Adapting the Lidcombe Program for 6–12-year-olds: insights from a video telehealth trial

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ABSTRACT

Purpose: Childhood stuttering is common and can have debilitating, long-term psychosocial implications if prompt and effective treatment is not provided. The Lidcombe Program has robust clinical evidence for treating stuttering in early childhood. The results of a recent Phase II trial with a cohort of 6–12-year-old children showed that this treatment may benefit a much broader age range of children than initially thought. Benefits included improved communication attitudes, and reduced impact of stuttering and social anxiety symptoms. This study describes how clinicians can use the Lidcombe Program flexibly to cater to the varied needs of older children.

Method: The Johnson et al. (2024) trial of the Lidcombe Program included clinical mentoring meetings every 2 weeks between the treating clinician and a member of the Lidcombe Program Trainers Consortium. Practical recommendations and clinical resources were developed to help clinicians adapt aspects of the available Lidcombe Program Treatment Guide (Onslow et al., 2021) for 6–12-year-old children.

Results: Five key themes emerged from the clinical mentoring meetings to support clinicians. These included (a) active generalization of stutter-free speech to everyday conversations, (b) strategies for engaging the child in treatment, (c) examples of non-verbal contingencies, (d) optimizing treatment dosage for busy families, and (e) versatile clinical resources for different settings and child ages.

Conclusions: This report provides resources for speech-language pathologists who manage school-age children who stutter. The recommendations and resources described in this report are designed to assist clinicians with adapting the Lidcombe Program for a wider age range of children.

Introduction

Childhood stuttering has genetic and neural speech motor processing components (Chang, Garnett, Etchell, & Chow, 2019; Chang & Guenther, 2020; Shaw et al., 2021). Children who stutter present with interruptions to the flow of speech, such as repetitions of sounds and words, prolongations or cessation of sound sometimes referred to as 'blocking.' Stuttering can also include head and torso movements. Functional communication can be disrupted by these speech events. Children who stutter may avoid talking and may express negative attitudes about their communication (Guttormsen, Kefalianos, & Næss, 2015). The rate of anxiety and depression is far greater for these children compared to their peers (Bernard, Hofslundsengen, & Frazier Norbury, 2022; Iverach et al., 2016).

Approximately 1 in 10 children will begin to stutter by 4 years of age (Reilly et al., 2009). Though many will recover either naturally or with intervention before reaching school age, in a typical elementary school of approximately 400 students, there could be a dozen children who stutter who will require regular speech-language pathology services. For this age group, intervention is of critical importance because of the increasing risks of bullying (Blood, Boyle, Blood, & Nalesnik, 2010, 2011), social rejection (Davis, Howell, & Cooke, 2002), and potential academic impact (Berchiatti, Badenes-Ribera, Ferrer, Longobardi, & Gastaldi, 2020).

At present, there is limited empirical information advising clinicians how to treat stuttering during the school years (Brignell et al., 2021; Johnson, Onslow, Horton, & Kefalianos, 2023a, 2023b). To contribute to solving this problem, a recent Phase II trial (Johnson et al., 2024) of the Lidcombe Program using video telehealth investigated the responsiveness of 37 elementary school children aged 6–12 years. This is currently

the largest prospective data-based treatment study of this program with elementary school children since Lincoln, Onslow, Lewis, and Wilson (1996) and is the first to report treatment outcomes of video telehealth delivery with this age group. Telehealth delivery allowed for the inclusion of children and families from Australia, New Zealand, Hong Kong and Singapore. The Lidcombe Program is a behavioral treatment which directly targets stuttering. There are two stages of the Lidcombe Program. The goal of stage 1 is to reduce stuttering to very low levels, or to remove it altogether. The goal of stage two is to maintain stuttering reductions into the future. The clinician teaches the parents how to do the treatment and through the course of the program checks that it is done correctly. Parents complete daily practice sessions at home, and in everyday conversations provide verbal contingencies in response to their child's stutter-free or stuttered speech. To ensure that a child does not develop negative attitudes towards their speech, the Lidcombe Program Treatment Guide (Onslow et al., 2024) emphasizes that parent verbal contingencies be 'inherently positive, supportive and enjoyable' (pg. 4). Parents are also encouraged to use neutral language when talking about stuttering. Instead of making a value judgment about stuttering as 'bad', 'getting better' or 'getting worse', parents are taught to use a stuttering severity rating scale (0 = no stuttering, 1 = extremely mild stuttering, and 10 = severe stuttering) to discuss treatment progress in a manner that is neutral, subtle and non-judgmental. This treatment program has substantive evidence of its efficacy during early childhood (Sjøstrand et al., 2021). A comprehensive Treatment Guide is freely available to clinicians online (Onslow et al., 2024).

The outcome measures of the Phase II trial included audio recordings of child conversation, to which a blinded speech-language pathologist assigned a stuttering severity rating. The children also completed three psychosocial questionnaires – the Spence Children's Anxiety Scale (SCAS), the Communication Attitude Test (CAT), and the Overall Assessment of the Speaker's Experience of Stuttering (OASES). These outcomes were collected before starting treatment, 6 and 12 months after starting treatment. The results showed that 12 months after starting treatment, of the sample of 37 elementary school children, two thirds had a stuttering reduction greater than one scale value on the Lidcombe Program severity rating scale (Onslow et al., 2021)[1], and more than one third of those had no stuttering or nearly no stuttering after 12 months. Statistically and clinically significant improvements for communication attitudes, impact of stuttering, and social anxiety symptoms were also observed. Although the Lidcombe Program does not directly target the psychosocial impact of stuttering, there are components of this treatment program that facilitate psychosocial improvements for parents and children, which have been reported in both the preschool (Goodhue, Onslow, Quine, O'Brian, & Hearne, 2010; Woods, Shearsby, Onslow, & Burnham, 2002), and the school-age literature (Johnson et al., 2024). Psychosocial management of stuttering is an essential component of effective intervention. This is particularly important for elementary school children considering the mental health impacts from bullying, and social and academic stigmatization (Blood & Blood 2004, 2012, 2023; Daniels et al., 2012; Davis et al., 2002; Evans et al., 2008; Gerlach-Houck et al., 2023; Langevin, 2009; Matheson et al., 2023). The psychosocial improvements following Lidcombe Program treatment are likely the result of supportive and beneficial relationships established between the clinician, children and parents, and the counseling benefits embedded within the program delivery.

These results are encouraging and indicate that the Lidcombe Program may have clinical benefits for a much broader age range of children than initially thought. However, to cater to this wider age range, speech-language pathologists need to use the Lidcombe Program flexibly. This report provides some practical recommendations and resources for clinicians who wish to administer the Lidcombe Program to a broader age range of children using video telehealth. It is based on the experiences of the authors and treating clinician during the Johnson et al. clinical trial.

Method

Clinical mentoring

The methods of the Johnson et al. trial included clinical mentoring meetings every 2 weeks between the treating clinician and a member of the Lidcombe Program Trainers Consortium, who had over 20 years of specialist experience with the Lidcombe Program. Mentoring ensured that the recommended procedures detailed in the Lidcombe Program Treatment Guide (Onslow et al., 2021)[2] were followed, thereby ensuring treatment fidelity. These recommended procedures include (a) observing the child's conversational speech with the parent, (b) monitoring parent accuracy with using the stuttering severity rating scale, (c) discussing treatment progress from the preceding week and problem solving any issues with parents, (d) observing parents implementing the treatment with their child, (e) providing feedback to parents about their use of verbal contingencies in practice sessions and in natural conversations, and (f) helping parents to plan treatment changes for the coming week. Every 2 weeks a video recording of an appointment was viewed by the Mentoring clinician. The recording was then discussed in a 1-hour appointment attended by the Mentor clinician and the treating clinician.

Data collection

During these meetings, we discussed cases where clients were progressing successfully through Lidcombe Program stages. We also discussed clients who were not progressing and identified common reasons for a lack of progress, planned and implemented potential remediating techniques, and reflected on techniques that might lead to favorable changes. These discussions were guided by the Lidcombe Program Treatment Guide (Onslow et al., 2021)[3] and the Reflective Clinical Questions checklist (Sheedy, MacMillan, O'Brian, & Onslow, 2017).

The treating clinician documented extensive notes during these mentoring meetings. From these notes, we identified patterns and repeated issues experienced by families in the trial. The five themes that emerged from these meeting notes are presented in the Results section.

Video telehealth

For all families in the Johnson et al. trial, the Lidcombe Program was presented by video telehealth, which, for pre-schoolers, is an efficacious method for Lidcombe Program treatment as demonstrated in a randomized controlled trial (Bridgman, Block, & O'Brian, 2015, 2016). Speech-language pathologists globally accept telehealth as a viable method of treatment delivery (Santayana, Carey, & Shenker, 2021), and it has become a component of standard clinical practice since the Covid pandemic (Campbell & Goldstein, 2022). Telehealth allows the clinician to observe and consult with children and parents while they are in their home environment using their own treatment resources. Clinicians can observe how parents independently manage their child's treatment. It has been argued that such use of the child's natural environment as a treatment setting assists with the establishment and maintenance of behavior change (Mashima, Birkmire-Peters, Holtel, & Syms, 1999; Stokes & Baer, 1977). Video telehealth is a particular benefit for school-based speech-language pathologists as it provides school-age children and their families different options for attending clinical appointments. This delivery option can allow for school-age children to attend clinical appointments from school or from home. Working parents can also attend clinical appointments from home or their workplace while the child and clinician are in a quiet room at school. To demonstrate the benefits of telehealth, the following video clip provides an example of a clinician observing a parent delivering Lidcombe Program treatment at home to their school-age child (Video example of telehealth delivery of the Lidcombe Program). In the video, the parent demonstrates two of the five possible verbal contingencies that can be implemented in response to a child's talking (i.e., acknowledging stutter-free speech, and praising stutter-free speech). Some other features of the video include feedback to the parents about treatment delivery, and then watching the parent implement any adjustments to ensure that treatment is being optimally delivered.

Results

Five key themes emerged from the clinical mentoring meetings to support clinicians. These included (a) active generalization of stutter-free speech to everyday conversations, (b) strategies for engaging the child in the treatment process, (c) examples of nonverbal contingencies, (d) optimizing treatment dosage for busy families, and (e) versatile clinical resources for different settings and child ages. Practical recommendations and resources associated with these five themes are discussed below to optimize Lidcombe Program treatment outcomes for 6–12-year-old children. These themes provide potentially valuable methods that can assist clinicians to deal with many clinical challenges common to older children receiving Lidcombe Program treatment. Many of these strategies apply also to pre-school children who stutter. This means that clinicians can still follow the Treatment Guide but can safely adapt aspects of the program to meet the varied needs of children and their families.

Generalization

The Lidcombe Program (Onslow et al. 2024) requires parents to conduct daily 10–15-minute practice sessions with their child, during which stuttering should occur only infrequently. For most pre-schoolers, the generalization, sometimes referred to as the 'transfer', of stutter-free speech from practice sessions to natural conversations tends to occur spontaneously. However, for children 6–12 years of age, active generalization strategies are often necessary. Active programming of generalization, rather than expecting it to occur spontaneously by the method of 'train and hope,' is a fundamental principle of establishing behavior change (Stokes & Baer, 1977). It is also reported to be necessary during stuttering treatment of adults and adolescents (Boberg, 1981; Cream, O'Brian, Onslow, Packman, & Menzies, 2009; Guitar & Bass, 1978; Howie, Tanner, & Andrews, 1981). During mentoring meetings, we identified the following four strategies to facilitate generalization of stutter-free speech beyond practice sessions.

The bridge (sequential modification)
This is a generalization technique that bridges the gap between practice sessions and everyday

conversations. In other words, the transfer of stutter-free speech from practice sessions to everyday conversations. This process is labeled by Stokes and Baer (1977) as *sequential modification*. A way for parents to achieve this is for them to not signal an end to a practice session, but instead continue the interaction to a natural conversation without announcing that it has occurred. This technique is not explicitly stated in the Lidcombe Program Treatment Guide but supports the transition from delivering verbal contingencies in practice sessions to natural conversation. For example, at the end of a practice session a parent might say to a school-age child, or in some cases a pre-school child, 'let's go into the kitchen and start getting ready for dinner, and I'll keep listening for smooth talking.' The technique requires parents to indicate that they are still listening for stutter-free speech but not asking the child to do anything specific to sustain stutter-free speech.

For some children, particularly school-age children, to bridge the gap between practice and daily conversation described above, the child may require further intermediate steps. This follows the intention discussed in the Treatment Guide (Onslow et al., 2024) of maximizing stutter-free speech by altering the range of utterance durations with different syntactic complexities. This is because there is evidence showing that stuttering likely increases with increased utterance length and syntactic complexity (Ratner & Sih, 1987; Kadi-Hanifi & Howell, 1992; Usler & Walsh, 2018; Yaruss, 1999). Unlike other stuttering treatments that use this evidence (e.g., Gradual Increased Length and Complexity of Utterance (GILCU); Ryan & Ryan, 1983), the Lidcombe Program is not criterion-based. There are no specific criteria needing to be met before adjusting the length and complexity of language required in an activity. Instead, parents learn how to respond to the child's needs and adapt the linguistic demands of practice activities as necessary to retain very low levels of stuttering. For Participant 42 in the Johnson et al. trial, the treating clinician systematically introduced spontaneous speech during daily practice sessions by following a hierarchy of different question types. For example, parents could start with a concrete question to join sentences (e.g., 'tell me two things to describe what the boys are doing in the picture?'). Next, parents could ask more abstract open-ended questions about the picture in front of them (e.g., 'what would you do if it started raining during a soccer game?'). And finally, the parent could use open-ended questions about the child's day (e.g., 'what did you do with your friends at lunchtime today?'). In the last example, the parent transitions to more conversational style questions but monitors the child's severity rating to ensure minimal to no stuttering is still maintained.

Practising features of a conversation (train sufficient exemplars)

This technique, labeled *train sufficient exemplars* by Stokes and Baer (1977), introduces elements of a typical conversation into practice sessions, while retaining low stuttering. In real-world contexts, child conversations are 'messy,' and do not always follow adult rules of active listening and reciprocity. Practice sessions can be varied to resemble everyday child conversations. This is particularly relevant to older children whose cognitive and social communication skills are more advanced compared to pre-schoolers (Pan & Snow, 2016). The structured turn-taking facilitated during practice sessions as described in the Treatment Guide may not resemble typical peer interactions. These practice sessions can be adjusted to more resemble their everyday conversations. During the Johnson et al. trial we used the following strategies to make practice sessions less rigid or 'messy': (a) time pressure, such as increasing speech rate in a game by using a countdown timer, (b) requiring the child to initiate speech with idea-generating tasks such as 'Finish the Story' or guessing games such as 'Twenty Questions', and (c) heightened emotions, such as humorous conversation topics or games involving several character voices. Our experience is that this technique is most effective if one conversational variable is introduced and monitored at a time. For example, the parent first introduces time pressure as a practice session variable, and then once it is noted that time pressure no longer prompts stuttering, they may introduce more idea generation activities for spontaneous language. In Johnson et al., children reported finding these games fun because they typically involved the whole family.

The 'switch effect'

We noted that some children 6–12 years of age can show a 'switch effect,' where stutter-free speech is 'switched on' when it is needed or when a parent or communication context reminds them to do so. Though this may happen more frequently with school-age children, the 'switch effect' can also be observed with pre-school children. During clinical consultations, parent report can reveal when this might be occurring. For example:

Parent of participant 25, treatment session 8

It's like he thinks, okay now I'm going to be super smooth.

Parent of participant 67, treatment session 35

He's quite okay when we are talking. If anything, I just hear the stutters more when he's talking with his friends.

Parent of participant 30, treatment session 25

Sometimes I just feel like it's like a switch and he's back to the high rating again.

We suggest that, in the first instance at least, the 'switch effect' adopted by some children is undesirable because it resembles a speech restructuring clinical approach more than the operant approach of the Lidcombe Program. With speech restructuring, the client adopts a novel speech pattern to control stuttering. An advantage of an operant approach to stuttering reduction is that children learn to use effortless, stutter-free speech in everyday conversations, which does not require their conscious attention or for them to alter any aspect of their speech (Onslow et al., 2024). Some of the children in the Johnson et al. trial required considerable concentration to control stuttering. The 'switch effect' became a clinical problem needing to be resolved with parents and children because, at this age, the cognitive demands of conscious stuttering control can be unsustainable and may result in a negative therapy experience.

Parents can offset this 'switch effect' by providing verbal contingencies in everyday conversations when the child least expects them, by varying the timing and context within which they are provided. This way, parents are not using verbal contingencies as 'reminders' for their children to use stutter-free speech but instead to encourage continual stutter-free talking that is already happening. During the Johnson et al. trial, several parents were observed to cue their child to not stutter, resulting in a behavior response where fluency only occurred when the parent reminded the child to do it, instead of it occurring spontaneously, which is not the goal of the Lidcombe Program. For example:

Parent of participant 46, treatment session 29

It's just that I noticed if I hadn't reminded him, [the speech] would be bumpy.

Speech-language pathologists therefore need to be aware of the clues from parent reports and child responses that may signify the 'switch effect' so that this can be promptly remediated, or a clinical decision can be made as to whether the Lidcombe Program is the best choice for the individual child. The goal of the Lidcombe Program is to obtain effortless, stutter-free speech, and not to 'cue' the child to speak without stuttering, but to provide verbal contingencies in response to their speech. For this reason, parents were asked to prioritize providing verbal contingencies wherever conversation occurred, rather than only at home. As a result, children received parent verbal contingencies in a range of different contexts to increase the variation in delivery, for example, as they prepared for swimming lessons, when at a café with the family, visiting their grandparents house, or when at the park.

Involving the child in problem solving

Evaluating the 'switch effect'

Problem solving is fundamental to effective Lidcombe Program treatment. For pre-school children, the speech-language pathologist trains the parent as the primary agent to resolve issues that arise while doing the treatment at home with their child. The benefit of using the treatment with children 6–12 years of age is that they may be able to be involved in the problem-solving process too. To return to the previous example of the 'switch effect,' an older child may be involved in a discussion about the level of effort required to maintain stutter-free speech. Involving older children in these discussions can provide novel information about the child's experience of the treatment and help to guide clinical decision-making. Some examples of how these questions can be phrased to children are presented below.

Clinician talking to participant 42, treatment session 15

I need your help on this one. Can you have a think and tell me, are you doing anything to make your smooth talking happen, or does it just happen by itself?

Clinician talking to participant 38, treatment session 16

You know how Mum and I are hearing lots of smooth talking at the moment, and mum and I don't hear many bumps. What do you think is happening when you're talking? Are you doing anything to make that happen?

Participating in the identification and measurement of stuttering

Identification of stuttering and measurement of stuttering severity are core Lidcombe Program procedures taught to parents. In many cases, children who are cognitively capable and willing can participate in these procedures. This includes school-age and pre-school children. This involves acknowledging whether an unambiguous stuttering moment occurred and being able to rate the severity of the stuttering using the Lidcombe Program's severity rating scale (Onslow et al., 2024). During the Johnson et al. trial we taught children who were 6–12 years of age how to use the Lidcombe Program severity rating scale and offered them the opportunity to contribute to stuttering measurement discussions during clinical consultations if they were willing and able. This is particularly useful if children indicate that they are stuttering more in some situations than in others when the parent is not present. For example, when the child is at school or at after-school activities. This additional information from the child can inform (a) progress in a broader range of contexts beyond the home, and (b) what treatment adjustments are needed to optimize outcomes. We encountered many differences in stuttering severity between home and at school. If this is an issue, parents can increase the frequency of verbal contingencies in conversation or even facilitate more frequent practice sessions on the way to school to

encourage more stutter-free speech throughout the day.

Older children can also be involved in identification of stuttering, which can assist clinicians and parents to accurately measure stuttering severity. This is not a parent verbal contingency requesting an evaluation from the child but rather a child-friendly way to establish whether an unambiguous moment of stuttering occurred or not. This can help the clinician and parents to gain insight into patterns of child behavior. Sometimes children might purposefully reduce their language output to minimize the social and emotional risk of stuttering publicly (Weiss & Zebrowski, 1994). This may not always be obvious to the parent, or even to the clinician, especially if the child is using covert behaviors such as avoidance to hide stuttering. Conversations with children can therefore be a rich source of information about the behaviors associated with stuttering to help with goal setting and support. These conversations can also be empowering to these children who contribute to their own therapy. Below is an example of a way to discuss this clinical issue with parents.

> Discussion between clinician and participant 59, treatment session 23
>
> *Do you know who is the expert of your speech? It's not Mum or me, it's actually you. So, you can be like a teacher for us today and tell us about what you hear and feel when you are talking, and whether it feels smooth or bumpy. Do you think you can help us with that?*
>
> *When you said the word [xx] in that sentence, what did it feel like? Did the word get stuck like a bump that time or did it feel smooth to you?*

Non-verbal contingencies

Non-verbal contingencies are a clinical option in the Lidcombe Program. During the Johnson et al. trial we found that parent verbal contingencies alone were not always sufficient to affect change for some children. With school-age and pre-school children, the effectiveness of verbal contingencies can gradually diminish over the course of treatment, and for some children the effectiveness may be limited from the outset. The treatment guide suggests supplementing verbal contingencies provided for stutter-free speech with non-verbal contingencies if necessary. This can be done both during practice sessions and everyday conversations. Non-verbal contingencies can be in the form of tangible rewards such as stickers or stamps, or physical gestures such as high-fives or fist-pumps. These are not intended to replace verbal contingencies, but rather are used alongside them to enhance the treatment effect.

Of the 37 children treated in the Johnson et al. trial, 29 (78%) families implemented non-verbal contingencies at some time during their child's program due to child or parent reports about children not enjoying verbal contingencies. This may mean that as children's interests and motivations change, parent contingencies – verbal or non-verbal – may also need to change. This video clip provides an example of how tokens can be used as non-verbal contingencies during a practice session to supplement parent verbal contingencies. This video also demonstrates how easily this can be done online (Video example of non-verbal contingencies).

There are many different ways that non-verbal contingencies can be enjoyed by children completing Lidcombe Program treatment. Below are some further examples of the most effective non-verbal contingencies enjoyed by children in the present trial.

Lego towers

When the parent hears spontaneous stutter-free speech, the child is given a Lego block. The child can collect Lego blocks in a visible spot in the house. This can then act as a visual reminder to the parent and child to complete their daily therapy, but also to visually highlight to the child the amount of stutter-free talking the parent is hearing each day. This visual representation of the child's stutter-free speech can provide added reinforcement and enjoyment. Once the block tower reaches a pre-determined height, the child can choose a reward, for example an ice-cream after dinner. While edible rewards can be highly effective, this same process can be implemented with any appropriate treat that interests the child and is acceptable to the parents. For children who thrive on competitive activities, parents can increase the designated height of the tower each day before any tangible reward is given. Of course, the Lego tower can be substituted with an alternative that reflects the child's interests such as toy animals, dinosaurs, toy cars, or even baseball or Pokémon cards.

Toy race

The child and parent create an actual or imaginary racecourse around their house. The child then selects a favorite toy to move across the house. When the parent hears spontaneous stutter-free speech at an optimal target level, the parent will provide a verbal contingency for stutter-free speech and the child can move the toy gradually forward in a stepwise fashion on the racecourse. Once the toy reaches the finish line, the child receives a reward, for example the choice of movie for the family to watch together on Friday night.

Lucky-dip bag

Parents and children can write down a series of prizes and place them in a shopping bag or bowl. Prizes could include adding 10 min to the child's bedtime,

purchasing a treat from the local café on the way home from kindergarten or school, time at a playground, or making someone wear a funny hat to dinner. When the parent hears an optimal level of spontaneous stutter-free speech, the child can select something from the lucky-dip bag. Alternatively, children could collect points across the day for stutter-free speech, and a designated number of points can earn them a choice from the lucky dip bag.

The key with these activities is that the non-verbal contingencies are presented (a) randomly, so the child does not learn to expect a reward for every stutter-free utterance praised; (b) for an optimal level of stutter-free speech that is appropriate for the child's treatment plan (i.e., if the child can say a sentence fluently, then praising single words would be ineffectual); (c) in a variety of situations, so that stutter-free speech is acknowledged in different contexts with different people; and (d) varied, to maintain child interest. Another fundamental consideration is that parents set daily target levels of stutter-free talking at an achievable level for their child. If children do not reach the tangible reward at the end of the day for stutter-free speech – for example, the child never obtains enough blocks to build the Lego tower – then this can undermine the effectiveness of using non-verbal contingencies in this way or become a negative therapy experience. Overall, children in the Johnson et al. trial reported significant enjoyment from these activities, sometimes requesting parents continued them at home even after the program had finished.

A logistical constraint with parents implementing non-verbal contingencies is the time and planning required. Some parents of pre-school children have expressed that the time commitment of the Lidcombe Program is a major challenge (Goodhue et al., 2010). It is essential to ensure that additional non-verbal contingencies do not increase parent burden and make families reluctant to do treatment. To manage this, rewards can be embedded in daily activities. Examples of this from the Johnson et al. trial included letting the child choose the family television show for the evening, allowing the child to choose a small treat at the weekly supermarket shop, or extra time on a trampoline or backyard activity. Clinicians can collaborate with parents, and in some cases the children, to determine a tangible reward that is practical, interesting, and not burdensome on parents. In this video, a child reflects on his favorite activities enjoyed during Lidcombe Program treatment (Video of child perspective of treatment). In particular, the child talks about how enjoyable it was using Lego as a tangible reward. He would choose a Lego character, and when his parents acknowledged his stutter-free talking, he then moved the Lego character up the stairs until it reached the top.

Increasing treatment dosage

It is possible for Lidcombe Program treatment progress to stall for some children, even after a period of stuttering reduction. While this may be less likely when treating pre-school children (O'Brian et al., 2013), it can still be a clinical issue that speech-language pathologists face with all ages. In the Johnson et al. trial, this occurred for 78% of the 29 children at some time during treatment. A stall in treatment progress during the trial was represented by there being no increase or decrease in stuttering severity ratings by more than one scale value on the stuttering severity scale for three or more consecutive weeks.

One reason for a stall in treatment progress could be related to treatment 'dosage.' Particularly for school-age children, it is likely that more treatment will be needed to reduce stuttering. Assuming that verbal and non-verbal contingencies are essential to Lidcombe Program treatment effects, this may present some barriers of practicality for children who spend long periods of time at childcare or school, sometimes followed by extracurricular activities. These time and access limitations may mean that parents are potentially missing significant opportunities to provide verbal contingencies. To maximize verbal contingencies in treatment, several suggestions emerged from the mentoring discussions in the Johnson et al. trial.

Maximizing verbal contingencies in structured practice

The Treatment Guide specifies that parents should implement verbal contingencies in at least one to two 10–15-minute practice sessions every day. For the 29 children whose treatment progress stalled, parents were encouraged to implement verbal contingencies in two or more practice sessions per day and monitor the effects of doing that. Parents who introduced a second practice session may be more likely to reach Stage 2 criteria of the Lidcombe Program than parents who did not. Of the 37 children in the study, 21 families (57%) reported implementing more than one practice session per day as part of their regular treatment plan. Of the 12 children who reached Stage 2 of the program, 10 parents (83%) reported implementing verbal contingencies in more than one practice session per day.

Maximizing verbal contingencies in natural conversations

Another strategy presented in the mentoring discussion to maximize treatment dosage was to coach parents how to use 'top up sessions.' This is specifically useful for time-poor parents to provide effective treatment without needing additional toys and games. Parents learn to identify 10-minute brackets of time during the

day when their child's stuttering severity is at its lowest. During this time, the parent provides the child with a concentrated period of verbal contingencies. This could occur while at the shops, while picking up siblings from school, or while making afternoon snacks. For example, the parent might start by saying:

> That was smooth. While we're in the kitchen making some afternoon snacks, I'm going to listen for more smooth talking just like that. Let's see if you can get 10 smooth points and then we can eat the afternoon snacks we made.

In this example, the parent is not asking the child to produce stutter-free speech. Instead, the parent is listening for spontaneous stutter-free talking during an everyday task as a 'top up session.' The parent has set up the practice session in a way that appears random to the child. The purpose of doing this is to minimize a learned response that stutter-free talking only occurs during structured practice sessions. The procedure can be embedded in the family routine. In this example, the parent used afternoon snack, a family routine after school, instead as an end reward.

Clinical resources

The Johnson et al. trial used video telehealth, which is a delivery format supported by randomized controlled trial evidence (Bridgman, Onslow, O'Brian, Jones, & Block, 2016). To support clinicians to adapt the Lidcombe Program to telehealth delivery with their school-age clients, a session plan proforma was developed during the mentoring meetings (see Appendix A) as well as a printable home practice proforma that can be provided to parents (see Appendix B). These proformas were designed using the clinical reflective checklist (Sheedy et al., 2017) and the Lidcombe Program Treatment Guide (Onslow et al., 2024). Clinicians may find it convenient to use the session plan checklist on their screen during telehealth appointments to minimize any potential challenges of managing video telehealth technology, the client, and the session plan simultaneously. This resource may be particularly useful to junior or inexperienced clinicians wanting to use telehealth delivery with either pre-school or school-age clients.

Another way to enhance the effectiveness of treatment delivery is having a bank of age-appropriate activities that can be easily accessible and adaptable to meet the needs of the child. To help speech-language pathologists practically apply this program, Appendix C presents a comprehensive list of activities that can be manipulated for in-clinic, online, at home, or school-based delivery of the Lidcombe Program for all age groups. The activities are sequenced in order of language length and complexity. However, they can all be adapted to any practice session structure based on

the child's needs. The activity list can also be used as a collaborative resource with children to identify what activities interest them, and to expand on those areas to ensure therapy remains fun and engaging.

Summary

The Lidcombe Program has the best evidence among treatments for pre-school children who stutter to stop or significantly reduce stuttering (Sjøstrand et al., 2021). There is growing evidence that this treatment can also be effective to stop or significantly reduce stuttering in children older than 6 years of age (Bakhtiar & Packman, 2009; Hewat, Unicomb, Dean, & Cui, 2020; Lincoln et al., 1996; Yandeau, Carey, & Onslow, 2021). The Lidcombe Program also improves psychosocial consequences of stuttering in pre-school and school-age children (Johnson et al., 2024; Woods et al., 2002), which is another important aspect of effective stuttering management. The Lidcombe Program also has demonstrable efficacy when provided by telehealth (Bridgman et al., 2016; Johnson et al., 2024). However, dealing with a group of children from as young as 3 years to as old as 12 years of age with one program requires flexible procedures. This means that speech-language pathologists need to have the clinical skills and knowledge to adapt their delivery of the program to a broader age range of children and their families. Accordingly, the recommendations discussed in this report can be beneficial for both older and younger children who stutter.

Regular case discussions between the treating clinician and an experienced Lidcombe Program Consortium member in the Johnson et al. trial allowed for real-world clinical issues to be developed into practical recommendations and resources. This highlights the value of clinical mentoring for speech-language pathologists, and the positive influence these discussions can have on outcomes for current and future families seeking stuttering treatment.

Notes

1. The present Phase II trial was conducted using the *Lidcombe Program Treatment Guide* (Ver.1.3) (Onslow et al., 2021) before the publication of the updated *Lidcombe Program Treatment Guide* (Ver.1.6) (Onslow et al., 2024) was published.
2. See note 1 for reference.
3. See note 1 for reference.

Disclosure statement

Funding

Data availability statement

The datasets generated during the current study are available from the corresponding author on reasonable request.

Consent for publication

Written consent was obtained from families to include treatment videos in scientific publication of the trial.

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