

# Shaping children's sentences: trialling visual support for children with language difficulties using the SHAPE CODING system in mainstream primary schools

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		<input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 17/05/2024	<b>Overall study status</b> Ongoing	<input checked="" type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
<b>Last Edited</b> 09/09/2025	<b>Condition category</b> Mental and Behavioural Disorders	<input type="checkbox"/> Individual participant data
		<input checked="" type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

Developmental Language Disorder (DLD) affects 7% of children; approximately two in every mainstream classroom. However, specialist Speech and Language Therapy (SLT) services for children with DLD are very limited, thus the effectiveness and efficiency of an intervention need to be maximised through the identification of appropriate targets and effective procedures and delivery of an appropriate dosage. Children with DLD have particular difficulties with grammar, which affects their ability to communicate with others and access the academic curriculum. Previous studies indicate that SLT intervention can improve the production of grammar in children with DLD. The SHAPE CODING system is a highly individualised intervention for children with DLD (and indeed wider language disorders), which teaches children the rules of grammar using the support of a visual system which represents the different aspects of grammar with shapes (for groups of words in a sentence playing different roles), colours (for different word classes, e.g., nouns, verbs, adjectives), arrows (for tenses) and lines (for singular versus plural). The effectiveness of SLTs using the system to improve the language of children with (D)LD has been evaluated in specialist settings. The intervention has recently been developed to include individualised identification of targets and detailed intervention steps <https://shapecoding.com/resources>. A recent study showed that this approach, together with a feedback hierarchy, was effective at improving the use of the targeted constructions in children (aged 7-10 years) with severe levels of DLD in a special school. Indeed, this method was more efficient than the previous methods used in the school, with the SLT focusing on 2-4 times as many targets over 2 terms. A pilot study was also carried out that investigated the feasibility of SLT delivery of the same intervention in mainstream primary schools with 7 children with DLD in years 3/4 (aged 7-8 years) in two mainstream primary schools with similar results. This study aims to investigate the effectiveness of the SHAPE CODING intervention in new settings with new interventionists and with a wider age group (aged 5-10 years) by carrying out a randomised control trial in mainstream schools.

### Who can participate?

Children in school years 1-5 (aged 5-9 years old) at the start of the intervention who are either already on an SLT caseload or for whom there are concerns about their language development. Only children with difficulties with expressive grammar will be included, so the study will exclude those standard scores in the typical range on either of the two standardised grammar tests

### What does the study involve?

The study team will partner with SLT practices that provide SLT services to schools. They will approach schools they work in and ask if they would like to participate in the project. If the headteacher consents, the SLT will then collaborate with the school to identify children who will be in years 1-5 (aged 5-9 years old) at the start of the intervention, and who are already on the SLT caseload, or for whom there are concerns about language development. The parents of these children will be sent an information sheet and consent form.

For children whose parents consent, the SLT will meet with the children to gain their consent and will then administer two standardized assessments (Structured Photographic Expressive Language Test - 3; Clinical Evaluation of Language Fundamentals (CELF)-5, Formulated Sentences subtest) to ensure that grammar is an area of difficulty. Those with a standard score above 95 on the SPELT-3 or above 6 on the CELF-5 Formulated Sentences subtest will be excluded from the study, as they are unlikely to benefit from the intervention.

Participants will then be randomly assigned to an intervention versus control group. Those in the intervention group will receive 20 half-hour sessions of 1:1 SLT intervention focusing on individualised grammatical targets, using the SHAPE CODING system. The SHAPE CODING system is a highly individualised intervention for children with DLD (and indeed wider language disorders), which teaches children the rules of grammar using the support of a visual system which represents the different aspects of grammar with shapes (for groups of words in a sentence playing different roles), colours (for different word classes, e.g., nouns, verbs, adjectives), arrows (for tenses) and lines (for singular versus plural). The intervention has recently been developed to include individualised identification of targets and detailed intervention steps <https://shapecoding.com/resources>. Those in the control group will receive usual support (intervention for other areas of speech and language, an SLT programme or school intervention).

### What are the possible benefits and risks of participating?

It is hoped that the participants in the intervention group will benefit from an intervention which aims to enhance their understanding and use of a range of grammatical structures in English. This should increase their access to the school curriculum and improve their everyday interactions with others. However, children in the intervention arm will miss lessons to participate in this research.

Children in the control group will not receive the intervention for grammar during the two terms of the project. However, detailed information will be gathered about their language that can be used to inform their support following the completion of the project. They can continue to have intervention as usual in other areas of speech, language and communication.

### Where is the study run from?

The study is a partnership between University College London and Moor House School & College. The research team will also partner with SLT services in the South East.

When is the study starting and how long is it expected to run for?  
December 2023 to December 2031

Who is funding the study?  
Moor House School & College

Who is the main contact?  
Dr Susan Ebbels, [ebbelss@moorhouseschool.co.uk](mailto:ebbelss@moorhouseschool.co.uk)

## Contact information

### Type(s)

Public, Scientific, Principal investigator

### Contact name

Dr Susan Ebbels

### ORCID ID

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### Contact details

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## Additional identifiers

## Study information

### Scientific Title

Shaping children's sentences: for children aged 5-10 years with language difficulties in mainstream primary schools, do those receiving intervention using the SHAPE CODING system make greater gains than those in a control group who receive usual support (intervention for other areas of speech and language, an SLT programme or school intervention) on expressive language as measured by a grammar factor combining six grammatical measures

### Study objectives

H1: Participants in the intervention group will show significantly greater improvement following intervention relative to those in the control group in their grammatical abilities as measured on a combined grammar factor.

H2: Participants in the intervention group will show significantly greater improvement following intervention relative to those in the control group on a standardised measure of sentence formulation.

### Ethics approval required

Ethics approval required

## **Ethics approval(s)**

approved 04/03/2024, UCL Research Ethics Committee (UCL REC) (Research and Innovation Services, 2 Taviton St, London, WC1E 6BT, United Kingdom; +44 (0)20 7679 8717; ethics@ucl.ac.uk), ref: 23949/002

## **Study design**

Multicentre interventional single-blind randomized controlled trial

## **Primary study design**

Interventional

## **Study type(s)**

Treatment

## **Health condition(s) or problem(s) studied**

Intervention aiming to improve expressive language in children with language difficulties (including Developmental Language Disorder, DLD)

## **Interventions**

This study aims to investigate the effectiveness of SHAPE CODING intervention for children with language difficulties (including DLD) aged 5-10 years old in mainstream schools by carrying out a 4-stage sequential design study. The study team will partner with private speech and language therapy practices that provide Speech and Language Therapy (SLT) services to schools. They will approach schools they work in and ask if they would like to participate in the project. If the headteacher consents, the SLT will then collaborate with the school to identify children who will be in years 1-5 (aged 5-9 years old) at the start of the intervention, and who are already on the SLT caseload, or for whom there are concerns about language development. The parents of these children will be sent an information sheet and consent form.

For children whose parents consent, the SLT will meet with the children to gain their consent and will then administer two standardized assessments (Structured Photographic Expressive Language Test - 3; Clinical Evaluation of Language Fundamentals (CELF)-5, Formulated Sentences subtest) to ensure that grammar is an area of difficulty. Those with a standard score above 90 on the SPELT-3 or above 6 on the CELF-5 Formulated Sentences subtest will be excluded from the study, as they are unlikely to benefit from the intervention.

The study uses the R package “carat” to carry out adaptive covariate randomisation using Hu and Hu’s randomisation using the command-line user interface to assign participants to groups sequentially. The study will use a biased coin probability of 0.85 and the following covariates (with double weight assigned to SLT):

- Year group (1, 2, 3, 4, 5)
- SLT (1, 2, 3, 4, 5, 6, 7, 8, 9, 10)
- CELF Formulated Sentences raw score (0-15, 16-20, 21-26)

Those in the intervention group will receive 20 half-hour sessions of 1:1 Speech and Language Therapy (SLT) intervention focusing on individualised grammatical targets, using the SHAPE CODING system. The SHAPE CODING system is a highly individualised intervention for children with DLD (and indeed wider language disorders), which teaches children the rules of grammar using the support of a visual system which represents the different aspects of grammar with shapes (for groups of words in a sentence playing different roles), colours (for different word

classes, e.g., nouns, verbs, adjectives), arrows (for tenses) and lines (for singular versus plural). The intervention has recently been developed to include individualised identification of targets and detailed intervention steps <https://shapecoding.com/resources>.

Those in the control group will receive usual support (intervention for other areas of speech and language, an SLT programme or school intervention).

## **Intervention Type**

Behavioural

## **Primary outcome(s)**

The creation of a grammar factor is assessed using the following measures at pre- and post-intervention in both the intervention and control groups:

1. Raw score on the SPELT-3
2. ACE narrative syntax raw score
3. Receptive grammar: TROG-E blocks passed
4. Three measures of grammatical accuracy and complexity in narratives (ERRNI – Story B) and ACE narrative combined):
  - 4.1. Mean length of utterance (MLU)
  - 4.2. Clausal density (number of clauses/number of utterances)
  - 4.3. Grammatical errors per utterance

## **Key secondary outcome(s)**

Semantics, morphology, syntax, and pragmatics measured using the CELF-5 Formulated Sentences raw score at pre- and post-intervention in both the intervention and control groups

## **Completion date**

31/12/2031

## **Eligibility**

### **Key inclusion criteria**

Current inclusion criteria as of 09/09/2025:

1. Children in school years 1-6 (aged 5-10 years old) at the start of the intervention
2. Either already on the SLT caseload or there are concerns about their language development
3. Difficulties with expressive grammar with a standard score at or below 95 on the SPELT-3, and a scaled score at or below 7 on the CELF-5 Formulated Sentences subtest

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Previous inclusion criteria as of 28/06/2024:

1. Children in school years 1-5 (aged 5-9 years old) at the start of the intervention
2. Either already on the SLT caseload or there are concerns about their language development
3. Difficulties with expressive grammar with a standard score below 95 on the SPELT-3, and a scaled score below 7 on the CELF-5 Formulated Sentences subtest

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Previous inclusion criteria:

1. Children in school years 1-5 (aged 5-9 years old) at the start of the intervention
2. Either already on the SLT caseload or there are concerns about their language development

3. Difficulties with expressive grammar with a standard score below 90 on the SPELT-3, and a scaled score below 7 on the CELF-5 Formulated Sentences subtest

**Participant type(s)**

Learner/student, Service user

**Healthy volunteers allowed**

No

**Age group**

Child

**Lower age limit**

5 years

**Upper age limit**

10 years

**Sex**

All

**Key exclusion criteria**

Current exclusion criteria as of 09/09/2025:

1. Children with a standard score above 95 on the SPELT-3, or
2. Children with a standard score above 6 on the CELF-5 Formulated Sentences subtest

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Previous exclusion criteria:

1. Children with a standard score above 90 on the SPELT-3, or
2. Children with above 6 on the CELF-5 Formulated Sentences subtest

**Date of first enrolment**

20/05/2024

**Date of final enrolment**

01/06/2030

**Locations**

**Countries of recruitment**

United Kingdom

England

**Study participating centre**

University College London

United Kingdom

WC1E 6BT

**Study participating centre**  
**Moor House School & College**  
Mill Lane  
Hurst Green  
Oxted  
United Kingdom  
RH8 9AQ

## Sponsor information

**Organisation**  
University College London

**ROR**  
<https://ror.org/02jx3x895>

## Funder(s)

**Funder type**  
University/education

**Funder Name**  
Moor House School & College

## Results and Publications

### Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study will be stored in a publicly available repository, the Open Science Framework at: <https://osf.io/adxcz>. Consent is obtained from both children and their parents. All shared data will be anonymised.

### IPD sharing plan summary

Stored in publicly available repository

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Protocol (other)</a>		17/04/2024	15/05/2024	No	No
<a href="#">Statistical Analysis Plan</a>		17/04/2024	16/05/2024	No	No