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**AUDITORY COMPREHENSION: FROM THE
VOICE UP TO THE SINGLE WORD LEVEL**

Volume 2 - Appendix

Anna Barbara Jones



**THE UNIVERSITY
of EDINBURGH**

**Doctor of Philosophy
The University of Edinburgh
2015**

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Voice perception vs. speech perception in aphasia

PARTICIPANT INFORMATION SHEET FOR HEALTHY VOLUNTEERS

We invite you to take part in a research project. Before you decide to participate we want to be sure that you understand:

- What all the technical words mean
 - Why we are doing it
 - What it would involve

What is aphasia?

Aphasia is a language impairment which can happen following brain damage. It can affect an individual's speech, understanding, reading or writing.

What is Speech and Language Therapy?

Speech and language therapy focuses on the management of disorders of speech, language, communication and swallowing in children and adults. A Speech and Language Therapist will assess and provide therapy, if appropriate, for people with the above disorders.

What is the study about?

It is important to study aphasia so that we can keep on improving therapy for people who have difficulties with speaking, understanding, reading and writing.

In this study we are looking at difficulties with understanding what people hear. We are looking at the difference between understanding of what people say and the understanding of the actual voice saying the words. There may be a link between the two things, and this could help speech and language therapists when treating difficulties with understanding in people with aphasia.

Why have I been asked to take part?

You are a healthy control

What will I have to do if I take part?

You will be asked to participate in some behavioural assessments for about 30 minutes where you will be listening to sounds.

What are the assessments I will have to do?

Speech & Voices:

- a. Phoneme differentiation: you will hear a range of sounds and will be asked to decide if each sound is more like 'ta' or 'pa'.
- b. Gender differentiation: you will hear the same range of sounds again, but this time you will be asked to decide if each sound is more 'female' or 'male'.
- c. Tone differentiation: you will hear different single tones and will be asked to decide if each tone is 'high' or 'low'.

These tasks will be given to you in one session (about 1/2 hour).

Is participation in the study confidential?

Yes. Your identity will be kept totally confidential. Only the main researcher (Anna Jones) and her supervisor (Dr Cyril Pernet) will have access to your data.

Do I have to take part?

No.

Can I stop at any time?

Yes. You do not need a reason to stop.

What is the benefit to me?

You could be helping medical staff, researchers and Speech and Language Therapists to provide better care for people with aphasia.

Who is funding the research?

This study is funded by the SINAPSE Collaboration (www.sinapse.ac.uk), a Pooling Initiative funded by the Scottish Funding Council and the Chief Scientist Office of the Scottish Executive.

Thank you for reading this information leaflet.

PLEASE ASK ANY QUESTIONS**If you would like more information please contact:**

Anna Jones
Brain Research Imaging Center
Division of Clinical Neurosciences
University of Edinburgh
Western General Hospital
Crewe Road
Edinburgh
EH4 2XU

a.b.jones@sms.ed.ac.uk

Voice perception vs. speech perception in aphasia

Researcher: Anna Jones

CONSENT FORM

Have you read the information sheet?	yes	no
Have you received enough information about the study?	yes	no
Have you had a chance to ask all your questions?	yes	No
Are you happy with the answers to your questions?	yes	no
Do you understand this is voluntary?	yes	no
Do you understand that you can stop at any time with no reasons?	yes	no
Do you agree to the main researcher and supervisor looking at your brain scan/s & using the information?	yes	no
Do you agree to the main researcher contacting you in future for further assessments and/or tasks and/or brain scans? (only in rare cases)	yes	no
Are you happy to take part in this study?	yes	no

I would like to receive information about the results of the research

I would NOT like to receive information about the results of the research

Name of participant

Date

Participant's signature

Name of researcher

Date

Researcher's signature

Appendix 2: Participant consent form for healthy controls for Study 1 – Voice gender categorisation vs. phoneme categorisation (Chapter 3).

Voice perception vs. speech perception in aphasia

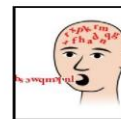
PARTICIPANT INFORMATION SHEET

We invite you to take part in a research project. Before you decide to participate we want to be sure that you understand:

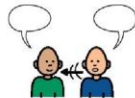
- What all the technical words mean
 - Why we are doing it
 - What it would involve

What is aphasia?

Aphasia is a language impairment which can happen following brain damage. It can affect an individual's speech, understanding, reading or writing.



What is Speech and Language Therapy?



Speech and language therapy focuses on the management of disorders of speech, language, communication and swallowing in children and adults. A Speech and Language Therapist will assess and provide therapy, if appropriate, for people with the above disorders.

What is the study about?

It is important to study aphasia so that we can keep on improving therapy for people who have difficulties with speaking, understanding, reading and writing.



In this study we are looking at difficulties with understanding what people hear. We are looking at the difference between understanding of what people say and the understanding of the actual voice saying the words. There may be a link between the two things, and this could help speech and language therapists when treating difficulties with understanding in people with aphasia.

Why have I been asked to take part?

1. You have had a brain injury and now have aphasia.

OR

2. You have had a brain injury but do not have aphasia



What will I have to do if I take part?



- First you will be asked to sign a consent form. If this happens more than 2 weeks before you participate you will be asked to sign a second consent form, to confirm you still agree with and understand the study fully.



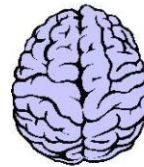
- You will be asked to participate in some behavioural assessments for about 1 hour (language and mood tests for about 30 minutes and another 30 minutes listening to sounds).



- Your GP and SLT (if applicable) will be told that you are participating in this study.

What else happens?

- When you became ill you had a brain scan at the hospital
- In this study we will look at your brain scan to help us see where the damage is in your brain.
- We will use a tool on the computer to help us map the area of damage in your brain to your performance on the behavioural tasks



What are the assessments I will be asked to do if I agree to take part?



1. Assessment of your language:
 - a. Western Aphasia Battery (WAB): a battery of short tests looking at different parts of language



2. Assessment of your mood:
 - a. VASES (Visual Analogue Self-Esteem Scale): you are shown pictures and asked to rate yourself on scales to look at your mood.
 - b. DISCS (The Depression Intensity Scale Circles): you are shown 6 circles ranging from white to black and are asked to say where you are on the scale in terms of your mood.



3. Speech & Voices:
 - a. Phoneme differentiation: you will hear a range of sounds and will be asked to decide if each sound is more like 'ta' or 'pa'.
 - b. Gender differentiation: you will hear the same range of sounds again, but this time will be asked to decide if each sound is more 'female' or 'male'.
 - c. Tone differentiation: you will hear different single tones and will be asked to decide if each tone is 'high' or 'low'.

These assessments will be given to you by a Speech and Language Therapist in one session (about 1 hour).

Will the researcher contact me at any point in the future for further assessments or brain scans?

ONLY if you indicate on the consent form that you are willing for the researcher (Anna Jones) to contact you in future she **MAY** do so. However, this would only be in **rare** circumstances if your results and scans showed up as particularly unusual.



In this case Anna Jones would contact you directly to see if you would like to be involved in further research in this area. A further consent form and information sheet would be provided and the next step of the study discussed.

This is completely **optional** – you do not have to take part in any further research if you do not want to.

Is participation in the study confidential?

Yes. Your identity will be kept totally confidential. Other than your medical care team, only the main researcher (Anna Jones) and her supervisor (Dr Cyril Pernet) will have access to your data.



Do I have to take part?

- No.



Can I stop at any time?

- Yes.
- You do not need a reason to stop.

Will being in the study affect my medical care?

- No.
- You will receive the same medical care.



What is the benefit to me?

You could be helping medical staff, researchers and Speech and Language Therapists to provide better care for people with aphasia.

Can I find out the results of the research?

- Yes.
- Give your address to the main researcher (Anna Jones)



Who is funding the research?



This study is funded by the SINAPSE Collaboration (www.sinapse.ac.uk), a Pooling Initiative funded by the Scottish Funding Council and the Chief Scientist Office of the Scottish

Executive.

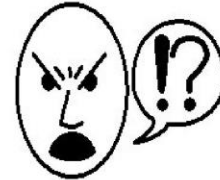
What if I want to make a complaint?

If you have a concern about any aspect of this study:

1: try speaking to Anna Jones on 0131 5371985.

2: if you are still not happy you can complain formally:

NHS Lothian Complaints Team, WaverleyGate,
2 - 4 Waterloo Place, Edinburgh, EH1 3EG
Telephone: 0131 536 3370 Email: complaints.team@nhslothian.scot.nhs.uk



Thank you for reading this information leaflet.

PLEASE ASK ANY QUESTIONS



**PLEASE TALK IT THROUGH WITH FAMILY/
FRIENDS**

If you would like more information please contact:

Anna Jones
Brain Research Imaging Center
Division of Clinical Neurosciences
University of Edinburgh
Western General Hospital
Crewe Road
Edinburgh
EH4 2XU

a.b.jones@sms.ed.ac.uk

0131 5371985 07841749461



Voice perception vs. speech perception in aphasia

Researcher: Anna Jones

CONSENT FORM



Have you read the information sheet?		yes	no
Have you received enough information about the study?		yes	no
Have you had a chance to ask all your questions?		yes	No
Are you happy with the answers to your questions?		yes	no
Do you understand this is voluntary?		yes	no
Do you understand that you can stop at any time with no reasons?		yes	no
Do you understand that your medical care will NOT be affected?		yes	no
Do you understand that your GP (and SLT if applicable) will be told that you are involved in this study?		yes	no
Do you agree to have more assessments of your language, memory?		yes	no
Do you agree to the main researcher and supervisor looking at your medical notes?		yes	no
Do you agree to the main researcher and supervisor looking at your brain scan/s & using the information?		yes	no
Do you agree to the main researcher contacting you in future for further assessments and/or tasks and/or brain scans? (only in rare cases)		yes	no
Are you happy to take part in this study?		yes	no

Voice perception vs. speech perception in aphasia CONSENT FORM

- I would like to receive information about the results of the research
- I would NOT like to receive information about the results of the research

Name of participant

Date

Participant's signature

Name of researcher

Date

Researcher's signature

**Voice perception vs. speech perception in aphasia
CONSENT FORM**

First or second
consent form?

If first: will a 2nd form
be required?

If second: has it
been signed less
than 2 weeks before
participation?



Anna Jones
Brain Research Imaging Center
Division of Clinical Neurosciences
University of Edinburgh
Western General Hospital
Crewe Road
Edinburgh
EH4 2XU

Date

GP address

Dear (GP name),

R.E. Participant's name + CHI number

I am writing to inform you that (Participant's name) has agreed to participate in the following research study:

'Voice perception vs. speech perception in aphasia'

(Participant's name) has been invited to take part in this study because s/he has aphasia and a left hemisphere lesion.

OR

(Participant's name) has been invited to take part in this study as a control subject who has a right hemisphere lesion but does not have aphasia.

The aim of the study is to investigate whether the same brain areas and neuronal networks are used to process voices as to process speech. This will allow us to investigate whether language perception and/or production impairments (aphasia) are related to speech perception difficulties and/or low level perceptual deficits (voice perception). In turn this could inform SLT practice in terms of commencing auditory comprehension therapy at a much lower level (voice perception) in specific types of aphasia.

Participants will be asked to participate in language and mood assessments, as well as some voice and speech perception tasks. Their clinical brain scans (CT and/or MRI), from admission to hospital for this episode, will be used in this research for analysis. Voxel-based lesion-symptom mapping will be carried out on these scans to look for correlations in lesion site and speech and/or voice perception impairments.

Participants will undergo all behavioural assessments and tasks at the Western General Hospital. All assessments and tasks will be administered by the main researcher Anna Jones, a qualified SLT.

This study will not affect any medical care the participant is currently receiving. (Participant's name) will continue to receive normal NHS Speech and Language Therapy if applicable.

Version 2

Page 1 of 2
10th September 2011

GP/health professional letter



This study is being carried out as part of a PhD project. The main researcher is Anna Jones and can be contacted at the above address with any queries/ concerns.

The study is being funded by the SINAPSE collaboration (www.sinapse.ac.uk), a Pooling Initiative funded by the Scottish Funding Council and the Chief Scientist Office of the Scottish Executive.

Thank you for your time.

Yours Sincerely,

Anna Jones (Main researcher and qualified SLT)

cc. SLT if appropriate

Appendix 5: GP letter sent out to the registered NHS GP of each participant stroke patient for Study 2- Association/ Dissociation of voice and speech perception across the cerebral hemispheres investigated in intact and impaired processing (Chapter 4).

P1

VOICE PERCEPTION PROJECT: CT or MR SCAN READING FORM

Adapted with permission from: <http://www.sbric.ac.uk/documents/ctandmr%20reading%20form.pdf>

PATIENT ID: _____

READER ID: _____

READ DATE: _____

SCAN DATE: _____

REASON: ACUTE PRESENTATION

CT (FORMAT): _____

MR (SEQ.): _____

FOLLOW-UP _____

SCAN NEAREST TESTING _____

1.	Is the scan completely normal? [if f/u / chronic scan – change / no change]	<input type="checkbox"/> Y	<input type="checkbox"/> N	IF YES, STOP & ASSESS F/U	<input type="checkbox"/> C	<input type="checkbox"/> N/C	<input type="checkbox"/> N/C
2.	Any sign of acute ischaemic change? [or if chronic scan – chronic change]	<input type="checkbox"/> Y	<input type="checkbox"/> N	IF NO, GO TO Q.10	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N
3.	Which side of the brain is the ischaemia?	<input type="checkbox"/> R	<input type="checkbox"/> L	TICK R AND L IF BOTH	<input type="checkbox"/> R	<input type="checkbox"/> L	<input type="checkbox"/> L
4.	Classify signs of ischaemia [or if chronic scan – infarct]						
a.	Loss of grey / white matter cortex definition	<input type="checkbox"/> Y	<input type="checkbox"/> N		<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N
b.	Loss of basal ganglia outline	<input type="checkbox"/> Y	<input type="checkbox"/> N		<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N
c.	Hypo-density or DWI hi / ADC lo signal [or if chronic scan – gliosis]	<input type="checkbox"/> Y	<input type="checkbox"/> N		<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N
d.	Mass effect (swelling) present [or if chronic scan - volume loss]	<input type="checkbox"/> Y	<input type="checkbox"/> N	IF NO, GO TO Q.5	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N
i.	Sulcal effacement? [or if chronic scan – ex vacuo dilation]	<input type="checkbox"/> Y	<input type="checkbox"/> N		<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N
ii.	Ventricular effacement? [or if chronic scan – ex vacuo dilation]	<input type="checkbox"/> Y	<input type="checkbox"/> N		<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N

P3

For chronic changes, rate gliosis / volume loss as:
Mild = 1. Moderate = 2. Severe = 3

 N

 Y

Diagrams © J Wardlaw, Univ of Edinburgh

c.

Degrees of mass effect:

- 0 no swelling
- 1 effacement of the sulci overlying the infarct
- 2 1 + minor effacement of adjacent lateral ventricle
- 3 1 + complete effacement of lateral ventricle
- 4 1 + effacement of the lateral and third ventricle
- 5 4 + midline shift away from the side of the ventricle
- 6 5 + effacement of the basal cisterns

 N

 Y

6. Does the ischaemia / infarct involve more than 1/3 of the MCA territory?

7. ASPECTS score (modified).

	Normal	Abnorm.
	<input type="checkbox"/> N	<input type="checkbox"/> A
Caudate	<input type="checkbox"/> N	<input type="checkbox"/> A
Lentiform	<input type="checkbox"/> N	<input type="checkbox"/> A
Insula	<input type="checkbox"/> N	<input type="checkbox"/> A
Int. Capsule	<input type="checkbox"/> N	<input type="checkbox"/> A
MCA 1 (M1)	<input type="checkbox"/> N	<input type="checkbox"/> A
MCA 2 (M2)	<input type="checkbox"/> N	<input type="checkbox"/> A
MCA 3 (M3)	<input type="checkbox"/> N	<input type="checkbox"/> A
MCA 4 (M4)	<input type="checkbox"/> N	<input type="checkbox"/> A
MCA 5 (M4)	<input type="checkbox"/> N	<input type="checkbox"/> A
MCA 6 (M6)	<input type="checkbox"/> N	<input type="checkbox"/> A
ACA	<input type="checkbox"/> N	<input type="checkbox"/> A
PCA 1 (P1)	<input type="checkbox"/> N	<input type="checkbox"/> A

Diagrams and score adapted from Lancel 2000;355:1670-1674

P4

Y	N
---	---

Y	N
---	---

N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A

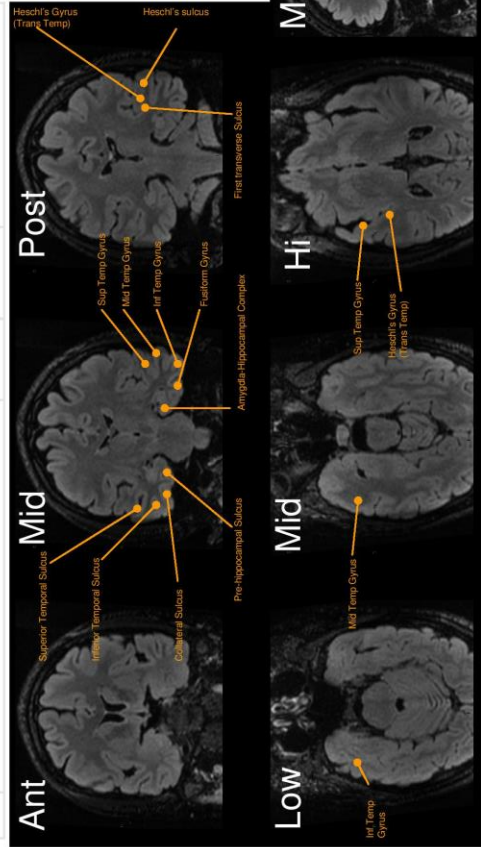
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A
N	A

8.	Is there another discrete relevant ischaemic / infarct focus?	Y	N	IF NO, GO TO Q.10
9.	Describe the second ischaemic lesion:	_____		
X	Specify the lobar location of the ischaemia / infarct:	Normal	Abn	
	Frontal	N	A	
	Caudate	N	A	
	Lentiform Nucleus	N	A	
	Insula	N	A	
	Internal capsule	N	A	
	Thalamus	N	A	
	Parietal	N	A	
	Occipital	N	A	
	Temporal	N	A	If temporal, go to X _{1,2}
	Midbrain	N	A	
	Pons	N	A	
	Medulla	N	A	
	Cerebellum	N	A	

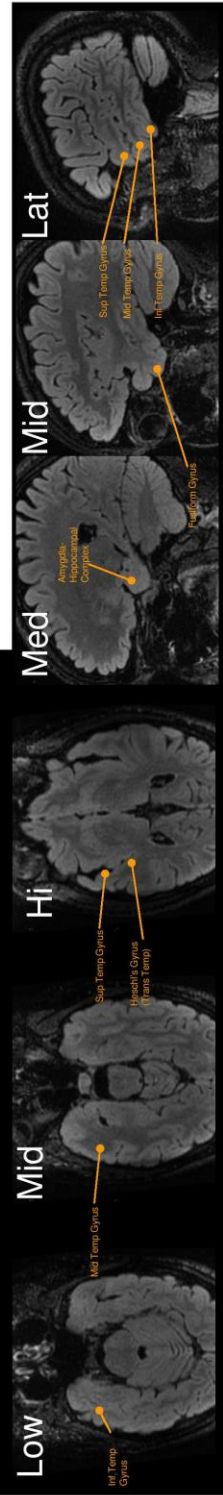
P5

X _{1,2}	Specify the temporal lobe location of the ischaemia / infarct:	Normal	Abn.
	A-H: amygdala-hippocampal complex	N	A
	HG: Heschl's gyrus (transverse temporal)	N	A
	STG: superior temporal gyrus	N	A
	MTG: middle temporal gyrus	N	A
	ITG: inferior temporal gyrus	N	A
	FG: fusiform gyrus	N	A

N	A	N	A
N	A	N	A
N	A	N	A
N	A	N	A
N	A	N	A
N	A	N	A



- Anterior vs posterior STG: in relation to head of hippocampus - posterior subdivision includes all sections beginning at the anterior hippocampus where the digitations of Ammon's horn were distinctly seen in relation to the amygdala. * Ford et al. 1984. The relationship between P300 amplitude and regional gray matter volumes depends upon the attentional system engaged. Electroencephalography and clinical neurophysiology, 90: 214-228
- The plane that separates the anterior and posterior superior temporal gyrus "is defined by the rostral end of the first transverse sulcus" (page 359). First transverse sulcus: The first transverse sulcus lies just in front of and parallel to Heschl's gyrus which is the anterior most transverse gyrus on the posterior supratemporal plane. HARVARD OXFORD ATLAS (FSL)



P6

10	Is there a hyperdense (CT) artery / no flow (MR)?	<input type="checkbox"/> Y	<input type="checkbox"/> N	IF NO, GO TO Q.12	<input type="checkbox"/> Y	<input type="checkbox"/> N
11	Name the affected artery:	<hr/>				
12	Is there any haemorrhage / haemosiderin anywhere?	<input type="checkbox"/> Y	<input type="checkbox"/> N	IF NO, GO TO Q.14	<input type="checkbox"/> Y	<input type="checkbox"/> N
13	Identify, rank, and classify the haemorrhage	Rank	<3cm	3-5	5-8	>8cm
a.	Petechial haemorrhage	<input type="checkbox"/> Side	<input type="checkbox"/> Rank	<input type="checkbox"/> <3cm	<input type="checkbox"/> 3-5	<input type="checkbox"/> >8cm
b.	Significant haemorrhagic transformation of infarct	<input type="checkbox"/> Side	<input type="checkbox"/> Rank	<input type="checkbox"/> <3cm	<input type="checkbox"/> 3-5	<input type="checkbox"/> >8cm
c.	Parenchymal haematoma (i.e. no infarct visible)	<input type="checkbox"/> Side	<input type="checkbox"/> Rank	<input type="checkbox"/> <3cm	<input type="checkbox"/> 3-5	<input type="checkbox"/> >8cm
d.	Parenchymal haematoma clearly remote from infarct	<input type="checkbox"/> Side	<input type="checkbox"/> Rank	<input type="checkbox"/> <3cm	<input type="checkbox"/> 3-5	<input type="checkbox"/> >8cm
e.	Subdural haematoma	<input type="checkbox"/> Side	<input type="checkbox"/> Rank	<input type="checkbox"/> <3cm	<input type="checkbox"/> 3-5	<input type="checkbox"/> >8cm
f.	Subarachnoid haemorrhage	<input type="checkbox"/> Side	<input type="checkbox"/> Rank	<input type="checkbox"/> <3cm	<input type="checkbox"/> 3-5	<input type="checkbox"/> >8cm
g.	Extradural haemorrhage	<input type="checkbox"/> Side	<input type="checkbox"/> Rank	<input type="checkbox"/> <3cm	<input type="checkbox"/> 3-5	<input type="checkbox"/> >8cm
h.	In your opinion, is the haemorrhage likely to have contributed significantly to the burden of brain damage?	<input type="checkbox"/> Y	<input type="checkbox"/> N			

P7

X	Specify the lobar location of the haemorrhage / haemosiderin:	Normal	Abn
	Frontal	N	A
	Caudate	N	A
	Lentiform Nucleus	N	A
	Insula	N	A
	Internal capsule	N	A
	Thalamus	N	A
	Parietal	N	A
	Occipital	N	A
	Temporal	N	A
	Midbrain	N	A
	Pons	N	A
	Medulla	N	A
	Cerebellum	N	A

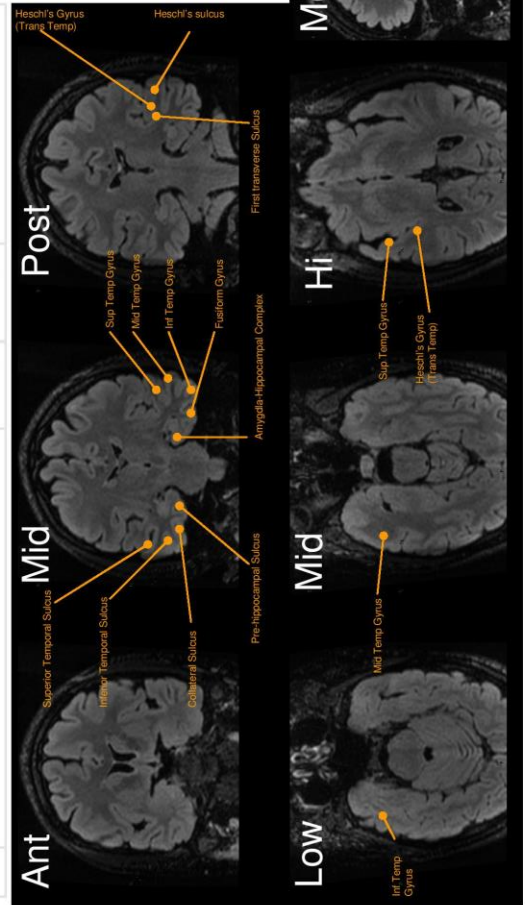
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A

		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A
		N	A

P8

X _{1,2}	Specify the temporal lobe location of the haemorrhage / haemosiderin:	Normal	Abn.
	A-H: amygdala-hippocampal complex	N	A
	HG: Heschl's gyrus (transverse temporal)	N	A
	STG: superior temporal gyrus	N	A
	MTG: middle temporal gyrus	N	A
	ITG: inferior temporal gyrus	N	A
	FG: fusiform gyrus	N	A

N	A	N	A
N	A	N	A
N	A	N	A
N	A	N	A
N	A	N	A
N	A	N	A



- Anterior vs posterior STG: in relation to head of hippocampus - posterior subdivision includes all sections beginning at the anterior hippocampus where the digitations of Ammon's horn were distinctly seen in relation to the amygdala. • Ford et al. 1994. The relationship between P300 amplitude and regional gray matter volumes depends upon the attentional system engaged. Electroencephalography and clinical neurophysiology, 90: 214-228
- The plane that separates the anterior and posterior superior temporal gyrus "is defined by the rostralateral end of the first transverse sulcus" (page 359). First transverse sulcus: The first transverse sulcus lies just in front of and parallel to Heschl's gyrus which is the anterior most transverse gyrus on the posterior supratemporal plane. HARVARD OXFORD ATLAS (FSL)

P9

N/C

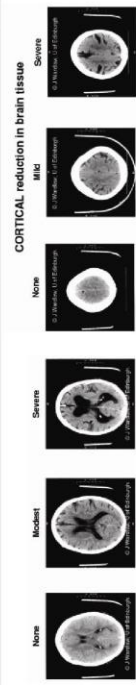
C

N/C

C

Moderate = 2
Severe = 3

None = 0
Mild = 1



CORTICAL reduction in brain tissue

Approach validated in Eur Radiol 2008;19:177-183
Diagrams © J Wardlaw, Univ of Edinburgh

15. Rate if reduction is significantly asymmetric

Cent

Cort

Cort

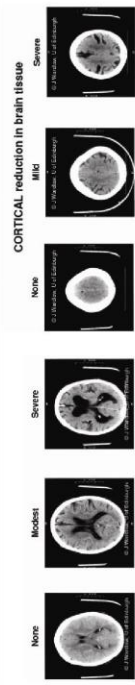
Cent

Cort

Cent

Moderate = 2
Severe = 3

None = 0
Mild = 1



CORTICAL reduction in brain tissue

Approach validated in Eur Radiol 2008;19:177-183
Diagrams © J Wardlaw, Univ of Edinburgh

17. Rate if white matter lucency is significantly asymmetric

Cent

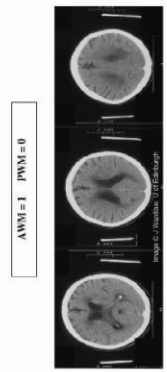
Cort

Cort

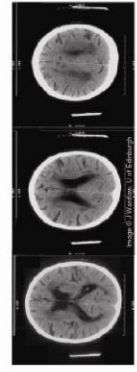
Cent

Cort

Cent



AWM = 1 PWM = 0



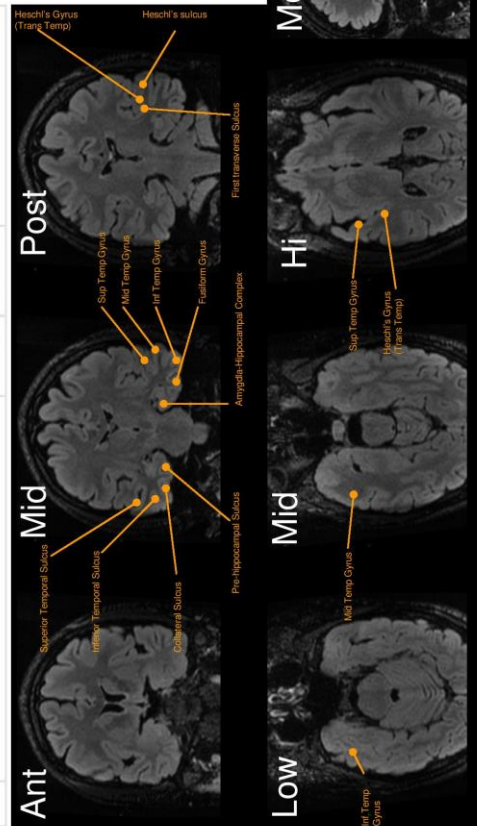
AWM = 2 PWM = 1

Diagrams © J Wardlaw, Univ of Edinburgh

P11

X ₃	Specify the temporal lobe location of the haemorrhage / haemosiderin:	Normal	Abn.
	A-H: amygdala-hippocampal complex	N	A
	HG: Heschl's gyrus (transverse temporal)	N	A
	STG: superior temporal gyrus	N	A
	MTG: middle temporal gyrus	N	A
	ITG: inferior temporal gyrus	N	A
	FG: fusiform gyrus	N	A

N	A	N	A
N	A	N	A
N	A	N	A
N	A	N	A
N	A	N	A
N	A	N	A



Anterior vs posterior STG: in relation to head of hippocampus - posterior subdivision includes all sections beginning at the anterior hippocampus - where the divisions of Ammon's horn are distinctly seen in relation to the amygdala. - Coda et al., 1994. The relationship between P300 and Heschl's gyrus and regional grey matter volumes depends upon the electrical system engaged. Electroencephalography and clinical neurophysiology, 90, 214-228. The pair that separates the anterior and posterior superior temporal gyri is defined by the plane that passes through the frontopolar sulcus (Fuchs, 1959). Fuchs' gyrus is the first transverse sulcus that lies just in front of and parallel to Heschl's gyrus which is the anterior most transverse gyrus on the posterior supratemporal plane. HARVARD OXFORD ATLAS (FSL)

Appendix 6: CT or MR reading form for Study 2- Association/ Dissociation of voice and speech perception across the cerebral hemispheres investigated in intact and impaired processing (Chapter 4).



Extended Study: Voice perception vs. speech perception in aphasia

PARTICIPANT INFORMATION SHEET

We invite you to take part in a research project. Before you decide to participate we want to be sure that you understand:

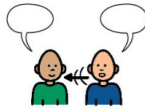
- What all the technical words mean
- Why we are doing it
- What it would involve

What is aphasia?

Aphasia is a language impairment which can happen following brain damage. It can affect an individual's speech, understanding, reading or writing.



What is Speech and Language Therapy?



Speech and language therapy focuses on the management of disorders of speech, language, communication and swallowing in children and adults. A Speech and Language Therapist will assess and provide therapy, if appropriate, for people with the above disorders.

What is the study about?

It is important to study aphasia so that we can keep on improving therapy for people who have difficulties with speaking, understanding, reading and writing.



You have already participated in the main study looking at listening and understanding and perception of voices and sounds in people with aphasia.

This is an **extension** to this study.

Why have I been asked to take part?



The way in which you present (your symptoms and/or your assessment results and/or your brain scan/s and/or your task results) is very interesting for researchers and Speech and Language Therapists. Therefore we would like to study this in more detail.

What will I be asked to do if you agree to take part?

1. First you will be asked to sign another consent form.
2. You will be asked to participate in additional assessments of your communication (these are detailed below)
3. You will be asked to participate in additional tasks to do with listening skills on the computer (some from Edinburgh University, some from Glasgow University – again, detailed below)
4. Your **MAY** be asked to have some more scans of your brain

**What else happens?**

- We would like to use any information to do with your communication that has already been collected. Therefore we will:
 - contact your Speech and Language Therapist (past & present) and look at your previous assessments and notes
 - use your assessment & task results from the study you have already participated in
 - use your medical notes and brain scan/s you have already had done as part of your medical care

**What are the assessments, tasks and brain scans I may be asked to do if I agree to take part?****1. Assessment of your communication:**

These **MAY** include (possibly not all):

- a. RIGHT (The Right hemisphere Language Battery)
- b. PALPA subtests (Psycholinguistic Assessments of Language Processing in Aphasia)
- c. Mount Wilga High Level Language Test
- d. Neurogenic Dysgraphia Battery (NDB) subtests
- e. PPTT (Pyramids and Palmtrees)
- f. BNT (Boston naming Test)

- g. SCOLP (Speed & Capacity of Language Processing)
- h. CLQT (Cognitive Linguistic Quick Test)
- i. Doors and People Test



These tests look at communication, and things that are involved in communication, in many different ways including listening, understanding, reading, writing, making sense of language, memory, speaking, using language, drawing, gesture, problem solving, and other skills too.

They involve writing things down, repeating words or sentences, memorising (pictures, symbols, words, sentences), listening to sounds, words and sentences, looking at pictures, naming objects and pictures, making decisions on things that go together, explaining decisions and choices, among other activities.

2. Listening and perception tasks:

These *MAY* include (possibly not all below):



a. Phoneme and gender differentiation

-follow on tasks from those already completed as part of the "Voice perception vs. speech perception in aphasia" study

b. Voice perception assessment (including 'Memory', 'Discrimination' and 'Gender labelling' tasks)

-part of Online Psychology Research with the University of Glasgow (Professor Pascal Belin – 2nd supervisor for this study)
<http://marc-web.psy.gla.ac.uk/online2/index.php#>

3. Brain Imaging:

This *MAY* include (possibly none, possible not all below):

- a. Structural
- b. Functional



What happens if you find something abnormal on the scans or tests?

- Sometimes an abnormality is found on your scan.
- The chance of this is very small.
- Your GP and NHS records will receive this information.



Is participation in the study confidential?

Yes. Your identity will be kept totally confidential. Other than your medical care team, only the main researcher (Anna Jones) and her supervisor (Dr Cyril Pernet) will have access to your data.



Do I have to take part?

- No.





Can I stop at any time?

- Yes.
- You do not need a reason to stop.

Will being in the study affect my medical care?

- No.
- You will receive the same medical care.



What is the benefit to me?

You could be helping medical staff, researchers and Speech and Language Therapists to provide better care for people with aphasia.

Can I find out the results of the research?

- Yes.
- Give your address to the main researcher (Anna Jones)



Who is funding the research?



This study is funded by the SINAPSE Collaboration (www.sinapse.ac.uk), a Pooling Initiative funded by the Scottish Funding Council and the Chief Scientist Office of the Scottish Executive.

What if I want to make a complaint?

If you have a concern about any aspect of this study:

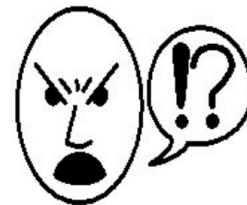
1: try speaking to Anna Jones on **0131 5371985**.

2: if you are still not happy you can complain formally:

NHS Lothian Complaints Team,
Waverley Gate,
2 - 4 Waterloo Place,
Edinburgh,
EH1 3EG

Telephone: 0131 536 3370

Email: complaints.team@nhslothian.scot.nhs.uk



What if I want to talk to someone independent about this research?

You can contact **Dr Thomas Bak** regarding this research if you would like to speak to an independent advisor:

Human Cognitive Neuroscience (HCN) & Centre for Cognitive Aging and Cognitive Epidemiology (CCACE),
School of Philosophy, Psychology and Language Sciences (PPLS),
7 George Square,
Edinburgh
EH8 9JZ

Telephone: 0131 6503441

Fax: 0131 6503461

Email: thomas.bak@ed.ac.uk



Thank you for reading this information leaflet.

PLEASE ASK ANY QUESTIONS

***PLEASE TALK IT THROUGH WITH FAMILY/
FRIENDS***

If you would like more information please contact:

Anna Jones
Brain Research Imaging Centre
Division of Clinical Neurosciences
University of Edinburgh
Western General Hospital
Crewe Road
Edinburgh
EH4 2XU
a.b.jones@sms.ed.ac.uk



0131 5371985 07841749461

Appendix 7: Participant information sheet (aphasia-friendly) for Study 3 – Crossed aphasia and developmental disorders: a mini-review of the literature and investigation of a case study (Chapter 5).

EXTENDED STUDY: Voice perception vs. speech perception in aphasia

Researcher: Anna Jones

CONSENT FORM



Have you read the information sheet?		yes	no
Have you received enough information about this extended study?		yes	no
Have you had a chance to ask all your questions?		yes	No
Are you happy with the answers to your questions?		yes	no
Do you understand this is voluntary?		yes	no
Do you understand that you can stop at any time with no reasons?		yes	no
Do you understand that your medical care will NOT be affected?		yes	no
Do you agree to have more assessments of your communication?		yes	no
Do you agree to carrying out more tasks looking at your listening skills?		yes	no
Do you agree to possibly having more brain scans?		yes	no
Do you agree to the main researcher and supervisor looking at (& using) your current medical notes & brain scan/s?		yes	no
Do you agree to the main researcher contacting your current and past Speech & Language Therapists and having access to your notes & assessments?		yes	no
Are you happy to take part in this EXTENDED study?		yes	no

Appendix 8: Participant consent form (aphasia-friendly) for Study 3 – Crossed aphasia and developmental disorders: a mini-review of the literature and investigation of a case study (Chapter 5).

SEISMOLOGY EXPERTISE RETENTION QUESTIONNAIRE***Designed for use with participant in single case study of crossed aphasia***

Can you explain the difference between primary and secondary waves?

(Primary waves are compressional waves that are longitudinal in nature. P waves (primary) are pressure waves that travel faster than other waves through the earth to arrive at seismograph stations first hence the name "Primary". Secondary waves (S-waves) are shear waves that are transverse in nature and arrive after P-waves).

Can you explain what Rayleigh waves are?

(Surface waves that travel as ripples with motions that are similar to those of waves on the surface of water)

Can you explain how we can locate an earthquake using waves?

(The difference in the arrival times of the P and S waves can be used to determine the distance to the event. In the case of earthquakes that have occurred at global distances, three or more geographically diverse observing stations recording P-wave arrivals permits the computation of a unique time and location on the planet for the event)

Can you name the different types of plate boundaries? And explain the differences between them?

1. *Transform*: occur where plates slide or, perhaps more accurately, grind past each other.
2. *Divergent boundaries*: occur where two plates slide apart from each other.
3. *Convergent boundaries* (or *active margins*): occurs where two plates slide towards each other commonly forming either a subduction zone (if one plate moves underneath the other) or a continental collision (if the two plates contain continental crust.)

Do you know who Richard Dixon Oldham is?

(British geologist who made the first clear identification of the separate arrivals of P-waves, S-waves and surface waves on seismograms and the first clear evidence that the Earth has a central core)

Do you know who Inge Lehmann is?

(Danish seismologist who, in 1936, argued that the Earth's core is not one single molten sphere, but that an inner core exists which has physical properties that are different from those of the outer core)

Are you familiar with linear elasticity? Is so can you explain the notion of tensor?

(Linear elasticity is the mathematical study of how solid objects deform and become internally stressed due to prescribed loading conditions.

Tensors are [geometric](#) objects that describe [linear relations](#) between [vectors](#), [scalars](#), and other tensor. Tensors provide a concise mathematical framework for formulating and solving physics problems in areas such as elasticity, fluid mechanics, and general relativity)

Appendix 9: Informal premorbid semantic retention questionnaire for Study 3 – Crossed aphasia and developmental disorders: a mini-review of the literature and investigation of a case study (Chapter 5).

Author(s) (year)	Number of cases	Additional cognitive deficits found	Additional cognitive deficits tested
April & Tse (1977)	1	Constructional apraxia	Oro-facial apraxia Constructional apraxia Ideomotor apraxia Visuo-spatial impairment Attention
April & Han (1980)	1	-	Constructional apraxia Visuo-spatial impairment Attention
Assal et al. (1981)	1	Limb apraxia Constructional apraxia Acalculia Dysgraphia Left visual field neglect	Limb apraxia* Constructional apraxia* Acalculia* Dysgraphia* Left visual field neglect* Visuo-spatial impairment*
Denes & Caviezel (1981)	1	-	Limb apraxia* Oro-facial apraxia* Constructional apraxia* Ideomotor apraxia* Acalculia*
Haaland & Miranda (1982)	1	Acalculia Dysgraphia	Limb apraxia Acalculia Dysgraphia Visuo-spatial impairment Attention Memory
Habib et al. (1983)	1	Constructional apraxia Dysgraphia Left visual field neglect	Constructional apraxia* Dysgraphia* Left visual field neglect*
Henderson (1983)	3	Dysgraphia Visuo-spatial impairment	Limb apraxia* Oro-facial apraxia* Dysgraphia Left visual field neglect* Visuo-spatial impairment
		Limb apraxia Visuo-spatial impairment	Limb apraxia* Oro-facial apraxia* Dysgraphia Left visual field neglect* Visuo-spatial impairment
		Acalculia Dysgraphia Visuo-spatial impairment	Limb apraxia* Oro-facial apraxia* Acalculia Dysgraphia Visuo-spatial impairment
Faglia & Vignolo (1990)	1	Oro-facial apraxia Constructional apraxia	Oro-facial apraxia Constructional apraxia

		Ideomotor apraxia Dysgraphia Left visual field neglect Visuo-spatial impairment Memory	Ideomotor apraxia Dysgraphia Left visual field neglect Visuo-spatial impairment Memory
Marshall & Halligan (1992)	1	-	Limb apraxia Oro-facial apraxia Constructional apraxia Left visual field neglect* Visuo-spatial impairment Memory
Cappa et al. (1993)	2	Limb apraxia Oro-facial apraxia Dysgraphia Left visual field neglect	Limb apraxia Oro-facial apraxia Dysgraphia Left visual field neglect
		-	Limb apraxia Oro-facial apraxia Dysgraphia Left visual field neglect
Cohen et al. (1993)	1	Limb apraxia Oro-facial apraxia	Limb apraxia* Oro-facial apraxia*
Giovagnoli (1993)	1**	Constructional apraxia Dysgraphia Acalculia Left visual field neglect Visuo-spatial impairment Attention	Oro-facial apraxia Constructional apraxia Ideomotor apraxia Dysgraphia Acalculia Left visual field neglect Visuo-spatial impairment Attention
Mastrorardi et al. (1994)	2**	Acalculia Dysgraphia Visuo-spatial impairment	Acalculia Dysgraphia Visuo-spatial impairment
		Constructional apraxia Acalculia Dysgraphia Visuo-spatial impairment	Constructional apraxia Acalculia Dysgraphia Visuo-spatial impairment
Rey et al. (1994)	1	Limb apraxia Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect Visuo-spatial impairment Memory	Limb apraxia Oro-facial apraxia Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect Visuo-spatial impairment Memory
Alexander & Annett (1996)	5	Visuo-spatial impairment	Limb apraxia Left visual field neglect Visuo-spatial impairment

		Limb apraxia Left visual field neglect Visuo-spatial impairment	Limb apraxia Left visual field neglect Visuo-spatial impairment
		Left visual field neglect	Limb apraxia Left visual field neglect Visuo-spatial impairment
		Limb apraxia Left visual field neglect	Limb apraxia Left visual field neglect Visuo-spatial impairment
		Limb apraxia Left visual field neglect	Limb apraxia Left visual field neglect Visuo-spatial impairment
Bakar et al. (1996)	3	-	Limb apraxia* Constructional apraxia* Dysgraphia*
		-	Limb apraxia* Constructional apraxia* Dysgraphia*
		Dysgraphia	Limb apraxia* Constructional apraxia* Dysgraphia*
Stefanis et al. (1997)	1	Memory	Dysgraphia Visuo-spatial impairment Memory
Osmon et al. (1998)	1	Left visual field neglect Visuo-spatial impairment Memory	Constructional apraxia Left visual field neglect Visuo-spatial impairment Memory
Marien et al. (2001)	8	Acalculia	Oro-facial apraxia Constructional apraxia Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect Visuo-spatial impairment Attention
		Constructional apraxia Left visual field neglect Attention	Oro-facial apraxia Constructional apraxia Ideomotor apraxia Dysgraphia Left visual field neglect Visuo-spatial impairment Attention
		Constructional apraxia Dysgraphia Left visual field neglect	Oro-facial apraxia Constructional apraxia Ideomotor apraxia Dysgraphia

			Left visual field neglect Visuo-spatial impairment Attention
		Constructional apraxia Left visual field neglect	Oro-facial apraxia Constructional apraxia Ideomotor apraxia Dysgraphia Left visual field neglect Visuo-spatial impairment Attention
		Constructional apraxia	Oro-facial apraxia Constructional apraxia Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect Visuo-spatial impairment Attention Memory
		Left visual field neglect Acalculia Constructional apraxia	Oro-facial apraxia Constructional apraxia Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect Visuo-spatial impairment Attention
		Oro-facial apraxia Constructional apraxia Acalculia Left visual field neglect	Oro-facial apraxia Constructional apraxia Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect Visuo-spatial impairment Attention Memory
		Constructional apraxia Dysgraphia Acalculia	Oro-facial apraxia Constructional apraxia Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect Visuo-spatial impairment Attention
Paparounas et al. (2002)	1	Dysgraphia Left visual field neglect	Dysgraphia* Left visual field neglect*
Paghera et al. (2003)	1	Visuo-spatial impairment Acalculia	Oro-facial apraxia Constructional apraxia

		Dysgraphia Left visual field neglect	Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect Visuo-spatial impairment Memory
Bartha et al. (2004)	1 + 2**	Oro-facial apraxia Ideomotor apraxia Dysgraphia Memory	Limb apraxia Oro-facial apraxia Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect Visuo-spatial impairment Memory
		-	Limb apraxia Oro-facial apraxia Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect Visuo-spatial impairment Memory
		Left visual field neglect Oro-facial apraxia	Limb apraxia Oro-facial apraxia Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect Visuo-spatial impairment Memory
Bhatnagar et al. (2006)	1	Dysgraphia	Limb apraxia Dysgraphia Visuo-spatial impairment
Lessa Mansur et al. (2006)	1	Visuo-spatial impairment Attention Constructional apraxia	Constructional apraxia Dysgraphia Left visual field neglect* Visuo-spatial impairment Attention Memory
De Witte et al. (2008)	1	Constructional apraxia Ideomotor apraxia Acalculia Left visual field neglect* Dysgraphia Visuo-spatial impairment Attention	Constructional apraxia Ideomotor apraxia Acalculia Dysgraphia Left visual field neglect* Visuo-spatial impairment Attention Memory
Bhatnagar et al.	1	Dysgraphia	Limb apraxia

(2011)			Dysgraphia Visuo-spatial impairment Memory
Ha et al. (2012)	2	Oro-facial apraxia Constructional apraxia Left visual field neglect Visuo-spatial impairment	Limb apraxia Oro-facial apraxia Constructional apraxia Left visual field neglect Visuo-spatial impairment
		Constructional apraxia Left visual field neglect Visuo-spatial impairment	Limb apraxia Oro-facial apraxia Constructional apraxia Left visual field neglect Visuo-spatial impairment
Ishizaki et al. (2012)	1	Constructional apraxia Ideomotor apraxia Dysgraphia	Constructional apraxia Ideomotor apraxia Dysgraphia
Kim et al. (2013)	7	-	-
Patidar et al. (2013)	1	Ideomotor apraxia Dysgraphia	Ideomotor apraxia Dysgraphia

Appendix 10: Studies containing case/s of confirmed crossed aphasia (according to Marien et al.'s (2001) algorithm) for Study 3 – Crossed aphasia and developmental disorders: a mini-review of the literature and investigation of a case study (Chapter 5).

Table shows number of cases (totalling 57), additional cognitive deficits tested and additional cognitive deficits shown up by investigation. Assessments with * were informal/bedside assessments – all others assessments were formal and/or standardised. All cases were stroke patients apart from those with ** which were tumour patients. For the purpose of this review the term ‘visuo-spatial impairment’ does not include visual field neglect (separate entity) – it includes: visual organisation, spatial relations, visuo-construction, visual memory and visual scanning speed (De Witte et al., 2008).

WAB	ACUTE		SUB-ACUTE		CHRONIC	
	Raw score	Normalised score	Raw score	Normalised score	Raw score	Normalised score
<i>Classification</i>	Anomic	Anomic	Anomic	Anomic	WNL	WNL
<i>Full Aphasia Quotient</i>	79.90	79.90	87.8	87.80	96.4	96.40
<i>Spontaneous speech: total</i>	14	70	16	80	19	95
<i>Information content</i>	7	70	8	80	10	100
<i>Fluency</i>	7	70	8	80	9	90
<i>Comprehension: total</i>	92.50	92.50	95	95.00	100	100
<i>Yes/No questions</i>	60	100	60	100	60	100
<i>Auditory word recognition</i>	58	96.67	60	100	60	100
<i>Sequential commands</i>	67	83.75	70	87.50	80	100
<i>Repetition: total</i>	94	94	98	98	100	100
<i>Naming: total</i>	73	73	86	86	92	92
<i>Object naming</i>	44	73.33	50	83.33	57	95
<i>Word fluency</i>	9	45	18	90	15	75
<i>Sentence completion</i>	10	100	10	100	10	100
<i>Responsive speech</i>	10	100	8	80	10	100
<i>Reading: total</i>	69	69	94	94	98	98
<i>Writing: total</i>	44.50	44.50	66.5	66.50	91	91
<i>Writing name & address</i>	3	50	5	83.33	5.5	91.67
<i>Spontaneous written output</i>	0	0	8	23.53	30	88.24
<i>Writing to dictation – sentence</i>	3	30	8	80	10	100
<i>Writing to dictation – words</i>	3	30	3	30	10	100
<i>Writing to dictation – letters</i>	1.50	60	1.5	60	2.5	100

WAB	ACUTE		SUB-ACUTE		CHRONIC	
	Raw score	Normalised score	Raw score	Normalised score	Raw score	Normalised score
<i>Writing to dictation – numbers</i>	4	80	5	100	5	100
<i>Writing of visually presented words</i>	3	30	3	30	10	100
<i>Writing to oral spelling</i>	4	40	4	40	10	100
<i>Alphabet (rote)</i>	9.50	76	9.5	76	12	96
<i>Numbers (rote)</i>	9.50	95	9.5	95	10	100
<i>Copying of words of a sentence</i>	10	100	10	100	10	100

Appendix 11: Raw and normalised results of the Western Aphasia Battery (WAB (Kertesz, 1982)) at the acute, sub-acute and chronic time point for Study 3 – Crossed aphasia and developmental disorders: a mini-review of the literature and investigation of a case study (Chapter 5).

Task (Each contains 4 sections – 2 written, 2 spoken)	Score (1 for each correct answer, 0 for incorrect – max 4 per task)	Comments
Counting forwards	4	Written and spoken tasks processed with no problems
Counting backwards	4	
Size decisions	4	
Simple additions	4	
Simple multiplications	4	
Simple subtractions	4	
Complex additions	2	Numeric length affected complex calculations in spoken number tasks only.
Complex multiplications	2	
Complex subtractions	2	
Simple word problems	4	Written and spoken tasks processed with no problems

Appendix 12: Informal acalculia assessment results for Study 3 – Crossed aphasia and developmental disorders: a mini-review of the literature and investigation of a case study (Chapter 5).

MAIN TEST FUNCTION	VARIABLE	TIMEPOINT	RAW SCORE	NORMALISED SCORE	SCALED SCORE/ MEAN CONTROL/ PERCENTILE/ PROFILE SCORE		PERFORMANCE DESCRIPTOR	REFERENCE
					SCALED SCORE	PERCENTILE		
Memory	DOORS AND PEOPLE: Doors subtest	ACUTE	15/24	62.50	8	25.3	UNIMPAIRED	Baddeley et al. (1994)
					SCALED SCORE	MEAN CONTROL SCORE		
Memory	WAIS IV: Digit Span: Total	ACUTE	17/32	53.13	6	25.5 ± 6.0	IMPAIRED	Wisdom et al. (2012)
	Forward condition	ACUTE	10/16	62.50	--	10 ± 2.5	UNIMPAIRED	
	Backward condition	ACUTE	7/16	43.75	--	8 ± 2.3	UNIMPAIRED	
					SCALED SCORE	QUANTITATIVE ANALYSIS		
Memory	WMS III: Faces I: visual immediate memory	CHRONIC	35/48	72.92	10		UNIMPAIRED	Weschler et al., (1997)
	WMS III: Faces II: visual delayed memory	CHRONIC	32/48	66.67	8	Percent retention score: 92%	IMPAIRED	
					MEAN CONTROL SCORE	PERCENTILE		
Memory	BMIBP (Brit Memory and Information processing battery): Total	CHRONIC	39/105	37.14	71.6 ± 18.4	<2	IMPAIRED	Coughlan et al. (2007)
	Speed of information processing	CHRONIC	50/100	50	55.9 ± 10.1	25-50	UNIMPAIRED	
	Errors	CHRONIC	18/100	18	3.8 ± 4.5	<2	IMPAIRED	
					SCALED SCORE	PERCENTILE		
Memory	Rey-Osterrieth Complex Figure: delayed recall	CHRONIC	30/36	83.33	18	<99	UNIMPAIRED	Fastenau, et al. (1999)

MAIN TEST FUNCTION	VARIABLE	TIMEPOINT	RAW SCORE	NORMALISED SCORE	SCALED SCORE/ MEAN CONTROL/ PERCENTILE/ PROFILE SCORE		PERFORMANCE DESCRIPTOR	REFERENCE
Visuo-Spatial/ Executive functioning	Rey-Osterrieth Complex Figure: copy	CHRONIC	36/36	100	18	<99	UNIMPAIRED	
					<i>MEAN CONTROL SCORE</i>			
Visuo-Spatial	VOSP (Visual Object & Space Perception Battery): <i>Incomplete letters</i>	CHRONIC	20/20	100	18.8 ± 1.4	UNIMPAIRED		Warrington & James (1991)
Visuo-Spatial	VOSP (Visual Object & Space Perception Battery): <i>Dot Counting</i>	CHRONIC	9/10	90	9.9 ± 0.2	UNIMPAIRED		Warrington & James (1991)
					<i>SCALED SCORE</i>	<i>MEAN CONTROL SCORE</i>		
Executive Functioning	WAIS IV (Wechsler Adult Intelligence Scale): Matrix Reasoning	CHRONIC	19/26	73.08	13	14.4 ± 5.5	UNIMPAIRED	Zinn et al. (2004)
					<i>PROFILE SCORE</i>	<i>MEAN CONTROL PROFILE SCORE</i>		
Executive Functioning	BADS (Behavioural Assessment of Dysexecutive Function) : <i>Key Search</i>	CHRONIC	10/16	62.50	2	2.60 ± 1.32	UNIMPAIRED	Wilson et al. (1996)
	BADS: <i>Temporal Judgement</i>	CHRONIC	2/4	50	2	2.15 ± 0.91	UNIMPAIRED	
	BADS: <i>Modified 6 elements</i>	CHRONIC	6/6	100	4	3.52 ± 0.80	UNIMPAIRED	
					<i>QUANTITATIVE ANALYSIS</i>			

MAIN TEST FUNCTION	VARIABLE	TIMEPOINT	RAW SCORE	NORMALISED SCORE	SCALED SCORE/ MEAN CONTROL/ PERCENTILE/ PROFILE SCORE	PERFORMANCE DESCRIPTOR	REFERENCE
Specialist knowledge retention	Informal: Seisomology Expertese Retention	CHRONIC	2/7	28.57	Word-finding difficulties; difficulties formulating sentences	IMPAIRED	--
<i>QUANTITATIVE ANALYSIS</i>							
Acalculia	Informal: Counting forwards	CHRONIC	20/20	100	--	UNIMPAIRED	--
	Informal: Counting backward	CHRONIC	20/20	100	--	UNIMPAIRED	
	Informal: Size decisions	CHRONIC	8/8	100	--	UNIMPAIRED	
	Informal: Simple addition	CHRONIC	4/8	50	Number length effect	IMPAIRED	
	Informal: Simple multiplications	CHRONIC	8/8	100	--	UNIMPAIRED	
	Informal: Simple deletions	CHRONIC	4/8	50	Number length effect	IMPAIRED	

Appendix 13: Performance on a battery of neuropsychological assessments looking at various aspects of cognition at the acute or chronic time-point for Study 3 – Crossed aphasia and developmental disorders: a mini-review of the literature and investigation of a case study (Chapter 5).

Performance Descriptors were calculated according to the following:

- Percentile classifications are based on those described in Flanagan and Ortiz (2001) and Flanagan, Ortiz, Alfonso and Mascolo (2001)
- UNIMPAIRED: within normal limits according to published norms;
- IMPAIRED: below normal limits according to published norms (see reference column)
- For informal assessments (Specialist Knowledge Retention & Acalculia) the following classification applies: UNIMPAIRED = 100%, IMPAIRED < 100%

MAIN TEST FUNCTION	VARIABLE	TIMEPOINT	RAW SCORE	NORMATIVE DATA	PERFORMANCE DESCRIPTOR	OTHER INFORMATION	NORMATIVE DATA REFERENCE
Auditory Input (auditory processing)	Informal phonological discrimination	ACUTE/SUB-ACUTE	5/8	--	IMPAIRED	Unimpaired: p/b, t/d, θ/φ, ʃ/ʒ, r/l. Impaired: m/n, k/g, s/z	--
	PALPA 1: non word minimal pairs: SAME JUDGEMENTS	CHRONIC	29/36	35.70/ 36 ± 0.56	IMPAIRED		Kay et al. (1992)
	PALPA 1: non word minimal pairs: DIFFERENT JUDGEMENTS	CHRONIC	32/36	35.09/ 36 ± 2.34	IMPAIRED		
	PALPA 2: word minimal pairs: SAME JUDGEMENTS	CHRONIC	33/36	35.54 ± 0.78	IMPAIRED		Kay et al. (1992)
	PALPA 2: word minimal pairs: DIFFERENT JUDGEMENTS	CHRONIC	35/36	34.83 ± 2.58	UNIMPAIRED		
	PALPA 5: auditory lexical decision: High imageability, High frequency	CHRONIC	20/20	19.86 ± 0.48	UNIMPAIRED	No imageability or frequency effect	Kay et al. (1992)
	PALPA 5: auditory lexical decision: High imageability, Low frequency	CHRONIC	19/20	20.00 ± 0.00	UNIMPAIRED		
	PALPA 5: auditory lexical decision: Low imageability, High frequency	CHRONIC	19/20	19.95 ± 0.22	UNIMPAIRED		
	PALPA 5: auditory lexical decision: Low imageability, Low frequency	CHRONIC	19/20	19.62 ± 0.67	UNIMPAIRED		
	PALPA 5: auditory lexical decision: Non words	CHRONIC	61/80	76.00 ± 4.27	IMPAIRED		
Auditory Input (auditory processing) with written output	PALPA 39: letter length spelling: total	ACUTE/SUB-ACUTE	13/24	30-100%	UNIMPAIRED	Word length effect	**
		CHRONIC	22/24		UNIMPAIRED		
	PALPA 39: letter length spelling: 3 letters	ACUTE/SUB-ACUTE	5/6		UNIMPAIRED		
		CHRONIC	6/6		UNIMPAIRED		
	PALPA 39: letter length spelling: 4 letters	ACUTE/SUB-ACUTE	4/6		UNIMPAIRED		
		CHRONIC	6/6		UNIMPAIRED		

	PALPA 39: letter length spelling: 5 letters	ACUTE/SUB-ACUTE	2/6		UNIMPAIRED			
		CHRONIC	5/6		UNIMPAIRED			
	PALPA 39: letter length spelling: 6 letters	ACUTE/SUB-ACUTE	2/6		UNIMPAIRED			
		CHRONIC	5/6		UNIMPAIRED			
	PALPA 40: imageability and frequency spelling: High imageability, High frequency	ACUTE/SUB-ACUTE	8/10	9.68 ± 0.67	IMPAIRED			<i>Acute/Sub-acute:</i> Imageability and frequency effect
		CHRONIC	9/10		UNIMPAIRED			
	PALPA 40: imageability and frequency spelling: High imageability, Low frequency	ACUTE/SUB-ACUTE	5/10	9.25 ± 0.75	IMPAIRED	<i>Chronic:</i> Imageability effect only		
		CHRONIC	9/10		UNIMPAIRED			
	PALPA 40: imageability and frequency spelling: Low imageability, High frequency	ACUTE/SUB-ACUTE	3/10	9.11 ± 1.37	IMPAIRED	Kay et al. (1992)		
		CHRONIC	6/10		IMPAIRED			
	PALPA 40: imageability and frequency spelling: Low imageability, Low frequency	ACUTE/SUB-ACUTE	6/10	8.36 ± 1.97	IMPAIRED			
		CHRONIC	6/10		IMPAIRED			
PALPA 45: nonword spelling: 3 letter	ACUTE/SUB-ACUTE	4/7	5.43 ± 0.88	IMPAIRED	Dissociation between spoken output and written output at both time points at all word lengths. Word length effect throughout			
	CHRONIC	5/7		UNIMPAIRED				
PALPA 45: nonword spelling: 4 letter	ACUTE/SUB-ACUTE	2/7	5.25 ± 1.14	IMPAIRED				
	CHRONIC	4/7		UNIMPAIRED				
PALPA 45: nonword spelling: 5 letter	ACUTE/SUB-ACUTE	1/7	5.25 ± 1.24	IMPAIRED				
	CHRONIC	2/7		IMPAIRED				
PALPA 45: nonword spelling: 6 letter	ACUTE/SUB-ACUTE	0/7	4.96 ± 1.45	IMPAIRED				
	CHRONIC	1/7		IMPAIRED				
Written input (reading) with spoken output	PALPA 8: reading of non-words: 1 -3 syllables	CHRONIC	27/30	23.64	UNIMPAIRED	Syllable length effect	Fillingham et al. (2005)	
	PALPA 36: non-word reading: 3 letters	CHRONIC	6/6	5.77 ± 0.71	UNIMPAIRED	Letter length effect	Kay et al. (1992)	
	PALPA 36: non-word reading: 4 letters	CHRONIC	5/6	5.89 ± 0.43	UNIMPAIRED			

	PALPA 36: non-word reading: 5 letters	CHRONIC	2/6	5.57 ± 0.90	IMPAIRED		
	PALPA 36: non-word reading: 6 letters	CHRONIC	3/6	5.65 ± 0.85	IMPAIRED		
Object input (pictorial) with written and spoken outputs	PALPA 54: Object frequency written output	CHRONIC	58/60	50-51	UNIMPAIRED	All errors semantic	Lambon Ralph et al. (2004)
	PALPA 54: Object frequency spoken output	CHRONIC	57/60	50-51	UNIMPAIRED		
			Number of errors	Normative data: number errors			
Semantic processing following object input (pictorial)	PPT	CHRONIC	1 (24/25)	2.5 ± 3.4	UNIMPAIRED		Van der Hulst, (2012)
	KDT	CHRONIC	2 (23/25)	4.1 ± 2.8	UNIMPAIRED		
	TTT	CHRONIC	0 (25/25)	2.5 ± 2.1	UNIMPAIRED		
	SPMT	CHRONIC	1 (29/30)	1.5 ± 1.3	UNIMPAIRED		

Appendix 14: Performance on a battery of language assessments looking at various aspects of communication at the acute, sub-acute or chronic time-point for Study 3 – Crossed aphasia and developmental disorders: a mini-review of the literature and investigation of a case study (Chapter 5).

Performance used to determine break-down on the adapted and extended cognitive neuropsychological model of single word processing presented in Chapter 2 (Figure 2-8). Performance Descriptors were calculated according to the following system:

- UNIMPAIRED: within normal limits according to published norms;
- IMPAIRED: below normal limits according to published norms (see normative data reference column)
- ** No normative data is available for PALPA 39. However, Medler & Binder (2008) state that the mean frequency of items is 108 per million on PALPA 39. The frequency of items on PALPA 40 is 105 per million, and the control range is 30-100%. Therefore the same control range is applied to PALPA 39 for the purposes of this study.
- For informal assessments (Informal phonological discrimination) the following classification has been applied: UNIMPAIRED = 100%, IMPAIRED < 100%



Investigating the benefits of computer assisted home speech therapy in Wernicke aphasia

HEALTHY PARTICIPANT INFORMATION SHEET

We invite you to take part in a research project.

Before you decide to participate we want to be sure that you understand:

- What all the technical words mean
- Why we are doing it
- What it would involve

What is aphasia?

Aphasia is a language impairment which can happen following brain damage. It can affect an individual's speech, understanding, reading or writing.

What is Speech and Language Therapy?

Speech and language therapy focuses on the management of disorders of speech, language, communication and swallowing in children and adults. A Speech and Language Therapist will assess and provide therapy, if appropriate, for people with the above disorders.

What is fMRI (functional magnetic resonance imaging)?

- It is a type of brain scan which lets medical staff and researchers look at how the brain works in more detail.
- It is a very safe technique normally and does not involve x-rays.
- We can not scan people with:
 - heart pacemakers
 - ferrous metal clips
 - any embedded ferrous metal fragments

What is the study about?

Approximately 1/3 of people who have a stroke experience aphasia. There is not much known about how the brain recovers and changes during aphasia following a stroke. This study will focus on investigating auditory comprehension in those people who are healthy, and those who have an impairment in this area. It will also focus on a particular type of speech and language therapy (REACT 2). It will look at the way the brain learns and changes following this speech therapy programme, in both people who have aphasia and people who do not.

What is the REACT 2 programme?

REACT 2 is speech and language therapy which is delivered on a computer or tablet. It has been specially developed for use with adults with aphasia, as well as other people who have communication impairments. It does not replace Speech and Language Therapy but aids it. Following assessment, a Speech and Language Therapist would select sections from the programme for you to try at home. You would then regularly work through the computer programme at home. For more information on the REACT 2 programme please visit the following website: <http://www.propeller.net/react2.htm>

Why have I been asked to take part?

You are a healthy individual who does not have aphasia.

What will I have to do if I take part?

- You **MAY** be asked to participate in some assessments of your language, mood and memory.
- You **MAY** be asked to carry out the REACT 2 computer-assisted Speech and Language Therapy programme (depending on group allocation).
- You will be allocated to 1 of 4 groups. You may or may not receive therapy. If you are given therapy it may or may not benefit you directly.
 - If you are allocated to a therapy group, you will be given a tablet computer to use the programme on
 - You will be given sections of the programme to practice (selected according to your abilities)
 - A Speech and Language Therapist will show you how to use the programme.
 - You will be asked to practice the REACT 2 programme every day, for about 45 minutes a day for 3 months.
 - The computer will automatically record the amount you practice.
 - A Speech and Language Therapist will phone to check how you are getting on at home.
- You will be asked to undergo brain scans (*depending on group allocation this will be 1 or 2 sessions*)
 - You will be asked to lie on a scanner bed for up to 1 hour.
 - You will be asked to perform a task inside the scanner

each time.

- Your GP and SLT (if applicable) will be told that you are participating in this study.
- You will also be asked to come to the Western General Hospital for 1,2 or 3 visits (*depending on group allocation*):
 - Once at the beginning
 - Once after 3 months
 - Once after another 6 months

What are the assessments MAY I have to do (depending on group allocation)?

1. Assessment of your language:
 - a. Western Aphasia Battery (WAB): a battery of short tests looking at different parts of language
 - b. Peabody Picture Vocabulary Test: you will be asked to point to pictures which match the words spoken by the researcher.
 - c. Pictures/Sounds association tests: computer tests looking at your understanding.
2. Assessment of your memory:
 - a. Digit Span: repeating back series of numbers in the correct order.
 - b. Wechsler Memory Scales- Symbol Span: you will see designs in an order and will try to remember them in the same sequence.
 - c. Doors Assessment: you are shown pictures of different doors and then asked to recognise which one you have seen before out of a choice of 4.
3. Assessment of your mood:
 - a. Becks Depression Inventory: a questionnaire about your mood
 - b. DISCS (The Depression Intensity Scale Circles): you are shown 6 circles ranging from white to black and are asked to say where you are on the scale in terms of your mood.

These assessments will be given to you by a Speech and Language Therapist during two sessions (1 hour each).

Is participation in the study confidential?

Yes. Your identity will be kept totally confidential. Other than your medical care team (if applicable), only the main researcher (Anna Jones) and her supervisor (Dr Cyril Pernet) will have access to your data.

What happens to my brain scans?

- We analyse the scans on computers.
- Several people in the research team will help with this.
- We store the scans on a secure computer in case we need to assess them again.
- We may share scans with other researchers in the future.
- The university has very strict storage policies to keep data safe
- The NHS radiology department will write a report.

- This report will be sent to your GP and put in your medical records.

What happens if I am a healthy subject and you find something abnormal on the scans or tests?

- Sometimes an abnormality is found on your scan.
- The chance of this is very small.
- Your GP and NHS records will receive this information, if applicable.

Do I have to take part?

- No.

Can I stop at any time?

- Yes.
- You do not need a reason to stop.

Will being in the study affect my medical care?

- No.
- You will receive the same medical care as you are currently
- You may actually benefit from this study!

What is the benefit to me?

- You may have access to extra Speech and Language Therapy which may help you if you have a language impairment.
- You will be helping medical staff, researchers and Speech and Language Therapists to provide better care for people with aphasia.

Can I find out the results of the research?

- Yes.
- Give your address to the main researcher (Anna Jones)

Who is funding the research?

This study is funded by the SINAPSE Collaboration (www.sinapse.ac.uk), a Pooling Initiative funded by the Scottish Funding Council and the Chief Scientist Office of the Scottish Executive.

Thank you for reading this information leaflet.

PLEASE ASK ANY QUESTIONS

PLEASE TALK IT THROUGH WITH FAMILY/ FRIENDS

If you would like more information please contact:

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Investigating the benefits of computer assisted home speech therapy in aphasia

Researcher: Anna Jones

CONSENT FORM: pilots



Have you read the information sheet?		yes	no
Have you received enough information about the study?		yes	no
Have you had a chance to ask all your questions?		Yes	No
Are you happy with the answers to your questions?		yes	no
Do you understand this is voluntary?		yes	no
Do you understand that you can stop at any time with no reasons?		yes	no
Do you understand that your GP will be told that you are involved in this study?		yes	no
Do you agree to your brain scans being kept and possibly used in future studies?		yes	no
Do you agree to take part in this study?		Yes	no

Name of participant	Date	Participant's signature
Name of researcher	Date	Researcher's signature



Appendix 16: Participant consent form for Study 4 – Single word level auditory comprehension (Chapter 6).



Investigating the benefits of computer assisted home speech therapy in Wernicke aphasia

PARTICIPANT INFORMATION SHEET

We invite you to take part in a research project.

Before you decide to participate we want to be sure that you understand:

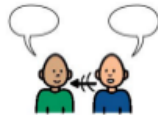
- What all the technical words mean
 - Why we are doing it
- What it would involve

What is aphasia?

Aphasia is a language impairment which can happen following brain damage. It can affect an individual's speech, understanding, reading or writing.



What is Speech and Language Therapy?



Speech and language therapy focuses on the management of disorders of speech, language, communication and swallowing in children and adults. A Speech and Language Therapist will assess and provide therapy, if appropriate, for people with the above disorders.

What is fMRI (functional magnetic resonance imaging)?

- It is a type of brain scan which lets medical staff and researchers look at how the brain works in more detail.
- It is a very safe technique normally and does not involve x-rays.



- We can not scan people with:
 - heart pacemakers
 - ferrous metal clips
 - any embedded ferrous metal fragments

What is the study about?



Approximately 1/3 of people who have a stroke experience aphasia. There is not much known about how the brain recovers and changes during aphasia following a stroke. This study will focus on a particular type of speech and language therapy (REACT 2). It will look at the way the brain learns and changes following this

speech therapy programme, in both people who have aphasia and people who do not.

What is the REACT 2 programme?



REACT 2 is speech and language therapy which is delivered on a computer or tablet. It has been specially developed for use with adults with aphasia, as well as other people who have communication impairments. It does not replace Speech and Language Therapy but aids it.

Following assessment, a Speech and Language Therapist would select sections from the programme for you to try at home. You would then regularly work through the computer programme at home.



For more information on the REACT 2 programme please visit the following website: <http://www.propeller.net/react2.htm>

Why have I been asked to take part?

1. You have had a stroke and now have aphasia.



OR

2. You are a healthy individual who does not have aphasia.



What will I have to do if I take part?

- You will be asked to participate in some assessments of your language, mood and memory.



- You **may** be asked to carry out the REACT 2 computer-assisted Speech and Language Therapy programme (depending on group allocation).

- You will be allocated to 1 of 4 groups. You may or may not receive therapy. If you are given therapy it may or may not benefit you directly.
- You will be given a tablet computer to use the programme on
- You will be given sections of the programme to practice (selected according to your abilities)



- A Speech and Language Therapist will show you how to use the programme.
- You will be asked to practice the REACT 2 programme every day, for about 45 minutes a day for 3 months.
- The computer will automatically record the amount you practice.
- A Speech and Language Therapist will phone to check how you are getting on at home.



- You **may** be asked to undergo 2 brain scans
 - You will be asked to lie on a scanner bed for up to 1 hour.
 - You will be asked to perform a task inside the scanner each time.
- Your GP and SLT (if applicable) will be told that you are participating in this study.
- You will be asked to come to the Western General Hospital for 3 visits in total:
 - Once at the beginning
 - Once after 3 months
 - Once after another 6 months



What are the assessments I will have to do?

1. Assessment of your language:
 - a. Western Aphasia Battery (WAB): a battery of short tests looking at different parts of language
 - b. Peabody Picture Vocabulary Test: you will be asked to point to pictures which match the words spoken by the researcher.
 - c. Pictures/Sounds association tests: computer tests looking at your understanding.
2. Assessment of your memory:
 - a. Digit Span: repeating back series of numbers in the correct order.
 - b. Wechsler Memory Scales- Symbol Span: you will see designs in an order and will try to remember them in the same sequence.
 - c. Doors Assessment: you are shown pictures of different doors and then asked to recognise which one you have seen before out of a choice of 4.
3. Assessment of your mood:
 - a. Becks Depression Inventory: a questionnaire about your mood
 - b. DISCS (The Depression Intensity Scale Circles): you are shown 6 circles ranging from white to black and are asked to say where you are on the scale in terms of your mood.



These assessments will be given to you by a Speech and Language Therapist during two sessions (1 hour each).

Is participation in the study confidential?

Yes. Your identity will be kept totally confidential.
Other than your medical care team, only the main researcher (Anna Jones) and her supervisor (Dr Cyril Pernet) will have access to your data.

**What happens to my brain scans?**

- We analyse the scans on computers.
- Several people in the research team will help with this.
- We store the scans on a secure computer in case we need to assess them again.
- We may share scans with other researchers in the future.
- The university has very strict storage policies to keep data safe
- The NHS radiology department will write a report.
- This report will be sent to your GP and put in your medical records.

**What happens if I am a healthy subject and you find something abnormal on the scans or tests?**

- Sometimes an abnormality is found on your scan.
- The chance of this is very small.
- Your GP and NHS records will receive this information.

**Do I have to take part?**

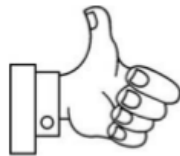
- No.

Can I stop at any time?

- Yes.
- You do not need a reason to stop.

Will being in the study affect my medical care?

- No.
- You will receive the same medical care.
- You may actually benefit from this study!

**What is the benefit to me?**

- You may have access to extra Speech and Language Therapy which may help you if you have a language impairment.
- You will be helping medical staff, researchers and Speech and Language Therapists to provide better care for people with aphasia.

Can I find out the results of the research?

- Yes.
- Give your address to the main researcher (Anna Jones)



Who is funding the research?

This study is funded by the SINAPSE Collaboration (www.sinapse.ac.uk), a Pooling Initiative funded by the Scottish Funding Council and the Chief Scientist Office of the Scottish Executive.

Thank you for reading this information leaflet.

PLEASE ASK ANY QUESTIONS



**PLEASE TALK IT THROUGH WITH FAMILY/
FRIENDS**

If you would like more information please contact:

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Appendix 17: Participant information sheet for Study 4 – Single word level auditory comprehension (Chapter 6).

Investigating the benefits of computer assisted home speech therapy in aphasia

Researcher: Anna Jones


CONSENT FORM




Have you read the information sheet?		yes	no
Have you received enough information about the study?		yes	no
Have you had a chance to ask all your questions?		Yes	No
Are you happy with the answers to your questions?		yes	no
Do you understand this is voluntary?		yes	no
Do you understand that you can stop at any time with no reasons?		yes	no
Do you understand that your medical care will NOT be affected?		yes	no
Do you understand that your GP (and SLT if applicable) will be told that you are involved in this study?		yes	no
Do you agree to have more assessments of your language, memory and mood?		Yes	no
Do you agree to the main researcher and supervisor looking at your medical notes?		Yes	no
Do you agree to have a further 2 sets of brain scans over the next year?		yes	No
Do you agree to your brain scans being kept and possibly used in future studies?		yes	no
Do you agree to take part in this study?		yes	no

Investigating the benefits of computer assisted home speech therapy in aphasia

CONSENT FORM

 I would like to receive information about the results of the research

 I would NOT like to receive information about the results of the research

_____	_____	_____
Name of participant	Date	Participant's signature
_____	_____	_____
Name of researcher	Date	Researcher's signature



Appendix 18: Participant consent form for Study 4 – Single word level auditory comprehension (Chapter 6).

Anna Jones
Brain Research Imaging Center
Division of Clinical Neurosciences
University of Edinburgh
Western General Hospital
Crewe Road
Edinburgh
EH4 2XU

Date

GP address

Dear (GP name),

R.E. Participant's name + CHI number

I am writing to inform you that (Participant's name) has agreed to participate in the following research study:

'Investigating the benefits of computer assisted home speech and language therapy in aphasia'

(Participant's name) has been invited to take part in this study because s/he has aphasia following a left perisylvian stroke.

OR

(Participant's name) has been invited to take part in this study as a healthy control subject who does not have aphasia.

The aim of the study is to look at a computer-assisted home SLT programme called 'REACT 2' (<http://www.propeller.net/react2.htm>). The study will allow us to look at the effect of computer assisted therapy on language performances as well as the way the brain learns and changes following this SLT programme. Participants will undergo all imaging and behavioural assessments at the Western General Hospital, Edinburgh.

Participants may undergo two 1hour fMRI brain scans 3 months apart. In this case, they will be asked to carry out an auditory comprehension task whilst inside the scanner. Results from these scans would then be sent to you as (participant's name) GP and any abnormal incidental findings will be flagged up.

Participants will also be asked to participate in some assessments of language, mood and memory – administered by the main researcher Anna Jones, a qualified SLT.

(Participant's name) has randomly been allocated to a group in which s/he will be asked to carry out the some modules of the REACT 2 computer assisted SLT program at home, independently, which will focus on auditory or written comprehension. S/he will be given a tablet touch-screen computer to use and will be allocated particular sections of the programme to practice. (Participant's name) will be asked to practice the REACT 2 program daily for about 45 minutes for a full 3 months. Note that following group assignment (Participant's name) may or may not directly benefit from this programme.

OR

(Participant's name) has randomly been allocated to a group in which s/he will NOT be asked to carry out the REACT 2 computer assisted SLT program

OR

(Participant's name) is a healthy control subject and will be asked to carry out the REACT 2 computer assisted SLT program at home, independently, which will focus on auditory comprehension. S/he will be given a tablet touch-screen computer to use and will be allocated particular sections of the programme to practice. (Participant's name) will be asked to practice the REACT 2 program daily for 45 minutes for a full 3 months.

Participants will also be asked to return to the Western General Hospital in 6 months for final behavioural assessments.

This study will not affect any medical care the participant is currently receiving. (Participant's name) will continue to receive normal NHS Speech and Language Therapy if applicable.

This study is being carried out as part of a PhD project. The main researcher is Anna Jones and can be contacted at the above address with any queries/ concerns.

The study is being funded by the SINAPSE collaboration (www.sinapse.ac.uk), a Pooling Initiative funded by the Scottish Funding Council and the Chief Scientist Office of the Scottish Executive.

Thank you for your time.

Yours Sincerely,

Anna Jones (Main researcher and qualified SLT)

cc. SLT if appropriate

Appendix 19: GP information letter for Study 4 – Single word level auditory comprehension (Chapter 6).

Communication, cognition and mood assessment results**Name:**

Assessment	Purpose of Assessment	Session 1: score	Session 2: score	Session 3: score
Western Aphasia Battery (WAB)	(fluency, comprehension, repetition and naming sections) to diagnose aphasia, measures its severity and type, and to look at specific impairments in more detail			
Comprehension section of WAB	Looks at your ability to understand spoken language			
Peabody Picture Vocabulary Test 4 (PPVT4)	Looks at your ability to understand spoken language			
The Visual Analogue Self-Esteem Scale (VASES)	Looks at your mood			
The Depression Intensity Scale Circles (DISCS)	Looks at your mood			
Weschler Adult Intelligence Scale - III: Digit Span Section	Looks at your verbal short-term memory (STM) and working memory (WM)			
The Doors and People Test: visual recognition	Look at your non-verbal WM			
The Wechsler Memory Scale: symbol span	Look at your non-verbal WM			
The Bell's Test	Looks at your ability to carry out visual scanning and looks at your attention skills			
PPT-KDT-TTT	Looks at your non-verbal semantics (understanding of meanings) of nouns, verbs and sequences			
Sound to picture matching test (SPMT)	Looks at your lower level non-verbal semantics (sounds)			

Appendix 20: Participant assessment feedback template for Study 4 – Single word level auditory comprehension (Chapter 6).

Feedback sheet

NAME:

1. Did you carry out the react2 therapy?



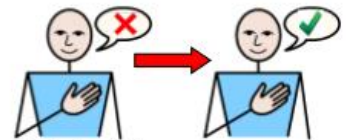
- a. If YES go to question 2
- b. If NO go to question 11

2. Do you have aphasia?

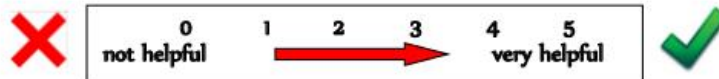


- a. If YES go to question 3
- b. If NO go to question 7

3. Do you feel like the react2 therapy helped you?



Please indicate how much react2 therapy helped you using the scale below (please circle):



a. Understanding of what other people say
0 1 2 3 4 5



b. Reading
0 1 2 3 4 5



c. Speaking
0 1 2 3 4 5



d. Memory
0 1 2 3 4 5



Any comments? ...

4. Did you want to keep using the react2 therapy after the 3 months?



YES



NO



Please explain: ...

5. Had you used the react2 therapy before this trial?



YES



NO



Please give details: ...

6. Would you consider buying the react2 therapy to continue your therapy in this way?



YES



NO



Please explain: ...

7. Did you need help to carry out the react2 therapy?



YES



NO



Please explain: ...

8. Did you like being able to do the therapy anywhere and at anytime you wanted?



YES



NO



Please explain: ...

9. Did you enjoy carrying out the react2 therapy?



YES



NO

Please explain: ...



10. Was there anything you would change about the react2 therapy?



YES



NO

Please explain: ...



11. Was the touch-screen 'Fizzbook' computer good?



YES



NO

Please explain: ...



12. If you have any comments on the brain scans you underwent please state them here: ...



13. If you have any comments about the assessments you underwent please state them here: ...



14. If you have any comments about the way the study was conducted please state them here: ..



15. Please leave any further comments below: ..



Appendix 21: Study feedback sheet for Study 4 – Single word level auditory comprehension (Chapter 6).

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