Supplemental Material S3. Case studies used to investigate objective two in Delphi study rounds two and three.

Intervention Case Study 1	

Student's name	Meg
Student's Age	4;10 years
Background information	Currently speech is limited to delayed echolalia. Predominantly, functional communication is through facial expression and body language. Meg will sometimes point to and name familiar objects (e.g., favourite characters from TV shows) and appears to recognise pictures of familiar objects by facial expression or by sometimes naming an item.
	Meg does not name items or point to indicate wants or needs. At home she will go to items she wants or take an item she wants when it is offered to her. Meg rarely initiates interactions appropriately with others. She displays tantrum behaviours, which appear communicative, given Meg's lack of ability to communicate in more appropriate ways.
	Intervention will target requesting items and actions using symbolic communication. This will begin in structured communicative situations.

Use the information below to describe the intervention with Meg using the proposed taxonomy

Strategies/ Approaches

Meg learns to request items by exchanging a picture of the favoured item with her mother. Intervention is conducted following the teaching phases in the "Picture Exchange Communication" intervention approach (Bondy & Frost, 1994).

The SLP plans the intervention, decides on the tasks for each week and provides direction to parents regarding tasks to be implemented at home. During intervention sessions, Meg's mother acts as a communication partner, with the SLP providing prompting. Meg's mother brings favoured items from home (identified from parent interview) to use in the intervention sessions. These items include: M&M's, Cheezels, a musical toy train and a jack-in-the-box with sound.

Service Provision

Meg and her mother attend appointments in SLP clinic for a block of intervention sessions.
Dose: at least 30 picture exchanges (requests) each clinic session
Dose frequency: 1 x 45 minute session per week, with parent providing additional practice at home in later stages of intervention
Dose duration: 3 months (approx 12 clinic sessions)

Intervention block goal/s and measurements:

Intervention block goal:
Meg will be able to make requests to parents at home for desired objects or actions, independently (through picture exchange and/or speech), on 80% or more of occasions when Meg appears (from body language) to want the items.

Intervention measurements:
The SLP records the level of independence with request making during the weekly intervention sessions (i.e. number of requests, level of independence with requests).

Later half intervention block:
Parents monitor progress using a chart regarding frequency and types of request making at home (i.e. types of items requested, number of requests made using speech or picture exchange, level of independence with picture exchange). Parents also use a chart to record frequency and types of tantrum behaviours at home.

Intervention Techniques

Step 1:
Goal: Meg will be able to use a picture card to request a desired item with no physical prompting 80% of the time in the clinic. Note: on occasions when she appears (from body language) to want the items.

Only one preferred item is presented at a time (with other items out of sight). Meg has a picture card for the preferred item stuck to a binder-book with Velcro (only one picture present). The book is placed close to Meg and her mother who is the communication partner. The SLP acts as the prompter.

Teaching episode:
- *Parent:* Holds or shows the desired item.
- *Meg:* Show interest in (or reaches for) the item.
- *Parent:* Holds out hand but does not say anything.
- *SLP:* Directs Meg to take picture card off binder and place in parent's hand. The SLP provides the minimal amount of prompting needed to facilitate the exchange. Prompts include (1) hand-over-hand assistance to hold card in fingers and move arm to exchange (2) assistance to move arm after Meg selects card and (3) light touch to prompt Meg to select card.
- *Parent:* Takes card, hands Meg the item and says the name of the item e.g., *"Cheezel" or "You wanted the Cheezel"*.

This process continues with the aim of achieving at least 30 exchanges in a 45 minute session.

Step 2:
Goal: Meg will be able cross the room to exchange a picture card to request a desired item with no physical prompting 80% of the time in the clinic. Note: on occasions when she appears (from body language) to want the items.

Only one preferred item is presented at a time (with other items out of sight). Meg has a picture card for the preferred item stuck to a binder-book with Velcro (only one picture). However, in stage 2, the binder-book is placed a distance away from both Meg and the parent who acts as the communication partner (with location gradually moved further away as Meg progresses through stage 2). The SLP acts as prompter in the process.

Teaching Episode:
- *Parent:* Holds or shows the desired item.

- *Meg:* Shows interest (or reaches for) item.
- *Parent:* Holds out hand but does not say anything.
- *SLP:* Directs Meg to move towards the binder-book and take picture card off the binder and place in parent's hand. The SLP provides the minimal amount of prompting needed to facilitate the exchange. (Prompts include physical prompt to move in direction of book, light touch to prompt Meg to select card)
- *Parent:* takes card, hands the item and says the name of the item e.g., *"Train" or "You have the train"*

Step 3:
Goal: Meg will be able to exchange a picture card to request a desired item from a choice of two cards with no physical prompting on 80% of the time in the clinic. Note: on occasions when she appears (from body language) to want the items.

Only one preferred item is presented at a time (with other items out of sight), however there is also a non-preferred item (i.e. an item that Meg does not like). Meg has two pictures stuck to the binder - one picture for the preferred item being requested and one picture for a non-preferred item. The binder-book is placed a distance away from Meg and the parent who acts as the communication partner. If required, the SLP acts as prompter.

Teaching episode:

- *Meg:* Shows interest in item.
- *Parent:* Does not say anything. Holds out hand to provide prompting if needed.
- *Meg:* Takes picture card and gives to parent (SLP may provide prompting with light touch if required). If Meg gives card for preferred item, parent gives preferred item with verbal affirmation i.e. *"Good choice".* If Meg gives card for non-preferred item, parent gives item and says nothing. Parent then holds or shows preferred item again to encourage exchange of correct picture for the desired item.

Step 4:
Goal: Meg will be able to make requests to a communication partner at home for desired objects or actions independently (through picture exchange and/or speech).

In this step, the number of pictures in the binder book increases, as Meg learns to select the appropriate picture from a group of pictures for what she wants, using the same teaching episodes as step 3. Choice-making will also be introduced i.e. a number of preferred items are visible and Meg exchanges a card to make a choice of which one she wants.
Meg also begins using the binder-book at home as well as in clinic sessions. Parents begin by replicating the teaching episodes from clinic sessions with the same motivating items. As Meg begins to use picture exchange at home, other pictures for items that Meg may wish to request at home are added to the book, and parents set up situations at home where Meg is expected to request items (e.g., putting desired items in sight but out of reach).

References:

Bondy, A., & Frost, L. (1994). The picture exchange communication system. *Focus on Autistic Behavior, 16,* 123-128.

Intervention Case Study 2

Class	Year 8 Science
Age	12-13 years
Summary of existing information	There are a high number of students at Hogwarts School with "at risk" backgrounds or previously identified language difficulties. The year 8 cohort is 80 students divided into three science classes taught by two different science teachers. After term one, the science teachers analyse written science/lab reports and written short answer exam questions. The teachers note, that at a whole cohort level, difficulties with language understanding and expression impacts on the quality of students' written work. For example, the use of non-specific or general words (e.g., "We *did* an experiment..." instead of "An experiment was *conducted*...") or incorrect use of words (e.g., "A hypothesis was analysed before the experiment..." instead of "A hypothesis was formulated before the experiment...").

Use the information below to describe the intervention with the Science Class using the proposed taxonomy

Strategies/Approaches

The school requests SLP support to assist in developing a teaching plan for improving vocabulary within classroom lessons. The SLP assists the two science teachers and the learning-support teacher to further analyse work samples and identify the words to target. The "Robust Tier Two Vocabulary Instruction" approach (Beck, McKeown, & Kucan, 2002; Beck, McKeown, & Kucan, 2013) is used to select the words and guide the teaching. The target words are "Tier two" academic words that occur frequently across all science curriculum units (as opposed to subject specific words which are defined in science textbooks and only relevant to specific units of work); and were identified as words that a large number of students experience difficulty with. Examples of target words include conduct, formulate, classify, specify, analyse, calculate, investigate, compare etc.

The SLP provides training to the teachers regarding vocabulary teaching techniques. The science teachers implement techniques in regular science lessons over terms 2 and 3. The SLP meets with teachers on several other occasions over the year to provide follow-up training and to assist with data analysis. Students who are still identified as having difficulties at the end of term 3 are selected for more intensive small group instruction with the learning support teacher in term 4.

Service Provision

There are three 45-minute science classes per week. The teachers aim to target three target words per week during science classes, with some follow-up each week on previously targeted words.
Dose: students will be exposed to a minimum of 10 models of each target word in a sentence per class (and have a number of opportunities to produce target words in appropriate contexts)
Dose frequency: 3 x 45 minute science classes per week
Dose duration: Two terms

Therapy Block Goal/s:

Goal:
To improve the quality and clarity of science report writing by increasing the frequency of correct use of "Tier Two" words.

Intervention measurements:
Teachers will keep data (as they mark regular written assignments/lab reports) on the number of times the targeted words are correctly versus incorrectly used by students in written work (term one work is used as baseline data). Samples of written work from students not at a sound level of achievement will also be compared across terms 1-3, with regards to the rubric (marking criteria) for written expression in science reports.

Intervention Techniques

In the first class of the week, the teacher introduces the three target words and explains that these three words will be a focus of learning for the week and that students are expected to use these words in science reports. The teacher:
- Gives a description or explanation of the word e.g., *"Formulate means to 'create something very specific or precise'"*.
- Explains how the word may relate to other words the students already know by giving synonyms or antonyms.
- Demonstrates to the students how the target words are spelled by writing them on a whiteboard.
- Gives examples of how the words may be used in a sentence, using examples that are directly relevant to the content that students will be talking and writing about in class e.g., *"Today we are going to formulate a hypothesis about the types of plants that were found in gardens around this area"*.

Students then complete tasks using the three new words (no more than 10 minutes in total for all tasks). This includes:
- Pairing the words with a word that goes with them e.g., which word would make sense with 'conduct': 'experiment', 'insect' or 'hypothesis' (completed on a worksheet i.e., draw a line between the words that match).
- A cloze completion activity e.g., "The scientist classified the _____" (completed on a worksheet i.e., write in the correct word from a choice of the three target words).
- Taking turns in pairs (by turning to person next to them) saying a sentence with the target words.

During the tasks, the teacher circles the room and gives feedback e.g., *"Yes, those words go together"* or *"That doesn't look right – try again".* Students who do not complete the worksheet in class are asked to complete it for homework.

In the remainder of the regular science class, the teacher encourages the students to use the words they have learned in appropriate contexts. For example, in a class activity involving an examination of plants found outside, students use target words to talk or write about how they '**formulated** a plan', '**conducted** examinations', '**classified** plants' etc. If needed, the teacher prompts use of words by asking such as "What could you say instead of "put in a group"? or "What word would be better instead of "made"? When students use the words, the teacher gives feedback (e.g., *"Good use of the word _____").* The teacher may also say the sentence with the word aloud as further demonstration for the class.

At the start of the remaining two classes in the week, the teacher reminds the students of the target words, writes the words on the whiteboard, and encourages students to use the words in appropriate contexts during science activities (in verbal discussions and written reports) using the techniques described above.

References:

Beck, I. L., McKeown, M. G., & Kucan, L. (2002). *Bringing words to life*. New York, NY: The Guilford Press.

Beck, I. L., McKeown, M. G., & Kucan, L. (2013). *Bringing Words to Life: Robust Vocabulary Instruction*. New York, NY: Guilford Press.