The University of Hong Kong
Faculty of Education
Child Language and Speech Laboratory (CLAS)

A Clinical Manual of Child Language Intervention

(Expanded version)

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This manual is written for staff and students in the HKU BSc (Speech and Hearing Sciences) program. It is used in the context of the course SHSC3032 Language Development and Disorders in the Pre-Primary Years, and SHSC3035 Complex Cases Paediatrics.

The manual was distributed to speech-language therapists in Hong Kong through the Hong Kong Association of Speech Therapists in December 2021. It is intended for colleagues' personal use.

If colleagues have doubts for the proper use of this manual, or have questions or comments, please get in touch with Dr. Anita Wong by email.

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10 Educational Videos on Language Development and Developmental Language Disorder 發展性語言障礙 in Cantonese Chinese https://www.youtube.com/clashku

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Table of Content

Objectives

This manual on child language intervention is written for speech-language therapists (SLTs) in training and their clinical educators at HKU. It provides a brief description of many of the evidence-based child language intervention approaches reported in the research literature. The description begins with the approach's theoretical background and empirical evidence. It then provides details on each of the components in Fey's child speech and language intervention model (McCauley, Fey, & Gillam, 2017) as provided in the evidence. The description ends with a script on how each can be used with Cantonese-speaking children and key references.

This manual does not tell us everything about intervention. It does not discuss how to make decisions on intervention goals, or complete a quantitative analysis of intervention outcomes using effect size measures like Tau-U. It is not meant to be exhaustive either. Several approaches, including those emerging ones (e.g., retrieval-based word learning (Leonard et al., 2019), structural priming (Wada, Gillam, & Gillam, 2020), Shaping Coding (Ebbels, 2007)) are not yet included.

According to the modified three-tier service delivery model described in Ebbels, McCartney, Slonims, Dockrell and Norbury (2018), most of the intervention approaches described here are Tier 3A "indirect individualized intervention planned and monitored by the SLT but delivered by parents or a member of the children's workforce", or Tier 3B "direct individualized intervention delivered by the SLT who planned the intervention" (p. 6). This manual does not include Tier 1 or Tier 2 intervention approaches.

Given that intervention is a broad and complex topic, this manual will be expanded and revised from time to time. In the meantime, we hope that it will be the beginning of some meaningful conversations among SLT students and colleagues on how to translate research evidence to clinical practice, with a goal for more optimal services for children with language disorders.

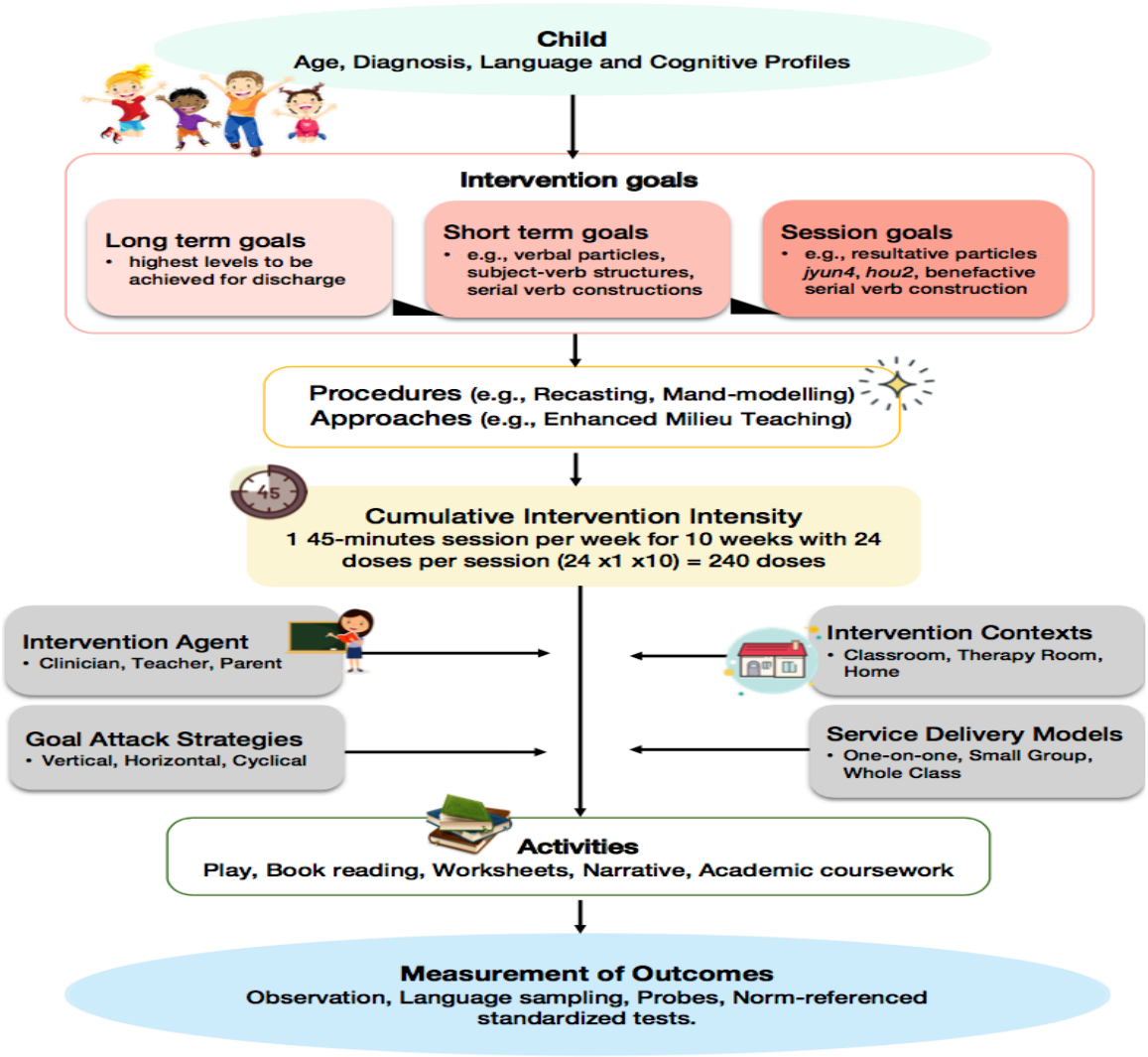
Feedback and suggestions are welcome!

Child language intervention

Language intervention is a special and purpose-driven way of interacting with, and responding to the child with speech, language, and communication disorders. The goal is to provide meaningful, dense and enhanced language input so that it is easier for the child to learn language knowledge that allows him/her to use it effectively and efficiently to speak, and to understand others in his/her everyday life. As in other areas of clinical practice, decisions language intervention should be grounded within the frameworks of the International Classification of Functioning, Disability and Health (ICF) and Evidence-Based Practice (EBP).

I. A guiding conceptual framework

Fey's child speech and language intervention model (McCauley, Fey and Gillam, 2017) (with illustration on goals for a Cantonese Chinese child with language problems)



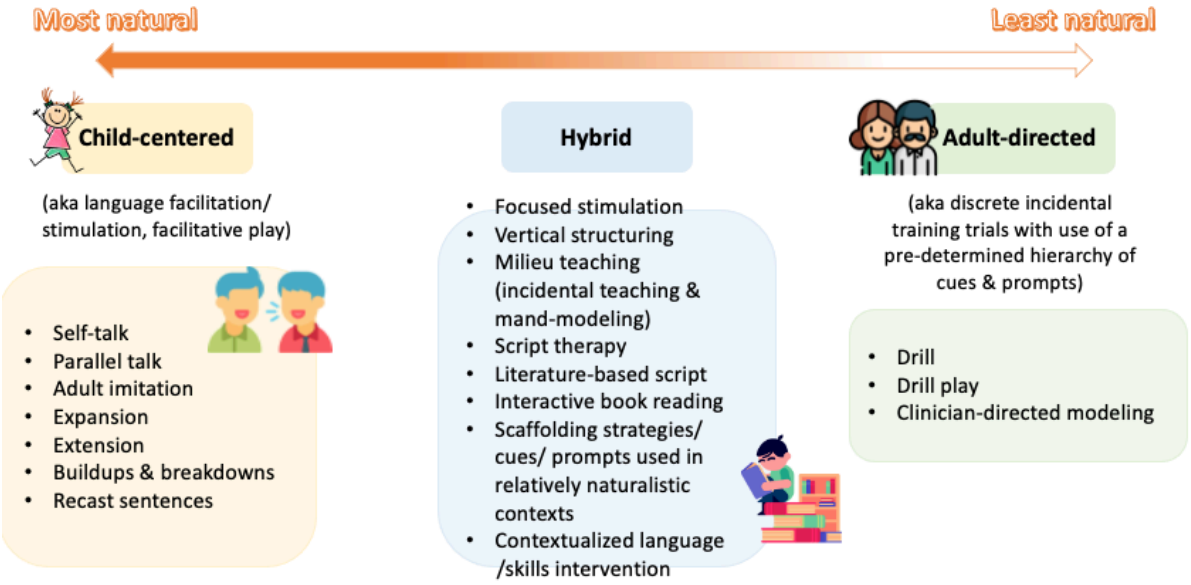
Adapted from Finestack & Satterlund (2018)

II. Definition of key concepts

Procedures and approaches

These two terms are often used interchangeably, but a distinction can still be made. McCauley, Fey and Gillam (2017) defines procedures as all those acts the intervention agent does with a purpose of helping the child to learn, and to accomplish the intervention goals. Procedures (e.g., mand-model, incidental teaching, expansion) can be used in some unique combinations to form intervention approaches (e.g., Enhanced Milieu Teaching). An intervention approach may also specify other components (e.g., cumulative intervention intensity, dose rate, or intervention agent) of the intervention.

There are different ways to characterize the different intervention procedures and/or approaches. One way is the use of a continuum of naturalness (Fey, 1986), with child-centered procedures and/or approaches at one end, and adult-directed procedures and/or approaches at the other, and hybrid approaches in the middle. The figure below illustrates the continuum with examples.



Fey's (1986) continuum of naturalness of intervention procedures and/or approaches adapted from Paul, Norbury, & Gosse (2018)

There are two other ways to characterize the different intervention procedures and/or approaches: 2) **explicit teaching** (e.g., Balthazar, Ebbels & Zwitserlood, 2020) versus **implicit learning** and 3) **input-based** (Plante & Gómez, 2018) vs **output-driven**. These two ways may overlap. For example, an input-based approach or intervention often assumes implicit learning.

Dose, dose number, cumulative intervention intensity and other related terms

Let's begin with the overarching concept ***cumulative intervention intensity***, which is a product of dose number X session frequency X total intervention duration (Baker, 2012). The term ***dose*** is defined in relation to ***dose form*** and ***teaching and learning episodes (or moments)***. Note that many of the terms here differ in such fine details that they can be confusing in the first instance.

Dose form: "the typical task or activity within which the teaching episodes are delivered" (Warren et al., 2007, p. 71). An example is child-directed play.

Teaching and learning episode (dose)*:* It is a challenge to define given that speech and language intervention is "fundamentally multifaceted" (Warren et al., 2007, p. 72). A teaching and learning episode occurs when the intervention agent does something that is essential, and something that is assumed to result directly in the child's learning of specific goals (Warren et al., 2007). An example is the intervention agent's recast of a child's platform utterance. A teaching and learning episode can also be what the child does that is essential and assumed to lead to the learning of the specific goals (Baker, 2012). An example is the child's production practice in speech sound intervention. These essential "therapeutic inputs" from the intervention agent, or essential "client acts" from the child (Baker, 2012, p. 402), are called the *active ingredients* of the intervention.

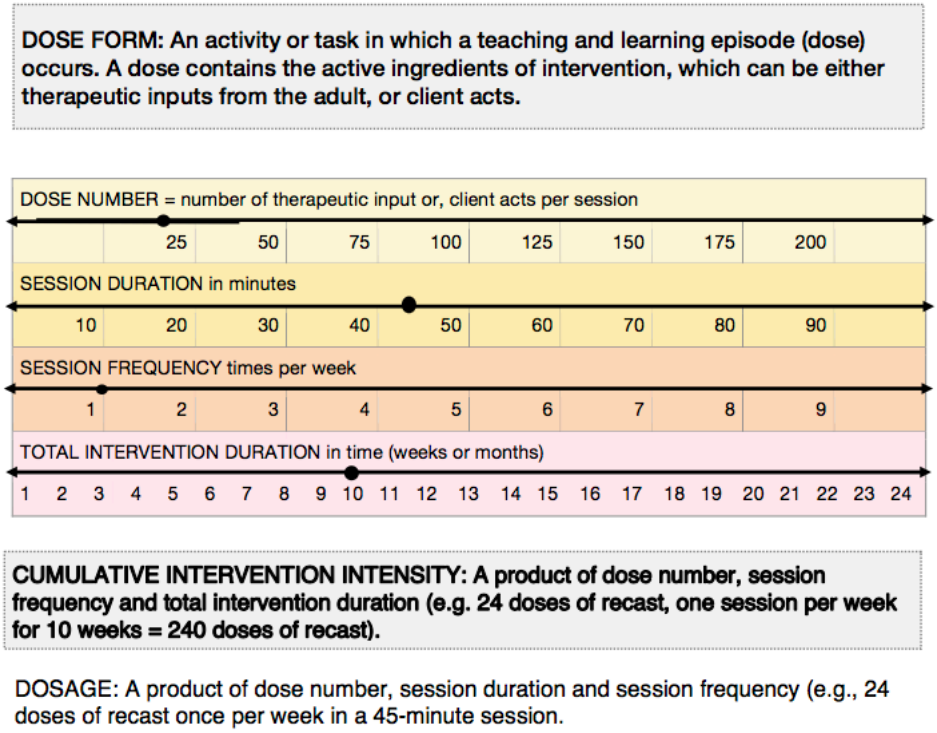
Dose number: Dose number (Plante, n.d.) is the number of doses for the target behavior during a single intervention session. The 24 adult recast of the target benefactive serial verb construction will be 24 doses. In a systematic review, Zeng, Law and Lindsay (2012), of the 26 phonology, syntax and vocabulary intervention studies included, only one reported on dose number. In place of dose number, studies typically reported on *session/dose frequency* (see below).

Dosage*:* In Fey's model, dosage specifies the dose number, the length of session (***session duration***) and the number of sessions per week (***session frequency***). An example of dosage description one 30-minute session per week with 10 doses per session. This term is rather common in non-professional context, and often gets mixed up with ***dose number***. Dosage is included in the calculation of cumulative intervention intensity.

Session frequency: "the number of intervention sessions per unit time, such as per day, per week, or per month" (Baker, 2012, p. 402). An example is once per day and two times a week. The term **dose frequency** is sometimes used.

Total intervention duration: "the total period of time in which a particular intervention is provided" (Baker, 2012, p. 402). An example is 8 weeks.

Cumulative intervention intensity**:** the product of dose number X session frequency X total intervention duration (Baker, 2012). The cumulative intervention intensity for 24 doses once per day, two sessions per week in each month (session frequency) X 2 months (total intervention duration) = 24 X 1 X 2 X 8 = 384



Adapted from Baker (2012)

In the above figure, there is one additional term. ***Session duration*** refers to the length of the session in minutes, particularly the length during which the specific goal is targeted. Session duration is used to calculate ***dose rate*** *(or* ***dose density****)*, the rate at which a dose is delivered. If 24 recast is delivered in 20 minutes, the dose rate is 24/20 = 1.2 per minute.

III. A three-goal framework

A goal framework is "a hierarchically organized network of goals" (McLeod & Baker, 2017, p. 346) with the ones lower in the hierarchy being more specific than the ones above. Examples of goal frameworks include Fey (1986), Klein & Moses (1999), and McCauley, Fey and Gillam (2017). The following table illustrates how the frameworks are related to one another.

Fey (1986)	**McCauley, Fey & Gillam (2017)**	**Klein & Moses (1999)**
		Long-term goal
Basic goal	Basic goal	Short-term goal
Intermediate goal	Intermediate goal	
Specific goal	Specific goal	
Subgoal		Session goal

We adopt Klein & Moses three-level goal hierarchy, which is more familiar to speech-language therapists (SLTs) in Hong Kong, and use McLeod and Baker's (2017) definition of goals here.

IV. **Setting goals**

Long-term goals

Definition:

LTGs "summarize what needs to be achieved before a child and his or her family can be dismissed from intervention services" (p. 346). Not all children with language disorders are able to achieve age-appropriate levels at discharge. So long-term goals sometimes state the highest level of language and communication behavior the child is capable of achieving.

Example:

CK[1] will speak and understand language at the same level as his age peers and demonstrate skills that adequately meet his everyday communication needs when he graduates from K3.

1: CK is a 4-year-old K1 child with DLD

Short-term goals

Definition:

STGs "describe the specific behavior or skill being targeted to achieve the long-term goal" (p. 346). Often a long-term goal is accomplished through several short-term goals. Briefly short-term goals specify

a) The child's response behavior
b) The task
c) The examiner
d) The setting
e) The passing criterion (states the level of performance required for termination of intervention for this specific behavior)
f) The expected duration

Details c) and d) are often assumed and not specified.

Example:

CK will produce the "benefactor + bong1 + benefactee + verb phrase" spontaneously (a) in 12 out of 16 trials (e) in a criterion-referenced probe (b) after 10 sessions of therapy (f).

Session goals

Definition:

SGs "describe the behaviors, skills, or knowledge taught through intervention procedures within an activity during intervention sessions with an intervention agent" (p. 347). In other words, SGs state the target behaviors, skills, or knowledge that the child is expected to demonstrate in the sessions. Session goals are developed from, and contribute to the realization of, the short-term goals. Briefly session goals specify

a) The child's observable behavior (i.e., the target language form and structure to be observed)
b) The response mode (e.g., spontaneously)
c) The meaning and/or communicative function of the language form and structure)
d) The teaching and learning procedure (e.g., after mand-modeling), or the intervention approach
e) The dose (i.e., teaching and learning episodes)
f) The criterion (i.e., stating the level of performance required for training the behavior at a more advanced level)
g) The intervention agent
h) The context (e.g., play-based activities in the clinic)

Detail c) replaces the response level (e.g., at word level, phrase level) originally described in McLeod and Baker (2017), which is more appropriate for speech intervention. Detail c) is critically important as it reminds SLTs that meaningful use of the grammatical form and structure should be made clear for the child. The option of intervention approach is added to item d). Item g) is often assumed and not specified.

<u>Examples for output-driven approaches:</u>
a1i) CK will produce "bong1 +ngo5 + verb phrase" (a) to request for help of an action from an adult (c) spontaneously (b) 5 out of 6 obligatory contexts in two consecutive sessions (e, f) using the Enhanced Milieu Teaching approach (d) in play-based activities (h).

(When this session goal a1i is met, move on to a1ii).

a1ii) CK will produce "benefactor + bong1 + ngo5 + verb phrase" (a) to request for help of an action from an adult (c) spontaneously (b) in 5 out of 6 obligatory contexts in two consecutive sessions (e, f) using the Enhanced Milieu Teaching approach (d) in play-based activities (h).

<u>Examples for input-based approaches</u>
a1i) CK will spontaneously (b) produce 18 (e) platform utterances (a) to request for help of an action from an adult (c) for the speech-language therapist (g) to provide an immediate recast in 20 minutes (f) using the Enhanced Conversational Recast approach (d) in play-based activities (h). The recast illustrate the target "bong1 +ngo5 + verb phrase".

(When the child produce "bong1 +ngo5 + verb phrase" spontaneously in 5 out of 6 obligatory contexts in two consecutive sessions, move on to a1ii).

a1ii) CK will spontaneously (b) produce 18 (e) platform utterances (a) to request for help of an action from an adult (c) for the speech-language therapist (g) to provide an immediate recast in 20 minutes (f) using the Enhanced Conversational Recast approach (d) in play-based activities (h). The recast illustrate the target "benefactor + bong1 + ngo5 + verb phrase".

Note: I would set b) the response mode as "spontaneously" by default. In output-driven approaches, we can use various cues or prompts or facilitation strategies to elicit correct productions from the child, even when these productions are imitations from an adult model. The ultimate goal, nevertheless, is spontaneous production without the support of cues and prompts, and this is the level when it indicates that the child as adequate and abstract knowledge of the target grammatical form, structure, or communicative function that allows him or her to generalize its use. Only when the child can produce the target spontaneously will we move on to another session goal.

Some students or clinicians take a detailed record or data on how many times the child produced the target correctly given different kinds of cues or prompts. The trade-off for this practice is that you are distracted from your moment to moment interaction with the child, and that you are not able to observe and provide the most appropriate response to the child.

I would suggest that *you use whatever prompt, or cue, or facilitating strategy that you think appropriate and that is consistent with the treatment approach, at that particular moment of interaction,* to scaffold the child's production given your general understanding of how the different prompts and cues provide different levels of support. Take record of these prompts and cues only when you can for you to develop an impression of the child's progress. *There is no need to be strict with a pre-determined cueing or prompting hierarchy unless you adhere to a strict behaviorist* (vs social interactional) theory of intervention, as positive interaction with the child is of primary importance.

I also do not use criteria, like 8 out of 10 times when given Say-prompt in my session goal, unless the child functions at a very, very, low level and you do not expect the child to produce the target spontaneously with the 10 week treatment period. Actually, if this is the case, it is very possible that the target behaviour selected as the session goal may not be appropriate. If you set the objective level for the target behaviour as spontaneous, you do not need to change your session goal frequently.

V. Measuring outcomes for short-term goals: Treatment, generalization and control data

One key question for speech-language therapists: Is the intervention responsible for the child's progress? (Olswang & Bain, 1994). To answer this question, we collect three types of data, particularly in relation to the short-term goals (STG). Sometimes, people refer to these data as goals, that is treatment goals, generalization goals and control goals. In this document, we do not use the terms treatment goals, generalization goals and control goals in order not to confuse them with long term goals, short term goals and session goals.

Treatment data: Treatment data are collected on the target behavior as described in the STG. Relative to generalization data, treatment data give a more "restricted view" (Olswang & Bain, 1994, p. 57) of the child's learning.

Generalization data: Generalization data are collected "*outside of the teaching paradigm*" (Olswang & Bain, 1994, p. 57) to examine the child's learning beyond the intervention context. Generalization is essential because *it is not plausible to teach every child every single language form or structure*. Broadly speaking, there are three types of generalization.

> *Stimulus generalization* refers to the child's ability to use the target with trained items when these trained items are presented with new materials, new people and new settings. For example, stimulus generalization can be observed in the child using the target words at home with his parents.
> *Response generalization* refers to the child's ability to use the target with untrained items. Generalization can also occur across behaviors. For example, response generalization can be observed when a child produces a target benefactive serial verb construction with verbs that have not been used during intervention.
> *Across-behavior generalization* occurs when the child demonstrates learning of another form or structure that is *linguistically similar to the target* when no training on this form or target has been provided. This form and structure should be previously *unknown* to the child. For example, when training the aspect marker *gan2*, data on another aspect marker *zo2* can be collected to document if generalization occurs.

Among the three types, stimulus generalization is the easiest to achieve and across-behavior generalization is the hardest. When situations do not allow the SLT to collect all three types of generalization data, s/he should choose the one that the child is most likely to achieve within the time frame of the short-term goal.

Control data: Control data are collected on behaviors that are not expected to change as a result of the treatment. The control behavior is selected to show that *the treatment effect is specific to the target*, and treatment gains are not a result of maturation or other factors that are *not* under the SLT's control. Behaviors that serve as controls have to be 1) ones the child has not acquired, b) ones that develop at around the same developmental time frame as the target, and c) ones that have similar linguistic complexity and in the same language domain as the treatment target. For example, when training the aspect marker *gan2*, control data on the modal auxiliary 'wui5' can be collected because it is not known to generalize from the learning of *gan2*.

Tasks for collecting treatment, generalization and control data in relation to short-term goals

Criterion-referenced probes with 12 items (10 items are minimal and 16 is ideal) are often used for collecting these data. These probes can make sure of individual picture cards, as in the case of vocabulary, or a picture sequence as in the case of grammatical construction. With young children and for some grammatical forms or structures (e.g., aspect markers for coding the temporal contour of events), real objects, or scripted actions or events can be more useful.

Probes are assessment tasks that are administered outside intervention time. They are the formal measures of outcomes. During intervention, the child may produce the target

spontaneous, or by imitation after a model, or after a cue or prompt or a facilitation strategy. These should be recorded as informal measures as well.

For an illustration of the measurement and report of outcomes that can be adopted in clinical practice, please refer to Hau, Wong & Ng (2020).

VI. Measuring outcomes for the long-term goal, short-term goals and session goals

for the long-term goal (LTG)
Collect data from different sources, including those that reveal the child's performance *in real-life contexts.* For example, a) administer one or two norm-referenced tests to document the child's current standing relative to his/her age peers, b) collect a language sample, and measure mean length of utterance, lexical diversity, and sentence complexity etc when engaging in conversation with you, a familiar individual, and/or a casual acquaintance, c) obtain a subjective rating of functional communication skills by parents, teachers or others who know the child well, or d) complete an ASHA NOMS survey.

for short-term goals(9STG):
Ideally, collect treatment, generalization and control data from probes using single-subject designs with three phases: 1) first phase—baseline, 2) intervention, and 3) last phase--follow-up and maintenance. There should be a minimum of three data points in the first two phases, and five is even better.

Collecting outcome data in in relation to STGs for individual children: Some tips

Different settings will pose different constraints in the collection of outcome data. For example, in settings where treatment is provided in 10-week blocks, it is not always possible to have three treatment, generalization and control data points in the baseline phase when no intervention is provided, and to collect data every session. Let's learn to identify priorities and find solutions to work around constraints, in order to strike a balance between accountability to the parents and practicality. Here are a few solutions you may consider.

a) collect baseline data in the first three sessions after assessment. In the third baseline session, intervention is provided immediately after data collection. In every, or every other session, of the intervention phase, collect formal data using criterion-referenced probes. The decision to do every session, or alternative sessions, depends on the length of the probes and the child.

   Here is an example of a data collection plan for a 10-week block. A minimal of three data points in the intervention phase is required (e.g., at Tx2, Tx4, Tx6). There is no follow-up maintenance phase in this example as a no-treatment period is required for measuring maintenance.

For example: STG: benefactor + bong1 + benefactee + verb phrase

	Ax	B1	B2	B3/Tx1	Tx2	Tx3	Tx4	Tx5	Tx6	Tx7
STG Treatment data		0	0	0	0	0	0	0	3	5
Generalization data		0	0	0	0	0	0	0	4	5
Control data		0	0	0	0	0	0	0	0	0

Ax: Assessment session; B: baseline phase, Tx: treatment phase, F: follow-up maintenance phase.

b) collect control data following the schedule in a), but collect generalization data using probes only once at the baseline phase and then again once at the last session. Pay attention to and record any spontaneous use of the target in other contexts or spontaneous use of any related behavior as generalization data. The reason for keeping control data over generalization data is that we need evidence to say that the child improves as a direct result of the intervention we provide.
c) include a minimum of 10 items in the probes (12 is optimal and 16 is ideal).

for session goals (SG)
The target behaviors specified in the STG and the SG statements are related, with the target behavior required for the STG being more advanced. It makes sense that the child gets 1 point in the SG when s/he produces the target behavior at the more advanced level as specified in the STG.

Here is an illustration of the outcome data collected on a child

SG: bong1 +ngo5 + verb phrase

	Tx1	Tx2	Tx3	Tx4	Tx5	Tx6	Tx &
SG treatment data (max = 6)	0	1	2	2	3	4*	5*

* The child used an additional element, the benefactor, in his platform utterance once. This in fact is the more advanced version of the target as specified in the ST goal.

Collecting outcome data in in relation to SGs for individual children

Collect data in relation to what is specified in the SG statement. Referring to examples of SG statements on page 7, it can be seen that the SGs are stated in way that requires the SLT to provide a pre-specified number of obligatory contexts in output-driven approaches. In input-based approaches, the SGs are stated in way that requires the SLT to provide an pre-specified number of input exemplars either after the child's platform utterances, or after joint attention with the child is secured.

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Prelinguistic Milieu Teaching (PMT)

Theoretical background:
PMT is an intervention approach designed for an adult to work directly on the child's non-linguistic skills to prepare him/her to learn language at a later time. The goals are to help the child use more requests and comments, and more complex ones, using non-linguistic means including gestures, vocalizations and eye gaze (Fey et al., 2017). PMT, also known as Milieu Communication Training, is typically followed by language intervention to facilitate the child's learning of words and word combinations after s/he has developed adequate non-linguistic communication skills (Fey et al., 2017).

PMT builds on the Transactional Model of Communication Development (McLean & Snyder-McLean, 1978), which assumes that bidirectional, reciprocal interactions between children and adults facilitate early social and communication development. As an example of milieu teaching, PMT also borrows procedures from behavioral theories, making it a hybrid intervention approach in Fey's (1986) continuum of naturalness.

Since the success of PMT depends largely on the adult's use of responsive strategies such as recasting, PMT is often provided with Responsivity Education, an intervention provided by the speech–language therapists (SLT) to the caregivers with a goal to increase their compliance to and recoding of the child's communication acts (Woynaroski et al., 2014). Responsivity Education is an adaptation of the Hanen Program. Read Fey et al. (2017) for more information.

PMT requires the adult to push the child to higher levels of communication frequency and complexity and at the same time, to follow the child's lead and be sensitive to the form and content of the child's communicative efforts (Fey et al., 2017). It focuses on two broad types of communicative acts - requests and comments. The three major components of PMT are (Fey et al., 2017):

1. Arranging the environment to increase opportunities for communication,
2. Following the child's attentional lead, and
3. Establishing social routines (i.e. turn-taking sequences around an object or activity) through play.

The five intermediate goals of PMT include (Fey et al., 2017):
1. Establish routines to serve as the context for communicative acts,
2. Increase the frequency of non-linguistic vocalizations,
3. Increase the frequency and spontaneity of coordinated eye gaze,
4. Increase the frequency, spontaneity, and range of conventional and non-conventional gestures, and
5. Combine components of intentional communication acts (eye contact, vocalizations and gestures).

The three principal procedures of PMT include (Fey et al., 2017; Yoder & Warren, 2002):
1. Prompts
    a. Time delay: a pause to encourage the child to generate a communication act

    b. Linguistic prompt: include open questions (e.g., What do you want?) as well as direct instructions for the child (e.g., Look at me!)
    c. Non-linguistic prompt: show the child what response is expected (e.g., move an object of the child's interest directly in line with the adult's face)
2. Models
    a. Gestural model
    b. Vocal model
    *Use vocal model only in the absence of clear referents to ensure that the child does not misinterpret the adult's non-linguistic vocalization as an actual label for the referent.
3. Natural consequences
    a. Compliance: comply with the child's request as much as possible
    b. Imitation: provide an exact, reduced or expanded imitation of the child's vocalization
    c. Recast/ Linguistic mapping: put into words (can be single words, questions or statements) a reasonable interpretation of the child's communication act

For a more detailed description of the procedures and specific techniques used in PMT, refer to Fey et al. (2017).

Empirical evidence:
The earliest quasi-experimental studies (Warren et al., 1993; Yoder et al., 1994) provided evidence for an increase in the participating children's frequency and clarity of requests after PMT. The specific gain could be attributed to the caregivers' contingent responses, including both verbal (i.e. comments that repeat or rephrase children's vocalizations) and non-verbal acts (i.e. mirroring children's acts), to the child. Generalization of children's requests was evident across contexts and communication partners.

In a 12-week intervention study involving preschoolers with severe autism and minimal verbal output, Paul et al. (2013) reported that children in the discrete training trial group and children in the PMT group showed comparable improvement in the average number of spoken words produced after intervention. The treatment effect was mediated by two factors. Children with better joint attention before intervention showed better outcomes than those with poor joint attention, and this was observed in both treatment groups. Children with stronger receptive language pre-treatment did better in PMT than in discrete training trials.

Several randomized controlled trials (Fey et al., 2006; Fey et al., 2013; Yoder & Warren, 1998) examined the causal relationship between PMT and the outcomes on toddlers with language disorder associated with intellectual disabilities. All studies demonstrated a medium to a large effect size between 0.5 and 0.7 in different communication variables.

There are limitations to the above-mentioned studies and cautions should be taken when using PMT in clinical practice. First, like many other intervention approaches, PMT has not been examined for its effectiveness in non-laboratory real-life clinical settings. Second, PMT in the studies were provided in three or four 20-minute sessions per week across 6 to 9 months, and this may explain the low maintenance shown in Fey et al. (2006) and Warren et

al. (2008). Third, participants in most randomized control trials have a wide spectrum of etiologies, and this may explain substantial individual differences in treatment responsiveness. Fourth, intervention alone may not explain the statistically significant findings as factors which can affect the internal validity might not have been controlled for (e.g., high parental use of recasts prior to intervention).

It will be good to conduct a systematic review and meta-analysis on all the PMT studies before we draw conclusions on its efficacy and effectiveness.

Specification of components in Fey's model

Target population:

Children who

- are between the chronological ages of 12-54 months
- function developmentally between the ages of 9-16 months;
- are at least occasionally producing some intentional communication acts; and
- are spontaneously producing no more than five ***referential*** words or signs (but not words or signs with limited meanings, like greetings or vocatives) in their expressive lexicon (a focus on language intervention is more suitable for children beyond this level). (Fey et al., 2017)

Populations that generally meet these criteria include children with intellectual disability, Autism Spectrum Disorder, Down syndrome and other developmental disabilities. Best candidates are children who produce limited comments using words or non-linguistic means.

Language (oral) areas targeted:

Prelinguistic skills, e.g., gestures, vocalization and eye gaze

Definition of a dose (teaching and learning episode):

Spontaneous/ elicited production of the target intentional communication acts by the child and modelling of the target intentional communication acts by the clinician.

Dose number and cumulative intervention intensity:

A cumulative intervention intensity of 20-minute session for 3 or 4 times per week, a duration of 6 months and no more than one teaching episode per minute (1440-1920 doses) is generally adopted in PMT (Fey et al, 2017). Speech-language therapists (SLTs) can manipulate session duration and session frequency while keeping the cumulative intervention intensity constant to meet individual children's needs.

A recent randomized control trials on milieu communication teaching, an alternative name for PMT (Fey et al., 2017) compared high intensity (five weekly 1-hour session) and low intensity intervention conditions (once-weekly 1-hour session). Results reveal a non-significant correlation between gains (parents' responsivity and children's intentional communication) and treatment intensity. Significant growth in vocabulary in the high-intensity group was mediated by the children's object play skills, as measured in a meaningful play with 9 or more objects within a 15-minute developmental Play Assessment. What it means is that children with good object play skills could be given a higher dose of

treatment. Symbolic play skills, non-word vocalizations, and gesture comprehension and production should be prioritized for children with poor play skills with objects.

Intervention agent:
SLT, teacher

Goal attack strategies:
Horizontal

Intervention context:
Therapy Room

Service Delivery model:
One-on-one

Activities:
Play-based activities, arts and craft

Measurement of outcomes:
Measures

1. Frequency of total / spontaneous / elicited intentional communication acts
2. Frequency of total / spontaneous/ elicited non-linguistic vocalizations
3. Frequency of total / spontaneous/ elicited coordinated eye gaze
4. Frequency and types of total / spontaneous/ elicited conventional and non-conventional gestures

Treatment data
Record the child's production of the target intentional communication acts in PMT play-based activities during the sessions.

Generalization data
Record the child's production of target intentional communication acts when playing/ communicating with the clinician / parent in pre-treatment, post-treatment and follow-up communication samples.

Considerations for Cantonese-speaking children and the Hong Kong context

1. PMT aims at teaching prelinguistic skills. As parents may be eager to teach their children to communicate with spoken words as soon as possible, it is important for the SLT to first establish realistic expectations with the parents by explaining to the parents that prelinguistic skills are the foundation for later language production.
2. SLTs should also educate parents on how to identify and respond to their child's intentional communication acts despite the fact that a full responsive training may not be feasible within a packed treatment session.
3. As Cantonese is a syllable-timed language and Cantonese words have simple VC/ CV/ CVC structures, simple, meaningful & early emerging words, e.g., 愛、畀、要 may be chosen when targeting vocalizations.

Script of an intervention activity

Intermediate goal 1: Establish routines to serve as the context for communicative acts
Activity: Rolling a ball back and forth
Clinician: 波波 (hold the ball) ……轆波波 (roll the ball to the child)
Child: Catch the ball
Clinician: 畀姐姐 (Ask the child to roll the ball back to the clinician using words and gestures)
Child: Roll the ball back to the clinician
Clinician: (Catch the ball) 有波波……轆畀 XX (roll the ball to the child again)
Child: Roll the ball back to the clinician
Clinician: 有波波……轆 (roll the ball to the child again)
Child: Roll the ball back to the clinician
Clinician: Hold the ball tightly [stop the routine by withholding the turn & look expectantly at the child to wait for the child's response, time delay]

Intermediate goals 2-4
Note: Should first establish the routine (e.g. ,after going on for at least 2 turns) before moving on to intermediate goals 2-4

<u>Increase the frequency of non-linguistic vocalizations</u>
Activity: Blowing bubbles
Clinician: 波波 (hold the bottle) ……吹波波 (blow bubbles)
Child: Play with the bubbles
Clinician: Screw up the lid tightly and pass the bottle to the child [stop the routine by withholding the turn & look expectantly at the child to wait for the child's response, time delay]
Child: No response
Clinician: 做咩啊? [linguistic prompt]
Child: No response
Clinician: 開 [model]
Child: Produce an approximation of 開
Clinician: 係啊，開 (open the lid) [recast / linguistic mapping]
吹波波 (blow bubbles) [provide a natural consequence]

<u>Increase the frequency and spontaneity of coordinated eye gaze</u>
Activity: Stacking Legos
Clinician: 積木 (get one piece of Lego from the bag) …… 砌 (stacking one piece of Lego) …… 砌好啦……到 XX (give one piece of Lego to the child)
Child: Stacking Legos
Clinician: Zip up the bag of Legos and hold the bag tightly [stop the routine by withholding the turn & look expectantly at the child to wait for the child's response, time delay]
Child: No response
Clinician: 愛唔愛? [linguistic prompt]
Child: Looking at the bag of Legos

Clinician: Move the bag of Legos close to the clinician's face & intersect the child's gaze 望著姐姐 [linguistic & non-linguistic prompts]
Child: Make eye contact with the clinician
Clinician: 你望住姐姐喎 [feedback]
愛積木 (give one piece of Lego to the child) [provide a natural consequence]

<u>Increase the frequency, spontaneity, and range of conventional and non-conventional gestures</u>
Activity: Playing with a toy car
Clinician: 車車 (hold the car) ……推車車 (push the car to the child)
Child: Push the car back to the clinician
Clinician: Place the car at a place that the child can see it but cannot reach it (e.g. on a shelf) [stop the routine by withholding the turn & look expectantly at the child to wait for the child's response, time delay]
Child: Look at the car/clinician
Clinician: 要車車? [linguistic prompt]
Child: Reach out and want to grab the car
Clinician: Point to the car [model]
[may provide physical prompt to shape the child's grabbing gesture (non-conventional gesture) into a pointing gesture (conventional gesture)]
Child: Point to the car
Clinician: 你指住車車喔 [feedback]
畀車車 (give the car to the child) [provide a natural consequence]

Intermediate goal 5: Combine components of intentional communication acts (eye contact, vocalizations and gestures)
Activity: Colouring
Clinician: 有星星 (hold the picture)……有筆 (hold a crayon) ……油星星 (colour the picture)
Child: Colour the picture
Clinician: Get the crayon from the child and hold a crayon of another colour [stop the routine by withholding the turn & look expectantly at the child to wait for the child's response, time delay]
Child: Look at the clinician [eye contact]
Clinician: 要唔要? [linguistic prompt]
Child: Look at the clinician & perform an open-palm gesture [eye contact & gesture]
Clinician: 要 [model]
Child: Produce an approximation of 要 [eye contact, gesture & vocalization]
Clinician: 要 [recast / linguistic mapping] 要筆 (give the crayon to the child) [provide a natural consequence]

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Focused Stimulation (FS)

Theoretical background:
In parent-implemented language intervention, parents and caregivers are taught and shown how to use interaction procedures to strengthen reciprocal social interactions with their children and to facilitate their children's language and communication development (Weitzman, Girolametto, & Drake, 2017). Two of these procedures are 1) general language stimulation where no specific words, word combinations, or grammatical morphemes are targeted and 2) focused stimulation where there is a clear focus on specific predetermined language targets (Girolametto et al., 1995, 1996). For details on the social learning theory, the social constructionist theory, and the transactional mode of language development that underlie focused stimulation as an intervention procedure and approach, please refer to Ellis Weismer, Venker, & Robertson (2017).

The focus of this chapter is on focused stimulation, which involves providing "frequent, highly concentrated presentations of a language target" (Girolametto et al., 1995, p.39). The language target can be a vocabulary item, a grammatical morpheme (Ellis Weismer et al., 2017) or word combinations. As focused stimulation is an implicit, input-based procedure, the child is not required to imitate the language target.

Research evidence on focused stimulation is heavily tied to the Hanen Programs for Parents. For example, Girolametto et al.'s (1995, 1996) focused stimulation approach was adapted from the Hanen Program for Parents – It takes Two to Talk, while Venker et al.'s (1995, 1996) focused stimulation approach was Hanen Program for Parents – More than Words. In these efficacy studies on parent-implemented intervention approaches, focused stimulation is the key intervention procedure. Other general language stimulation strategies (e.g., following the child's lead, presenting the language target after establishing a joint focus, and using talk and communication moves that promote turn-taking) are also included in the intervention approach reported.

More recently, theoretical-driven modifications are added to the traditional focused stimulation procedure to create new intervention approaches. The VAULT vocabulary intervention (Alt et al., 2014) for late-talking toddlers, which is also described in this manual, is one such approach.

As an intervention procedure, focused stimulation is not limited in its used by parents for children in the early stage of language development. More recently, Bruinsma, Wijnen, & Gerrits (2020) reported on a new therapy approach called Language in Interaction Therapy, which includes focused stimulation as the key intervention procedure. Other procedures include modelling, recasting and evoked production. This approach was designed and used with 4- to 5-year-old children with DLD for goals on morphosyntax.

Empirical evidence:
A randomised control trial by Girolametto et al. (1995) showed some efficacy of parent-implemented focused stimulation in English-speaking late-talking toddlers. Children in the experimental group learned significantly more target words than children in the control

group, and the groups did not show significant differences in the number of control words. There was, however, no statistically significant change in the overall vocabulary size.

Another randomised control trial by Girolametto et al. (1996) also showed some efficacy of parent-implemented focused stimulation in English-speaking late-talking toddlers. Children in the experimental group produced significantly more target and untreated control words, and a significantly higher diversity of target words in the post-intervention probes than children in the control group. Children in the experimental group also used a greater number of different words in the language sample, and had a significantly larger overall vocabulary size when compared to children in the control group. Yet, the effect sizes for the target and the control words were very similar. One plausible explanation for the comparable learning of the target and the control words is that the learning effect was a result of maturation. Another plausible explanation was the presence of a carryover treatment effect to untreated control words outside intervention.

A randomised control trial completed by Venker et al. (2012) also demonstrated some efficacy of parent-implemented focused stimulation that was adapted for preschool children with autism spectrum disorder (ASD). Compared to the delayed treatment group, parents in the treatment group showed a significant increase in responsiveness to their children's communication acts while parents in the treatment group significantly increased their prompted communication acts. However, there was no significant difference in the spontaneous communication acts between children receiving and waiting for intervention, which may be due to the abbreviated length of the study or the nature of ASD.

As for the use of focused stimulation on the intervention of grammatical forms, a randomised control trial by Fey et al. (1993) compared the efficacy of parent-delivered focused stimulation, clinician-implemented focused stimulation and no treatment on preschool children with marked delays in grammatical development. Results showed that regardless of differences in intervention agents, children receiving focused stimulation made significantly greater improvement on Developmental Sentence Scores as compared to the no-treatment group. Although differences in intervention agents did not yield significant differences in treatment outcomes, more consistent gains were shown in children receiving clinician-implemented intervention, which was likely because parent-implemented interventions had more confounding variables (e.g., quality of parent-child interaction, parent-child relationship etc). This did not suggest that SLTs should be the sole intervention providers, rather, the choice of intervention agents should be based on the characteristics of the child, the commitment of the parents and the parent-child interaction.

Overall, research studies with more rigorous research designs are needed in the future to further confirm the present findings. These studies should systematically manipulate details on the implementation of focused stimulation (e.g., i.e., the number of input dose per session, the session duration, frequency and intervention length) to identify elements that will lead to optimal effects.

Specification of components in Fey's model

Target population:
Late-talking toddlers (i.e., children with Speech, Language and Communication Needs as recommended in Bishop et al., 2017) through early elementary school-age children with Developmental Language Disorder or LanguageDdisorder associated with intellectual disability or ASD

Language (oral) areas targeted:
Vocabulary, early word combinations, grammar

Definition of a dose (teaching and learning episode):
Each instance of the parent/ SLT's use of the target word/word combination, grammatical form or construction, in appropriate and meaningful contexts when there is joint attention to the child, is a dose. The child's spontaneous production (i.e. unsolicited production in appropriate contexts) of the target is also considered a dose.

Dosage and cumulative intervention intensity:
Dose number was not reported

Intervention agent:
Parent/ SLT

Goal attack strategies:
Horizontal

Intervention context:
Home/ Clinic room

Service Delivery model:
One-on-one/ Small group

Activities:
Activities that allow intensive adult production/use of the target words (e.g., Daily routines, book reading, constructive play, pretend play, etc) that the child is interested in.

Measurement of outcomes:
Treatment data
The number of targets spontaneously produced relative to the controls
(Measured by elicited production in probes (see below for details) and parent report of the use of targets at home)

Probe on vocabulary
Pictures of all target and control words will be presented to the child together with questions (e.g. 妹妹做乜嘢?), or spoken cloze phrases (e.g. 媽媽食.....) to elicit spontaneous responses. Gestures or facial expressions will be provided whenever necessary. To encourage spontaneous responses from the child, adult modelling should not

be provided. The same pictures and elicitation phrases should be used every time but the order of presentation should be different.

Probe on word combinations, grammatical forms or structures
A set of pictures probing the use of target and control word combinations, grammatical forms or structures will be presented separately. An example illustrating the use of the target will be provided at the beginning (e.g. Yesterday, the boy played with a ball.) After the demonstration, further adult modelling should not be provided. The same pictures and elicitation phrases should be used every time but the order of presentation of individual pictures should be different.

With young children and some words (e.g., verbs), use of picture probes might not work well. SLTs can consider designing a more dynamic probe where the child is engaged in a pre-planned play activity which is embedded with many opportunities for the child's use of the target.

Generalization data
Parent report
Vocabulary growth outside treatment is measured by pre-post intervention change in the Chinese Communication Development Inventories (CCDI, Tardif et al., 2008), a parent report measure.

Language sample analysis
Talkativeness (number of utterances, number of words per minute), sentence complexity (mean length of utterances, number of different grammatical structures) and vocabulary (number of different words) can be measured by comparing the language samples obtained before and after the intervention.

Considerations for Cantonese-speaking children and the Hong Kong context
Focused stimulation is presented without requiring the child to say the target. This contrasts with the more common output-based procedures that parents in Hong Kong are used to. When parents question the efficacy of focused stimulation, SLTs should be ready to share the empirical evidence as well as the theoretical basis of the therapy approach with them. Parents' questions provide the motivation for SLTs to collect outcome data systematically on the children they work with.

Script of an intervention activity at home
(Unlike VAULT for vocabulary intervention, SLTs do not have to manipulate the variability of the grammatical structures where the target word appears. In the following script on focused stimulation, there is a fair bit of repetition of the target word 手 with the verbs 洗 and 抹).

a. Example of a target word: 手
Activity: Hand-washing
Parent: **手手**污糟啊。我地要洗**手**。唧梘液先。揸揸**手**。
Child: (rubbing his/her hands)
Parent: 好，我地開水喉。姐姐洗**手**。明明洗**手**。

Child: (washing his/her hands)
Parent: 係啊，用水洗**手**。洗完**手**，對**手**濕晒。我地抹**手**。
Child: 抹
Parent: 姐姐抹**手**。明明抹**手**。我地一齊抹**手**。

b. Example of a target word: 肚餓
Activity: Dialogic book reading – The Very Hungry Caterpillar
Parent: 今日我會講個故事，係一隻好**肚餓**嘅毛毛蟲。
Child: 唔
Parent: 毛毛蟲一起身，就覺得好**肚餓**。**肚餓**就想食野。
Child: 食野。
Parent: 係啊，佢食咗一個蘋果，但係佢仲係好**肚餓**。
Child: 唔
Parent: 第二日，佢食咗兩個梨，但係佢仲係好
Child: **肚餓**
Parent: 係啊，佢好**肚餓**，唔夠飽。

c. Example of a target word combination: 唔 + 動詞 / 形容詞
Activity: Playing with playdoh with the SLT and the mother
SLT: 媽媽，你要唔要泥膠啊？
Mother: 要。
SLT: 明明，你呢？
Child: 要。
SLT: 你地要泥膠。嗱。
SLT: 嘩，我哋用乜嘢嚟整泥膠啊？
SLT: 媽媽，比張紙你呀？
Mother: **唔要**紙。
SLT: 俾支筆你呀？
Mother: **唔要**筆，我要刀。
SLT: 明明，你呢？
Child: 刀。
SLT: 點整啲泥膠啊？
SLT: 不如搣啲泥膠呀？
Mother: **唔搣**泥膠。
Mother: 我切泥膠。
SLT: 不如扱啲泥膠呀？
Mother: **唔扱**泥膠。
Mother: 我切泥膠。
SLT: 好啦 ，**唔扱**泥膠。
SLT: 明明，你呢？
Child: 切泥膠。
SLT: 好啦 ，我地一齊切泥膠啦。

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Vocabulary Acquisition and Usage for Late Talkers (VAULT)
(previously known as Cross-situational statistical word learning intervention (CSWLI))

Theoretical background:
We can make a distinction between different child language intervention procedures and approaches along three dimensions: 1) the degree of naturalness (Fey, 1986), 2) explicit teaching (e.g., Balthazar, Ebbels & Zwitserlood, 2020) versus implicit learning and 3) input-based (Plante & Gómez, 2018) vs output-driven. These dimensions may overlap. For example, an input-based approach of intervention often assumes implicit learning.

VAULT is developed on the basis of the premise that when the properties of the language input are optimized, children with language disorders will demonstrate better learning (Alt et al., 2014; Alt et al., 2020). VAULT is an input-based vocabulary intervention approach as the speech-language therapist (SLT) does not prompt the child to successfully produce the target words during the session. The primary procedure that is used is focused stimulation. Through the manipulation of variability and frequency of the adult input provided using focused stimulatuon, VAULT makes implicit learning of the target words easier for young children with slow vocabulary development.

Implicit statistical learning
Implicit statistical learning is "a process in which learners extract regularities from the world around them without conscious intent or knowledge of these patterns" (Plante & Gómez, 2018), and without explicitly being taught what the regularities or patterns are. In contrast with output-driven language intervention approaches that are based on behavioral theories, there is no reinforcement or direct feedback in input-based approaches. In input-based approaches, children's implicit statistical learning ability, that is their own cognitive bias for extracting statistical structures and probabilistic relationships between elements in the input, (Plante & Gómez, 2018) is enhanced.

Although children with slow language development and language disorders may not be able to detect statistical structures and probabilistic relationships between language elements as readily as their typically developing peers, evidence from language intervention studies shows that their learning can be improved when the language input is specifically designed to enhance the salience of statistical and probabilistic relationships (Aguilar et al., 2018; Alt et al., 2014; Alt et al., 2020; Plante et al., 2018). These findings suggest that applying statistical learning principles in the design of input in language intervention has the potential to lead to more effective and efficient learning.

Input variability
There are four types of input variability: within-trial ambiguity, referent diversity, speaker diversity and linguistic diversity (Alt et al., 2014).

Within-trial ambiguity refers to the number of possible referents that a word is paired with (i.e., three words/three objects versus four words/four objects) in a single trial. Lower within-trial ambiguity is associated with better word learning (Kachergis, Yu & Shiffrin, 2009).

Referent diversity, speaker diversity and linguistic diversity should be maximized to allow for better mapping of words, better generalization to novel objects and improved vocabulary learning overall (Alt et al., 2014).

The following is an example to illustrate the application of the different types of input variability in a session with the word "cat" as the target.

- The number of possible referents that the word "cat" is paired with in each trial should be controlled and kept low to achieve ***low within-trial ambiguity***.
  e.g., When playing with a LEGO set, present a cat figure and a dog figure only at the same time; but not a cat, a dog, a cow, a pig and a horse.

- Different activities involving different forms of a "cat" is used in therapy to achieve ***high referent diversity***.
  e.g., reading a book about a cat, watching a video about a cat, pretend-playing with a cat doll, etc.

- Involving more than one therapist and/or caregiver to provide input that includes the word "cat" to achieve ***high speaker diversity***.

- Grammatical sentences (but not single word or telegraphic speech) illustrating different syntactic structures with use of the word "cat" is needed to achieve ***high linguistic diversity***.
  e.g., That's my cat. A cat meows. I love cats. Where is the cat going? The grey cat is pretty, etc.

<u>High input frequency</u>
By definition, children with slow language development and language disorders have difficulty learning language. Clearly, the amount of input that they receive in the natural environment is inadequate for them to learn words at the same rate as typically developing children (Alt et al., 2014). However, research has revealed that children with language disorders can acquire and produce novel words when they received twice as much input as their typically developing peers (Gray, 2003). These findings suggest that language input at a high frequency has the potential to enhance these children's word learning, although there is no definitive evidence on how many times a word is heard and used before a child with slow language development and language disorders can successfully learn to use it. There is likely to be individual variability in the cumulative intervention intensity as well.

Empirical evidence:
A single-subject-design study by Alt et al. (2014) demonstrated the efficacy of CSWLI in English-speaking late-talking toddlers. The children learned more target words than control words. There was generalization of word-learning strategies as demonstrated by an overall increase in vocabulary in the parent-report measure at a rate faster than the rate reported in the literature.

Alt et al. (2020) replicated findings in Alt et al. (2014). With an average effect size of almost 1.0, Alt et al. (2020) further proved that VAULT was an efficacious expressive vocabulary

intervention for English-speaking late-talking toddlers when compared to no-treatment controls.

In Hong Kong, a single-case experimental study completed by a BSc (Speech and Hearing Sciences) student under the supervision of Prof. Stephanie Stokes also showed some evidence of CSWLI's efficacy with Cantonese late-talking toddlers (Ng, 2018; Ng, Stokes & Alt, 2020)

Research with a more rigorous study design is needed in the future to further confirm the present findings. Moreover, the current protocol simultaneously provides a high level of variability of input (in language, activities, and clinicians), and intensity. More research is needed to identify the specific mechanisms (i.e., which manipulations or interactions between manipulations) that drive the improvement.

Specification of components in Fey's model

Target population:

Late-talking toddlers aged 24 months to 36 months

*Current evidence on the efficacy of VAULT involved only toddlers with age-appropriate receptive language skills and non-verbal cognitive skills (Alt et al., 2014; Alt et al., 2020). More research is needed to determine whether this approach works for toddlers with different language profiles.

Language (oral) areas targeted:

Vocabulary

*Targets should be words that the child understands but does not say (Alt et al., 2020). Teaching words that are unknown may work, but it takes much longer - even twice as long (Davis et al. 2016).

Definition of a dose (teaching and learning episode):

Each instance of the SLT's use of the target word in linguistically varied sentences and semantically varied contexts (i.e., implicit learning) is a dose. The child's spontaneous production of the target word (i.e. unsolicited productions in appropriate contexts) is also considered a dose.

Dose number and cumulative intervention intensity:

VAULT described in Alt et al. (2020) showed that there were no differences in treatment outcome between condition 1 (3 target words/90 doses per word) and condition 2 (6 target words/45 doses per word) at a consistent dose rate of 9 doses per minute in a 30-min session.

While one might interpret this as a recommendation for using a lower dose number as it appears to be more efficient, Alt et al.'s (2020) interpretation is that clinicians may customize the number of target words with regards to the child's characteristics (e.g. attention span, ease with transitions of activities) based on the evidence-based range of dose number (i.e. 45-90 doses) per target word.

Intervention agent:
SLT

Goal attack strategies:
Horizontal

Intervention context:
Therapy Room

Service Delivery model:
One-on-one

Activities:
Book reading, food making, handicrafts making, constructive play, pretend play, etc.
SLTs should introduce the target words in a variety of activities to ensure high variability.

Measurement of outcomes:
Treatment data
The number of target words spontaneously produced relative to the control words (Measured by elicited production in probes (see below for details), spontaneous production during treatment and parent reports of word use at home)

Probe
Pictures of all target and control words will be presented to the child together with questions (e.g. 姨姨用乜嘢?), or spoken cloze phrases (e.g. 媽媽做完運動，佢覺得好.....) to elicit spontaneous responses. For adjectives, an antonym will be used in a cloze phrase (e.g. 呢杯茶好熱，呢杯汽水好.....). Gestures or facial expressions will be provided whenever necessary. To encourage spontaneous responses from the child, adult modelling should not be provided. The same pictures and elicitation phrases should be used every time but the order of presentation should be different.

Generalization data
Vocabulary growth outside treatment is measured by pre-post change in the Chinese Communication Development Inventories (CCDI, Tardif et al., 2008), a parent report measure.

Considerations for Cantonese-speaking children and the Hong Kong context

- Many Chinese words are compound words.
- There are more homophones in Chinese than in English.
- VAULT occurs without requiring the child to say the word. This contrasts with the more common output-based approaches that parents in Hong Kong are used to. When parents question the efficacy of VAULT, the SLT should be ready to share the empirical evidence as well as the theoretical basis of the therapy approach with them.
- There are individual differences in children's responsiveness to different intervention approaches. Some may benefit from high linguistic and contextual variability while

others may find variability a barrier to learning. Observe the child, collect outcomes data systematically and reflect on our decisions on a regular basis.

Script of an intervention activity

Session goal: The SLT will provide 45 exemplars for each of the 6 target words in 30 minutes using VAULT
Note: The target words should be presented in linguistically varied sentences. Use simple sentences as VAULT was designed for 2- to 3-year-old children who are poor in vocabulary, and who are barely combining words. Also pause often. It does not mean that the SLT keeps talking non-stop in input-based approaches.

a. Example of a target word: 搽

Activity: Food making: The SLT and the child will make sandwiches together by spreading jam/ butter onto the sliced bread.

Clinician: 今日我地整三文治。姐姐有好多醬喎。仲有把刀添。我地可以**搽**牛油，或者**搽**果醬。你想**搽**咩啊？
Child: 果醬
Clinician: **搽**牛油定係**搽**依啲醬？
Child: 依啲
Clinician: 好啊！**搽**果醬醬落麵包度。我地用刀**搽**果醬。慢慢**搽**，**搽**多啲。要**搽**勻塊麵包啊！睇吓**搽**好未先。

b. Example of a target word: 豬

Activity: Dialogic-book reading
Clinician: 今日我會講三隻小**豬**嘅故事。
Child: 好啊
Clinician: **豬**媽媽有三個小朋友，有**豬**大哥，**豬二**哥，同埋**豬**細佬。有一日，佢同三隻**豬**仔講：「你地大個啦，要自己起屋住。」
Child: 大個仔
Clinician: **豬**媽媽又話：「小心啲啊，森林有隻大灰狼。佢最鍾意食**豬**肉。佢之前捉咗**豬**姨姨食啊」

c. Example of another target word: 大

Activity: Playing with a doll house

Clinician: 依度有間**大**屋喎。我地擺啲傢俬入去羅。擺張**大**檯定係細檯？
Child: 呢個 (point to the big table)
Clinician:好啊，擺**佢**係客廳度。呢張檯真係好**大**喎。跟住放啲凳先。放唔放到張**大**凳呢？
Child: 唔得
Clinician: 哎也，原來張凳太**大**，擺唔到入去，要搵張無咁**大**嘅凳啦。

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Enhanced Milieu Teaching (EMT)

Theoretical background:

EMT is a naturalistic, conversation-based intervention approach that uses a child's interests and initiations as opportunities to model and prompt language in everyday contexts (Kaiser & Hampton, 2014). EMT incorporates procedures from both incidental teaching and mand-modelling, and is often considered a hybrid intervention approach as defined in Fey (1986).

The EMT approach is developed on the basis of both behavioral and social interactionist theories on language learning (Kaiser & Hampton, 2017). The use of ***milieu prompts*** to elicit verbal production follows an antecedent-behavior-consequence paradigm, while the emphasis on ***responsive interaction*** promotes learning through meaningful communicative interactions.

The six major components of EMT are as follows (Kaiser & Hampton, 2014):

1. ***Environmental arrangement***
   - Set up an interactive context and connect with the child during play
   - Manage and prevent challenging behaviors
2. ***Responsive interaction***
   - Notice and respond to the child's communication
   - Engage in balanced verbal turns with the child
   - Mirror the child's actions and map language onto those actions
3. ***Modelling and expanding play***
   - Model new play actions
   - Use new play objects
4. ***Modelling and expanding communication***
   - Model both target-level language and language slightly higher than the target level
   - Expand the child's utterances
5. ***Time delays***
   - Use non-verbal tasks to create obligatory contexts and anticipate communication from the child
6. ***Milieu prompts***
   - Give prompts only when the child makes a request in order to reinforce his/her behavior
   - Use prompts at the child's target communication level
   - discontinue prompting if the child loses interest

   *The four milieu prompts to be described below provide increasing levels of adult support, with time delay being the least and say prompt being the most supportive. **A rigid prompting hierarchy is <u>not</u> required in EMT.** In general, the most natural prompts, or prompts that provide the level of support the child needs at that particular moment, should be used (Kaiser & Hampton, 2017). Kaiser & Hampton (2014) also suggests that the SLT or adult should go from the least to the most support, and never backwards.

   - Time delay: The adult uses an expectant look and waits for the child to verbalize before performing the action desired by the child (e.g. wait for 5 seconds).

- Open prompt: The adult asks open questions that have no single correct answer (e.g. what do you want?).
- Choice prompt: The adult asks choice questions that have no single correct answer (e.g. cat eats or cat drinks?).
- SAY prompt: The adult tells the child exactly what to say (e.g. say: cat drinks).

Empirical evidence:

EMT is an evidence-based intervention with over 20 years of research. EMT was found to be efficacious in increasing children's use of language targets and frequency of communication (Kaiser & Roberts, 2013a; Kaiser & Roberts, 2013b). Research has also shown that EMT yields generalization of treatment effects across settings, people and language concepts, as well as maintenance of newly learned targets (Kaiser & Roberts, 2012).

It is important to note that published research so far has primarily involved English-speaking children and parents as intervention agents.

Specification of components in Fey's model

Target population:

EMT is suitable for preschool children with Autism Spectrum Disorder (ASD), Developmental Language Disorder (DLD), Intellectual Disability (ID), Down Syndrome, repaired cleft palate, and cognitive impairments.

EMT is most likely to be useful for children who (1) produce some verbal imitation, (2) have at least 10 productive words, and (3) are in the early stages of language development, with mean length of utterances (MLUs) from 1 to 3.5 words (Paul, Norbury & Goose, 2018).

Language (oral) areas targeted:

Vocabulary, word combination, syntactic forms and pragmatics (specifically requests)

Definition of dose (teaching and learning episode):

Each of the adult's language models, play models and their expansion, and milieu prompts is counted as a dose. Each of child's correct production is also counted as a dose. The former is considered therapeutic input and the latter client acts in Baker's (2012) terms.

One can sometimes get confused with this general definition of dose and the term "Milieu Teaching episode (MT episode)". MT episode can be understood as an obligatory context for a desired target. Within the context, multiple procedures will be employed, including models, prompts, positive consequences, and expansion of the prompted response. Therefore, there can be more than one teaching and learning episode within one MT episode. See the script of intervention activity below for illustration.

As pointed out on page 4, it is not always easy to define a dose. This is more true to EMT than other approaches given the number of prompts an adult will use to elicit an output from the child. The key is to identify the essential ingredients that you assume will lead to the child's learning of the target. When the essential ingredient is present, it is a dose. The other key is to be consistent in what you consider as a dose.

Dose number and cumulative intervention intensity:
Evidence regarding the dosage and the cumulative intervention intensity of EMT required to yield treatment effects is not yet available. One challenge in proposing an optimal dosage and cumulative intervention intensity of EMT is that different forms of active ingredients exist, thus leading to a large variety of dose and dose forms across children and across sessions.

In terms of dose rate, it is recommended that no more than 6 to 10 MT episodes per 20 minutes should be used (Kaiser & Hampton, 2017). Regarding milieu prompts, Kaiser & Hampton (2014) suggested that there should not be more than one prompt per minute. These guidelines are meant to ensure that the child will not get frustrated with frequent demands of output from the adult.

The therapist-only EMT run by Kaiser & Roberts (2013b) included 24 biweekly 20-minute sessions in the clinic and 12 biweekly 20-minute sessions at home.

Intervention agent:
SLTs, parents or teachers

Goal attack strategies:
Horizontal
Multiple goals can be targeted in the same session, and it is the activity and the child's focus of interest that determine exemplars for which goal are provided (Kaiser & Hampton, 2017). For example, a child's short-term goal is two-word utterances. In the session, the adult provides exemplars for all three sessions goals, including the production of agent-action, action-object and modifier-noun. These exemplars can be "I/you/we push" (agent-action), "stop car" (action-object) and "big car" (adjective-noun).

Vertical
To achieve the short-term goal of two-word combinations, the child learns only one type of two-word combination (e.g., agent-action) in a session. It is only when the child reaches a pre-determined level of performance before another type of two-word combination is taught in subsequent sessions.

Intervention context:
Therapy room, home or classroom

Service Delivery model:
Individual therapy

Activities:
Play and other relatively unstructured, child-centered activities

Measurement of outcomes:
Possible measures include:
1. frequency of total / spontaneous / elicited child utterances,
2. frequency of total / spontaneous elicited target language forms,

3. mean length of utterances,
4. diversity of words used in conversation,
5. frequency of communication initiations,
6. others

Possible methods for collecting outcome data include:
1. record the child's language production in EMT play-based activities during the sessions,
2. collect pre-treatment, post-treatment and follow-up language samples,
3. probes using structured activities or pictures,
4. parent reports, etc.

Considerations for Cantonese-speaking children and the Hong Kong context

- In EMT, prompts are of relatively low frequency compared to traditional drill-based approaches. When parents question the efficacy of EMT, the SLT should be ready to share the empirical evidence as well as the theoretical basis with them.
- Involving parents as intervention agents are a big part in the EMT approach. Given the level and intensity of training required, the SLT should be very familiar with EMT himself or herself and have some experience and skills in adult education.
- Hybrid approaches like EMT might be more acceptable to Chinese parents than more child-centred approaches (e.g., the Hanen program). This is a question to be answered.

Script of an intervention activity

Activity: play using LEGO blocks
Child's current level: 50+ single words, including a variety of verbs
Child's target level: 2-word combinations
SLP's language models: 2-word utterances, expansion that combines words the child uses, early 3-word utterances

Example of one MT episode

SLP: 嘩！有積木啵。大積木，細積木。我地砌…… 姐姐擺積木。你呢？
(setting up an interactive context) (modelling language at the child's target level)
SLP: *puts one LEGO block on top of another*
Child: 玩。
SLP: 玩積木！
(expanding the child's utterance, this can also be called a recast)
…… (play without prompting, to create a natural interactive context)
SLP: *SLP holds a lego block of a different shape and shows it to the child. The child does not have access to it. SLP waits for the child's request. *
(time delay)
Child: *tries to grab the lego block*
SLP: *copies the child and takes a lego* 擺積木。
(mirroring the child's behaviour and mapping language onto it)
SLP: *continues to hold the lego block* 要乜野呀？
(open prompt)
Child: 要。

(the child's request)

SLP: *offers the lego block to reinforce the child's request*

SLP: 嗯，謙謙要。

(expansion) (Did not push the child with additional prompts, as this may sacrifice naturalness / lose the child's interest.)

Example of another MT episode

SLP: *SLP introduces a new person figure to the lego set*
(expanding play to allow more opportunities for language learning)

SLP: *moves the figure*

SLP: 有男仔啵。男仔行。
(modelling language at the child's target level)

SLP: *offers the figure to child*
(taking and balancing turns with the child)

Child: *makes the figure jump*

Child: 高高。

SLP: 跳高高！男仔跳高高。
(expanding the child's utterance)

SLP: *makes the figure jump onto a lego block*
(following the child's lead)

SLP: 佢跳。跳上積木度。
(modelling language at child's target level)

SLP: *offers the figure to the child*
(taking and balancing turns with the child)

Child: *throws figure away from the table*
(undesirable action with the toy)

SLP: *makes the figure move a LEGO block *
(modelling a new play action)

SLP: 男仔搬。搬積木。擺。擺紅色積木。
(modelling language at the child's target level)

Child: *reach for the pile of LEGOblocks*
(the child shows interest in the new play action)

Child: 擺。
(the child's request)

SLP: 擺積木，定 擺男仔？
(choice prompt)

Child: 擺積木。
(correct production of target)

SLP: *offers LEGO*
(reinforcing the child's request)

SLP: 嗯！謙謙擺積木。
(expanding the child's utterance)

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Toy Talk (TT)

Theoretical background:

Toy Talk is a language modelling strategy developed to facilitate the emergence of diverse sentence combinations (particularly subject-predicate sentences) in toddlers. The two major strategies in toy talk are 1) talk about the toys the child is playing with and 2) give the object its name (Hadley & Risopoli, 2015).

Similar to other traditional child-centered language modelling strategies (e.g., self-talk and parallel talk), Toy Talk matches the content of language input to children's interests. However, in self-talk and parallel talk, the focus is on what the adult or the child is doing. Thus, the use of first- and second-person sentence subjects is promoted. Whereas in Toy Talk, the focus is shifted to the toys. The use of third-person lexical noun phrases (e.g. the pig, the block) (versus pronouns) as sentence subjects is therefore promoted. By increasing the variability of sentence subjects in the adult input, it is hypothesized that children can better identify the constituent boundary between the subject and the predicate (Hadley & Risopoli, 2015). As a result, children will become better able to produce novel subject-predicate sentences. Toy Talk is also hypothesized to help with the acquisition of tense and agreement morphemes (in languages with subject-verb agreement, like English).

Toy Talk can be used in conjunction with other language facilitation strategies and as part of a responsive interaction style. Toy Talk can be used by SLTs, parents and teachers.

Empirical evidence:

The first and only experimental study on Toy Talk looked at the effects of parent-implemented Toy Talk on promoting language development for toddlers with typical language abilities (Hadley et al., 2017). Results from this quasi-randomized trial study showed that the number of different noun subjects in parents' Toy Talk sentences predicted the children's rate of growth in sentence diversity. In terms of feasibility, their study also demonstrated that parents could successfully learn and use Toy Talk given relatively brief instruction (one group education session and two individual coaching sessions). Research studies that look at the effects of Toy Talk in young children at-risk for DLD are still under preparation.

Note that Toy Talk was originally developed based on features of the English language and its relevant theories. There has yet been any research studies on Toy Talk's applicability in other languages.

Specification of components in Fey's model

Target population: Toddlers who are learning to combine words

Language (oral) areas targeted: early word combinations, grammatical constructions

Definition of a dose (teaching and learning episode): Each Toy Talk word combination or sentence (e.g., "The monkey is drinking", "積木冚啦") is counted as one dose.

Dose Number: There is no report on dose number. Hadley & Rispoli (2015) recommended parents to use Toy Talk sentences approximately once or twice per minute (Dose density).

Intervention agent: SLT, parents, and/or teachers

Goal attack strategies: vertical (i.e., production of subject-predicate sentences)

Intervention context: naturalistic play

Service Delivery model: usually one-to-one

Activities: any naturalistic play activities that interest the child

Measurement of outcomes:
Toy Talk does not target one specific grammatical construction, so there is no need to conduct probes to track the child's production of particular words or sentences. SLTs could collect and analyze language samples to track the change in the child's frequency and diversity of word combinations.

Considerations for Cantonese-speaking children and the Hong Kong context

1. The use of pronouns might not be as common in Cantonese child-directed speech. We tend to use noun phrases to refer to the subjects or objects in play activities (e.g., 個 BB, 隻狗仔, 積木, 車車, 波波, etc.) instead of using the pronoun (佢). The novelty of the Toy Talk strategy in Hong Kong context might not be as high.
2. Having said that, Toy Talk can provide models of lexical noun phrases in many different word combinations or sentences that can support vocabulary development especially in children who often use non-specific demonstrative + classifier combinations like nei1 go3 'this CL' (this one) or go2 go3 'that CL' (that one).
3. Cantonese is typologically very different from English. For example, there is no subject-verb agreement in Chinese, and subject-verb agreement is a persistent challenge for English-speaking children with DLD. Moreover, the dropping of sentence subjects is acceptable and in fact very common in Chinese. It is questionable whether the proposed benefits of Toy Talk for English-speaking children are generalizable to Cantonese-speaking children.

Script of an intervention activity
In a Lego-building play context:

Examples of toy talk sentences:

- 舊積木冧啦
- 啲積木好高呀

Examples of other modelling strategies:

- (呢舊係)積木啵；紅色積木 (responsive labelling)
- 你擺積木；輝輝擺紅色 (parallel talk)
- 我又擺；我砌高高 (self talk)

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Enhanced Conversational Recast (ECR)

Theoretical background:
We need to talk about Conversational Recast before we talk about Enhanced Conversational Recast. Conversational Recast is one of the most well-researched grammar intervention approaches. A recent meta-analysis (Cleave et al., 2015) reported average effect sizes of *d* = .96 for proximal measures directly related to the intervention goal(s) and *d* =.76 for distal measures that are more indicative of generalization of the intervention effect. Using Conversational Recast, the speech-language therapist (SLT) adds new information by repeating some, or all, of the child's utterance (called the platform utterance), while maintaining the basic meaning expressed by the child (Cleave et al., 2015). The SLT's recasts can be corrective, correcting the child's error in the utterance (e.g., the adult can say "*jung6 mou4gan1 maat3 min6* (use towel wipe face)" after the child says "*maat3 mou4gan1* (wipe towel)). They can also be non-corrective, simply repeating or expanding the child's utterance with additional but optional information (e.g., the adult may say "*hai2dou6 saai2 gan2 min6* (here-at wash Aspect-Marker face after the child says "*hai2dou6 saai2 min6*" (here-at wash face)). It is important to note that conversational recast is input-based as the child is not asked or prompted to imitate the adult's recast, or pushed to produce a correct production of the target.

ECR (Plante et al., 2014) was designed on the basis of research on implicit "statistical" learning (Plante & Gomez, 2018 for a review) in order to further improve the intervention outcomes for children with Developmental Language Disorder (DLD). In ECR, language input is manipulated to make it easier for children with DLD to rapidly extract or chunk constructions at different levels of representation or abstraction, for comprehension and production in real time, in meaningful communicative contexts. Specifically, ECR emphasizes that 1) there is high variability of non-essential elements in the input and 2) the child is fully attentive to the input.

The following adult recasts illustrate the application of the principle of input variability for the child who is learning the third person singular: the cow chews grass, one sheep stands, he kicks, a duck swims over. In these recasts, the only thing that is consistent is the target morpheme, third person singular. All other nonessential elements, including the noun and its modifiers, and most importantly the verbs, are variable and never repeated in the recasts. The target element is the only constant and salient element in all the recasts.

Empirical evidence:
Efficacy of ECR in the treatment of grammatical morphemes for English-speaking children with DLD was reported in five early efficacy studies (Eidsvåg, Plante, Olivier, Privette & Mailend, 2019; Meyers-Denman & Plante, 2016; Plante, Mettler, Tucci & Vance, 2019; Plante et al., 2014; Plante, Tucci, Nicholas, Arizmendi, & Vance, 2018). In the first ECR study, Plante et al. (2014) provided evidence of efficacy with 18 4- to 6-year-old preschool children with DLD. Half of the children heard highly varied recasts and half heard recasts that were less varied, but just as many in number. Regardless of the condition, children would hear a recast of their target morpheme 24 times in each of the 30-minute sessions with a rate of 24/30 = .8 per minute. Children in the high variability condition had a higher percentage of post-treatment use of the target grammatical morphemes in new lexical contexts, and a

higher number of unique spontaneous productions of the target morpheme, than those in the low variability condition. The four subsequent studies, with variations of other parameters Fey's intervention model (e.g., service delivery models), replicated the same results as in the first study.

One study investigated the efficacy of ECR in promoting the learning of aspect markers in four Cantonese-speaking typically-developing preschool children (Hau, Wong & Ng, 2, 2021). Two children demonstrated positive outcomes with the progressive aspect marker '*gan2'* given 12 ECR training sessions within a mean dosage of 288. One of these children demonstrated statistically significant gains in the percentage of correct use in the probes. The other two children showed no positive outcomes on their target, the earlier developing aspect marker 'zo2', plausibly due to the design of the probe task. There is yet any evidence on the efficacy of ECR on Cantonese speaking children with DLD.

It is important to note that evidence of ECR has only been on the treatment of grammatical morphemes. It is yet to be determined empirically whether the principle of variability works in the intervention of syntactic constructions (e.g., serial verb constructions) as well.

Specification of components in Fey's model

Target population: Children aged between 3-6 with speech, language and communication needs (SCN) or Developmental Language Disorder (DLD).

Language (oral) areas targeted: Grammatical morphemes, perhaps grammatical constructions

Definition of dose: A dose is a recast that the SLI provides after the child's platform utterance. The recast includes the target grammatical morpheme. When necessary, the SLT will deliver attentional cues to the child (e.g., gentle tapping and calling of the child's name) to direct his or her focus on the recast. A dose predicates on the child's platform utterance. How can the SLT get the child to produce an utterance using a relevant verb to describe an action for you to recast? 1) you may draw the child's attention to the action that is depicted on the picture or an action that you do, and then say the verb once or twice (e.g., look, run!), and then wait. 2) if the child gives you a verb in his platform utterance, recast the utterance with the addition of the morpheme to the verb if it is not there, and 3) if the child says nothing, you ask the child a question that is appropriate in context without providing a correct utterance with the morpheme (e.g., so what?). The key to ECR is that the SLT does not elicit a correct production of the target morpheme from the child. Once a recast is provided, the SLT moves on to create another opportunity to produce a platform utterance.

Dose number and cumulative intervention intensity: Individual variability is likely to exist in terms of the dosage and cumulative intervention intensity required to yield an effect. Empirical evidence (e.g., Plante et al., 2014) suggests that a total of 24 recasts within a 30-minute session, yielding a dose rate of 24/30 = 0.8 per minute works well. In one study, the session frequency is twice per week and the total intervention duration is 15 weeks. The cumulative intervention intensity is therefore 24 X 2 X 15 = 720.

Intervention agent: High agent variability, involving a speech-language therapist (SLT), and assistant and parents.

Goal attack strategies: Vertical. It is only when the child reaches a pre-determined level of performance before another grammatical morpheme is taught in subsequent sessions.

Intervention context: Clinic room, home or classroom.

Service Delivery model: One-on-one

Activities: Activities may include picture-book reading, video-viewing, board games, arts and crafts, or any activities that are of interest to the child. Within a session, two to three different activities are employed to ensure high contextual variability. For the entire intervention, each activity is repeated no more than three times. Same activities often involve the same words, and too much repetition will limit the number of different words, especially verbs, that the child is exposed to.

Measurement of outcomes:
Within and across session in relation to the short-term goal
1) Percentage correct of the target grammatical morpheme (e.g., zo2) in a criterion-referenced probe with 16 unique verbs.

Three probes, one to collect response generalization data (e.g., *zo2* with verbs not in training), one to collect across-behavior generalization (e.g., *gan2*) data and one to collect control data (e.g., *wui5*) are administered every other session. The order of the probes and the order of the items in the probes are randomized to avoid practice effects.

Another measure of response generalization is the child's spontaneous use of the target morpheme in conversation free play, which is not part of the training (language sample).

Ideally, the verbs used in the probes are not used in training. This can be hard to do, given that children with DLD or language disorders do not know too many verbs to begin with. A compromise is this: only the verbs used in the probe for the target morpheme are not used in training of the target.

Within session in relation to the session goal
1) Number of platform utterances that the child produced with correct use of the target grammatical morpheme. Correct use is defined as the use of the target morpheme with a verb that the adult has provided or a verb that is contextually appropriate.

Considerations for Cantonese-speaking children and the Hong Kong context
1. Evidence for ECR is primarily on English grammatical morphemes that are used with verbs, and syntactically obligatory (e.g., third person singular –s, progressive –ing, past-tense –ed). Cantonese Chinese is typologically very different from English. It has several aspect markers that mark the temporal contour of events encoded by the verb, but they are not syntactically obligatory. Hau, Wong and Ng (2021) has reported evidence on the

feasibility of ECR for training aspect markers for typically developing children. Cantonese Chinese has many verbal particles, and potentially they can be learned using ECR as well.

Script of ECR

a. Target morpheme: perfective marker zo2

Activity: Dialogic-book reading using the book 《包姆和凱羅的星期天》which illustrates a holiday packed with daily activities such as bathing, cleaning the house and baking.

1st Teaching and learning episode (dose) – Waken up		
Clinician	今日係星期日喎，一齊睇吓包姆同青蛙仔放假， 留喺屋有咩做？	Set up the scene
	咦？已經十二點啦，要**起身**啦！ 唔知青蛙仔**起身**未呢？	Model the verb twice, Elicit a platform utterance with a question
Child	起身啦！	Absence of zo2
Clinician	係喎，青蛙仔起**咗**身啦。	Recast and feedback

2nd Teaching and learning episode (dose) – Swapped the floor		
Clinician	哎呀，包姆倒瀉水呀，要**抹地**先得啦！ 唔**抹地**好易跣親架！	Set up the scene, model the verb twice
	嗯…乾淨晒，頭先包姆…	Elicit a platform utterance using sentence completion
Child	抹地咗啦！	wrong use of zo2
Clinician	嗯，包姆啱啱**抹咗**地。	Recast and feedback

3rd Teaching and learning episode (dose) – Taken a shower		
Clinician	青蛙仔玩到成身泥，好污糟呀！ 要**沖涼**先得，包姆！快啲幫手**沖涼**啦！	Set up the scene, model the verb twice
	擦、擦、擦…嗯，香噴噴啦！頭先青蛙仔…	Elicit a platform utterance using sentence completion
Child	香噴噴呀佢！	No attempt to use the marker
Clinician	媽咪會講… (turn to look at the mother)	Involve the caregiver to create high speaker variability
Mother	青蛙仔頭先**沖咗**涼呀，而家香噴噴！	Recast and feedback

4th Teaching and learning episode (dose) – Baked a cake		
Clinician	小朋友好肚餓呀，咦？不如**焗蛋糕**食呀！ 你睇！包姆有好多材料，用嚟**焗蛋糕**喎。	Set up the scene, model the verb twice
	叮！哇好香呀！拎出嚟睇吓，食得啦！佢哋啱啱做乜嘢啊？	Elicit a platform utterance with a question
Child	整咗啲蛋糕！	Contextually appropriate platform utterance with zo2

Clinician	係喎！小朋友啱啱**整咗**朱古力蛋糕，好似好好味喎！	Recast with the child's verb and feedback

Script of ECR

b. target morpheme: progressive marker gan2

Activity: Cook set with dolls. The child and the SLT prepares a feast for the birthday doll, during which different ingredients and cooking utensils are being manipulated.

1st Teaching and learning episode (dose) – Washing utensils		
Clinician	嘩！把刀咁污糟，要**抹**吓先得，唔**抹**乾淨會有好多細菌架！	Set up the scene, model the verb twice
	姐姐做咩呀？	Elicit a platform utterance with a question
Child	抹、抹、抹！	Absence of the marker
Clinician	你睇！姐姐**抹緊**把刀呀。	Recast and feedback

2nd Teaching and learning episode (dose) – Placing the tablecloth		
Clinician	細佬想攞啲水果出嚟喎。媽媽話要**舖**枱布先:「我**舖**喺枱上面先！」	Set up the scene, model the verb twice
	媽咪而家…	Elicit a platform utterance using sentence completion
Child	舖呢張嘢囉。	Absence of marker
Clinician	係呀！媽咪**舖緊**枱布呀。	Recast and feedback

3rd Teaching and learning episode – Pouring juice		
Clinician	妹妹覺得好口渴呀，不如**斟**啲橙汁飲呀。呢度有個杯，可以**斟**橙汁喎。	Set up the scene, model the verb twice
	妹妹而家…	Elicit a platform utterance using sentence completion
Child	倒緊啲果汁落去呢度！	appropriate use of the marker with a situationally relevant verb
Clinician	嗯，好香呀！你睇妹妹**倒緊**橙汁喺杯度。	Recast with the child's verb and feedback

4th Teaching and learning episode (dose) – Cutting beef		
Clinician	兔仔好肚餓，想**煮**啲蘿蔔啊。要開火咁危險，等工人姐姐**煮**啦！	Set up the scene, model the verb twice
	工人姐姐做咩啊？	Elicit a platform utterance with a question
Child	打緊嗰個！	appropriate use of the marker with a situationally relevant verb
Clinician	係喎工人姐姐**煮緊**蘿蔔，好快有得食啦。	Recast with a semantically relevant verb and feedback

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Rich Vocabulary Instruction (RVI)

Theoretical background:
Beck et al. (2008) proposed a three-tier framework for classifying words. Tier One words are words that appear frequently in oral language. Examples include apple (蘋果), boy (男仔) and sad (傷心). Tier Two words are words that are more commonly used in written language across domains. Examples are propose (提議), tragedy (悲劇) and diligent (勤奮好學). Tier Three words, on the contrary, are words that are used only in specific subjects or disciplines. These include hydrogen (氫氣), longitude and latitude (經緯線). As Tier One words are usually mastered by children at an early age and Tier Three words are only used in specific subjects or disciplines, Tier Two words are hence the intervention targets of choice for school age children (Beck et al., 2008).

Inspired by Beck et al.'s (2013) robust vocabulary instruction, McGregor et al (2021)'s rich vocabulary instruction approach involves explicitly teaching the target words using the following strategies:

- Provide child-friendly definition of the target word
- Provide examples of the target word within meaningful contexts
- Help the child associate the target word with their personal experience
- Engage in classroom routines when introducing the word

Yet, without a standardised protocol, the procedures and details of rich vocabulary instruction vary across different studies.

Empirical evidence:
In a large-scale cluster randomized trial, Apthorp et al.'s (2012) demonstrated efficacy of a rich vocabulary instruction approach developed on the basis of Beck & McKeown (2004)'s work. Participants were English-speaking kindergarten to fourth grade children. Children receiving rich vocabulary instruction scored significantly higher on vocabulary and comprehension after 1 year, when compared to the control children who received usual vocabulary instruction. Yet, the difference between both groups was eliminated after 2 years, suggesting that continuous instruction might be necessary.

A multi-cohort cluster randomized trial by Vadasy et al. (2015) showed some evidence on the efficacy of rich vocabulary instruction in older English-speaking fourth to fifth grade children. Classes receiving rich vocabulary instruction outperformed the typical classroom (control) vocabulary instruction on distal and proximal measures of vocabulary and comprehension. However, although randomisation was used in the assignment of children in the three cohorts, pre-existing differences between the rich vocabulary instruction and the typical classroom vocabulary instruction control group could not be eliminated--the control group was found to have significantly higher scores at pre-test.

A case series by McGregor et al. (2021) showed some efficacy of rich vocabulary instruction in 4- to 6-year-old English-speaking children with Developmental Language Disorder (DLD). After intervention, the children made significant improvement in the vocabulary post-test,

where the accuracy exceeded chance-level performance. Yet, as this is only a case series study, its applicability to other children with DLD has to be ascertained.

Overall, rich vocabulary instruction is an emerging intervention that is potentially efficacious. Yet, more research with a more rigorous study design on children with DLD is needed. Children with DLD are at risk for reading comprehension problems and there is a strong relationship between vocabulary and reading comprehension.

Specification of components in Fey's model

Target population:
Children with DLD aged 4 to 7

Language (oral) areas targeted:
Tier 2 Vocabulary

Definition of a dose (teaching and learning episode):
Each instance of the SLT/ teacher's use/ explanation of the target word is a dose

Dosage and cumulative intervention intensity:
A minimum of 10 exposures

Intervention agent:
SLT/ teacher

Goal attack strategies:
Horizontal

Intervention context:
School

Service Delivery model:
Small group

Activities:
Explicit instruction, discussion, question-asking, experiments, video-watching

Measurement of outcomes:
Vocabulary knowledge

- Spoken word-picture matching
- Provide word definition spontaneously/ associate the word with the correct definitions
- Word judgment task, e.g. 如果一個人悶悶不樂，佢係咪好開心？

Considerations for Cantonese-speaking children and the Hong Kong context

- SLT should point out to the child the difference between Cantonese oral language, which is commonly used in daily life, and Standard Chinese written language, which is required in academic context, when teaching vocabulary.

Script of an intervention activity

Introduction of the target word

我地今日會學「提議」呢個生字

Step 1: Provide child-friendly definitions of the target word

Clinician:「提議」即係同你講佢嘅睇法同埋佢想你點做

Step 2: Provide examples of the target word within a meaningful context

In a book reading activity with the book <漢堡包和叉燒包>

Clinician: 爺爺同哥哥商量緊去邊度食飯。爺爺「提議」去茶樓食叉燒包。

Step 3: Help the child associate the target word with their personal experience

Clinician: 有無試過同屋企人「提議」去邊度食飯？或者「提議」食咩？

Child A: 有啊，「提議」去麥當勞

Clinician: 好好啊，A 試過「提議」去麥當勞食飯 [Acknowledge & Expansion]

Child B: 有啊，「提議」Pizza

Clinician: B「提議」食 Pizza [Recast]

Step 4: Engage in classroom routines when introducing the word

Clinician: 同學不如「提議」一陣小息做咩

Child A: 玩狐狸先生幾多點

Child B: 我想玩象棋

Clinician: A「提議」玩狐狸先生幾多點，B「提議」玩象棋。[Recast]

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Interactive book reading (IBR)

Theoretical background:
IBR combines explicit teaching and incidental learning. The speech-language therapist (SLT) will first define and give the synonym of each of the target words to the child. The SLT will then use the target words in sentences to illustrate how the words are used in the story context. Here the focus is not on decoding the text word for word, but on telling a story with support of the pictures and the text. There should be a reasonable number of target words for each picture book. IBR should not be conducted in an adult-directed manner. The SLT should also engage the child by giving him or her opportunities to collaborate in the story telling.

Empirical evidence:
Previous studies on explicit instruction (Biemiller & Boote, 2006) and shared book reading (Marulis & Neuman, 2010) showed that both approaches were effective in improving vocabulary learning in preschool children. This conclusion is confirmed findings reported in Dickinson et al. (2019).

Meanwhile, Storkel et al. (2017) found that 36 is the optimal dose number for teaching a target word using Interactive Book Reading. Leung (2018) reported on an early efficacy study using a single-subject design based on Storkel et al. (2017). The study established suggestive evidence on the use of Interactive Book Reading with preschool Cantonese-speaking children with Developmental Language Disorder (DLD).

Specification of components in Fey's model
Target population: Preschool children with DLD aged 5 to 7

Language (oral) areas targeted: Vocabulary

Definition of dose (teaching and learning episode): The SLT's explicit teaching of the target word (e.g., providing definition or a synonym), and the SLT's modeling and use of the target word in sentences during reading without explicitly drawing the child's attention to it (i.e., incidental learning)

Dose number and cumulative intervention intensity: The SLT provides 6 doses of each target word in 1 session. The same activities are repeated in 6 sessions. In total, 36 doses are provided for each target word.

Intervention agent: Clinician (Parent/ Teacher may use this approach as well)
Goal attack strategies: Horizontal
Intervention context: Therapy Room
Service Delivery model: One-on-one
Activities: Book reading

Measurement of outcomes:
Probes
1. Definition task: Ask the child to provide a definition of the target word

E.g. 傷心係咩意思啊? / 傷心係點解啊?
*Alternative: True or false questions on the definition of the target word
E.g. (True) 傷心係咪好開心係度笑啊？(False) 傷心係咪好唔開心，好想喊啊？

2. Naming task: Prompt the child to use the target word
E.g. (Show the picture of a girl crying) 妹妹唔見咗佢最鍾意嘅公仔，佢好_____

Considerations for Cantonese-speaking children and the Hong Kong context (Lee, 2020)
- Many Chinese words are compound words
- There are more homophones in Chinese than in English
- Chinese words are morphologically more complex than English
- The transparency of a compound word may affect how quickly it is learned

Script of an intervention activity
Session goal: The SLT will produce 6 target words 6 times in 20 minutes using Interactive Book Reading in pre-book reading, book reading and post-book reading activities

Example of a target word: 傷心

1. **Pre-book reading** (Preview)
- **Provide a synonym:** 傷心即係唔開心 – Explicit teaching
- **Provide a definition:** 無咗啲嘢, 或者被人鬧, 會好傷心，會喊 – Explicit teaching

Note: the synonym should be a word that the child probably already understands, and the definition should be again given in simple sentences using words the child already understands.

2. Book reading: E.g.《馬鈴薯家族》
- **Use the word in the book:** 薯仔媽媽被姨姨買走咗，薯仔見唔到媽媽，覺得好傷心 – Incidental learning
- **Provide a synonym:** 傷心即係唔開心 – Explicit teaching

3. **Post–book reading**
- **Review the story by using the word in a context sentence:** 薯仔好傷心，因為薯仔以後都見唔到媽媽 – Incidental learning
- **Provide a definition:** 無咗啲嘢或者被人鬧會好傷心，會喊 – Explicit teaching

Other tasks: suggested by Lee (2020)
- **Ask a question using the word about personal experience:** 妹妹整跌咗杯雪糕，無雪糕食，佢覺得點啊？
- **Fill in the blank using the word about an event:** 哥哥整爛咗媽咪送畀弟弟隻錶，弟弟覺得_____
- **Provide antonyms:** 傷心唔係高興
- **Provide a gesture:** 傷心即係咁樣 (Pretend to be grumpy & sad)

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Story Champs

Theoretical background:

"Story Champs" is a commercially available narrative intervention program designed to foster the development of oral expressive language, as well as literacy (e.g., story writing) and higher-order cognitive skills (e.g., inferencing, problem solving, etc.). Literacy and higher-order cognitive skills form an important part of academic language development. Story Champs is a semi-manualized program with explicit teaching procedures, but it also allows clinicians flexibility to make adaptations. The program is available in both English and bilingual English/Spanish for children from the preschool to the early primary school years. In Story Champs, visual icons and picture cards are used to support story retell and personal story generation (Spencer et al., 2013). These supports are then systematically faded to encourage independent storytelling. Story Champs has a multi-tiered curriculum design (large group, small group or individual). Children with greater language needs receive more intensive and focused intervention, whereas children with fewer needs receive a lower dose of intervention.

The two primary developers of Story Champs, suggested ten principles of narrative intervention in their practice guide article (Spencer & Petersen, 2020):

1. Build story structure before vocabulary and complex language
2. Use multiple exemplars to promote metalinguistics and generalization
3. Promote active participation
4. Contextualize, unpack, and reconstruct stories
5. Use visuals to make abstract concepts concrete
6. Deliver immediate corrective feedback
7. Use efficient and effective prompts
8. Differentiate, individualize, and extend
9. Arrange for generalization opportunities
10. Make it fun

Read the article for a detailed description of each of the stated items and for more about narrative intervention in general.

Empirical evidence:

Over 20 large and small group research studies reported on the efficacy of Story Champs in improving different language parameters in different population groups. Each tier of intervention (i.e., large group, small group and individual) has been studied separately and as an integrated system. In the Story Champs website, positive outcomes in these areas are reported: story retelling, personal story generation, fictional story generation, story comprehension, acquisition of targeted vocabulary, inferential word learning, story writing, information retelling, and reading comprehension (Language Dynamics Group, 2021). It was reported that in many studies, only a relatively small number of Story Champs intervention sessions (e.g., twice per week for ten weeks) was sufficient to generate considerable language gains (Language Dynamics Group, 2021).

The single-subject multiple baseline experimental study by Spencer et al. (2013) was one of the first peer-reviewed published studies to demonstrate early efficacy of Story Champs in children with disabilities. All 5 participants showed improvement on the auditory-oral retell

task without pictures, but results on story comprehension were inconsistent. There was, however, no report on the statistical or practical significance of this finding. Also, there was no strong positive evidence regarding the maintenance of effects.

A few studies with improved methodological design were conducted subsequently. Spencer et al. (2017) conducted a quasi-experimental controlled study on the efficacy of Story Champs in preschool classrooms. Large group, small group, and individual lessons were delivered. Results indicated statistically significant improvement on story retelling and language comprehension with medium effect sizes. More importantly, this study demonstrated ecological validity by showing that Story Champs was feasible and effective when conducted in real-life classrooms by teachers and teaching assistants.

Specification of components in Fey's model

Target population: preschool to early primary children (including typically developing children, children with ASD, children with language and/or learning disabilities, and others)

Language (oral) areas targeted: Story retell, personal storytelling and story comprehension are the most common, but other language skills such as vocabulary, syntax, problem solving and writing can also be addressed, depending on the needs of the child/ group of children.

Definition of a dose (teaching and learning episode):

In the literature on narrative intervention, there is no agreement on the definition of a dose. One reason is that it is not easy to define a teaching/learning episode (the other term for dose) in discourse, be it narrative or expository, because discourse cannot be conveniently segmented into consistent and discrete units in the same way as morphemes, words, or sentences (Hoffman, 2009). Also, discourse often varies in length and complexity.

Depending on the intervention goal, each instance of the SLT's input of the story grammar elements/target words/syntactic structures/connectives etc. in a story could be seen as a dose. The child's output of the above, and retell or spontaneous production of a story could also be considered a dose.

Dose number:

Research studies Story Champs (and most other narrative intervention studies) did not report a definite dose number. Total intervention duration was often reported instead. In the case of Story Champs, the intervention was found efficacious when provided under widely varied schedules (e.g. 15-30 minutes, twice a week over 12 weeks; 1 hour, once a week over 5 weeks; 10 minutes, 8 times over 1 week, etc.). Given the lack of specification of dose number and other related details in the reported evidence, SLTs may make decisions according to the needs of the children, and collect data on their caseloads to make informed evidence-based decisions for subsequent children. The first thing to do, however, is to define what counts as a dose that makes sense for your child, and deliver the dose number accordingly as planned in each session.

Intervention agent:

SLTs, parents, and teachers

Goal attack strategies:
horizontal

Intervention context:
school, clinic
room, and sometimes, child's home

Service Delivery model:
one-on-one/ large group/ small group

Activities:
listening to stories, story retelling, story generation, games (e.g. bingo), story writing, etc.

Measurement of outcomes:
Treatment data
The macrostructure and microstructure of the narratives produced
(Measured by story retelling and story generation in probes (see below for details))

Probe
The stories used in the probes should not be stories introduced during interention. The child will be asked to retell stories and to generate his/her own stories. Other cues, including but not limited to. visual prompts, icons, or graphic organizers should not be provided during probes. The child's narrative will be scored for macrostructure (story grammar and episodic complexity), and microstructure (vocabulary use, syntactic structure, use of referencing).

Considerations for Cantonese-speaking children and the Hong Kong context
- SLTs should note the difference between spoken Cantonese, which is commonly used in daily life, and Standard Written Chinese, which is required in academic context.

Script of an intervention activity (with annotation of the procedures used in the approach)
Story Champs is a commercially available program that comes with its own instruction manual, original stories and materials. The example here was not extracted from the Story Champs program and was created by the author only to demonstrate the broad intervention principles used in the Story Champs.

Story Exemplar (illustrating the 5 core story grammar elements):
1) 星期日，欣欣去公園踩單車。(character)
2) 踩踩吓，佢唔小心由單車度跌左落地。欣欣唔單止擦傷膝頭哥，而且仲整爛左新買嘅牛仔褲。(problem)
3) 返到屋企，欣欣望住條爛褲，覺得好傷心。(feeling)
4) 於是，欣欣決定剪開條褲，重新將佢改成短褲。(action)
5) 見到條新褲咁靚，欣欣最尾都開心番喇。(ending)

Step 1: Model story

Clinician lays out the 5 story picture cards. Each story card corresponds to one story grammar element. As the clinician models the story in Cantonese, he/she places the appropriate story grammar icons near pictures the illustrate the elements. He/she also names the story grammar elements and talks about them before she models the story.

Step 2: Retell with a decreasing level of support

The child is asked to retell the story 1) first with support of both the pictures and the icons, 2) then with icons only, and 3) finally without the pictures or the icons. Verbal scaffolding is provided whenever necessary (e.g. 故事入面有邊個呀？欣欣覺得點呀？).

Step 3: Guide the child to generate story

The SLT asks the child if something like that has ever happened to him/her (e.g. 你有冇試過整爛野呀？). As the child attempts to generate a story, the clinician lays out the icons, draws pictures on sticky notes to support the child's story telling. After story generation, the SLT guides the child to retell the story with a decreasing level of visual or verbal support.

Remarks:

Developmentally, children include the basic story grammar elements before they use complex language in their stories. Therefore, it is suggested that SLTs first use a simple story with core story grammar elements to help the child learn the basic structure of a story. After the child has mastered the basic story structure, SLTs can move on to using more elaborate stories to help the child learn the supplementary story grammar elements and linguistic targets.

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Contextualized language/skill intervention

Theoretical background:

Language intervention for children in the late preschool years and older can be described as either decontextualized or contextualized. In decontextualized intervention, treatment goals are introduced in a number of discrete, clinician-directed activities with little topic continuity (Gillam et al., 2012).

On the contrary, in contextualized intervention, linguistic goals are systematically and explicitly targeted in simplified but authentic, functional and communicative contexts (Ukrainetz, 2015). These contexts can be social, or linked to the classroom curriculum. They provide the meaning, and the purpose for language learning.

Contextualized language intervention makes sure of children's literature (e.g., Gillam and Ukrainetz, 2006), or expository texts (Ukrainetz, 2006). Contextualized language intervention is sometimes referred to as contextualized skill intervention (Ukrainetz, 2016). The latter term draws attention to the fact that specific language skills are targeted and addressed explicitly in intervention. Each contextualized language skill intervention unit, which spans over several sessions, has a whole-part-whole structure. The intervention first starts with a wholistic contextualized communication activity (e.g., reading a story book, advertising an item, conducting a scientific experiment) which introduces and incorporates all the language skills. During the intervention, planned activities focusing on the parts, that is, the pre-determined language skills (e.g., using specific vocabulary; reporting on the experiment in an organized manner; consistent use of perfective aspect marker and resultative particles on the verbs), will be used to provide repeated opportunities for practice. The intervention finally ends with a meaningful and again wholistic communication activity (e.g., writing a report on the experiment, preparing a poster for an oral presentation) which allows students to integrate all the language skills learnt. The final product also acts as an exit test for measuring intervention outcomes.

Ukrainetz (2016) summaries the critical features of contextualized language intervention in the simple mnemonic of RISE+. R is repeated opportunities for practice and learning, I is intensity, S is systematic support and E is explicit skill focus. Last but not least, plus + is the learner factor. The learner factor refers to the extent the learner is involved in the intervention, which is multiply-determined by his/her attention, motivation and engagement.

Empirical evidence:

Gillam et al.'s randomized control trial (2012) examined whether contextualized language intervention or decontextualized language intervention yielded a larger effect on sentence production and narrative tasks when compared to the no-intervention control group. The children, aged 6 to 9 years, had what we now called Developmental Language Disorder. For sentence-level measures, results showed significant differences between the contextualized language intervention group and the control group on both sentence recall and sentence formulation. The effect sizes were large (Recalling Sentences, d = 3.08; Formulated Sentences, d = .99). Yet, between the decontextualized language intervention group and the control group, the only significant difference was on sentence recall.

For narrative discourse measures, significant differences between the contextualized language intervention group and the control group were found on the Test of Narrative Language (TNL) Narrative Language Index, TNL Narrative Comprehension score, and Monitoring Indicators of Scholarly Language (MISL) microstructure score. The effect sizes were moderate to large (TNL Narrative Language Index, d=.43, TNL Narrative Comprehension score, d=.93, and the MISL microstructure score, d=.45). As for the decontextualized language intervention group versus the control group, a significant difference was found only on MISL microstructure score. Overall, results favoured contextualized language intervention. It would be better if there was a direct comparison between the contextualized and decontextualized intervention groups.

Specification of components in Fey's model

Target population:
School-aged children with Developmental Language Disorder

Language (oral) areas targeted:
Vocabulary, syntax, discourse comprehension and production (narrative discourse/expository discourse)

Definition of a dose: (teaching and learning episode)
Each instance of the SLT's demonstration of story grammar elements/target words/syntactic structures/connectives in a story is a dose. The child's retell or spontaneous production of a story is also considered a dose.

Dosage:
There is no report of a definite dose number and there is no agreed method of calculating the dose number.

Intervention agent:
SLT

Goal attack strategies:
Horizontal

Intervention context:
Clinic room

Service Delivery model:
Individual/small group

Activities:
Curriculum-based activities (i.e., matching intervention activities with topics covered in class) explicit instruction on language skills, shared book reading, post-story discussion

Measurement of outcomes:
Vocabulary
- Spoken word-picture matching

- Provide word definition spontaneously/associate the word with the correct definition
- Word judgment task (e.g., 如果一個人悶悶不樂，佢係咪好開心？)

Syntax
- Probe on the target syntactic structures

Discourse
Narrative
- Macrostructure: story grammar elements
- Episodic complexity
- Microstructure: coherence (use of connectives, logical linking of ideas), syntax, vocabulary

Exposition
- Content (topic, elaboration with examples, ending)
- Coherence (use of signaling devices, logical linking of ideas)

Facilitation strategies
There are no pre-determined cues, prompts or procedures that are specifically required for contextualized language intervention approaches. Different facilitation strategies could be used for each goal, intervention context and child. Gillam and Ukrainetz (2006) classifies these strategies into three types.

> *Linguistic facilitation*: "adult responses that are contingent---directly related to the content or the form of the student's prior utterance" (p.68). Examples: syntactic expansion, semantic expansion, recast, prompt, elaboration question, vertical structure.
> *Response facilitation*: talk moves that "provide support or structure to encourage student responses" (p.68). Examples: model, question to elicit a new utterance, prompt.
> *Regulatory facilitation*: talk moves that "raise students' awareness of the targeted language skill as the purpose for completing the activity. Example: state the goal or target, compare or contrast, informative feedback.

Considerations for Cantonese-speaking children and the Hong Kong context
- The SLT should note the difference between spoken Cantonese, which is used in daily life, and Standard Written Chinese, which is required in academic contexts, when teaching vocabulary, and grammar.

A contextualized skill intervention unit: Example 1
The table below shows a brief example of a 8-session whole-part-whole intervention unit. Readers may also refer to Gillam et. al (2012) for a more detailed sample of a contextualized language intervention session conducted in English.

Sessions	**Whole/ Part?**	**Content**

<table>
<tr><td>Session 1</td><td>Whole</td><td>Short writing (Describing an accident-got hurt)
- Introducing the task and the learning goals
- Pre-baseline taking</td></tr>
<tr><td>Session 2</td><td rowspan="6">Part</td><td rowspan="2">Story grammar</td></tr>
<tr><td>Session 3</td></tr>
<tr><td>Session 4</td><td rowspan="2">Vocabulary</td></tr>
<tr><td>Session 5</td></tr>
<tr><td>Session 6</td><td rowspan="2">Use of connectives</td></tr>
<tr><td>Session 7</td></tr>
<tr><td>Session 8</td><td>Whole</td><td>Short writing (Describing an accident-got lost)
- Wrap-up of learning
- Post-baseline taking</td></tr>
</table>

In a whole-part-whole treatment unit, more than one text/context of intervention will be used to provide multiple opportunities for skill practice and generalization. Here, a P3 Chinese Language passage is chosen to illustrate the contextualized skill intervention approach.

Text

新編啟思中國語文(第二版) 三下(二) 第十六課：《破缸救人》

Whole: Short writing (Person introduction)

The SLT tells the child that short writing (with “describing an accident-got hurt” as the topic) will be the central theme of this intervention unit. The SLT will introduce the structure of such a discourse type. The child will learn a range of language skills (the “parts”) that contribute to the success of the short writing task. The SLT collects pre/post-treatment data on the child’s performance in the short writing task.

Part: Story grammar

Depending on the level of the child, the SLT can target narrative retell, parallel story production and/or story comprehension etc. and provide different types and amount of scaffolding.

- 背景: 司馬光和幾個小朋友（人物）；院子（地點）；有一天（時間）
- 起因: 一個小朋友掉進了大水缸
- 反應: 小朋友們驚呼起來；司馬光則很鎮定

- 計劃: n/a
- 行動: 司馬光搬起一塊石頭，向水缸砸去
- 結果: 司馬光救出了小朋友

Part: Vocabulary
For example, the SLT can focus on the different emotion adjectives covered in the text:

- 他從小就很*冷靜*
- 一個小朋友玩得*高興*
- 可是那個小朋友卻往更高處爬，*得意*地說...
- 司馬光卻很*鎮定*

Part: Syntax/ grammar
For example, the SLT can work on the concessive conjunctions that appeared in the text:

- 孩子們驚呼起來，大叫：「不好了，有人掉進水缸了！」*但*誰都沒想到救人的方法。
- 那個掉進水缸裡的小朋友*雖然*喝了幾口水，*卻*被安全救了出來。
- 這時，司馬光*卻*很鎮定。

Part: Other intervention goals
The SLT is also free to design other intervention goals that are appropriate to the child (e.g. switching between oral and literate languages, story sparkles [e.g. dialogues, onomatopoeia] that may enrich the story).

A contextualized skill intervention unit: Example 2
Ref: Gillam, S. L., Gillam, R. B., & Reece, K., 2012; Peterson, A. K, Ukrainetz, T. A. & Risueno, R. J., 2021

Intervention frequency & duration
45 minutes weekly intervention sessions (8-10 sessions, to be completed in 1 term)

Target clients
Primary school students with Developmental Language Disorder aged 6 to 8 (Lower primary)
*[*Can modify the content to make it suitable for older upper primary students]*

Group size
Small group (2-4 students)

Intervention goals
O1: Discourse structure

1. Able to summarize the narrative with the following story grammar elements,

setting, initiating event, internal response, plan, attempt, consequence given minimal cues (with visual cues on story grammar elements)

2. Able to introduce characters in a well-formulated paragraph containing a topic sentence, reasons, examples and elaboration

[Older upper primary students: Able to introduce the author/ major character, e.g. 孫悟空 (Sun Wukong), Sherlock Holmes, with a well-formulated framework, containing background, professional highlights, e.g. major career achievements, other awards & accomplishments, other relevant/useful information, own judgment]

O2: Vocabulary
Able to use 3 Tier II vocabulary words, i.e. 欣賞 (appreciate), 擔心 (worried), 感激 (grateful)

O3: Self-review/ Peer-review
Able to evaluate own & others' narrative/ expository production given a checklist

Outcome measures
Content (discourse structure & vocabulary) of the book report before and after intervention
*Note: Book reports are usually completed during school holidays, e.g., summer vacation, Christmas holiday, Easter holiday...

Materials
Book series/ comic books
Chinese
小雞系列, E.g.《小雞逛超市》(Chicks go shopping)、《小雞過生日》(Chicks' Birthday Party)、《小雞去露營》(Chicks go camping).....
野貓軍團 , E.g. 《野貓軍團烤麵包》(Cats bake a bread)、《野貓軍團壽司店》(Cats sushi shop)
Doraemon comics

English equivalent
Maisy series
Magic Tree House

Activity
Overview

Session	Main content
1	Introduction of story grammar elements, Shared book reading, Post story discussion
2	Role play - acting out a scene, story retell/ summary
3	Create a new ending, story retell/ summary (with a new ending)

4	Shared book reading using another book in the same series, story retell/ summary
5	Story retell/ summary on another book in the same series
6	Introducing a book character - pictography/ bulleted notes
7	
8	Introducing a book character - oral presentation
9	Review and conclusion

Session 1

1. Pre-story presentation

- Show the cover page
- Reading and discussing the book title
- Chicks go camping 小雞去露營 - What is it about?

2. Introduction of story grammar elements

- Setting 背景
- Initiating event 問題
- Internal response 感受
- Plan 計劃
- Attempt 行動
- Consequence 結果

3. Shared book reading

[童書繪本] 小雞去露營 - YouTube

4. Post story discussion

- Discussion on story grammar elements → jot down on a piece of paper/ a whiteboard
- Story comprehension

Literal questions	Inferential questions
What were Mommy and Daddy doing? What were the chicks doing? What happened to the chicks? How did the chicks feel?	Have you ever gone to the countryside? How do you feel?

5. Explanation of home practice

- Parents read aloud the story & discuss the story with the child
- Introduction of story grammar elements when reading the story
- Go through the list of comprehension questions

Session 2

1. Review of story grammar elements - Matching/ Sequencing

2. Highlight Tier II vocabulary words
   E.g. 欣賞 (appreciate)、擔心 (worried)、感激 (grateful)

3. Role play - Act out a scene

4. Story retell/ summary

5. Self-review/ Peer review
- Evaluate own story retell given a checklist (with/ without audio-recording)
- Evaluate others' presentation given a checklist

6. Explanation of home practice
- Practice story retell & parents provide feedback
- Self-review & parents provide feedback
- Upload the audio recording & evaluation form to the school learning platform

Session 3

1. Review of story grammar elements - Fill in the blanks/ Short questions

2. Review of vocabulary words introduced in the book
   E.g. 欣賞 (appreciate), 擔心 (worried), 感激 (grateful), 露營(Camping)、Forest (森林)、 採摘(pick)、燒烤(Barbeque)

3. Act out a new ending

4. Story retell/ summary (with a new ending)

5. Self-review/ Peer review
- Evaluate own story retell given a checklist (with/ without audio-recording)
- Evaluate others' presentation given a checklist

6. Explanation of home practice
- Practice story retell after twisting the story ending & parents provide feedback
- Self-review & parents provide feedback
- Upload the audio recording & evaluation form to the school learning platform

Session 4

1. Quick review of story grammar elements/ vocabulary words

2. Introduce another book in the same series
   《小雞逛遊樂園》 Chick's funfair
https://www.youtube.com/watch?v=V6npqCuFoYo

3. Shared book reading

4. Story retell/ summary

5. Self-review/ Peer review
- Evaluate own story retell given a checklist (with/ without audio-recording)
- Evaluate others' presentation given a checklist

7. Explanation of home practice
- Shared book reading
- Practice story retell with another book in the same series & parents provide feedback
- Upload the audio recording & evaluation form to the school learning platform
- Self-review & parents provide feedback

<u>Session 5</u>

1. Quick review of story grammar elements/ vocabulary words

2. Each student performs story retell/ summary on another book in the same series

3. Self-review/ Peer review
- Evaluate own story retell given a checklist (with/ without audio-recording)
- Evaluate others' presentation given a checklist

4. Explanation of home practice
- Shared book reading
- Practice story retell with other book in the same series & parents provide feedback
- Upload the audio recording & evaluation form to the school learning platform
- Self-review & parents provide feedback

<u>Session 6</u>

1. Identify one favourite character from the book, e.g. Mommy hen, Daddy rooster...

2. Introduce the framework for introducing a book character
- Topic sentence + reason + example + ending

3. Pictography
- Introduce pictography notes
- Using pictography to make notes
- Formulate full sentences from pictography notes
- ST rephrases sentences & the child repeats what the ST said

4. Deliver an oral presentation on a favorite character from pictography notes

5. Self-review/ Peer review
- Evaluate own/ others' presentation given a checklist (with/ without audio-recording)

6. Explanation of home practice
- Review the overall framework
- Use of pictography notes

Session 7

1. Review the framework for introducing a character

2. Deliver oral presentation from pictography notes

3. Jot down keywords (bullet points) from full sentences formulated from pictography

4. ST rephrases sentences & the child repeat what the ST said if needed

5. Deliver oral presentation from bulleted notes

6. Self-review/ Peer review
- Evaluate own/ others' presentation given a checklist (with/ without audio-recording)

7. Explanation of home practice
- Review the overall framework
- Use bullet notes on another character

Session 8

1. Review the discourse structure of the oral presentation on character introduction

2. Introduce the opening and closing statements, e.g. 今日我想同大家介紹_____。
我今日既分享來到呢度，多謝大家

3. Choice of pictography/ bullet notes

4. Deliver oral presentation on another book character from pictography notes

5. Self-review/ Peer review
- Evaluate own/ others' presentation given a checklist (with/ without audio-recording)

6. Explanation of home practice
- Review the overall framework
- Use pictography/ bullet notes on different book characters
- Upload the audio recording to the school learning platform

Session 9

- Conclude the narrative & expository skills learned
- Observe carryover effect in oral/ written book reports

(1) Complete the book reports usually assigned for them
(2) Share the book reports with their classmates

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Supporting Knowledge in Language and Literacy (SKILL)

Theoretical background:

The Construction-Integration model of text comprehension proposed by Kintsch (2013) stated that discourse comprehension requires 1) "construction of a textbase, which is a (mental) representation of what the oral or written discourse actually says (Gillam et al., 2018, p. 199), and 2) integration of different pieces of information, including background knowledge or experience, in the mental representation in order to interpret what the text means. The other word for the listener or the reader's rich, integrated, and evolving mental representation constructed during comprehension is called a situation model.

Based on the Construction-Integration model, a contextualized language intervention program called Supporting Knowledge in Language and Literacy (SKILL) was developed. SKILL is a comprehensive manualized narrative intervention program designed to facilitate students' construction of textbases and situation models, and their integration into long term memory (Gillam et al., 2018). These textbases and situation models will support comprehension of similar discourse or text in the future. SKILL contains the following three phases (Gillam & Gillam, 2016).

Phase 1: Explicit Instruction of Story Elements and Causal Connections [18 lessons]
Focus: Learning the story grammar elements

Exit test 1:
- Able to identify and provide examples or definition for all the story grammar elements
- Able to generate own story using all the story grammar elements (with scaffolding)
- Able to answer comprehension questions about the story grammar elements after listening to a new story without pictures provided

Phase II: Teaching Strategies for Creating a Situation Model [16 lessons]
Focus: Production of an elaborated story with complex episodes using literate language

Exit test 2:
- Able to generate own story with good use of vocabulary, syntax and coherence
- Able to answer comprehension questions about the story grammar elements and recall the story after listening to a new story without pictures provided

Phase III: Teaching Strategies for Integration into Long Term Memory
Focus: Acquisition of metacognitive skills (e.g., critique children's literature, edit their own stories) needed for independent storytelling.

Empirical evidence:
Gillam and Gillam (2016) summarised the intervention studies on SKILL. Out of the seven studies included, SKILL yielded moderate to large effect sizes for 5- to 11-year-old school age children with DLD (0.66-2.54) and yielded large effect sizes for 8 to 12 year-old school age children with language disorder associated with ASD (1.63 to 5.11). Yet, as this literature review did not mention the search strategy and selection criteria, there might be a selection bias.

Looking into individual studies, a multiple-baseline, across-participants single-subject experimental study by Gillam et al. (2018) showed some efficacy of the SKILL intervention program on six English-speaking children with DLD aged 6 to 10 years. All four children receiving intervention showed moderate-to-large improvement in narrative productivity (number of different words, Tau-U = .71-.92). Yet, only three of the four children also showed moderate-to-large improvement in narrative complexity (Monitoring Indicators of Scholarly Language, MISL, Tau-U = .61-1), with one child showing no significant improvement in narrative complexity (Tau-U =.26). As for the two control participants, they did not make any significant improvement in narrative production (Tau-U=—0.13-—0.02) nor complexity (Tau-U=0.07-0.15).

Another multiple-baseline, across-participants single-subject experimental study by Gillam et al. (2015) also showed some efficacy of the SKILL intervention program on five English-speaking children with language disorder associated with ASD aged 8 to 12 years. All the participating children showed moderate-to-large improvement in narrative complexity (MISL, PND = 58%-95%) and moderate improvement in narrative coherence (Story Knowledge Index, PND = 50%-79%). Yet, the improvement in perspective taking varied from small to large (PND = 19% to 77%), which was likely because some participants had lower initial language proficiency which required more time and effort to master perspective taking.

A non-randomised group study by Gillam et al. (2014) demonstrated some efficacy of the SKILL intervention program on first grade students in classroom settings. Compared to the comparison group receiving no intervention, students in the treatment group showed large improvement in narrative complexity (d = .82) and vocabulary (d = 1.02).

Overall, more randomised controlled trials are needed in the future to eliminate the pre-treatment differences among participants and further confirm the present findings.

Specification of components in Fey's model

Target population:

- School-aged children with DLD aged 5 to 11 years
- School-aged children with language disorder associated with ASD aged 8 -12 years

Language (oral) areas targeted:

- Story comprehension: Literal and inferential comprehension
- Story production: Narrative macrostructure and microstructure

Definition of a dose (teaching and learning episode):

In the literature on narrative intervention, there is no agreement on the definition of a dose. One reason is that it is not easy to define a teaching/learning episode (the other term for dose) in discourse, be it narrative or expository, because discourse cannot be conveniently segmented into consistent and discrete units in the same way as morphemes, words, or sentences (Hoffman, 2009). Also, discourse often varies in length and complexity.

Depending on the intervention goal, each instance of the SLT's input of the story grammar elements/target words/syntactic structures/connectives etc. in a story could be seen as a dose. The child's output of the above, and retell or spontaneous production of a story could also be considered a dose.

Dose number:
Research studies on the SKILL program (and most other narrative intervention studies) did not report a definite dose number. Total intervention duration was often reported instead. In the case of the SKILL program, the intervention was found to be efficacious when provided under a variety of schedules (e.g. 50-minute (session duration) individual sessions scheduled twice per week (session frequency) for a total of 21 to 33 sessions; 60-minute large group sessions scheduled three times per week for 6 weeks). Given the lack of specification of dose number and other related details in the reported evidence, SLTs may make decisions according to the needs of the students, and collect data on their caseloads to make informed evidence-based decisions for subsequent students. The first thing to do, however, is to define what counts as a dose that makes sense for your students, and deliver the dose number accordingly as planned in each session.

Intervention agent:
SLT

Goal attack strategies:
Horizontal

Intervention context:
School/ Clinic Room

Service Delivery model:
Small groups of three of four/ one-on-one

Activities:
Explicit instruction, listening to stories, story retelling, parallel story development, spontaneous story generation, literature-based language activities

Measurement of outcomes:
Treatment data
The macrostructure and microstructure of the narratives produced
(Measured by story retelling and story generation in probes (see below for details))

Probe
The stories used in probes should not be stories introduced during treatment. The child will be asked to retell stories (without pictures provided) and to generate his/her own stories (with pictures provided). Other cues including, but not limited to, visual prompts, icons, or graphic organizers should not be provided. The child's narrative will be scored for macrostructure (story grammar and episodic complexity), and microstructure (vocabulary use, syntactic structure, use of referencing).

Considerations for Cantonese-speaking children and the Hong Kong context

- SLTs should note the difference between spoken Cantonese, which is commonly used in daily life, and Standard Written Chinese, which is required in academic context. With some children, it is necessary to work on their spoken Cantonese and written Chinese, perhaps the former should take precedence. Let the child know what the focus is, and point out how the same words, or structures, can be similar or different in the two languages, when appropriate.

Script of an intervention activity

SKILL is a commercially available manualised programme that comes with its own instruction manual, original stories and materials. The example here was not extracted from the SKILL manual and was created by the author only to demonstrate the broad intervention principles used in the SKILL program.

Step 1 Explicit instruction

Clinician introduces and defines each story grammar element

- 背景: 人物、地點、時間
- 起因: 事件
- 反應: 主角/其他人對於事件的反應
- 計劃: 主角/其他人的想法
- 行動: 主角/其他人的做法
- 結果: 行動帶來的後果

Step 2 Shared book reading

Using a wordless picture book “狼來了”, the clinician models the story written in Standard Written Chinese using Cantonese. He/she also illustrates the story grammar elements.

- 背景: 從前，有一個牧童在山上放羊
- 起因: 由於牧童在山上百無聊賴，所以他想作弄村民。於是，他往村莊的方向跑去，大叫：“狼來了！狼來了！
- 反應: 村民立刻跑山上幫忙趕走狼。可是，當他們到達時，卻看不見狼。牧童立刻嘲笑他們，而村民怒氣沖沖地下山了。
- 計劃: 後來，狼真的來了。牧童決定大聲求救，請村民幫忙。
- 行動: 牧童往村莊的方向跑去，大叫：“狼來了！狼來了！可是，村民以為是牧童的惡作劇而沒有上山。
- 結果: 最後，結果狼將所有羊吃掉了。

Step 3 Story retell

The child is asked to retell the wordless picture story. Scaffolding (e.g., verbal cues), icons, graphic organizers (e.g. a storyboard with all of the story grammar elements presented in a sequential manner) will be provided whenever necessary.

Step 4 Parallel story development

Based on the wordless picture story, the clinician and the child generate parallel stories with the aid of pictographic planning (stick pictures drawing). The child will then be asked to retell and evaluate the parallel stories.

Step 5 Literature-based language activities

To address other language goals (e.g., vocabulary, syntax and discourse comprehension), different literature-based language activities (e.g., vocabulary instruction, introduction of temporal relations) and comprehension activities (answering literal and inferential questions) may be included.

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Oral Inferential Comprehension Intervention (OICI)

Theoretical background:
Oral Inferential Comprehension Intervention (OICI) was developed by Dawes et al., (2015). It is an interactive book-sharing program with guided scripts, with an aim to foster the oral inferential comprehension of narratives in young children with Developmental Language Disorder (DLD).

Young children with DLD showed weaker inferential comprehension skills than their typically developing age peers across a wide age range (e.g., Bishop & Adams, 1992; Dodwell & Bavin, 2008; Norbury & Bishop, 2002). Difficulties in oral inferential comprehension in the preschool years cannot be taken lightly as it has been found to predict narrative retell and oral comprehension (Lepola et al., 2012) and reading comprehension (Silva and Cain, 2015) in the later primary school years. There is a need for intervention to remediate children with DLD's problems with inferential comprehension.

In addition to a focus on oral inferential comprehension, the OICI program targets literal comprehension as well to help children with DLD establish links between sentences and across paragraphs for inferential comprehension (van Dijk & Kintsch, 1983). The OICI includes these key features: 1) repeated exposures of several stories with explicit teaching of story grammar elements, 2) discussion of the stories around some Tier 2 words, and 3) SLTs' use of think aloud to demonstrate how to make inference of the characters' emotions, and make prediction of the characters' actions. These features are designed to promote children's narrative retell skills both in terms of the macrostructure and the microstructure, to increase not just their number of words (vocabulary breadth) but also the knowledge of the words (vocabulary depth), and to strengthen their theory of mind understanding of others' behaviors, thoughts and feelings.

Dawes et al., (2015), the developers of OICI, suggested thirteen principles of narrative intervention in their article:

1. Focus at the discourse level to support the development of coherent narrative schemas
2. Use dialogic book sharing with scripted literal and inferential questions
3. Use different types of inferential comprehension (causal, evaluative, informative) questions
4. Integrate different TOM skills (e.g., prediction, interpreting emotions) in questioning and discussion
5. Use think-aloud strategies to model inferential comprehension processes
6. Relate the story to children's personal experiences and make predictions
7. Develop children's awareness of story grammar elements through discussion on what makes a good story
8. Use scaffolding strategies to assist children's responses to inferential questions
9. Use visual aids and graphic organizers (e.g., icon/story map)
10. Make the learning goals explicit
11. Discuss Tier 2 words and emotions during book-sharing
12. Adopt naturalistic book-sharing strategies (e.g., tone of voice, balance of questions and comments to make the story sharing engaging
13. Read the same storybooks repeatedly is often helpful

Empirical evidence:
The OICI program was developed in Curtin University, Australia. The efficacy of the narrative intervention was investigated in a randomized controlled trial study conducted by Dawes et al. (2019). In the study, 5- to 6-year-old children with DLD were randomly assigned to the inferential comprehension (OICI) (experimental) group and the phonological awareness (control) group. Results showed that children in the OICI group demonstrated statistically significant improvement in inferential comprehension skills, including inferring emotions, prediction, evaluative and causal reasoning. The improvement can be explained by the repeated exposure and modelling of inferential thinking during shared book reading and retelling. There were no statistically significant changes in the literal comprehension scores in either group of children, which suggests that the OICI may not have treatment effects on literal comprehension. Given the design of the study, improvement in inferential comprehension was demonstrated in stories not used in training, hence response generalization was demonstrated. It is also important to note that effects of the OICI program was maintained two months after it ended. Having said this, results from individual children in the study suggested that OICI might not work well with children with poor listening and attention during shared-book reading (Dawes et al., 2019).

Previous studies on oral narrative intervention used outcome measures that tapped mostly on changes in expressive language and story production (e.g., Gillam et al. 2018; Glisson et al. 2019). Although the OICI program was designed with an intervention focus on inferential comprehension, the way it was delivered suggested that improvement in the children's expressive language and story production is plausible. This plausibility can be ascertained in future studies.

Specification of components in Fey's model
Target population: Preschool children with DLD aged 5 to 6

Language (oral) areas targeted: Literal and inferential comprehension of oral narratives, fictional narrative retell, vocabulary, causal connectives

Definition of dose (teaching and learning episode): Number of literal questions posed by the SLT during story map creation, the SLT's modelling of the think-aloud process, the SLT's use of causal connectives for inferential comprehension during the storytelling, the SLT's explicit teaching of macrostructure story grammar elements during the creation of the story map, the SLT's explicit teaching of the selected Tier 2 words and adjectives on emotions (e.g., provide definition, discuss associated personal experiences)

Dose number and cumulative intervention intensity [based on Dawes et al., (2015)]:
There are four stories in OICI. Four intervention sessions will be allocated to one story, targeting different areas (e.g., comprehension, retell, emotion, prediction). The dose number for the different target skills is summarized below:

1. Literal question comprehension: 13-25 doses per story (total for 4 stories is 76 doses)
2. Think-aloud modelling with causal connectives for inferential comprehension: 25-38 doses per story (total for 4 stories is 126 doses)
3. Explicit teaching of story grammar elements: 2 doses per story

(total for 4 stories is 8 doses)

4. Explicit teaching of each selected vocabulary: 3 doses per session
   (total for 4 stories is 12 doses per target)
   (4 Tier 2 words will be targeted per story, 16 tier 2 words will be targeted for the whole intervention program)
5. Explicit teaching of each emotional adjective: 3 doses per story
   (total for 4 stories is 12 doses per target)
   (Around 3-4 emotional adjectives will be targeted per story, 11 tier 2 emotional adjectives will be targeted for the whole intervention program)

Intervention agent: SLT
Goal attack strategies: Horizontal
Intervention context: Therapy Room
Service Delivery model: Small group (3-4 children)
Activities: Book reading, Story map drawing, Story retell
(Four books: The Very Brave Bear, Monkey Puzzle, Giraffe Can't Dance, The Gruffalo)

Measurement of outcomes:

Treatment data

The Squirrel Story Narrative Comprehension Assessment was administered at three time points (i.e., pre-treatment, post-treatment, and maintenance phase). It documents the child's progress in the literal and inferential comprehension of stories. The Peter and the Cat Narrative Comprehension Assessment was used at the post-treatment phase to measure the generalization effect of the above target skills.

Considerations for Cantonese-speaking children and the Hong Kong context

The OICI treatment protocols and evidence are primarily in English. While Cantonese Chinese is morphologically and typologically different from English, the four stories are translated into oral Cantonese with some Tier 2 words customized according to the Hong Kong language context.

Script of an intervention activity (Demonstrate using the book 'Monkey Puzzle')

1. Think aloud: model inferential thinking when answering inferential questions

Clinician	你覺得點解蝴蝶會幫小馬騮？	Ask inferential questions and wait
Child	因為佢好好。	Incomplete reasoning
Clinician	因為蝴蝶係小馬騮嘅好朋友，佢想幫可憐嘅小馬騮。	Model inferential thinking, feedback and recast

2. Emotional adjectives (Tier-2):

Clinician	小馬騮唔見咗媽咪嘅時候覺得點呀？	Question prompt on emotions
Child	唔開心。	Tier-1 word

Clinician	仲有呢？佢全身震曬，個心卜卜跳，佢覺得點呀？	Provide semantic cue
Child	。。。	No response
Clinician	佢好緊。。。	Provide syllabic cue
Child	緊張！	Tier-2 word
Clinician	係喎！小馬騮心情好緊張，因為佢得翻自己一個，搵唔到媽咪。	Feedback and recast

3. Prediction of story outcome (last session)

Clinician	小馬騮終於搵到爹地媽咪啦，你覺得佢哋之後會做咩？	Ask prediction question
Child	佢哋好開心！	Inaccurate response
Clinician	小馬騮行咗咁耐去搵媽咪，一定好肚餓啦，你估佢想做咩？	Discuss appropriate prediction and brainstorm ideas
Child	想去食飯。	Ok response
Clinician	啱啦，我覺得馬騮一家人會返屋企食晚飯，因為小馬騮蕩失路咁耐會好肚餓！	Model prediction and reasoning

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Resources

https://www.languageandliteracyinyoungpeople.com/apps-resources --->

FREE: ORAL INFERENTIAL COMPREHENSION INTERVENTION

MAIN stories in English, Cantonese, Mandarin and other languages for assessment of narrative production and comprehension: Free with registration

Intro paper on Cantonese:

Chan, A., Cheng, K., Kan, R., Wong, A. M-Y., Fung, R., Wong, J., Cheng, T., Cheung, A., Yuen, K., Chui, B., Lo, J. & Gagarina, N. (2020). The Multilingual Assessment Instrument for Narratives (MAIN): Adding Cantonese to MAIN. *ZAS Papers in Linguistics*, 64, 23–29. https://doi.org/10.21248/zaspil.64.2020.553

Full Manual on Cantonese:

Gagarina, N., Klop, D., Kunnari, S., Tantele, K., Välimaa, T., Bohnacker, U. &Walters, J. (2019). MAIN: Multilingual Assessment Instrument for Narratives –Revised. Materials for use. ZAS Papers in Linguistics, 63. Cantonese version. Translated and adapted by Chan, A., Cheng, K., Kan, R., Wong, A. M-Y., Fung, R., Wong, J., Cheng, T., Cheung, A., Yuen, K., Chui, B., Lo, J. & Gagarina, N. https://main.leibniz-zas.de/en/main-materials/main-materials/

(visit this webpage, and then click onto " Copyright and License Agreement for MAIN: Multilingual Assessment Instrument for Narratives – Revised." and complete the agreement form, then you will be able to download the Cantonese and other language MAIN versions.)

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Oral Inferential Comprehension Intervention (OICI)
Appendix: Script of the The Very Brave Bear in Cantonese

The Very Brave Bear
非常勇敢的大熊
Nick Bland

Translated by
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In the jingle jangle jungle on the edge of a slimy bog, Bear was picking berries from a very wobbly log.
喺一個生氣勃勃嘅森林裡面，一個黏泅泅嘅泥澤側邊，有一隻大熊。佢企喺一舊郁吓郁吓嘅木頭上面摘野果。

'Ahoy!' said Boris Buffalo, from the underneath the mud, and Bear fell off his wobbly log and landed with a thud.
「喂！」水牛喺啲泥漿下面同大熊打招呼。舊木頭搖吓搖吓，好似就快冧落嚟咁。大熊喺上面企唔穩，就跌咗落嚟啦。

'I didn't mean to scare you,' said Boris with a grin, 'I only came to ask you if you wanted to come in.'
「我唔係想嚇你㗎。」水牛笑笑口咁話：「我只係想問你想唔想入嚟咋嗎。」

'I wasn't even scared,' said Bear, 'I'm just as brave as you. The bravest thing that you can do, I can do it too.'
「我根本冇驚過。」大熊就答佢。「我同你一樣咁勇敢。 你可以做到嘅最勇敢嘅事，我都一樣可以做得到。」

So he balanced like a butterfly upon the wobbly log, He did a double somersault and splashed in the slimy bog.
於是，大熊喺嗰舊郁吓郁吓嘅木頭上面，好似隻蝴蝶咁平衡好。佢連續打咗兩個筋斗，跟住就「揾」一聲跳咗落去黏泅泅嘅泥澤度。

'If you're so brave,' continued Bear, ' then come and follow me. We'll see how brave a buffalo is when climbing up a tree.'
「如果你係勇敢嘅，」大熊跟住繼續講：「你就跟我嚟啦！ 我哋就睇下一隻水牛爬樹嘅時候有幾勇敢。」

So Bear climbed up a mighty tree, the tallest he could find, and there was Boris Buffalo, climbing right behind.
於是大熊就爬咗上一棵參天大樹，呢棵樹係森林裡面最高嘅。水牛就喺大熊後面，爬呀，爬呀，爬！

‘That was easy!’ Boris said, ‘And what a pleasant view. But I can think of something else that you’d be scared to do.’
「好簡單啫，難唔到我嘅，」水牛話：「難唔到我嘅。嘩！呢度嘅風景一望無際喎。嗯，我諗到有一樣嘢你係會唔敢做嘅。」

Boris wandered up a hill, the steepest he could find, then tumbled down the other side and Bear was right behind.
水牛好輕鬆咁向山上面行，呢座山係森林裡面最高嘅。上到山頂，水牛就瞓低，好似嗰波咁碌落嚟。大熊就喺水牛後面，碌呀，碌呀，碌！

‘That was easy!’ boasted Bear, ‘I’m just as brave as you. But I can think of something else that you’d be scared to do.’
「好簡單啫！難唔到我嘅，」大熊好得戚咁話：「我同你一樣咁勇敢。嗯，我諗到有一樣嘢你係唔會敢做嘅。」

They crossed a raging river and they swung between the trees.
大熊同水牛行過一條洶湧嘅河流，仲好似馬騮咁揸住啲樹枝，由一棵樹掏到第二棵樹度。

They tried to catch a porcupine and wear a beard of bees.
佢哋嘗試去捉一隻刺蝟，又去搞啲蜜蜂，搞到啲蜜蜂圍住佢哋塊面，好似生鬍鬚咁。

Bear and Boris Buffalo were the bravest of the brave, until, that is, they came across a very scary cave!
大熊同埋水牛都係世界上最，最，最勇敢嘅兩隻動物，直到佢哋見到一個好恐佈嘅山洞！

‘It’s awfully dark inside,’ said Boris. ‘It’s quiet too,’ said Bear. Then with his softest voice he said, ‘Is anybody there?’
「裡面好黑呀。」水牛話，「仲好靜添。」大熊話。然後佢用最柔弱嘅聲音問：「有冇人呀？」

‘Maybe we should wait,’ said Boris, ‘until we know for sure.’
「或者我哋應該等一陣。」水牛話，「直到我哋肯定裡面無人為止。」

And then, from in the cave, there came a very scary ‘ROAAAAR!’
跟住，喺山洞入面傳嚟一把好得人驚嘅聲音：「ROAAAAR！」

Bear and Boris Buffalo had never been so scared. They decided not to go inside and ran away instead!
大熊同水牛從來都未試過咁驚嘅。佢哋决定唔入去，仲即刻逃走添。

They hurried through the jungle and they hid in Slimy Bog.
佢哋急急腳好匆忙咁穿過森林，最後就匿埋喺嗰竊泅泅嘅泥澤度。

And then, from in the cave, there came a tiny little frog.
跟住，有一隻小青蛙喺個山洞入面走出嚟。

'I didn't mean to scare you,' said Froggy with a grin, 'I only came to ask you if you wanted to come in.'
「我唔係想嚇你哋㗎，」青蛙笑笑口咁同佢哋講：「我只係想問你哋想唔想入嚟咋嗎。」

So Bear and Boris Buffalo went back to Froggy's cave, and agreed that bears and buffaloes are equally as brave.
於是，大熊同水牛返番入去青蛙個山洞。佢哋一致同意所有嘅大熊同埋水牛都係一樣咁勇敢嘅。

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Oral Inferential Comprehension Intervention (OICI)
Appendix: Script of the The Very Brave Bear in Cantonese

The Very Brave Bear
非常勇敢的大熊
Nick Bland

Translated by
Rachel H.-Y. Chan
Anita M.-Y. Wong, Ph.D.

In the jingle jangle jungle on the edge of a slimy bog, Bear was picking berries from a very wobbly log.
喺一個生氣勃勃嘅森林裡面，一個黐泅泅嘅泥澤側邊，有一隻大熊。佢企喺一舊郁吓郁吓嘅木頭上面摘野果。

'Ahoy!' said Boris Buffalo, from the underneath the mud, and Bear fell off his wobbly log and landed with a thud.
「喂！」水牛喺啲泥漿下面同大熊打招呼。舊木頭搖吓搖吓，好似就快冧落嚟咁。大熊喺上面企唔穩，就跌咗落嚟啦。

'I didn't mean to scare you,' said Boris with a grin, 'I only came to ask you if you wanted to come in.'
「我唔係想嚇你㗎。」水牛笑笑口咁話：「我只係想問你想唔想入嚟咋嗎。」

'I wasn't even scared,' said Bear, 'I'm just as brave as you. The bravest thing that you can do, I can do it too.'
「我根本冇驚過。」大熊就答佢。「我同你一樣咁勇敢。 你可以做到嘅最勇敢嘅事，我都一樣可以做得到。」

So he balanced like a butterfly upon the wobbly log, He did a double somersault and splashed in the slimy bog.
於是，大熊喺嗰舊郁吓郁吓嘅木頭上面，好似隻蝴蝶咁平衡好。佢連續打咗兩個筋斗，跟住就「掾」一聲跳咗落去黐泅泅嘅泥澤度。

'If you're so brave,' continued Bear, ' then come and follow me. We'll see how brave a buffalo is when climbing up a tree.'
「如果你係勇敢嘅，」大熊跟住繼續講：「你就跟我嚟啦！ 我哋就睇下一隻水牛爬樹嘅時候有幾勇敢。」

So Bear climbed up a mighty tree, the tallest he could find, and there was Boris Buffalo, climbing right behind.
於是大熊就爬咗上一棵參天大樹，呢棵樹係森林裡面最高嘅。水牛就喺大熊後面，爬呀，爬呀，爬！

‘That was easy!’ Boris said, ‘And what a pleasant view. But I can think of something else that you’d be scared to do.’
「好簡單啫，難唔到我嘅，」水牛話：「難唔到我嘅。嘩！呢度嘅風景一望無際喎。嗯，我諗到有一樣嘢你係會唔敢做嘅。」

Boris wandered up a hill, the steepest he could find, then tumbled down the other side and Bear was right behind.
水牛好輕鬆咁向山上面行，呢座山係森林裡面最高嘅。上到山頂，水牛就瞓低，好似嗰波咁碌落嚟。大熊就喺水牛後面，碌呀，碌呀，碌！

‘That was easy!’ boasted Bear, ‘I’m just as brave as you. But I can think of something else that you’d be scared to do.’
「好簡單啫！難唔到我嘅，」大熊好得戚咁話：「我同你一樣咁勇敢。嗯，我諗到有一樣嘢你係唔會敢做嘅。」

They crossed a raging river and they swung between the trees.
大熊同水牛行過一條洶湧嘅河流，仲好似馬騮咁揸住啲樹枝，由一棵樹掏到第二棵樹度。

They tried to catch a porcupine and wear a beard of bees.
佢哋嘗試去捉一隻刺蝟，又去搞啲蜜蜂，搞到啲蜜蜂圍住佢哋塊面，好似生鬍鬚咁。

Bear and Boris Buffalo were the bravest of the brave, until, that is, they came across a very scary cave!
大熊同埋水牛都係世界上最，最，最勇敢嘅兩隻動物，直到佢哋見到一個好恐佈嘅山洞！

‘It’s awfully dark inside,’ said Boris. ‘It’s quiet too,’ said Bear. Then with his softest voice he said, ‘Is anybody there?’
「裡面好黑呀。」水牛話，「仲好靜添。」大熊話。然後佢用最柔弱嘅聲音問：「有冇人呀？」

‘Maybe we should wait,’ said Boris, ‘until we know for sure.’
「或者我哋應該等一陣。」水牛話，「直到我哋肯定裡面無人為止。」

And then, from in the cave, there came a very scary ‘ROAAAAR!’
跟住，喺山洞入面傳嚟一把好得人驚嘅聲音：「ROAAAAR！」

Bear and Boris Buffalo had never been so scared. They decided not to go inside and ran away instead!
大熊同水牛從來都未試過咁驚嘅。佢哋決定唔入去，仲即刻逃走添。

They hurried through the jungle and they hid in Slimy Bog.
佢哋急急腳好匆忙咁穿過森林，最後就匿埋喺嗰竊泅泅嘅泥澤度。

And then, from in the cave, there came a tiny little frog.
跟住，有一隻小青蛙喺個山洞入面走出嚟。

‘I didn’t mean to scare you,’ said Froggy with a grin, ‘I only came to ask you if you wanted to come in.’
「我唔係想嚇你哋㗎，」青蛙笑笑口咁同佢哋講：「我只係想問你哋想唔想入嚟咋嗎。」

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Template for the intervention approach

Name of the approach:
Theoretical background: (brief)
Empirical evidence: (key references only)

Specification of components in Fey's model
Target population:
Language (oral) areas targeted: vocabulary, grammatical morphology, early word combinations, grammatical constructions, story comprehension, story production, narrative structure, pragmatics
Definition of a dose: (teaching and learning episode)
Dose number:
Intervention agent:
Goal attack strategies:
Intervention context:
Service Delivery model:
Activities:
Measurement of outcomes:

Considerations for Cantonese-speaking children and the Hong Kong context

Script of an intervention activity (with annotation of the procedures used in the approach)

June 17, 2020
Minor changes August 2021