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► **Computer-assisted cognitive rehabilitation for the treatment of patients with substance use disorders: a randomized clinical trial.**

**Fals-Stewart W, Lam W.K.K.**

**Experimental and Clinical Psychopharmacology: 2010, 18(1), p. 87–98.**

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*Researchers have long suspected that pre-existing or drug/alcohol-induced cognitive deficits prevent patients making the most of treatments which rely on complex verbal communications and understandings. For the first time this US study has shown that psychological exercises to remedy these deficits do improve outcomes by helping patients get to grips with treatment.*

**Summary** Chronic abuse or dependence on psychoactive substances is associated with neuroanatomical changes that seem to cause cognitive deficits. Such deficits could significantly impair the ability of patients being treated for substance use problems to benefit from psychosocial therapies which require patients to receive, encode, and integrate new information, to organise this information into behavioural plans, and to initiate and execute these plans. Cognitive impairment is likely to interfere with the learning and using of new information and, in turn, to be associated (as some studies have confirmed) with poorer response to treatment and worse long-term outcomes.

It follows that interventions which ameliorate cognitive impairments may improve treatment outcomes. Cognitive rehabilitation – exercises designed to enhance skills such as problem-solving, attention, memory, and abstract reasoning – appears a promising approach. Rather than directly, it may improve outcomes by strengthening the patient's ability to engage with the core treatment, stay longer and complete the process. As with physical exercise, it may also benefit patients who are not cognitively impaired, broadening its applicability and easing implementation because lengthy tests would not be required to identify impaired patients. Results to date from cognitive rehabilitation studies have been promising, but limited by recruitment of atypical and highly selected patients, no long-term follow-ups, and too few patients to tease out how the interventions might work.

The featured study aimed to address these limitations. Via ads at the service, it recruited 160 out of 199 eligible adult problem substance users starting treatment at a six-month 'Minnesota Model' residential programme in the USA based on 12-step principles. Typically they were single men in their early 30s with alcohol problems. About a third tested as cognitively impaired. Additional to the service's standard programme, for the first eight weeks of therapy they were randomly assigned to three 50-minute sessions per week of cognitive rehabilitation, or to the same time learning how to type. Both were computerised programmes and sessions were overseen by research staff.

The four modules of the cognitive rehabilitation package started with foundation training in focusing, shifting, sustaining, and dividing attention; discrimination; initiation; inhibition; and differential responding. A visuospatial module taught complex attention skills, followed by a problem solving module, and finally one devoted to improving memory.

Among other variables and assessments, the patient's substance use and problems were assessed when they left the residential service and then quarterly for a year. All but 13 of the 160 completed all assessments during and after treatment. What the 14% of missing assessments might have recorded was estimated from the data that was available.

**Main findings**

On average both sets of patients attended the computerised training sessions, engaged in the exercises, and said they felt satisfied with the interventions.

A 45-minute battery of tests assessed cognitive functioning in terms of attention, language, memory, and visuospatial ability and the executive functions which regulate the application of these and other abilities. After completing their cognitive training, on this measure patients had improved significantly more than those assigned to typing training. They also had significantly higher scores on all three measures of engagement with treatment – two assessed by their counsellors (their therapeutic relationship with the patient and how well the patient was 'working the programme') and one the patient's own assessment of their progress. Cognitive training patients also stayed longer in treatment – 129 days versus 109 – and more successfully completed – 55% versus 38%.

At the final follow-up one year after leaving the residential service cognitive training patients had improved more on assessments of their drug use and problems, legal difficulties, and family and social relationships. Over the 12 months they had also spent more days without using alcohol or drugs – 71% versus 54% ► chart. Problems in relation to employment and medical and psychiatric health were not significantly affected.

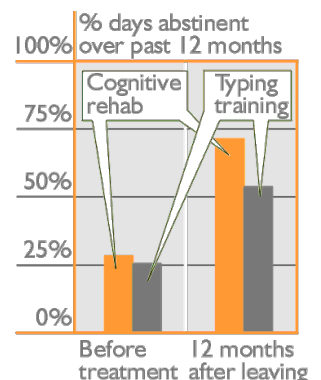
The model of how the programme worked that fit the data best suggested that cognitive rehabilitation had elevated days of abstinence because it deepened engagement with treatment and via that effect (and also directly) extended stays. Patients who were not cognitively impaired at the start of the study also benefited from the cognitive exercises, and to a degree not significantly different from the third who seemed to need them most.

**The authors' conclusions**

Compared to the same time spent in an equally satisfying and engaging task also demanding the patients' attention, cognitive rehabilitation exercises resulted in deeper engagement with treatment, longer stays and more patients completing the programme, and (due to engagement and retention effects) better substance use outcomes up to a year after leaving, as well as improvements in associated areas of the patients' lives.

These findings clearly support cognitive rehabilitation to enhance the effects of treatment for substance use disorders, and imply that the recovery of the significant proportion of substance use patients who are cognitively impaired can be accelerated by exposing patients to environments which promote cognitive functioning. These positive effects may generalise to various forms of psychosocial intervention for substance use, and to targeted interventions such as HIV risk-reduction training. However, more remains to be established about how this happens and whether it will remain the case with different forms of treatment, among different patient populations, and in non-residential programmes.

Though this was how the exercises were expected to work, the featured study did not examine whether patients in fact acquired new information and skills and whether this new learning caused the patients to engage more fully in treatment. Participants were drawn from one long-term residential programme. Though typical of such US programmes, most patients are treated in less intensive and less controlled non-residential programmes. With patients sheltered from drugs and other influences and already on-site, the residential setting can be considered an ideal test bed for cognitive improvement. Whether effects will survive transfer to less controlled settings requires testing.



**FINDINGS** Unusually rigorous steps were taken to ensure that in the featured study extra improvements in the patients offered cognitive rehabilitation could be attributed to the content of that programme. The point made however about whether results would generalise to non-residential settings is well taken. One thing patients have in residential settings is time – 24 hours a day. In non-residential services already hard pressed to offer more than basic counselling, the first problem will be get patients to accept this is a good use of their time at the service, and services to accept that time which could have been spent counselling patients should be diverted to indirectly improving the impact of that counselling. What would help is a demonstration that not only is time spent in cognitive rehabilitation better than time spent learning to type, but also that is better than spending the same time in directly therapeutic activities.

An alternative approach to cognitively challenged patients or those with less well developed verbal understanding is to cater for these deficits rather than trying to rectify them. One technique which has gained currency in the UK is node-link mapping, the basis of a [manual](#) released in 2013 by Public Health England. Flow-chart style maps present worker and client with a simplified and shared visual representation of the client's needs, resources and goals, why they relapse, and how they can avoid relapse. Mapping these and other processes is intended to help maintain focus, improve communication and understanding, and offer an aide-memoire of where therapy has got to.

In its application to substance use problems, node-link mapping derives from [research and development work](#) at the Institute of Behavioral Research at the Texas Christian University in the USA, who say the maps particularly help clients with deficits in communication, attention, problem solving and decision making. Mapping was an element in the unit's [project](#) to improve substance use counselling for often poorly educated offenders unused to abstract, verbal explorations. The [key innovation](#) was not the project's therapeutic principles based on motivational interviewing, but its delivery methods based on engaging, hands-on, practical activities and 'games' requiring only basic reading and verbal skills. As expected, these tools particularly improved engagement with treatment among less well educated offenders and those averse to 'hard thinking' or thinking things through.

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After this entry had been released Findings was informed that the lead author William Fals-Stewart had been found dead on 23 February 2010 after being arrested a few days before on charges arising from an attempt to rebut an accusation of scientific misconduct made in 2004. The accusation related to the alleged fabrication of data in studies undertaken as an employee at the University at Buffalo and Research Institute on Addictions. The arrest was in relation to his allegedly hiring actors to give false testimony during an investigation of the misconduct accusation conducted by the university. At the time of writing we do not know which particular study was alleged to have been falsified, nor whether other studies led by Dr Fals-Stewart are also under suspicion.

For more see the announcement of the charges made by the New York State Attorney General at: <http://www.ag.ny.gov/press-release/new-york-state-attorney-general-andrew-m-cuomo-announces-charges-against-former-ub>

This note drafted 30 August 2013.