnement parental de faible intensité (trois séances de quatre heures) sur les parents et les enfants. Les parents et les enfants inclus dans cette étude quasi expérimentale prétest-post-test ont été recrutés lors d'une évaluation initiale en orthophonie. Lors de cette évaluation initiale et lors de la réévaluation, les parents ($n$ = 67) ont répondu à un questionnaire conçu pour mesurer leur assurance et leurs comportements. La participation communicative des enfants ($n$ = 89) a été mesurée à l'aide de l'outil *Focus on the Outcome of Communication Under Six*. L'assiduité des participants aux séances du programme d'accompagnement parental a été utilisée pour les grouper en fonction de l'intensité de l'intervention qu'ils ont reçue : groupe expérimental (présence à l'ensemble des trois séances), groupe « partiellement » contrôle (présence à quelques séances) et groupe « entièrement » contrôle (présence à aucune séance). Des tests de Student pour échantillons appariés et des analyses de variance ont été utilisés pour analyser les différences dans le temps (pré-post) et entre les groupes. Chez les parents, les tests de Student pour échantillons appariés ont révélé une augmentation statistiquement significative dans le groupe expérimental et dans le groupe partiellement contrôle. De même, des différences cliniquement et statistiquement significatives ont été observées en ce qui concerne les scores du *Focus on the Outcome of Communication Under Six* complétés avant et après le programme d'accompagnement parental chez les enfants du groupe expérimental et ceux du groupe partiellement contrôle. L'analyse de la variance n'a révélé aucune différence significative entre le groupe expérimental, le groupe partiellement contrôle et le groupe entièrement contrôle. Bien qu'aucun effet n'ait été constaté pour le programme d'accompagnement parental à faible intensité, la présente étude soulève d'importantes questions sur les besoins futurs en matière de recherche, ainsi que pour les décisions que les cliniciens, les prestataires de services et les chercheurs doivent prendre actuellement.

Late talker is a term used to describe children aged 18–35 months with delayed expressive language skills, no known underlying cause, and typical skills in other areas of development (Rescorla, 2011; Singleton, 2018). The estimated prevalence of late talkers at 24 months is about 13% (Zubrick et al., 2007). Some of these children may also have a mild receptive language delay (Rescorla, 2011), slow word processing (LaTourrette et al., 2023), and other risk factors that may predict later poor language outcomes (Fisher, 2017; Morgan et al., 2020; Perry et al., 2022). Although many late talkers catch up with their peers by school age (Rice et al., 2008), some will present with a persistent language delay that is eventually diagnosed as a developmental language disorder (Bishop et al., 2016; Singleton, 2018). Because developmental language disorder is characterized by the presence of language difficulties significant enough to impact daily life and no association with other known causes or diagnoses (Bishop et al., 2016), early identification and early intervention for this population are critical.

One potential service delivery pathway for late talkers is parent-implemented intervention that involves teaching parents skills and strategies to use their role as language facilitators to support their children's language development. In general, evidence suggests that these intervention models are impactful. Several systematic reviews and meta-analyses reported significant gains in children's receptive and expressive language across several language constructs following parent-implemented intervention when compared to controls (DeVeney et al., 2017; Roberts & Kaiser, 2011, 2015; Roberts et al., 2019; Tosh et al., 2017). Further, these studies suggested that outcomes following parent-implemented interventions for young children presenting with language difficulties are in fact not significantly different than outcomes observed in clinician-implemented interventions (DeVeney et al., 2017; Roberts & Kaiser, 2011; Roberts et al., 2019; Tosh et al., 2017).

Despite the extent of the literature on parent-implemented interventions to support language development in late talkers, very little literature has explored appropriate intensity for these models (Tosh et al., 2017). Studies included in these reviews offered anywhere between 2 and 110 hr of parent training (Roberts & Kaiser, 2011; Roberts et al., 2019). Currently, the lowest intensity level of intervention typically studied in the literature for this target group is between five and seven parent sessions (Buschmann et al., 2015; Ciccone, 2012; Cunningham et al., 2019; Kruythoff-Broekman et al., 2019; Kwok et al., 2020). A recent study by Zulkifli et al. (2023) compared the treatment effect for a varying number of parent sessions and found intensity did not predict child language outcomes. Zulkifli et al. called for further research into the number of sessions necessary for a treatment effect. Additionally, findings from many of the studies investigating five to seven sessions were limited by lack of comparison groups to adequately control for maturation effects and natural language gains (Ciccone, 2012; Cunningham et al., 2019; Kwok et al., 2020; Zulkifli et al., 2023).

Lack of clarity on appropriate intensity and the efficacy of lower intensity models poses several challenges. Administering long, high-intensity parent-implemented models may be excessive for children who often catch up to their peers, recognizing that high-intensity intervention is not always better (Frizelle et al., 2021). In fact, lengthy parent-implemented models may place unnecessary time and resource strains on families, creating barriers to care and contributing to program attrition (Mytton et al., 2014). Provision of these longer format interventions may also face operational challenges due to resource constraints that limit speech-language pathologist and speech-language assistant time, and in turn, result in higher wait times for all services. Given these considerations, it is beneficial to investigate the efficacy of low-intensity (fewer than five sessions) parent-implemented interventions as a first intervention option for late-talking toddlers, given more intensive services could be offered afterwards, as needed, in response to the child's progress.

Addressing this research need, the current study evaluated a low-intensity parent-implemented intervention for late talkers in a publicly funded clinical setting in southeast Ontario. The goal of the program evaluation was to determine the most appropriate service delivery pathway in the clinic for late talkers by asking the following specific evaluation questions:

1. In a real-world clinical setting, what are the outcomes for children who are late talkers and parents who attend all, some, or none of a three-session parent-implemented intervention?
2. Were there differences in outcomes based on the level of attendance in the program?
3. What was the attendance rate for sessions and the overall attrition rate for the intervention?

## Methods

### Study Design

This evaluation used a pre–post design with a nonrandom quasicontrol group as, given the real-world clinic-based

setting, a randomized clinical trial design was not possible. The evaluation was designed to use the best available control group given the high likelihood of maturation in the target population (due to both their age and the possibility of them catching up to their age-matched peers without any direct intervention). Specifically, two convenience control groups were identified based on the number of intervention sessions attended after agreeing to participate: some (a partial control group) and none (a full control group).

The Queen's University Health Sciences and Affiliated Hospitals Research Ethics Board approved the research study (#6016667 KFLA-061-15). Informed consent was obtained from all participants at the time of recruitment using a standardized recruitment script, letter of information, and consent form.

### *Recruitment*

The evaluation was conducted in a clinical preschool speech and language program setting funded by Ontario's Ministry of Children, Community and Social Services. All children in the program receive an initial assessment with a speech-language pathologist. The parents of children identified as late talkers between 18 and 30 months of age were recommended to attend the three-session parent-implemented intervention as the first intervention recommended in the service delivery pathway for this target group.

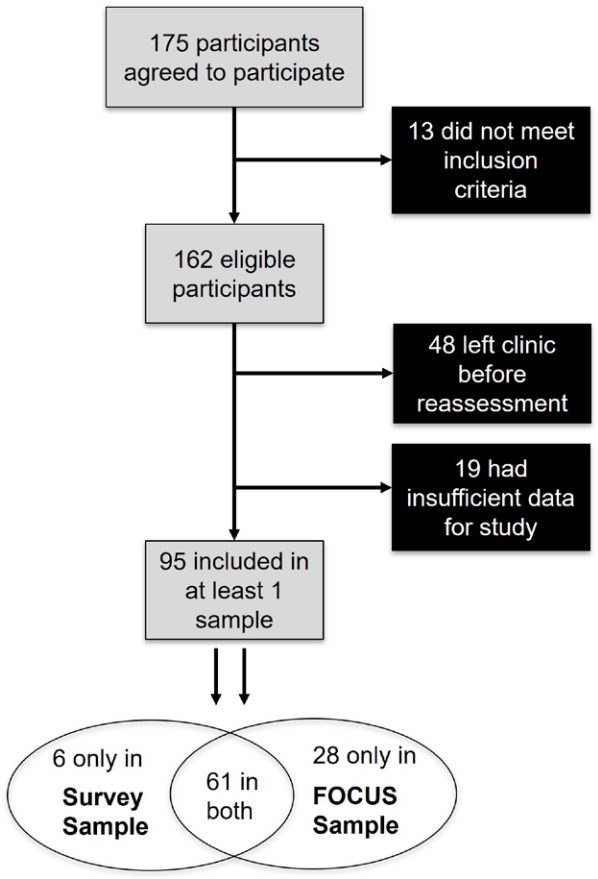
Speech-language pathologists were provided with the eligibility criteria, with late talkers defined as children with delayed expressive language in the absence of a causal diagnosis or delays noted in other areas of development, including social communication skills or receptive language skills. A notable exception was to include children who also have a mild receptive language delay identified through informal assessment. The program content and structure were designed to also meet the needs of this group of children and a more restrictive inclusion criteria would limit both treatment options for these families and enrolment in the treatment group. A formal assessment tool was not used, as this would have deviated from typical clinical practice for this age.

Starting in spring 2016, all intervention participants were invited to participate in the study. Families were included in the study if their child was 18 months at time of initial assessment and was not receiving additional interventions, including private speech-language therapy. Recruitment ceased in March 2020, before the intended sample size was met, due to changes in the intervention's service delivery model with the onset of the COVID-19 pandemic.

### *Participants*

A total of 175 participants were recruited to the study, 13 of whom did not meet inclusion criteria. Of the remaining 162 eligible participants, 95 were included in the evaluation, 48 left the clinic before the end of the intervention, and 19 had insufficient data to be included. A full overview of the participants can be seen in **Figure 1**. Of the 95 final participants, the mean age was 107 ± 16 weeks (approximately 26 months ± 4 months); 52.6% of children included had a Communication Function Classification System score of Level III, 37.9% Level IV, 6.3% Level II, 2.1% Level V and 1.1% Level I. A more detailed breakdown of the participants as well as those who left the clinic and those who had insufficient data is shown in **Table 1**, including breakdowns by demographics, hearing status, and comorbidities. An observational analysis was conducted to compare those included in the study with those excluded to determine any differences. The children who left the clinic

**Figure 1**




Flowchart of recruited participants

**Table 1**

**Summary of Included Participants, Those Who Left the Clinic Before the Intervention Ended, and Those Excluded Due to Insufficient Data**

| Characteristic | Included participants *N* = 95 % (*n*) | Left clinic before intervention ended *N* = 48 % (*n*) | Excluded due to insufficient data *N* = 19 % (*n*) |
|---|---|---|---|
| **Age at initial assessment** | | | |
| in weeks *M* ± *SD* | 107 ± 16 | 99 ± 17 | 104 ± 19 |
| **Gender** | | | |
| Male | 72.6 (69) | 64.6 (31) | 57.9 (11) |
| **Multilingual** | | | |
| Yes | 9.5 (9) | 12.5 (6) | 21.1 (4) |
| **Communication Function Classification System level** | | | |
| I | 1.1 (1) | 0 | 0 |
| II | 6.3 (6) | 4.2 (2) | 0 |
| III | 37.9 (36) | 43.8 (21) | 36.8 (7) |
| IV | 52.6 (50) | 33.3 (16) | 47.4 (9) |
| V | 2.1 (2) | 2.1 (1) | 0 |
| Missing | 0 | 16.7 (8) | 15.8 (3) |
| **Time spent in early learning environment** | | | |
| None | 60.0 (57) | 52.1 (25) | 47.4 (9) |
| 0.5–2.5 days/week | 6.3 (6) | 8.3 (4) | 0 |
| ≥ 2.5 days /week | 33.7 (32) | 22.9 (11) | 36.8 (7) |
| Missing | 0 | 16.7 (8) | 15.8 (8) |
| **Hearing** | | | |
| No concerns | 81.1 (77) | 81.2 (39) | 73.7 (14) |
| History of ear infections | 2.1 (2) | 2.1 (1) | 15.8 (3) |
| Ongoing concerns | 14.7 (14) | 12.5 (6) | 5.3 (1) |
| Missing | 2.1 (2) | 4.2 (2) | 5.3 (1) |
| **Comorbidities** | | | |
| None | 93.7 (89) | 79.2 (38) | 78.9 (15) |
| ASD | 0 | 0 | 0 |
| Anything confounding | 4.2 (4) | 2.1 (1) | 0 |
| Missing | 2.1 (2) | 18.8 (9) | 21.1 (4) |

*Note.* ASD = autism spectrum disorder.

before the end of the intervention were slightly younger than the other two populations. Otherwise, there were minor differences in the distribution of the groups, notably more multilingual children were excluded due to insufficient data.

For the 95 participants included, missing data remained an issue and so two samples were defined: a survey sample (67 participants) and a sample based on the Focus on the Outcomes of Communication Under Six

(FOCUS; Thomas-Stonell et al., 2012; 89 participants). A more detailed definition of the two samples is provided in the following sections. For both samples, the majority of participants were in the experimental group, followed in number by the partial control group, and then the control group. **Table 2** shows the breakdown of each sample and their characteristics overall and by group. Statistically it was unclear, but the two partial control groups may have had lower rates of hearing concerns.

### *Intervention Design*

The intervention was originally developed in September 2014. The initial assessment, within the context of the Ontario Preschool Speech and Language Program, included specific requirements such as obtaining a relevant case history, assessing communication development, and in consultation with the family, recommending an appropriate intervention if the child demonstrated a communication delay. Suggestions and strategies for home were provided to parents as part of the initial assessment and, when appropriate and time allowed, were demonstrated with parent coaching to support understanding and learning. For late talkers, the intervention curriculum builds on the early language modelling strategies provided at the initial assessment.

The evaluated parent-implemented intervention consisted of three group sessions, typically over 3 to 5 months, for a total parent-training intervention time of 4 hr. The program design evolved from longer, more intensive parent-implemented interventions for this population. The number of hours and number of sessions were reduced from previous intervention designs due to parent attrition (attendance reduced over time), wait time management for young children (fewer sessions meant a new group could start every month), and general resource demands (managing wait times for all children).

Sessions were conducted by speech-language pathologists and speech-language assistants, and, in some cases, a community librarian or early literacy specialist provided Session 3. The content of the language modelling strategies included in Session 1 was described by Moharir et al. (2014). Handouts provided (e.g., "Face-to-Face") were consistent with the parent handouts referenced in Moharir et al.'s article and used with permission. Each session also identified personalized goals for specific language modelling strategies to be implemented during daily routines (Session 1 – adults only), while playing (Session 2 – adult and child coaching), and while reading books (Session 3 – adults only). **Table 3** contains a summary of intervention content. The strategies included in the sessions can be summarized into three categories:

- being face-to-face with their child when communicating,
- thinking about what they are saying and how they are saying it (e.g., simple language, repeating, using gestures, and imitating child's sounds/words), and
- watching and listening to how their child communicates (e.g., waiting, following child's lead, and paying close attention to child's words, sounds, and gestures).

The program theory supporting the intervention is outlined in **Figure 2**. Specifically, the intervention teaches parents how to implement the strategies alongside feedback to increase their confidence in doing so, with the aim of changing the parents' behaviours when interacting with their child during daily activities and routines. In turn, the children's outcomes are expected to improve. The evaluation of this intervention was designed according to the hypothesized program theory, especially in terms of parent outcomes.

After the intervention, children were reevaluated by a speech-language pathologist. Ideally, this occurred 6 months from the initial assessment to support timely re-administration of outcome measures and assess response to intervention to plan next intervention, as needed, but wait lists could increase the length between the two assessments.

## Study Measures

The evaluation used both parent and child outcome measures which are summarized in **Table 4** alongside their collection points (typically the initial assessment for preintervention and reassessment for postintervention).

### *Parent Outcome Measures (Survey)*

A self-reported parent outcome measure was used to assess the short- and intermediate-term intervention objectives. Using measures that focused on parent constructs that were not expected to change without intervention decreased the risk of maturation effects on the study. A survey tool was developed for this as the service delivery model did not include parent responsivity observations, given feasibility constraints in a clinic-based study. The survey was designed to be specific to the intervention, relate to the hypothesized program theory, be capable of detecting change pre- and postintervention, and use an appropriate literacy level.

The tool measured three constructs: the short-term outcome of confidence, the intermediate outcome of self-reported behaviour change, and the potential

**Table 2**

**Summary of Survey and FOCUS Samples and Their Characteristics**

| Characteristic | Survey sample | | | | FOCUS sample | | | |
|---|---|---|---|---|---|---|---|---|
| | Total included *N* = 67 % (*n*) | Experimental *N* = 42 % (*n*) | Control *N* = 11 % (*n*) | Partial control *N* = 14 % (*n*) | Total included *N* = 89 % (*n*) | Experimental *N* = 53 % (*n*) | Control *N* = 13 % (*n*) | Partial control *N* = 23 % (*n*) |
| **Age at initial assessment** | | | | | | | | |
| in weeks *M* ± *SD* | 105 ± 13 | 104 ± 11 | 103 ± 21 | 109 ± 11 | 107 ± 13 | 106 ± 11 | 103 ± 19 | 110 ± 13 |
| **Gender** | | | | | | | | |
| Male | 70.1 (47) | 73.8 (31) | 63.6 (7) | 64.3 (9) | 73.0 (65) | 77.4 (41) | 61.5 (8) | 69.6 (16) |
| **Multilingual** | | | | | | | | |
| Yes | 9.0 (6) | 4.8 (2) | 18.2 (2) | 14.3 (2) | 10.1 (9) | 9.4 (5) | 15.4 (2) | 8.7 (2) |
| **Time between initial & reassessment** | | | | | | | | |
| in weeks *M* ± *SD* | 42 ± 15 | 41 ± 15 | 47 ± 19 | 44 ± 16 | 43 ± 17 | 41 ± 16 | 48 ± 16 | 43 ± 16 |
| Missing or N/A | 4.4 (3) | 4.7 (2) | 9.1 (1) | 0 | 2.2 (2) | 1.9 (1) | 7.7 (1) | 0 |
| **Communication Function Classification System level** | | | | | | | | |
| I | 1.5 (1) | 2.4 (1) | 0 | 0 | 0 | 0 | 0 | 0 |
| II | 7.5 (5) | 11.9 (5) | 0 | 0 | 6.7 (6) | 9.4 (5) | 7.7 (1) | 0 |
| III | 29.9 (20) | 23.8 (10) | 36.4 (4) | 42.9 (6) | 39.3 (35) | 35.8 (19) | 38.5 (5) | 47.8 (11) |
| IV | 59.7 (40) | 61.9 (26) | 54.5 (6) | 57.1 (8) | 52.8 (47) | 52.8 (28) | 53.8 (7) | 52.2 (12) |
| V | 1.5 (1) | 0 | 9.1 (1) | 0 | 1.1 (1) | 1.9 (1) | 0 | 0 |
| **Time spent in early learning environment** | | | | | | | | |
| None | 58.2 (39) | 54.8 (23) | 54.5 (6) | 71.4 (10) | 61.8 (55) | 60.4 (32) | 46.2 (6) | 73.9 (17) |
| 0.5–2.5 days/week | 7.5 (5) | 7.1 (3) | 9.1 (1) | 7.1 (1) | 4.5 (4) | 3.8 (2) | 7.7 (1) | 4.3 (1) |
| ≥ 2.5 days /week | 34.3 (23) | 38.1 (16) | 36.4 (4) | 21.4 (3) | 33.7 (30) | 35.8 (19) | 46.2 (6) | 21.7 (5) |

**Table 2 (continued)**

**Summary of Survey and FOCUS Samples and Their Characteristics**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Hearing** | | | | | | | | |
| No concerns | 77.6 (52) | 71.4 (30) | 72.7 (8) | 100 (14) | 80.9 (72) | 75.5 (40) | 69.2 (9) | 100 (23) |
| History of ear infections | 1.5 (1) | 2.4 (1) | 0 | 0 | 2.2 (2) | 3.8 (2) | 0 | 0 |
| Ongoing concerns | 19.4 (13) | 23.8 (10) | 27.3 (3) | 0 | 14.6 (13) | 18.9 (10) | 23.1 (3) | 0 |
| Missing | 1.5 (1) | 2.4 (1) | 0 | 0 | 2.2 (2) | 1.9 (1) | 7.7 (1) | 0 |
| **Comorbidities** | | | | | | | | |
| None | 92.5 (62) | 92.9 (39) | 90.9 (10) | 92.9 (13) | 95.5 (85) | 96.2 (51) | 92.3 (12) | 95.7 (22) |
| ASD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Anything confounding | 4.5 (3) | 2.4 (1) | 9.1 (1) | 7.1 (1) | 4.5 (4) | 3.8 (2) | 7.7 (1) | 4.3 (1) |
| Missing | 3.0 (2) | 4.8 (2) | 0 | 0 | 0 | 0 | 0 | 0 |
| **Parent relationship** [a] | | | | | | | | |
| Father/stepfather | 10.4 (7) | 16.7 (7) | 0 | 0 | 6.7 (6) | 11.3 (6) | 0 | 0 |
| Mother/stepmother | 85.1 (57) | 81.0 (34) | 90.9 (10) | 92.9 (13) | 61.8 (55) | 60.4 (32) | 76.9 (10) | 56.5 (13) |
| Missing | 4.5 (3) | 2.4 (1) | 9.1 (1) | 7.1 (1) | 31.5 (28) | 28.3 (15) | 23.1 (3) | 43.5 (10) |
| **Parent education** | | | | | | | | |
| Postsecondary di ploma/degree | 76.1 (51) | 76.2 (32) | 81.8 (9) | 71.4 (10) | 53.9 (48) | 56.6 (30) | 61.5 (8) | 43.5 (10) |
| Less than postsecondary degree & other | 19.4 (13) | 21.4 (9) | 9.1 (1) | 21.4 (3) | 14.6 (13) | 15.1 (8) | 15.4 (2) | 13.0 (3) |
| Missing | 4.5 (3) | 2.4 (1) | 9.1 (1) | 7.1 (1) | 31.5 (28) | 28.3 (15) | 23.1 (3) | 43.5 (10) |

*Note*. ASD = autism spectrum disorder; FOCUS = Focus on Outcomes of Communication Under Six (Thomas-Stonell et al., 2012).
[a] Response categories that had no selection: grandparent, other relative, guardian/foster parent, and other.

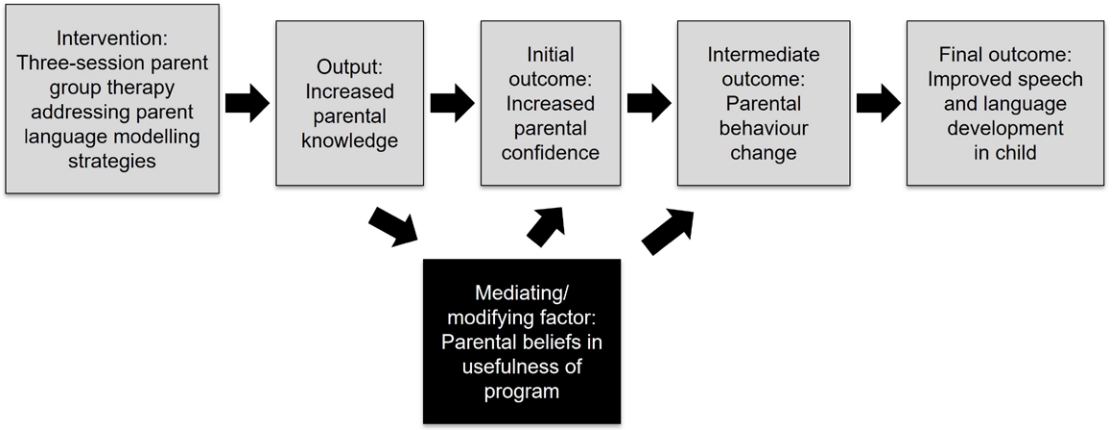
mediating factor of belief in the intervention. These constructs are similar to measures used in "readiness rulers" that have been applied in a wide variety of health-related lifestyle behaviour change settings (Bethelot et al., 2012; Rollnick et al., 2009). The two primary constructs (confidence and self-reported behaviour) were asked for each of the three main strategies employed by the intervention (being face-to-face, thinking about what you say and how you say it, and watching and listening: e.g., How confident are you in your ability to be face-to-face with your child when communicating? How often do you think about what you are saying and how you are saying it?). A final question asked the level of belief in the intervention (How much do you believe that by you using communication strategies with your child, you will improve your child's language skills?). Each question was asked on a 10-point Likert-style scale (1 = *Rarely when I interact with my child* to 10 = *Every time I interact with my child*). Face validity and acceptability of the tool were sought through brief cognitive interviewing

**Table 3**

**Summary of the Parent Training Intervention**

| Aspect of training | Initial assessment (up to 1.5 hr) | Session 1 (2 hr) | Session 2 (1 hr) | Session 3 (1 hr) | Reassessment (up to 1.5 hr) |
|---|---|---|---|---|---|
| Participants | Child and parent(s)/guardian(s). | Parents/guardians. | Children and parents/guardians. | Parents/guardians. | Child and parent(s)/guardian(s). |
| Goal setting for parent/guardian | Speech-language pathologist and parent work together to identify one or more goal. | Parent/guardian identifies one specific strategy that they will implement during daily routines with their child. | Parent/guardian identifies one specific strategy that they will implement while playing with their child. | Parent/guardian identifies one specific strategy that they will implement while reading books with their child. | Individualized. |
| Goal setting for child | Individualized. | With help from speech-language pathologist, parent chooses target vocabulary or 2 different 2-word combination types (e.g., descriptive word + noun). | Review goals set in Session 1 and discuss progress. Target goals in session through play. | Parents/guardian selects new target words or 2-word combinations to target with selected book. | Individualized. |
| Language modelling strategies targeted to parent/guardian | Identify up to 3 strategies provided (with handouts). | Teach strategies and discuss use within routines (e.g., face-to-face). | Review strategies and coach use within play activities.<br>May model and coach some new strategies in play, as needed. | Review strategies and discuss use within reading activities. | Review strategies with parents.<br>May introduce new strategies at this time to address new goals beyond group. |
| Techniques used by facilitator | Play-based using formal and informal tools.<br>Discussion of results with parent/guardian.<br>Modelling and discussion of language modelling strategies. | Interactive discussions in small group setting.<br>Hands-on practice.<br>Handouts provided for each strategy. | Coach parent(s) during facilitated play with child.<br>Play-based activities to practice language modelling strategies. | Interactive discussions in small group setting.<br>Hands-on practice. Handout booklet provided.<br>Free take-home book. | Play-based using formal and informal tools.<br>Speech-language pathologist reviews and documents progress of child's goals from group.<br>Discussion of results with parent/guardian. Identify new child goals and new intervention plan, based on progress. |

**Figure 2**




Program theory of low-intensity intervention

**Table 4**

**Summary of Study Measures**

| Instrument | Description | Completed by | Completed on | Data-collection point for premeasure | Data collection point for postmeasure |
|---|---|---|---|---|---|
| Focus on the Outcomes of Communication Under Six (FOCUS) Parent Form (Washington, 2015) | Participation-based child measure that links speech and language treatment to the child's ability to communicate and participate in their world | Parent | Child | Initial assessment | Reassessment |
| MacArthur-Bates Communicative Development Inventories (Fenson, 2006) | Impairment-based child measure that screens language and communication skills | Parent | Child | 1st intervention session | Reassessment |
| Reassessment recommendation | Postintervention outcome recommended for child (discharge or type of future intervention) | Speech-language pathologist | Child | N/A | Reassessment |
| Parent survey | Measures parental confidence, behaviour, and beliefs in intervention | Parent | Parent | End of initial assessment [a] | Reassessment |

[a] To gather complete data, some parents completed the survey at home after the initial assessment or in the waiting room before the first intervention session.

with families who were participating in the intervention during the study design phase. These interviews continued until saturation was reached (six families) and the number and wording of questions was finalized to those described above based on this parent feedback.

### *Child Outcome Measures (FOCUS)*

The FOCUS (Thomas-Stonell et al., 2012) was used as the child-based outcome measure, a validated tool that measures the child's overall communicative participation (Washington et al., 2015). During the study, the tool changed from being 50 items to 34 items (Oddson et al., 2019). The study used the standardized methods provided to convert between the two (Thomas-Stonell et al., 2012). A minimal clinically important difference (MCID) of 11 points for the 34-item tool has been established (Oddson et al., 2019; Washington et al., 2015). At time of study development, evidence suggested that the tool was robust against maturation effects, especially at the level of the MCID (Thomas-Stonell, 2013; Washington et al., 2015), an important consideration given the study used a pre–post design.

The evaluation also intended to measure change in the child's expressive vocabulary using the MacArthur-Bates Communication Development Inventory (Fenson, 2006) as an impairment-based measure, but due to high amount of missing data for all groups, these data were not analyzable. Instead, a brief supplementary analysis was performed looking at next intervention recommendations at reassessment (whether the child was discharged/recommended for home monitoring, recommended for an additional group therapy, or recommended for individual therapy). The type and intensity of intervention recommended at reassessment was informed primarily by child outcomes of the previous intervention but may also have been informed by other child and family factors (e.g., family schedule).

## Outcome Analyses

Participants were included in the outcome analysis if there were sufficient data to assess the inclusion criteria, their attendance at the intervention, and pre–post data for at least one of the child or parent outcome measures. To maximize sample sizes, two sample sets were defined for analyses: the survey sample (having pre–post parent outcome measures) and the FOCUS sample (having pre–post child outcome measures). Participants were also classified into one of three groups: experimental (attended all three sessions), full control (attended none of the sessions despite agreeing to attend), and partial control (attended some but not all three sessions). **Figure 1** and **Table 2** list the numbers in each group. All analyses were performed in R (version 4.1.1).

One primary outcome measure was defined for the parent survey – a total change in score across all confidence and self-reported behaviour questions. Supplementary exploratory measures were defined for a change in each of the constructs (a change in score across all confidence questions and a change in score across all self-reported behaviour questions) and for change in score on the strategies (being face-to-face, thinking about what you say and how you say it, and watching and listening). The final survey question, the potential mediating factor of beliefs, was not used as there was insufficient sample size to conduct mediating factor analyses. A single outcome measure was defined for children – the mean difference in FOCUS scores.

To answer the first evaluation question (the outcomes in parents and children depending on number of sessions attended), individual paired *t* tests were conducted for each outcome measure for each group with the mean differences, 95% confidence intervals and *p* values reported. To control for Type 1 error, the *p* values were interpreted in the context of the number of analyses conducted. For example, the parent analyses were considered at a *p*-value cutoff of .003 (.05 divided by the 18 total analyses). For the child measure, a significant increase of the MCID signified a likely improvement. For the parent measures, any statistically significant increase signified a likely improvement. To answer the second evaluation question (differences based on number of sessions attended), analysis of variance (ANOVA) tests were used to determine if there were any differences between experiment, full, and partial control groups. For the parent measure, the ANOVA was only used on the primary outcome measure. To further investigate question two, $\chi^2$ analyses were used to assess differences by groups for the reassessment recommendations.

## Intervention Completion Analyses

To assess the final evaluation question (the intervention attendance and attrition rate), a final sample was identified that contained all participants with complete attendance records. From this, the total completion rate for the intervention (the percentage of participants who attended all sessions) and the overall session absence rate (the percentage of all sessions that were not attended) were determined.

Furthermore, for all children who did not complete the intervention or reassessment, information was retrieved

from the child's record to determine any known reason for the absence (e.g., participant moved to a new region or the clinic was unable to reach the participant's family). This information was used to provide context to the high rate of individuals excluded from the outcome analyses as well as for understanding the implications to delivering multisession group therapy in the clinical setting.

## Results

### Parent Outcome

The parent survey results of the paired *t* tests analyses for the primary and supplementary survey outcome measures (related to confidence and self-reported behaviour) are found in **Table 5**. For the experimental and partial control groups, statistically significant mean differences between pre- and postsurvey ratings were observed for the primary outcome measure (total score). For the experimental group, there were also statistically significant differences in the supplementary measures for confidence, think about what you say and how you say it, and watch and listen. For the control group, statistically significant differences were not observed for any measures using the Type 1 error-adjusted *p* value. Observationally, the mean differences were similar between the experimental and control groups, but there was a smaller sample size for the control group. A post hoc analysis revealed, given the group's mean difference and standard deviation, that a sample size of 21 would have been required (compared to the actual sample size of 11). Both observationally and statistically (through ANOVA tests), there were no statistically significant differences in the means between the groups ($F(2,64) = 1.03$, $p = .362$).

### Child Outcome

**Table 6** shows the FOCUS score mean differences by FOCUS sample groups. All estimates of mean difference are the equivalent of at least 3 times the MCID of 11. Statistically significant differences above the MCID were observed for both the experimental and partial control groups. For the full control group, statistically significant differences were not observed, but a post hoc analysis revealed that a sample size of 26 would have been required (compared to the actual sample size of 13) given the group's mean difference and standard deviation. There were no differences between the groups either observationally or through ANOVA statistical testing ($F(2,86) = 1.83$, $p = .166$). There were also no differences by group for reassessment recommendations based on $\chi^2$ analysis (discharge/home monitoring, additional group therapy, or individual therapy; $\chi^2(4, N = 11) = 2.16$, $p = .71$).

### Intervention Attendance and Attrition

Of the 48 participants who left the clinic before the reassessment,

- 45.8% (22) were unreachable by the clinic (by phone or mail; at least two attempts were made per clinic policy)
- 22.9% (11) left due to parent reporting no further concerns or needs
- 18.8% (9) moved or were transferred to a different clinic
- 12.5% (6) declined a reassessment

Complete attendance data were available for 144 participants. Based on this, the intervention had a completion rate of 52.1%, with 20.8% not attending any of the intervention despite agreeing to do so at the initial assessment. Overall, 33.1% of all sessions were not attended (143 missed sessions out of 432 total sessions). As part of service delivery, significant efforts were made to ensure attendance, including reminder calls before Sessions 1 and 3 (Session 2 was scheduled shortly after session one so a reminder call was not made). Families who missed sessions were offered a spot in the subsequent group session(s), which were usually provided the following month.

## Discussion

This program evaluation assessed the impact of a low-intensity parent-implemented intervention model in late talkers and their parents in the context of determining the most appropriate service delivery pathway for these children in a publicly funded clinic. It was the first to investigate a low-intensity model with nonrandom control groups. Overall, the study did not detect a treatment effect that could be solely associated with the intervention in either parents or children. Instead, statistically significant improvements of at least 3 times the validated MCID were observed in children that attended at least one session of the intervention (experimental group and partial control group). Furthermore, although the study lacked the power to detect statistical significance in the group who did not attend the intervention, observational results suggested a similar rate of improvement in this control group. The parent outcome results aligned with the child outcome findings. The reassessment recommendations similarly found no differences between groups. Meanwhile, high rates of attrition were observed throughout the program.

Unexpectedly, it is possible that all of the low-intensity intervention groups saw similarly improved outcomes.

**Table 5**

**Parent Outcome Measures Paired *t* Test Mean Differences and 95% Confidence Intervals with Statistical Tests and Significance**

| Measure | Experimental group pre–post survey *M* [95% CI] *t* (degrees of freedom) *p* value | Control group pre–post survey *M* [95% CI] *t* (degrees of freedom) *p* value | Partial control group pre–post survey *M* [95% CI] *t* (degrees of freedom) *p* value |
|---|---|---|---|
| **Total score** | 2.8 [1.4, 4.2]*<br>4.0 (41)<br>< .001 | 3 [−1.5, 7.5]<br>1.5 (10)<br>.171 | 5.1 [1.5, 8.8]*<br>3.02 (13)<br>.001 |
| **Construct** | | | |
| Confidence | 1.2 [0.5, 1.9]*<br>3.4 (41)<br>.002 | 1.2 [−1.2, 3.6]<br>1.1 (10)<br>.295 | 2.4 [0.3, 4.5]<br>2.5 (13)<br>.027 |
| Self-reported behaviour | 1.6 [0.6, 2.7]<br>3.2 (41)<br>.003 | 1.8 [−0.7, 4.4]<br>1.6 (10)<br>.148 | 2.7 [0.9, 4.5]<br>3.2 (13)<br>.007 |
| **Strategy** | | | |
| Face-to-face | −0.1 [−0.7, 0.5]<br>−0.2 (41)<br>.816 | −0.5 [−2.9, 2.0]<br>−0.4 (10)<br>.690 | 0.9 [−0.4, 2.3]<br>1.5 (13)<br>.166 |
| Think about what you say and how you say it | 1.7 [1.0, 2.4]*<br>4.9 (41)<br>< .001 | 1.7 [0.3, 3.2]<br>2.6 (10)<br>.026 | 2.7 [1.0, 4.6]<br>3.3 (13)<br>.006 |
| Watch and listen | 1.2 [0.5, 1.9]*<br>3.6 (41)<br>< .001 | 1.7 [0.1, 3.3]<br>2.4 (10)<br>.036 | 1.4 [−0.1, 3.0]<br>2.0 (13)<br>.068 |

* To adjust for Type 1 error, $p < 0.003$ was considered significant.

**Table 6**

**FOCUS Score Mean Differences From Paired t Test with 95% Confidence Intervals and Statistical Significance**

| Group | *M* [95% CI] | *t* (degrees of freedom) | *p* |
|---|---|---|---|
| Experimental | 45.2 [32.3, 58.1]* | 7.1 (52) | < .001 |
| Control | 38.3 [−1.9, 78.6] | 2.1 (12) | .060 |
| Partial control | 66.9 [44.7, 89.1]* | 6.3 (22) | < .001 |

*Note.* FOCUS = Focus on Outcomes of Communication Under Six (Thomas-Stonell et al., 2012).
* To adjust for Type 1 error, $p < .017$ was considered significant.

There are three possible explanations for these findings: (a) that the evaluation measured a considerable maturation effect in all groups; (b) the control groups were exposed to a sufficient intervention to have a clinical improvement from it; or (c) a combination of both (a) and (b) occurred. Each postulation and its relative likelihood

are assessed below based on the detailed findings of this evaluation and recent literature.

In general, maturation effects in the study's child population are highly probable given the rapid speech and language development in typically developing children between ages 18 and 30 months (Ellis & Thal, 2008). At the time of study design, the FOCUS was reported to be largely immune to maturation effects and that a difference above the MCID was only due to an intervention (Thomas-Stonell et al., 2013; Washington et al., 2015). Based on this rationale, the FOCUS was selected as the outcome measure for this study. More recent literature does suggest a maturation effect is possible, at least in certain populations (Cunningham et al., 2019). Additionally, the FOCUS was validated with assessment every 6 months (Thomas-Stonell et al., 2012). Due to the realities of resource constraints in clinical settings, the mean length of time before pre- and post-FOCUS was 43 weeks (10.5 months). This extended time frame increases the probability of a maturation effect occurring. As such, it is reasonable to conclude that at least some of the improvements observed in children from all groups were due to a maturation effect.

There are, however, two reasons why maturation is unlikely to account for the entirety of the improvements observed by this study. First, improvements equivalent to multiple times the MCID were observed and so a maturation effect, even with the extended timeline, seems unlikely to explain the whole effect size. Second, there is no reason to expect a maturation effect in parents and so the improvements observed in the parent outcome measure cannot be explained by this phenomenon. This was one of the primary reasons for including the parent survey in the study.

Before the evaluated intervention and alongside the initial point of data collection, participants in all groups received an initial assessment. As described above, the initial assessment had elements that could be considered a parent-implemented intervention, including provision of early language modelling strategies along with demonstration and coaching, as time allowed in the session. It could be argued that the evaluated intervention was an extension and reiteration of the strategies (e.g., watch and listen) first introduced during the initial assessment. Hence, it is possible that the improvements detected by this study in both the parents and children were due to the initial assessment acting as an intervention in and of itself. As no data were collected before the initial assessment or after the initial assessment and before the first session, it is impossible to directly assess any treatment effect of the initial assessment in isolation from the three-session studied intervention. As the only statistical evidence of similar clinical improvements was between the partial and experimental groups, it is also possible attending some of the evaluated intervention sessions were equivalent to all sessions. In the recent study that identified a possible maturation effect in the FOCUS, a clinical improvement was observed between the initial assessment and intervention start suggesting this could also have been measuring an improvement due to the initial assessment (Cunningham et al., 2019).

Based on the above evidence, it is the researchers' postulation that the study findings are indicative of both a maturation effect in the target population and that the initial assessment and/or partial attendance to the intervention may be a sufficient intervention to achieve a clinical improvement in children and parents. As the primary objective of this evaluation was to determine the appropriate service delivery pathway for late talkers, this would suggest that interventions with fewer than three sessions may be acceptable.

The findings of this study raise an additional consideration. The partial and full control groups were critical to correctly interpreting the results. Without partial and full control groups to compare to the experimental group outcomes, statistically significant gains in both parent and child experiment groups could have been wrongly attributed to the intervention. Unfortunately, many of the higher intensity models in the literature for this target population use similar child outcome measures without the benefit of a control group yet make conclusions about treatment effects (Cunningham et al., 2019; Gaines & Gaboury, 2004; Kwok et al., 2020). This study reinforces the importance of study design, demonstrating that it is inappropriate to draw conclusions about treatment effects without a control group. The need for further research utilizing a control group was recently highlighted by one of these studies (Cunningham et al., 2019).

The overall goal of the evaluation was to determine the most appropriate service delivery pathway for late talkers. The attendance and attrition results provide critical context. Overall, only 52% of participants completed the intervention with one third of all sessions being missed. Hence, even a three-session intervention may be too many sessions to expect families to attend, for any number of reasons. Interventions with a higher number of sessions would likely have an even higher rate of attrition. This finding is supported in the literature; for example, Mytton et al. (2014) observed that competing demands were a significant barrier to parent-implemented models, including childcare and the frequency and timing of sessions in relation to the parents' work patterns. Hence, the

clinic-level efficiency of offering multisession group therapy when attrition is so high must be considered. To design the best service delivery pathway for this target population, a resource balance must be achieved between the additional benefit of each session with the additional resources required to offer it, accounting for expected attrition.

In the real-world clinical setting, such as the one in which the evaluation was conducted, the findings could be implemented to change the first intervention in one of two ways: (a) decrease the content of (and resources allocated to) the initial assessment so it ceases acting as an intervention and immediately refer children to the intervention or (b) focus efforts on the initial assessment as the intervention. The first choice could decrease wait times for the initial assessment, but with the high rate of attrition, could result in insufficient intervention intensity and an inefficient use of resources. To successfully implement the first choice, options to increase attendance of the parent-implemented intervention should be considered. Reduced resources allocated to the initial assessment (due to less content, shorter in duration) could be reinvested to reduce wait time for services. The second choice could also decrease wait times by decreasing the number of clinic staff required to provide the intervention and reallocate this time to conduct initial assessments and other services. Based on the findings of this program evaluation, a hybrid of these two options was implemented to change the service delivery pathway for late talkers in this clinic. The initial assessment format was kept intact by providing parents with links to online, recorded training modules for Sessions 1 and 3, prepared and maintained by a speech-language pathologist. These modules are made available to the parents immediately following the initial assessment (no wait time). If the parent needs further support to implement the strategies, one individual coaching session is offered as follow-up to the initial assessment intervention and online training modules. A reassessment to monitor progress and determine the next appropriate type and intensity of intervention continues to be scheduled for all children.

### Limitations

The real-world clinical setting of the evaluation was both a strength and limitation. The practicalities of the clinical setting limited the rigour of the study both in design (a convenience sample, nonrandom allocation into groups, self-reported outcomes measures) and in implementation (limited sample sizes and group distribution, and an increase in time between data collection points). Attempts were made to minimize the impact of these limitations, including investigating differences between groups. There were only minor variations between the groups, but it is possible that the groups differed in nonmeasured ways. Because the parent outcome measure was a locally developed purpose-built tool, it did not undergo comprehensive psychometric testing. It was deemed to be fit for purpose as it provided additional support for findings from the FOCUS, which is fully validated. However, the clinical setting allowed for the broader program evaluation lens for the study, including studying attrition, which increased the applicability of the findings.

The early end to recruitment caused by the pandemic resulted in an insufficient sample size, especially in the control group, to analyze the evaluation data as intended in many instances. As evidenced by the post hoc analyses, the study did not have sufficient power to detect statistical changes in the full control group for either the parent or child outcome measures. As such, all results from this group were solely observational and do not provide the desired level of evidence to inform service delivery planning. However, the inclusion of this group in conjunction with the partial control group provides critical contextual information on the importance of a control group when studying, as discussed previously.

Furthermore, the evaluation was initially designed to control for potential confounding and/or mediating demographic and individual risk factor variables between the groups and the outcome. Unfortunately, given the final sample sizes, this was not possible. The researchers postulate that parent and/or child characteristics exist which could increase/decrease the likelihood of success of the intervention as evidenced in recent literature. In a study on children with language delays, Zulkifli et al. (2023) found that children and parents with a higher baseline had better outcomes. The study also noted that although measured parent responsivity was lower in multilingual parents, the intervention had been designed for the cultural norms of English-speaking families. Zulkifli et al. concluded that adapting interventions based on baseline levels could be possible, and that interventions should be better adapted to the linguistic and cultural needs of families. It is possible that subgroups of the population included in this evaluation would benefit from an adapted intervention resulting in more clinical effects than were observed in the overall group in this study. More research is required, especially that which can account for the feasibility of offering these adaptations in a real-world clinical setting.

### Recommendations for Future Research and Clinical Practice

This evaluation observed a clinical improvement in children and parents who attended at least one session

of a three-session parent-implemented intervention, but was unable to measure a specific treatment effect from the intervention itself because control and partial control groups for children and parents showed similar gains. In consideration of the high attrition rates, the findings from this study were used to change the local service delivery pathway for late talkers. Similarly, these results can be used by clinicians and service delivery decision-makers to help determine appropriate pathways in their own service systems. Notably, these groups should reconsider the current best practice of higher intensity parent-implemented intervention models as a default recommendation because this evaluation both calls into question the evidence from these studies (with their lack of control groups) and provides early evidence in support of lower intensity first-intervention models for late talkers. Furthermore, decision-makers especially should consider the high rates of attrition in programming when determining efficient pathways and as such, consider few-to-no-session interventions while monitoring progress over time for this population.

Although the findings of this study are informative in clinical settings, they are limited in scope and by methodology. Further research is required on all possible intervention intensities, from initial assessments with strategies and coaching (as described in this study) to low-intensity models to higher intensity models. All research in this target population must include a control group to be able to establish a treatment effect, as the outcome measures are susceptible to maturation effects. However, wherever possible, real-world clinic settings should be used for this research as this evaluation demonstrates it is critical to understanding the feasibility of such interventions.

## Conclusions

This study was the first to evaluate a low-intensity (three-session) parent-implemented intervention for late talkers in a publicly funded clinical setting, with control groups and in consideration of varying levels of attendance. Outcomes improved for both children and parents who attended some or all the sessions, with no statistically significant differences between groups, and observational evidence suggested similar outcomes for families who attended none of the sessions. The program had substantial attrition, further calling into question the feasibility of the service delivery pathway. The results from this program evaluation were used to change the service delivery pathway for late talkers and can inform similar changes in other service systems. The study demonstrated the need for further clinic-based research, where findings can simultaneously assess clinical outcomes and feasibility of intervention modalities.

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## Disclosures

No conflicts of interest, financial or otherwise, are declared by the authors.