UNIVERSITY OF BIRMINGHAM
APPLICATION FOR ETHICAL REVIEW

Who should use this form:

This form is to be completed by PIs or supervisors (for PGR student research) who have completed the University of Birmingham's Ethical Review of Research Self Assessment Form (SAF) and have decided that further ethical review and approval is required before the commencement of a given Research Project.

Please be aware that all new research projects undertaken by postgraduate research (PGR) students first registered as from 1st September 2008 will be subject to the University's Ethical Review Process. PGR students first registered before 1st September 2008 should refer to their Department/School/College for further advice.

Researchers in the following categories are to use this form:

1. The project is to be conducted by:
    - staff of the University of Birmingham; or
    - a research postgraduate student enrolled at the University of Birmingham (to be completed by the student's supervisor);
2. The project is to be conducted at the University of Birmingham by visiting researchers.

Students undertaking undergraduate projects and taught postgraduates should refer to their Department/School for advice.

NOTES:

- Answers to questions must be entered in the space provided.
- An electronic version of the completed form should be submitted to the Research Ethics Officer, at the following email address: aer-ethics@contacts.bham.ac.uk. Please **do not** submit paper copies.
- If, in any section, you find that you have insufficient space, or you wish to supply additional material not specifically requested by the form, please it in a separate file, clearly marked and attached to the submission email.

➢ If you have any queries about the form, please address them to the Research Ethics Team.

X Before submitting, please tick this box to confirm that you have consulted and understood the following information and guidance and that you have taken it into account when completing your application:

- **The information and guidance provided on the University's ethics webpages (http://www.rcs.bham.ac.uk/ethics/index.shtml)**
- **The University's Code of Practice for Research (http://www.as.bham.ac.uk/legislation/docs/COP_Research.pdf)**

UNIVERSITY OF BIRMINGHAM **APPLICATION FOR ETHICAL REVIEW**	*OFFICE USE ONLY:* Application No: **ERN_14-0073** Date Received:

1. TITLE OF PROJECT

CogWatch - grooming

2. THIS PROJECT IS:

University of Birmingham Staff Research project **X**
University of Birmingham Postgraduate Research (PGR) Student project ☐
Other ☐ (Please specify):

3. INVESTIGATORS

a) PLEASE GIVE DETAILS OF THE PRINCIPAL INVESTIGATORS OR SUPERVISORS (FOR PGR STUDENT PROJECTS)

Name: Title / first name / family name	Dr Pia Rotshtein
Highest qualification & position held:	PhD, Lecturer
School/Department	Psychology
Telephone:	0121 414 2879
Email address:	p.rotshtein@bham.ac.uk

Name: Title / first name / family name	Professor Alan Wing
Highest qualification & position held:	PhD, Chair
School/Department	Psychology
Telephone:	
Email address:	A.Wing@bham.ac.uk

b) PLEASE GIVE DETAILS OF ANY CO-INVESTIGATORS OR CO-SUPERVISORS (FOR PGR STUDENT PROJECTS)

	Dr Micheal Larkin
	PhD, Chair
	Psychology
	m.larkin@bham.ac.uk

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c) In the case of PGR student projects, please give details of the student

Name of student:	Victoria Caines	Student No:	1099437
Course of study:	MRes Clinical Psychology	Email address:	VXC337@bham.ac.uk
Principal supervisor:	Pia Rotshtein		

Name of student:	Diar Abdlkarim	Student No:	932992
Course of study:	MRes	Email address:	diarkarim@gmail.com
Principal supervisor:	Pia Rotshtein		

4. ESTIMATED START OF PROJECT Date: 14-2-2014

ESTIMATED END OF PROJECT Date: 31-6-2015

5. FUNDING

List the funding sources (including internal sources) and give the status of each source.

Funding Body	*Approved/Pending /To be submitted*
FP7 CogWatch: A European collaborative projects. http://www.cogwatch.eu/	Approved

If applicable, please identify date within which the funding body requires acceptance of award:

Date:

If the funding body requires ethical review of the research proposal at application for funding please provide date of deadline for funding application:

Date:

6. SUMMARY OF PROJECT

Describe the purpose, background rationale for the proposed project, as well as the hypotheses/research questions to be examined and expected outcomes. This description should be in everyday language that is free from jargon. Please explain any technical terms or discipline-specific phrases.

After a stroke, patients can suffer from a wide range of problems depending on which area of their brain is affected. Physical impairments, such as problems with motor movements, vision or balance, are addressed with physical therapy. Cognitive impairments, such as problems with language, memory or problem solving are harder to identify and may be overlooked during a patient's rehabilitation. These later cognitive problems often have negative impact on patients' wellbeing. 'Apraxia and Action Disorganisation Syndrome' (AADS) is a common disorder following stroke. Patients who suffer from AADS have trouble performing ordered sequences of movements, such as those required to make a cup of tea or to brush their teeth. Even patients with normal movement of their hands and arms find themselves unable to complete everyday activities because they cannot execute the correct sequence of movements necessary to complete a task or have difficulty in controling the way their upper limbs move. In the UK as many as 68% of stroke patients have problems typical of AADS (Bickeron et al., 2012). AADS can have a significant effect on a patient's recovery after stroke (Bickeron et al., 2012) and on their ability to live independent lives in their own homes.

The cogwatch system is aimed to create a computer user interface (CUI) that will support patients in their daily activities (http://www.cogwatch.eu/). In brief, the system uses intelligent objects, motion tracking technology (kinect) and auditory information to infer on patients behaviour. This information is analysed and if needed the system provide a cue to guide the patients through the correct sequence of actions. In the first prototype of Cogwatch, we focused on tea making (ERN_12-0683). The current application refers to prototype 2 of the project which deals with grooming activities.

Grooming was selected as the target task for prototype II based on a field research. A qualitative study that we conducted (ERN_13-0414), assessed patients and carers most desired needs. We found that both patients and their carers reported that CUI support will be best valued if it centred on daily activities of grooming, such as tooth brushing, hair brushing, dressing up etc. Patients indicated that a CUI that support activity of grooming will enhance their autonomous feeling.

Grooming as opposed to tea making requires the ability to control actions that involve the interaction between the hand and the body. This type of movement cannot be guided through vision. Even if visual information is provided i.e. a mirror. However, guiding movement from mirror is non-trivial task and requires extensive training. Jax et al. (2006) demonstrate that vision play an important role in guiding one owns movements when imitating. It is therefore not surprising that AADS patients find it particularly challenging to perform hand gestures toward their face, e.g. tough the tip of the nose (Goldenberg, 2013 Book Title: Apraxia: the cognitive Side of a motor control, Oxford).

Based on the above, the task chosen for the Cogwtach prototype 2 is tooth brushing. Similar to application ERN_12-0683 the first phase aims to collect data in support of the development of the CUI system. This will be done through a series of research projects. The data that we will collect:

7. CONDUCT OF PROJECT

Please give a description of the research methodology that will be used

Phase 1:

1) Collecting data on how people brush teeth.

Three groups of participants will be tested:

i) Healthy young students
ii) Healthy elderly
iii) Dental hygiene experts (/students) from the school of dentistry

procedure: Participants will be asked:

1) To brush their teeth with their right and left hand as they would normally do.
2) To brush their teeth with their right and left hand after reading the NHS guidelines for the proper procedure http://www.nhs.uk/Livewell/dentalhealth/Pages/Teethcleaningguide.aspx.

Tooth brushing will be performed in psychoogy's neuro-rehabilitation lab which had a sink and an in-built kitchen.

Data recorded:

1) motion tracking of the hand and the toothbrush
2) video
3) kinect
4) audio information from 2 microphones, one places on the toothbrush and another is attached to the participants head (similar to the head set used in mobile conversations).
5) data from instrumented objects (tooth brush, tooth paste, glass)

2) collecting data from AADS patients,

We will recruit two patients groups from our patients panel which we have screened (see application 12-0683 and NHS ethical approval):

1) patients who failed our screen and hence are diagnosed as AADS
2) As a control group, we will also recruit patients who did not fail the screen, and hence are not diagnosed as having AADS.

procedure: Patients will be asked:

1) To brush their teeth as they would normally do.
2) To brush their teeth after reading the NHS guidelines for the proper procedure http://www.nhs.uk/Livewell/dentalhealth/Pages/Teethcleaningguide.aspx.

Tooth brushing will be performed in psychoogy's neuro-rehabilitation lab which had a sink and an in-built kitchen.

Data recorded:

We will record for the patients the same data we recorded for the healthy above.

3) Testing cuing efficacy:

Study 3a: pantomime gestures

Participants: Experimental group: patients who failed the imitation task in the screening
Control groups: patients how did not fail the imitation task in the screening
Healthy young and elderly controls
Tasks: During the pre & post gesture production tests: the task will be to perform the required gesture based on the given cue (verbal or video).
During the recognition training phases the task will be to judge whether a gesture was correct or incorrect.

Performances during the pre & post tests will be recorded using video and motion capture.
Performance during the recognition training phase will be recorded using a computer keyboard and include response times & accuracy.
Analysis: Pre & post tests: Motion tracking data will be analysed using matlab to establish the similarity and accuracy of the gesture to the cues. The video will be analysed using 20 independent raters. Their task will be to provide qualitative (e.g. identify the gesture) as well as quantitative (e.g. how accurate is the movement) rating for each gesture.

Study 3b: **guiding an object to various target locations**
Many grooming activities involve the use of tools when interacting with the body (e.g. tooth brushing, shaving, hair brushing). Therefore in order to succeed in completing a grooming task, one needs to be able to guide the tool to a specific target location. The aim of the current project will be to test factors that affect the ability to guide object to different locations in space. We would assess two factors: the location of the target: 1) on the upper body part; 2) on a table; and the presence of visual feedback in addition to the proprioceptive cues (own sensory feedback).
Tasks: four targets will appear on random locations on a monitor screen. These will be mapped to virtual targets on the table or on the upper body torso. Participants need to move their hand till they reached the four targets as quickly as possible.
Participants: Young and elderly healthy controls
Neurological patients displaying AADS and not suffering from AADS.
measurements:
1) motion tracking
2) video
3) eye tracking

Study 3c: testing cueing for tooth brushing.
The experiment will involve few conditions that aim to test the most effective cues that could guide a healthy volunteer or patients for correct using the bristle when brushing the teeth.
The following cues:
1) a video of a person that correctly brush the teeth – the instruction will be to imitate this person movements
2) An animated schematic cartoon image of the teeth. The tooth display will change colour as function of time spent at a given location, and the way the brush move. For example: the tooth on the

8. DOES THE PROJECT INVOLVE PARTICIPATION OF PEOPLE OTHER THAN THE RESEARCHERS AND SUPERVISORS?

Yes **x** No ☐

Note: ”Participation” includes both active participation (such as when participants take part in an interview) and cases where participants take part in the study without their knowledge and consent at the time (for example, in crowd behaviour research).

If you have answered NO please go to Section 18 . If you have answered YES to this question please complete all the following sections.

9. PARTICIPANTS AS THE SUBJECTS OF THE RESEARCH

Describe the number of participants and important characteristics (such as age, gender, location, affiliation, level of fitness, intellectual ability etc.). Specify any inclusion/exclusion criteria to be used.

Participants:
Phase 1:
Normative data (study 1)
30 young healthy participants recruited through the RPS, no age restriction.
30 elderly (<60y) healthy participants recruited from the school of psychology panel.
30 dentistry experts (students and practitioner) will be recruited trough the school of dentistry, UoB.
Patient data (study 2)
20 patients diagnosed with AADS, based on our screen. 20 patients who do not suffer from AADS

Neurological patients will be recruited from the School of Psychology patients' panel and from stroke support group. New patients will be first screened using the Cogwatch screen procedure ERN_12-0683. In brief the screen is based on 1) the apraxia tests within the Birmingham Cognitive Screen (BCoS, http://www.cognitionmatters.org.uk/). These tests assess gesture production, imitation, and recognition, ability to copy a complex figure and ability to assemble a torch. Cogwatch include additional two everyday tasks in its screening procedure: make two cups of tea to specification and a filing task.

Cuing experiments (study 3a-c).

Experimental group:

1) 20 Neurological patients who suffer from apraxia or action disorganization syndrome. These patients experience cognitive deficits that affect their ability to perform everyday tasks. Tasks that they were previously able to perform automatically. Diagnosis will be made based on their performance on the BCoS Aparxia section (Bickerton et a., 2012; www.bcos.bham.ac.uk). As above, these patients will be recruited from the School of Psychology patients panel and stroke club. These are likely to be the same patients hwo participated in the above study

Control groups:

2) 20 Young healthy participants age range 18-30 years
3) 20 Elderly healthy participants – age range 60 – 90 years.
4) 20 Neurological patients who do not show problems typically associated with apraxia or action disorganization disorder. As above, these are likely to be patients who participated in the above study

10 students will be used for the rating of the gesture quality.

Phase 2: testing the cogwatch 2 efficacy.
15 patients who have or report difficulty in brushing their teeth will be invited to use the system in the lab while brushing their teeth. These are likely to be patients who have participated in the study above

10. RECRUITMENT

Please state clearly how the participants will be identified, approached and recruited. Include any relationship between the investigator(s) and participant(s) (e.g. instructor-student).

Note: Attach a copy of any poster(s), advertisement(s) or letter(s) to be used for recruitment.

Participants Recruitment

Young healthy participants will be recruited through: i) the research participation scheme and ii) advertisement in JobZone (http://www.guildofstudents.com/content/index.php?page=29305).

Text used to recruit young participants through JobZone or the RPS

Study 1&3c: teeth brushing -CREDITS OR MONEY £4!

We are working on designing a new system that will provide on-line support for tooth brushing for stroke patients. WE NNED YOU! To learn how people typically brush their teeth. We would ask you to brush your teeth in the lab while we record your behaviour using video, kinect, motion tracking, microphones and intelligent objects. You will be provided with a new toothbrush. Duration 30 minutes. Researcher Rosanna Laverick, e-mail: r.Laverick@bham.ac.uk

Study 3a: 'Pantomiming task' -CREDITS OR MONEY £7! The Study involves motioning with your fingers, either on your own face or an imaginary face, shapes or gestures presented to you by a verbal prompt or human demonstration. Duration 60 minutes. Researcher Victoria Caines Email VXC337@bham.ac.uk

Study 3a: rating gestures: credits or money £3 The study will involve viewing gestures clips on a monitor screen and assessing how accurate they are. The experiment will last 30min

Study 3b: finding and reaching a target task - CREDITS OR MONEY £7!. The study involves navigating an object toward a target on your upper body or on a table using on-line feedback from a computer monitor. It is fun! The duration of the experiment is 60 min.

Expert participants will be recruited from the dental school. An e-mail for undergraduate students will be distributed by the head of the hygiene education. The content of the e-mail will match the content for study 1&3 see above. Student will be invited to contact the research if they are interested in taking part. We would offer them £6 rather than £4, as their participation is likely to involve traveling.

Elderly healthy participants will be recruited from: i) the School of Psychology's database (Bham Panel) for volunteer participants and ii) through recruitment posters that would be presented on public note boards. (see Appendix 1a)

Neurological patients will be recruited from: i) the School of Psychology's database of patients (Bham Panel). These patients volunteer on a regular base to take part in experiments run in the school.

ii) through announcements and posters distributed by the stroke association (see Appendix 1b)

Recruitments of patients or elderly from the regular panel will be done by phone, or during one of their regular visits. There will be no fix script to follow, but the conversion will include the following information: "We are conducting a new research project that aim to understand how various neurological conditions, such as stroke affect patients' ability to execute everyday life activities. The experiment will involve performing task with real objects and a test performed on a computer. A session will last about 2hours and if needed transport will be provided (this will be offered only for patients). If you are interested to take part in this research project we would send you (or hand them on the spot) an information letter explaining the project in more details. Following this letter we would contact you again to hear your response and if interested we would schedule a testing session."

11. CONSENT

a) Describe the process that the investigator(s) will be using to obtain valid consent. If consent is not to be obtained explain why**.** If the participants are minors or for other reasons are not competent to consent, describe the proposed alternate source of consent, including any permission / information letter to be provided to the person(s) providing the consent.

Consent is obtained in two steps:

1) Patients and elderly controls form the Bham panel. Initial phone contact with the participant is made by Denise Clissett who is the participant coordinator of the panel. She will provide initial introduction of the study. She would explain that we are recruiting participants for experiments that investigate the way people brush their teeth/ ability to pantomime gestures/ reaching for a target. If the participants (healthy or patients) are interested in taking part, she would schedule a meeting for them. In addition she would post for them the study information sheet (see Appendix 2).
2) At the beginning of the experimental session the experimenter will present the information sheet to all participants (including the young healthy) and would discussed it with them. Participants would then be asked to sign the consent form (Appendix 3).

Note: Attach a copy of the Participant Information Sheet (if applicable), the Consent Form (if applicable), the content of any telephone script (if applicable) and any other material that will be used in the consent process.

b) Will the participants be deceived in any way about the purpose of the study? **Yes** ☐ **No x**

If yes, please describe the nature and extent of the deception involved. Include how and when the deception will be revealed, and who will administer this feedback.

12. PARTICIPANT FEEDBACK

Explain what feedback/ information will be provided to the participants after participation in the research. (For example, a more complete description of the purpose of the research, or access to the results of the research).

At the end of the experiment participants would be debriefed. They would be asked the following questions: 1) how they felt during the experiment, 2) whether the recording equipment and the monitor of their behaviour was uncomfortable in anyway, and 3) how do they think they performed.
They would receive verbal feedback on their accuracy and if needed their errors would be explained to them.

13. PARTICIPANT WITHDRAWAL

a) Describe how the participants will be informed of their right to withdraw from the project.

Participants would be informed that they can withdraw at anytime during the experiment, without the need for explaining or giving any reasons.

b) Explain any consequences for the participant of withdrawing from the study and indicate what will be done with the participant's data if they withdraw.

If the participant asked to withdraw, then they will be asked if they want their data to be deleted from the study. We would delete their data, if the participants asked for this to be done. There will be no consequences for withdrawal.

14. COMPENSATION

Will participants receive compensation for participation?

i) Financial **Yes x No ☐**

ii) Non-financial **Yes x No ☐**

If **Yes** to **either** i) or ii) above, please provide details.

Compensation:
All participants would be offered £7 per hour of participation. If patient a taxi service will be offered as a mean of transport to the University.

If participants choose to withdraw, how will you deal with compensation?

Participants will be compensated for the time they have spent till they withdraw and/or for their travel expenses if needed.

15. CONFIDENTIALITY

a) Will all participants be anonymous? **Yes ☐ No x**

b) Will all data be treated as confidential? **Yes x No ☐**

Note: Participants' identity/data will be confidential if an assigned ID code or number is used, but it will not be anonymous. Anonymous data cannot be traced back to an individual participant.

Describe the procedures to be used to ensure anonymity of participants and/or confidentiality of data both during the conduct of the research and in the release of its findings.

All participants will be given an ID number, and would be identified throughout the study using this number. The indexing of personal details, consent forms and ID numbers will be kept separately from the data in a lock file cabinet. However, given the nature of the data participant's faces will be recorded in the video. Hence we cannot guarantee complete anonymity. These video will be kept in a password secured server and would be viewed only by the researchers directly involved. Participants will be inform of that in advance and would be asked to explicitly consent for the data to be recorded via video.

If participant anonymity or confidentiality is not appropriate to this research project, explain, providing details of how all participants will be advised of the fact that data will not be anonymous or confidential.

1) The data include videos of the participants performing the tasks. Hence the data cannot be completely anonymous. Participants would be informed that their performances would be recorded in video (see Appendix 2), and would be explicitly asked to agree to that in the consent forms (Appendix 3).
3) We may present part of the individual data on the project web page which is available for the general public. Participants would be explicitly asked for permission to do so (Appendix 3).

16. STORAGE, ACCESS AND DISPOSAL OF DATA

Describe what research data will be stored, where, for what period of time, the measures that will be put in place to ensure security of the data, who will have access to the data, and the method and timing of disposal of the data.

The data would be stored in password locked computers. The data will be accessed only by researchers in the University of Birmingham that are involved in the CogWatch project. At the end of the project the data would be backed-up to a hard drive and kept for 10years.

17. OTHER APPROVALS REQUIRED? e.g. Criminal Records Bureau (CRB) checks

☐ YES ☐ NO x NOT APPLICABLE

If yes, please specify.

18. SIGNIFICANCE/BENEFITS

Outline the potential significance and/or benefits of the research

The current research project would provide initial data to support the development of the CogWatch system. Cogwatch aims to help and provide support for the rehabilitation of AADS patients, enabling them to regain their ability to perform activities of daily living. The current project will provide both normative data on parameters that characterised normal performances across ages of everyday life activities and the type of errors that patients are likely to make.
In addition, it would facilitate patient assessment. There is no current systematic assessment and classification of AADS patients. As no reliable data is available. We would provide systematic assessment and classification of AADS patients' ability to select objects.

19. RISKS

a) Outline any potential risks to **INDIVIDUALS**, including research staff, research participants, other individuals not involved in the research and the measures that will be taken to minimise any risks and the procedures to be adopted in the event of mishap

There are minimal risks involved in this research as all data collecting methods are non-invasive. Participants are asked to performed tasks with objects that they are likely to encounter in their everyday life.

However, given that some experiments in this proposal involve tooth brushing. There is a potential risk of contamination for both the researchers and the participants. To account for that we have conducted a self-assessment risk procedure (appendix 4). As noted in Appendix 4: we have implemented the following procedures: researchers will wear gloves; all materials will be thoroughly washed and disinfected after each participant; each participant will be given a new toothbrush, and participants will be given anti-bacterial hand gel to be used before and after the testing.

An additional potential risk of tooth brushing is that we may expose participants to excessive brushing which can damage the tooth enamel. To minimize that we would: 1) use soft bristles only, 2) advice participants not to consume any acidic drinks or food 2h before the experiment and 3) would insure participants do not brush their teeth more than four times in a visit.

Some patients may become frustrated, if failing to complete the tasks adequately. In cases like that the experimenter and a more senior member of the research team will meet with the participant and would discuss in more details the aim of the research and how it may help to support their rehabilitation process. The patients would be asked again if s/he is willing to continue with the study and would be offered to come to additional sessions for further trainings.

If a patient experience further stress and discomfort or struggle to with the tasks they would be offered to contact the Stroke Support West Midlands organization (Tel: 01902373602; e-mail: strokesupportwestmidlands@gmail.com; web: https://sites.google.com/site/strokesupportwestmidlands/; or contact our research collaborators Headwise (www.headwise.org.uk/cogwatch.htm) who specialised in rehabilitation and clinical services.

b) Outline any potential risks to **THE ENVIRONMENT and/or SOCIETY** and the measures that will be taken to minimise any risks and the procedures to be adopted in the event of mishap.

NA

20. ARE THERE ANY OTHER ETHICAL ISSUES RAISED BY THE RESEARCH?

Yes ☐ No x

If yes, please specify

21. CHECKLIST

Please mark if the study involves any of the following:

- Vulnerable groups, such as children and young people aged under 18 years, those with learning disability, or cognitive impairments **x**
- Research that induces or results in or causes anxiety, stress, pain or physical discomfort, or poses a risk of harm to participants (which is more than is expected from everyday life) ☐
- Risk to the personal safety of the researcher ☐
- Deception or research that is conducted without full and informed consent of the participants at time study is carried out ☐
- Administration of a chemical agent or vaccines or other substances (including vitamins or food substances) to human participants. ☐
- Production and/or use of genetically modified plants or microbes ☐
- Results that may have an adverse impact on the environment or food safety ☐
- Results that may be used to develop chemical or biological weapons ☐

Please check that the following documents are attached to your application.

	ATTACHED	NOT APPLICABLE
Recruitment advertisement	X	☐
Participant information sheet	X	☐
Consent form	X	☐
Questionnaire	☐	☐
Interview Schedule	☐	☐
Experimental protocols	X	

22. DECLARATION BY APPLICANTS

I submit this application on the basis that the information it contains is confidential and will be used by the University of Birmingham for the purposes of ethical review and monitoring of the research project described herein, and to satisfy reporting requirements to regulatory bodies. The information will not be used for any other purpose without my prior consent.

I declare that:

- The information in this form together with any accompanying information is complete and correct to the best of my knowledge and belief and I take full responsibility for it.
- I undertake to abide by University Code of Practice for Research (http://www.as.bham.ac.uk/legislation/docs/COP_Research.pdf) alongside any other relevant professional bodies' codes of conduct and/or ethical guidelines.
- I will report any changes affecting the ethical aspects of the project to the University of Birmingham Research Ethics Officer.
- I will report any adverse or unforeseen events which occur to the relevant Ethics Committee via the University of Birmingham Research Ethics Officer.

Name of Principal investigator/project supervisor:	Pia Rotshtein
Date:	

Please now save your completed form, print a copy for your records, and then email a copy to the Research Ethics Officer, at aer-ethics@contacts.bham.ac.uk. As noted above, please do not submit a paper copy.

Appendix 1: recruitment posters

COG WATCH

Cognitive Rehabilitation of Apraxia & Action Disorganisation Syndrome

The problem

Many stroke survivors suffer from **problems with mental processes** such as language, attention and memory.

The **CogWatch** project aims to help stroke patients who have trouble performing **ordered sequences of movements**, such as those required to make a cup of tea. These patients are diagnosed as suffering from apraxia and action disorganization syndrome (AADS)

How will CogWatch help?

The **CogWatch** researchers are investigating the specific problems faced by AADS patients and developing **new technologies** to assist them with their daily activities.

If **CogWatch** is successful it has the potential to:

- enable stroke patients with AADS to overcome the mental challenges that impair their daily lives
- improve their quality of life in the long term.

B) To be distributed by the stroke association

CogWatch

CogWatch

Developing rehabilitation tools for stroke survivors with mental difficulties

The problem

Many stroke survivors suffer from **problems with mental processes** such as language, attention and memory. These difficulties are harder to identify than the physical symptoms of stroke and often get overlooked during a patient's rehabilitation.

Mental difficulties can have a very **negative impact** on a stroke survivor's quality of life and can increase their **dependence** on family members for daily support.

The CogWatch project aims to help stroke patients who have trouble performing **ordered sequences of movements**, such as those required to make a cup of tea or to brush their teeth. These patients may have normal movement of their hands and arms but struggle to complete everyday activities because they cannot execute the correct sequence of movements necessary to complete a task.

This type of impairment is termed 'Apraxia and Action Disorganisation Syndrome' (AADS) by doctors and, although it is hard to diagnose, it is quite common. Recently, scientists in the UK found that perhaps as many as 68% of stroke patients have problems typical of AADS.

CogWatch is funded by the European Union and coordinated by the University of Birmingham.

SEVENTH FRAMEWORK PROGRAMME

How will CogWatch help?

The CogWatch researchers are investigating the specific problems faced by AADS patients and developing **new technologies** to assist them with their daily activities.

The ultimate aim is to develop a personalised rehabilitation system that can be installed into the homes of stroke survivors. It will silently monitor them as they go about their daily routine and provide helpful and relevant information to guide them when they make errors.

COG WATCH
Cognitive Rehabilitation of Apraxia & Action Disorganisation Syndrome

If CogWatch is successful it has the potential to:

- **enable stroke patients with AADS to overcome the mental challenges that impair their daily lives**
- **improve their quality of life in the long term.**

The CogWatch partners

University of Birmingham · Technische Universität München · BMT Group · RGB · headwise · Stroke association

How will CogWatch work?

The system will use 'intelligent' everyday objects, like cutlery or a tea kettle, that contain sensors to monitor orientation, motion and grip strength. A central processing system will wirelessly collect the object data and combine it to assess how the objects are being held and used.

During a task, such as making a cup of tea, the system will track the actions of the user through the intelligent tools. When an error is detected, it will notify the user and provide guidance to assist them in completing the task.

Guidance could be in the form of relevant images on a display screen, audible sounds or instructions, or the physical vibration of a wrist watch.

The CogWatch system will:

- **Guide user actions to help complete daily tasks.**
- **Make users more aware of the mental errors they commit.**
- **Help users learn to overcome their errors.**
- **Alert users if their safety is at risk**

Do you want to help?

We are looking for stroke survivors who experience problems with completing everyday tasks to participate in our research.
If you live in the West Midlands area and would like to move information, please contact:
Denise Clissett at the University of Birmingham.
Phone: 0121 414 4932
Email: D.Clissett@bham.ac.uk

Appendix 2: Participants' information sheet

UNIVERSITY OF BIRMINGHAM
SyMon Lab, Hills Building
School of Psychology
University of Birmingham
Edgbaston, Birmingham B15 2TT
Tel: 0121 414 4932

Participants' Information Sheet

You are receiving this letter because you have agreed to take part in this research following a phone conversation with Denise Clissett (Participants coordinator) from the School of Psychology, University of Birmingham. We would first like to thank you for agreeing to help us with this research. Below you would find more information about the research, what it involves and the expected outcomes.

What is CogWatch?

CogWatch is a European Commission funded research project whose aim is to enhance the rehabilitation of stroke patients, a third of whom will experience long term physiological and/or cognitive disabilities.

A significant proportion of these patients can suffer from Apraxia or Action Disorganisation Syndrome (AADS) which, is characterised by an impairment of cognitive abilities to carry out activities of daily living (ADL).

CogWatch is co-ordinated by the University of Birmingham, and will develop advanced and intelligent, common objects and tools which will help to re-train patients in how to carry out ADL, by providing persistent multimodal feedback to them.

Who is conducting the research?

This research is conducted by a team of researchers from the School of Psychology, University of Birmingham in collaboration with researcher groups in Munich, Germany and Madrid, Spain. The Psychology Birmingham team is led by Prof Alan Wing, Prof Glyn Humphreys and Dr Pia Rotshtein. The actual experiments would be carried out by Rosanna Laverick and Bogna Drozdowska, Victoria Caines, Diar Abdlkarim. The research would be conducted in the SyMon lab located in the Hills building.

What does the research involve?

The content of this page will change depending on the specific study that participants are recruited for (tooth brushing/pantomime an action/raters for pantomime actions/ reaching to a targets)

Tooth brushing

The current research aims to understand how we performed activities of daily living. The research would focus on brushing teeth. Brushing the teeth is a major challenge for stroke survivor. Therefore we aim to develop a system that could support and guide them. For that we need your help. The experiment will simply involve you brushing your teeth in the lab. You would be given a new toothbrush and towel. While you brush your teeth we would record your hand movement using motions captures attached to you wrist and head, record you movement using video camera and Kinect and record the sounds of your brushing using two small microphones and record your eye gaze. The experiment will last 30min. In addition we would test the effectiveness of various ways of guiding people while they are brushing their teeth: 1) reading NHS guidelines; 2) imitating someone else actions; 3) using a schematic mouth to indicate locations that need to be brushed in the mouth.

To insure no damage is done to your teeth, we ask you, as recommended by the NHS to avoid consuming acidic drinks and food 2h before the experiment.

Pantomime an action

The experiment will include three parts. In the first part you would ask to produce a gesture, either by imitating an actor or following a written verbal command presented on the screen. In the second part you be presented with gestures preform by other actors, as they attempt to imitate or execute a verbal

command. Your task will be to judge how accurate are the gestures? The final art will be a repetition of the first part. The experiment will take about 1h. We would collect video recording and motion capture data while you produce gestures, and collect your response time and accuracy when you judge other people data.

Raters for pantomime actions

The experiment will involve rating gestures presented on a computer monitor on various parameters. Such as accuracy, movement cleanness etc… The experiment will last 30min.

Reaching to a target

You would be sited in front of a computer monitor. The monitor will present 3-4 targets on the screen. These targets are mapped to virtual targets on the table in one condition or on your upper body part on another condition. Your task is to move your hand toward the targets is the most accurate and fast way. Your vision of your moving hand will be occluded, so you can only rely on information from your hand on its estimated location in space, or from the monitor screen.

While you are doing the task we would record your motion by placing one electrode on your wrist and three electrodes on your upper body, forehead and two shoulders.

If you have participated in research in the School of Psychology before, we will ask your permeation to access pervious data that was collected with you by research in the School. This specifically applies for brain imaging data behavioural data collected as part of the BCoS screen.

Are there any risks involved?

The experiment involves performing activities that you are likely to carry out routinely at home. Hence we do not anticipate that it would expose you to any risks beyond those which are expected in everyday life. Furthermore, all measurements are non-invasive and do not pose any danger.

For brushing teeth only: However, brushing teeth in the lab may expose to contamination and excessive brushing risk. To avoid contamination we would make sure that you brush with a new tooth brush and use a new towel to clean yourself; furthermore all materials used are thoroughly cleaned and disinfected after every participant. To avoid excessive brushing which can damage your teeth enamel, we would only use soft bristle and would ask you to avoid consuming acidic drinks or food 2h before the study. We would also ask you to brush your teeth maximum 4 times.

Why am I invited to participate in this research?

This research investigates the way people perform activities of daily leaving. We are interested to learn how healthy participants perform these activities and how patients who suffered a stroke or from any other neurological condition performs these daily activities. Therefore you are invited either because you have a neurological condition or because you are neurologically healthy.

Is the data anonymous?

Your personal details will be kept separately from the data in a locked file cabinet. You will be identified throughout the study using a random generated ID number. We will record your gender, age and health condition. However, as the sessions are being video recorded, it is impossible to keep the data completely anonymous, as the video will include information about your face, limbs, torso and possibly of your voice.

What will you do with my data?

The analysed data will be presented in scientific conferences and reported in scientific journals. We may also present the data on our web page www.cogwatch.eu. Again if do not want your individual data be presented on the web page, please insure to tick the appropriate box in the consent form.

Would I be compensated for my time?

You would receive £7 per hour to compensate you for the time you spent participated in the study, or equivalent of course credits if you prefer

Can I withdraw from the study?

You can withdraw from the study, or parts of it, at anytime without the need to give any reason or justification. There will be no consequences for your

withdrawal. You can also ask to withdraw all your data, or part of your data at any time before the project is completed. If you decide to withdraw, you would be compensated according to the time you spent doing the study till you withdraw.

What shall I do next?

Your scheduled appointment is on the _____.

Please arrive to the reception of the School of Psychology, at the Hills building, University of Birmingham. If you decide that you are not interested to take part in this research please let us know as soon as possible.

For more details:

If you required any more details please feel free to contact us:

Ms. Denise Clissett 0121 414 4932; D.Clissett@bham.ac.uk

Dr. Pia Rotshtein 0121 414 2879; P.Rotshtein@bham.ac.uk

Appendix 3: Consent form

UNIVERSITY OF BIRMINGHAM
SyMon Lab, Hills Building
School of Psychology
University of Birmingham
Edgbaston, Birmingham B15 2TT
Tel: 0121 414 4932

Consent form

Please circle which studies you are participating in:
Toot brushing/ pantomime an action/ raters of pantomimed action/ reaching a target

Name:_____ **Date of Birth:** _____

Gender: Female / Male **Handedness: Right / Left**

	yes	No
I have read the information sheet		
I have received enough information about the study		
I had a chance to ask questions		
I have received satisfactory answers to my questions		
I understand that I am free to leave the study: · at any time? · without having to give a reason for leaving? · without affecting my medical care?		
I agree that my hand movements and eye gaze be recorded		

I agree that my hand and gaze movement data be presented on the cogwatch webpage and be made available to the general public.		
I agree that my session will be video taped		
I understand that the videos will include information that can identify me		
I agree that my data from the videos be presented on the cogwatch webpage and be made available to the general public.		
I agree that the sounds of my actions be recorded		
I agree that my data from the audio sounds be presented on the cogwatch webpage and be made available to the general public.		
If applicable, I understand the potential mild risks involve in brushing the teeth in a lab environment		
If applicable, I agree that the current research will use brain-MRI and BCoS behavioural data previously collected from me by researchers at the School of Psychology		

Participant signature: ……..……