

Facing The Challenges And Benefits Of Automated Cognitive Assessment In The Acute Stroke Pathway



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Automated video analysis detects emotional facial expression and affective changes after stroke that may impact cognition and should be considered in cognitive assessment.

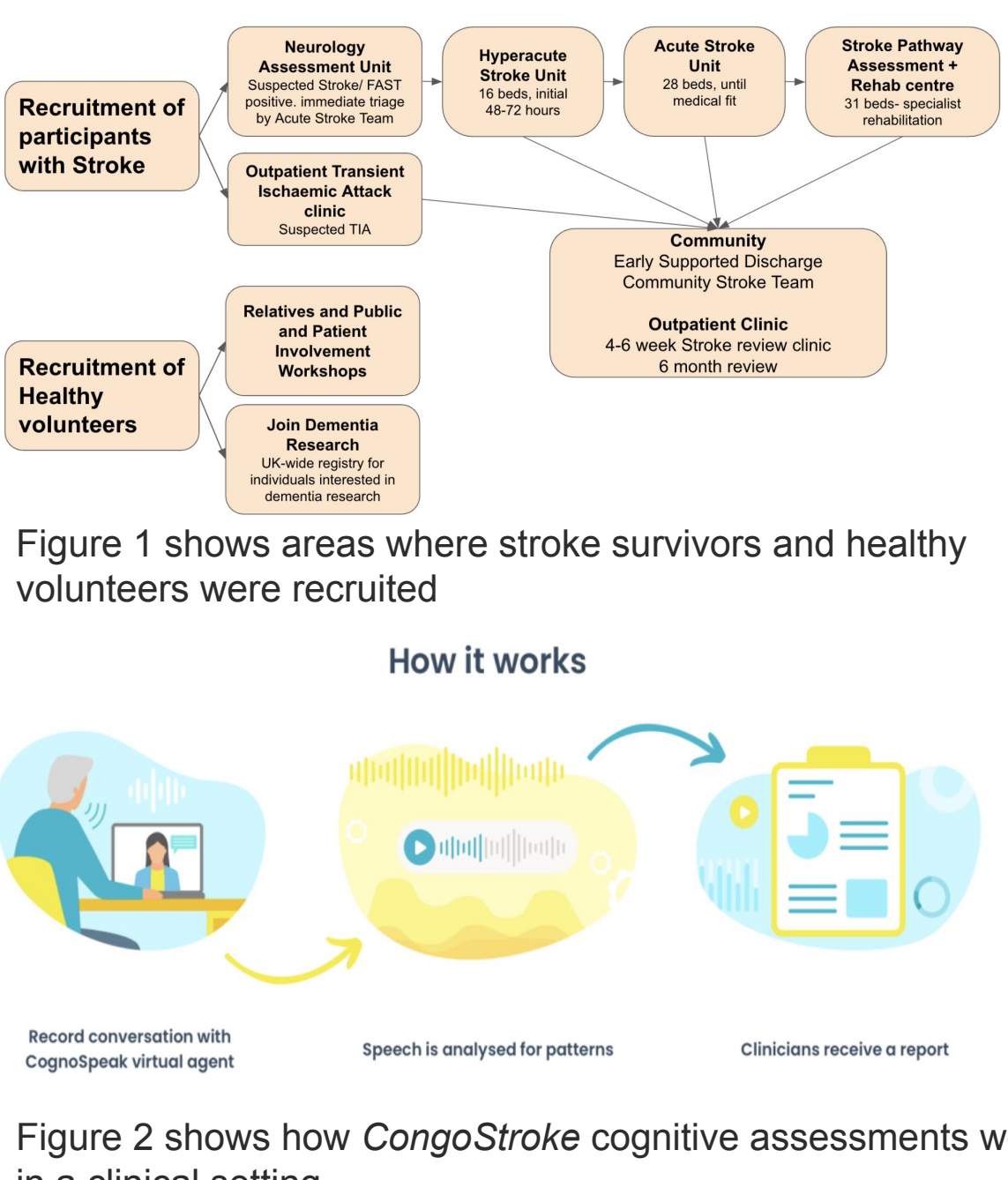
IntroductionResultsConclusions

Post-stroke cognitive impairment is common with 1 in 5 survivors suffering from long-term memory issues (1). In addition, 1 in 3 stroke-survivors experience depression and anxiety post-stroke (1), which impacts recovery and cognitive assessment performance. Traditional assessments are resource-intensive and may delay diagnosis or long-term follow-up. *CognoStroke* is a digital, automated cognitive and mood assessment which can be completed in hospital or at home. Previous work has demonstrated it has potential to predict cognitive function in stroke survivors (2).

This study explores how digitally-derived cognitive and affective measures can support monitoring of post-stroke cognitive impairment.

Methods

Single-centre, prospective study in the North of England. All participants completed the *CognoStroke- short version*- which includes semantic and phonemic fluency tests, picture description, open-ended questions and mood questionnaires. An automated computer vision framework was applied to video recordings to extract dynamic facial movement and emotional expression features.



Results

Stroke patients show different facial movement compared to healthy volunteers during fluency assessments. These movements also have potential to differentiate between mood and cognitive function post-stroke.

	Stroke (n=119)	Stroke mimic (n=15)	Healthy volunteers (n=333)
Age, years	68.6 (13.8)	55.6.3 (15.7)	65.6 (11.6)
Gender (%M)	60.5%	61.5%	41.8%
Years of education	16.6 (3.3)	14.6 (4.5)	-
GAD-7	6.9 (5.9)	13.1 (6.1)	2.5 (3.6)
PHQ-9	7.6 (6.2)	13.7 (8.1)	3.3 (4.3)
MOCA	22.2 (7.6)	22.2 (5.2)	-

Table 1 shows the demographic results of participants recruited in *CognoStroke*

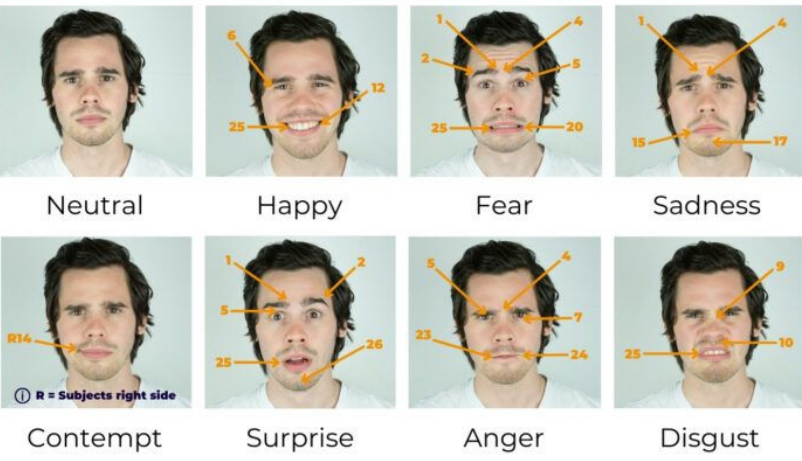


Figure 3 shows corresponding facial movements to emotions (3)

Computerised perception-based emotional intelligence model mathematically models facial movements which correspond to basic emotion applied to *CognoStroke* video (3).

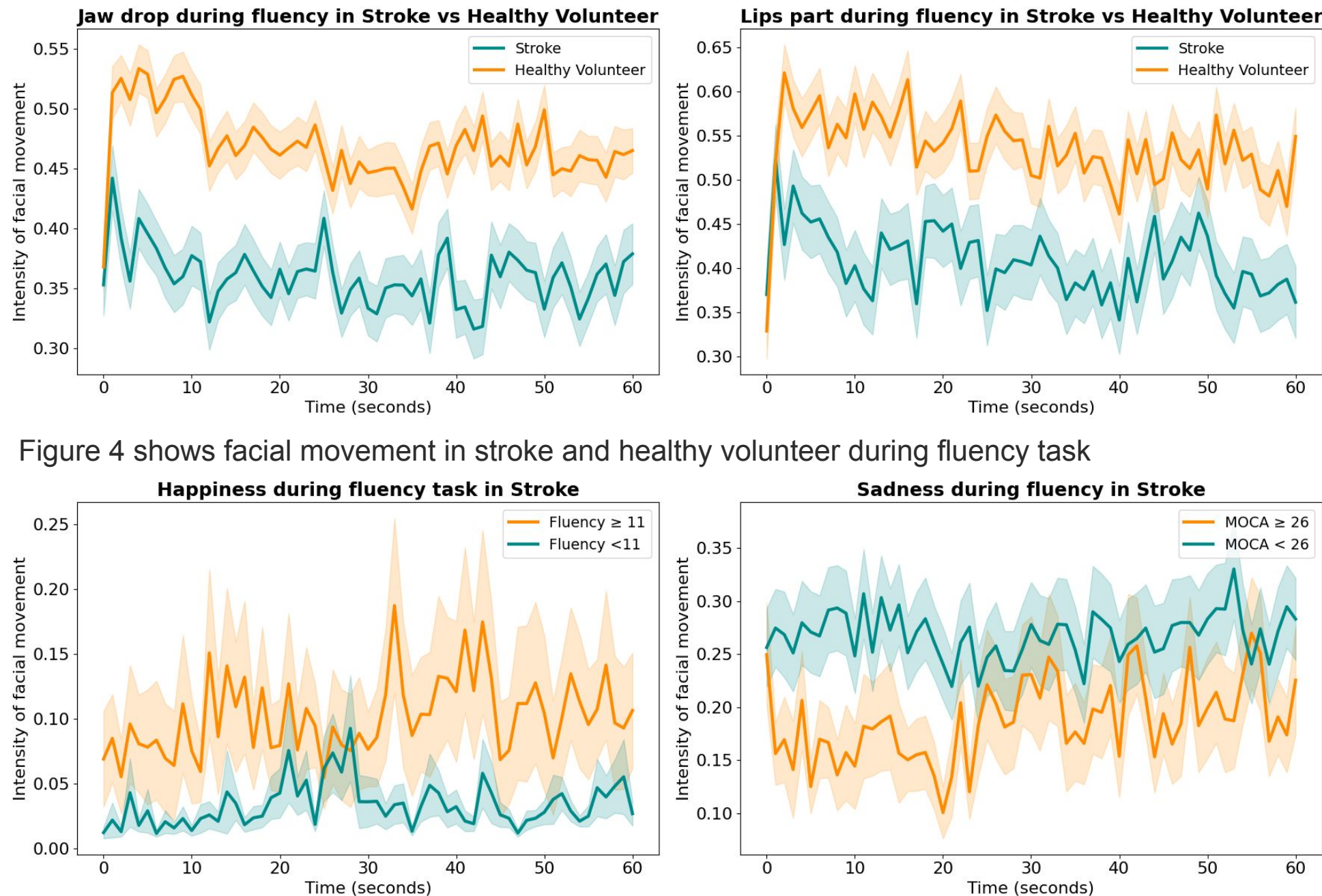
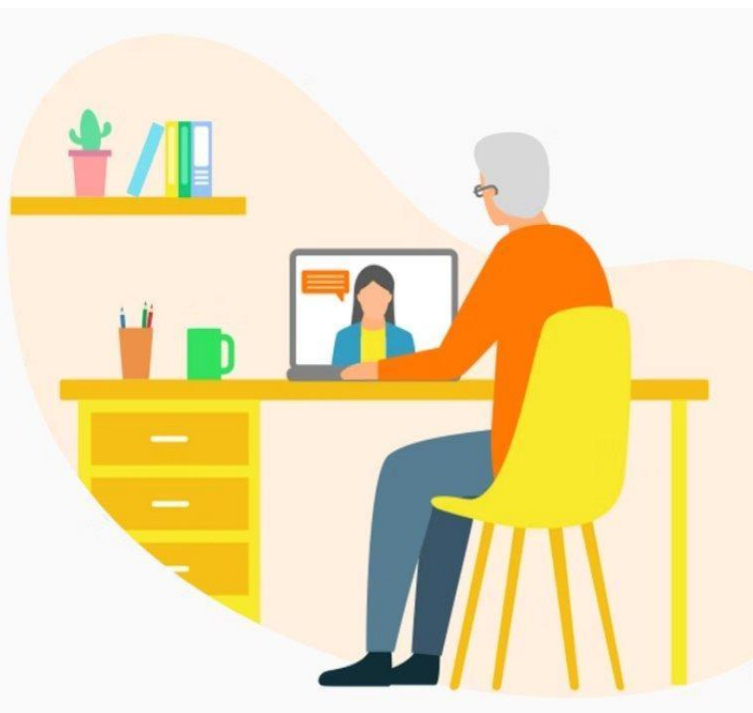


Figure 4 shows facial movement in stroke and healthy volunteer during fluency task

Figure 5 shows facial movement in stroke patients grouped by cognitive ability

Conclusions

CognoStroke is a feasible and well-accepted digital cognitive assessment to use in the acute stroke pathway. Automated computer vision shows potential in distinguishing stroke-related cognitive and facial movement differences, which may also correspond to post-stroke mood assessment.



The ability to derive objective, data-driven markers of cognitive and mood function from a 60-second verbal fluency task using *CognoStroke* is clinically valuable for detecting and longitudinal monitoring of post-stroke cognitive impairment.

ReferencesContact

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