

Supplemental Text A. Training Method Procedures

Psychoeducation

All participants attended a joint, 1-hour psychoeducational presentation. The presentation discussed seven topics: (a) communication, (b) communicating with individuals with an intellectual disability (ID), (c) augmentative and alternative communication (AAC), (d) key word signing, (e) *Speaking With Support of Signs*, (f) advantages and disadvantages of *Speaking With Support of Signs*, and (g) communicating with *Speaking With Support of Signs* (see general introduction in Meuris, 2014, for discussion).

First, communication was discussed as a multimodal, two-way exchange of information. Second, the term *intellectual disability* was defined (American Association on Intellectual and Developmental Disabilities, 2013), and the prevalence of language impairment was presented. The various communication levels, from nonsymbolic to symbolic, were introduced using an adaptation of Shane's model (Verpoorten, Hectors, & Verbist, 1982). This topic concluded with the importance of communication partners (e.g., offering choices) and possible pitfalls regarding staff–client communication (e.g., high workload or talking with less responsive clients; Van der Maat, 1982). Third, the different AAC strategies were introduced, after which key word signing was discussed as one AAC strategy. A fourth and fifth topic were devoted to the characteristics (Loncke, Nijs, & Smet, 2012), advantages, and disadvantages of *Speaking With Support of Signs*. Advantages included availability, unbreakability, only slight disruption of natural communication, the slowing of speech rate, and so on. Disadvantages pertained to limited vocabulary of this signing system, required motor skills, sign knowledge of most communication partners, and so on (see general introduction in Meuris, 2014, for discussion). In a final topic, communication with key word signing was discussed and, in particular, using the entire body and the environment expressively (to indicate speed, size, etc.), using AAC as a 24-hour multimodal communication mode (e.g., Loncke, Campbell, England, & Haley, 2006), adapting the content and complexity of messages and sentences, maintaining signing skills, modeling key word signing to clients, and eliciting communication.

All participants received an information booklet depicting *Speaking With Support of Signs* hand shapes and a list with the most important aspects of an adapted communication style. This list contained items such as the use of short sentences, predominant use of highly functional content words, importance of simultaneously signing and speaking, the lowering of the speech rate, and so on.

Key Word Signing Training

After this introductory session, participants were randomly assigned to one of three groups that differed in key word signing teaching method: classical method (CM), video feedback (+ViF), and video feedback with an additional reminder containing performance photos of all the signs (+ViF/R). Even though some groups performed more tasks, the duration and number of training sessions did not differ between the groups. Each group separately attended a series of four training sessions that each lasted 45–60 minutes (see Table S1 for a list of the signs that were taught).

The first session and part of the second session had the same format in all groups and used classical instructional methods. The trainer modeled the signs in 10 series of 10, while giving verbal instructions concerning hand shape, hand movement, and hand location. After each 10-sign series, the participants jointly imitated the 10 signs, and the trainer provided individual verbal feedback. At the end of the session, the group was asked once more to perform each sign without prior modeling. From the second session onward, the signs were practiced through compound words and short sentences. In this session, differences in training method were introduced as different didactic strategies were applied in the three training groups.

Table S1. List of signs (*Speaking With Support of Signs*) from the key word signing training.

| | | | | |
|--------|-----------|-------|---------|--------|
| Afraid | Dog | I | Nothing | Spring |
| All | Different | In | Nurse | Summer |
| And | Difficult | Jesus | Nut | Tea |

| | | | | |
|-----------------|--------------|--------------------|--------------------|------------|
| Apple | Drink | Large (one-handed) | On | Teacher |
| Autumn | Dry dishes | Learn | Operation | Thanks |
| Banana | Eat | Leek | Other | Tired |
| Beard | Enough | Lemonade | Out | Toilet |
| Bear | Farmer | Lie | Pain | Tram |
| Boy | Fight | Little bit | Party | Under |
| Bottle | Fire brigade | Machine | Pink | Vegetables |
| Brown | First | Many (a lot) | Plant | Wash up |
| Burn | Friend | Marry | Rise | We |
| Cherry | Girl | Menstruation | Salt | What |
| Chicken | Gnome | Meat | Same | Wheelchair |
| Clothes | Grass | Middle | Scarf | Which |
| Coffee | Happy | Mine | Shop | Who |
| Cookie | He | Mommy | Sit | Winter |
| Dance (classic) | House | Monday | Sign | Year |
| Daddy | How | Money | Small (one-handed) | You |
| Day | How many | More | Sponge | Your |

Classical method (CM). The program of the CM group coincides with the instruction methods and exercises that are used in the official *Speaking With Support of Signs* training program. In the CM group, the format did not differ much from the first session as instruction (i.e., modeling and imitation), with immediate verbal feedback remaining the primary teaching methods. Each session consisted of three types of exercises that used cards with written words or sentences. The first exercise aimed at sign recognition. The trainer took a word card and performed the sign that depicted that word, after which the participants verbally labeled and imitated the sign. Then the roles reversed, so that each participant drew a card and depicted the sign, and the other participants verbally labeled and imitated the sign. In the second exercise, cards containing compounds were given to each participant (see Table S2 for a list of the compounds).

Table S2. Compound signs.

| Concept | First Sign | Second sign |
|-------------|----------------|-------------|
| Apple sauce | Apple | Stir |
| Banana milk | Banana | Milk |
| Fireman | Fire | Man |
| School | Learn | House |
| Doghouse | Dog | House |
| Walnut tree | Nut | Tree |
| Dishwasher | Washing dishes | Machine |
| Café | Drink | House |

| Concept | First Sign | Second sign |
|----------------|------------|-------------|
| Chick | Small | Chicken |
| Wedding dress | Marry | Dress |
| Birthday | Year | Day |
| New year | New | Year |
| Vegetable soup | Vegetable | Soup |
| Apple juice | Apple | Drink |
| Cola | Brown | Lemonade |
| Factory | Machine | House |
| Living room | Sit | Room |

One by one the participants signed the compound, after which the trainer provided verbal feedback, and the group jointly imitated the sign. Finally, short sentences containing two to four key words—the number of concepts to be signed was increased over the sessions—were practiced in the same manner (see Table S3 for examples of short sentences).

Table S3. Examples of short sentences containing two to four key words.

| |
|------------------------------------------------------------------------------------|
| Two key words |
| The <u>nurse</u> asks if you're in <u>pain</u> . |
| <u>Thanks</u> for the <u>party</u> . |
| <u>What day</u> is it? |
| Three key words |
| <u>Bears</u> <u>sleep</u> during <u>winter</u> . |
| <u>I</u> find it <u>difficult</u> to <u>lie</u> . |
| <u>What</u> would <u>you</u> like to <u>eat</u> ? |
| Four key words |
| I want a <u>little bit</u> of <u>meat</u> with <u>a lot</u> of <u>vegetables</u> . |
| <u>First</u> , <u>we</u> are going to <u>dance</u> at the <u>party</u> . |
| <u>I</u> have <u>drunk</u> <u>enough</u> <u>tea</u> . |

Note. Underlined words are the key words that had to be signed.

Additional video feedback (+ViF). During the training sessions, the +ViF and +ViF/R groups separately completed the same tasks with the same feedback modes. These groups completed the same type of exercises as the CM group. However, there were two alterations. First, in the sentence task, each participant drew cards containing written words rather than a sentences. They were instructed to form an arbitrary sentence that contained the word on the card and to support the respective word with a sign while they verbally produced the sentence. As the sessions progressed, the number of words to be combined in one sentence increased from one to four. Second, after the sentence task, a role play ensued. In groups of two to three, participants received a role play scenario (see Table S4). In this scenario, one or two trainees simulated a support worker and the other an individual with an ID (client). The latter participants were asked to think of someone familiar to them who had an ID—for

example, a person they had met during an internship or social activity. Therefore, the simulated client's age and degree of ID depended on the participant's choice.

In addition to the imitation and verbal feedback, the ⁺ViF and ⁺ViF/R groups practiced with video feedback. Both the sentence generation and the role-play task were video recorded. The performance of each student was recorded with a camera in frontal position. Each video recording was shown and reviewed in group. The student had the chance to judge his/her own performance before the trainer, and fellow participants provided feedback. The participants were asked to pay attention to their motor performance (handshape, movement, location, nonmanual elements, etc.). During the role plays, as the sentences became more elaborate, participants were cued to pay attention to the length and complexity of their sentences, the relevance of the signs they chose to produce, the simultaneity of their signing, and their speech rate. If participants found it difficult to evaluate themselves, the trainer provided guidance by asking open-ended questions pertaining to these topics.

Table S4. Role play scenarios.

| | |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | The support worker wants to know what the client would like to eat for breakfast. The client takes little initiative. Finally the client answers: I would like chocolate. However, they have just run out of chocolate. |
| 2 | The client needs to learn how to get dressed. The client is not familiar with the order in which to put on clothes. |
| 3 | The support worker discusses with the client what they will do on Saturday. They go over the day schedule. The client needs clarity, repetition, and short messages. |
| 4 | The support worker shows the client how to make tea. |
| 5 | The client requests to read a book. The support worker wants to know what kind of book the client would like. |
| 6 | The client has been home during the weekend. The support worker asks how the weekend has been. |
| 7 | The client and support worker are making vegetable soup. The client needs extensive guidance to perform the separate steps. |
| 8 | The client would like to watch a television program, but cannot name it. The support worker tries to find out which television program the client is talking about. |
| 9 | The support worker explains to the client what he/she still has to do before going to bed. Washing, brushing teeth, combing hair, ... |
| 10 | The client is feeling sad because his/her friend is ill. The friend has cancer. The support worker tries to talk about this with the client. |

The purpose of the role play was to practice motor performance, communicating expressively, selecting key words to sign, adapting to the client's communication level, and taking time to bring across the message. Each of five fellow trainees observed and reviewed one of these goals. They were given instructions on how to conduct the peer-review: (a) attention had to be directed toward the behavior rather than the person, (b) the behavior needed to be adjustable, (c) comments needed to be concrete and descriptive, and (d) reviewers were asked to provide suggestions for improvement. General points of improvement that often recurred were in regard to expressive intonation and facial expression, simultaneously speaking while signing, and speaking/signing at a slower rate.

At the end of each role-play review, the trainer summarized the feedback from the peer-review. Finally, the trainer provided general communication topics to jointly discuss, including (a) whether the participant had selected appropriate key words to sign, (b) the clarity and conciseness of the message, and (c) the complexity of the sentences.

Additional video feedback and reminder (⁺ViF/R). At the end of the program, a final distinction in training method was introduced. The ⁺ViF/R participants received an A4-sized booklet containing performance pictures of all signs (see Figure S2 for examples). They were free to consult this booklet any time (both in between and during the training sessions), except during signing measurements.

Figure S1. Signing accuracy per training method and measurement time.

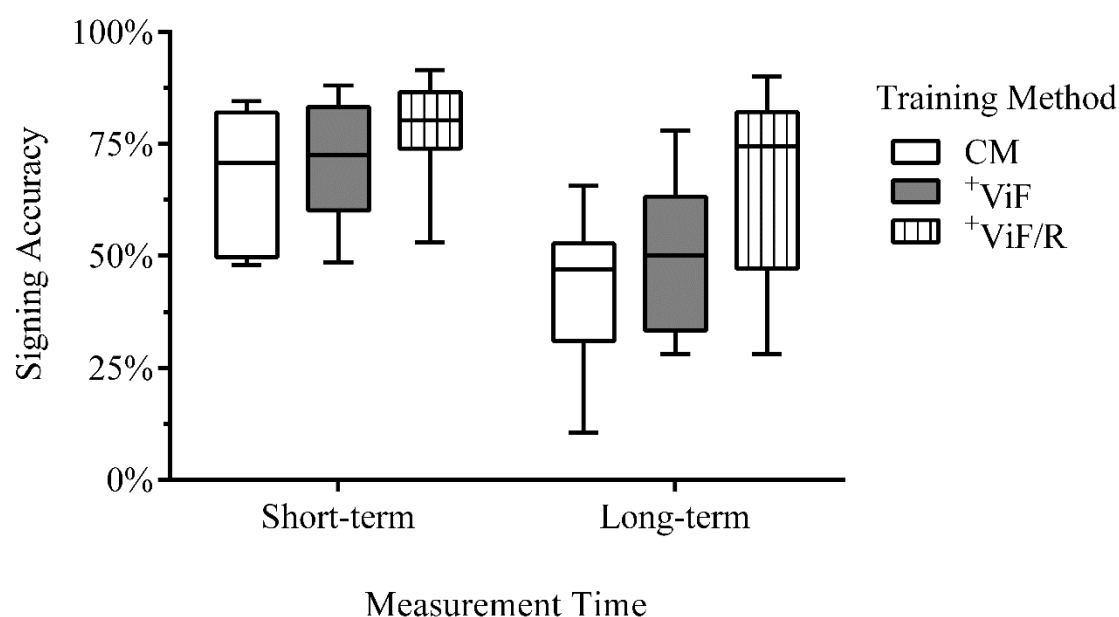
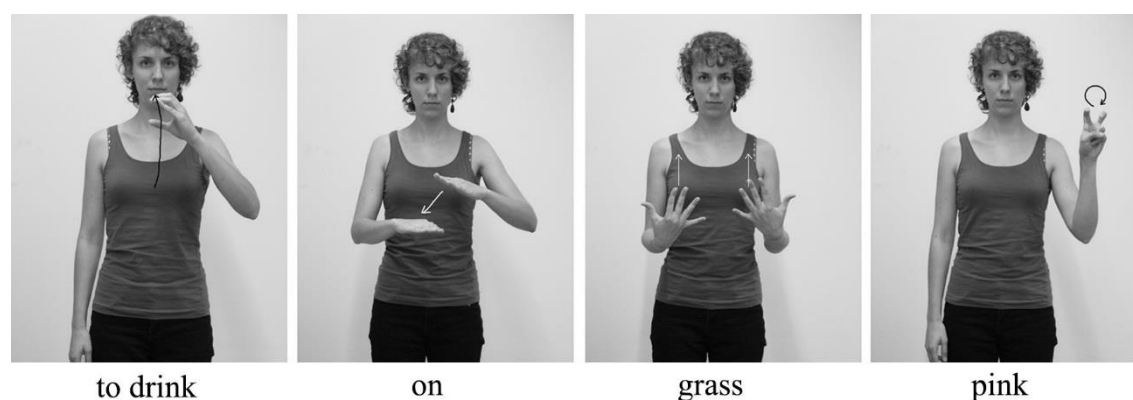


Figure S2. Examples of performance photos from reminder.



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