Introduction
Depression is a serious and highly prevalent psychological disorder and it has been identified as one of the leading causes of disability worldwide. Cognitive behavior therapy (CBT) is currently considered as the gold standard of psychotherapies in the treatment of depression. However, research indicates that only about half of patients respond to treatment and relapse appears to be a common occurrence.

Over the last decade, considerable research has emerged indicating that individuals with depression experience marked deficits in executive function i.e. the regulation of cognitive processes, and attention. Research also indicates that depressed individuals exhibit negative biases in emotional information processing e.g. they tend to show sustained attention towards negative stimuli, and there is evidence to suggest that these dysfunctions are inherently linked. Cognitive deficits and biases have not only been found in currently depressed individuals but also in those at risk of developing the disorder and in patients who have undergone remission. It has therefore been proposed that these neuropsychological dysfunctions underlie the development and maintenance of depression and that they may provide a possible explanation for its high recurrence rate; making them a potential target for treatments.

Metacognitive therapy (MCT) is a relatively new form of psychotherapy that has components that are based in part, on knowledge of the neuropsychological dysfunctions believed to be giving rise to depression. It incorporates the teaching of attentional control strategies which are thought to help ameliorate the deficits in executive function and attention. In turn, this is believed to reduce the negative biases in emotional information processing, as it allows patients to disregard and disengage with negative stimuli.

To date, no studies have investigated the relative impact of MCT versus CBT on neuropsychological functioning in patients with depression. Can MCT, a therapy with components believed to be specifically targeting dysfunctions, lead to greater neuropsychological change over and above that observed with CBT, a therapy which does not?

Aim
The aim of this project was to examine early and overall changes in executive function, attention and emotional processing in depressed patients receiving 12 weeks of CBT or MCT. It was hypothesized that MCT would induce greater changes in neuropsychological functioning from baseline to Week 4, indicative of more rapid changes with MCT. It was also hypothesized that MCT would lead to greater neuropsychological change from baseline to the end of treatment at Week 12.

Method
Participants were 48 unmedicated individuals with depression, who were recruited as part of the COMET study; a randomized outpatient psychotherapy trial where patients were to receive 12 weeks of CBT or MCT (8-15 therapy sessions in total). Neuropsychological assessments were conducted at baseline, at Week 4 to assess early change and at the end of treatment (Week 12). Executive function was assessed using the Controlled Word Association Task (COWAT) and the Groton maze learning task. In the COWAT, participants had to generate as many words as they could which started with a specific letter, over a one minute period. During the Groton maze learning task, participants had to
locate a secret pathway through trial and error and the total amount of errors over 4 consecutive trials was measured. The Rapid Visual Information Processing task (RVIP) was used to measure participants' sustained attention, whereby patients were to identify target sequences of numbers as quickly as possible. The time taken to correctly identify target sequences and the number of correct identifications were measured. Emotional processing was assessed using the Affective go/no-go task where participants were rapidly presented with words that were positive (e.g. joyful), negative (e.g. hopeless) or neutral (e.g. item) in valence; with words from two categories presented at a time. Participants were provided with a target valence and were asked to identify the words which matched it. Negative biases were determined by comparing the number of negative words individuals missed to the number of positive words they missed. If more positive words were missed in comparison to negative, it suggested a bias towards negative stimuli.

Results

The groups were well matched in terms of demographics and baseline depression scores and they did not differ in terms of baseline task performance. At baseline, both groups exhibited negative biases on the Affective go/no-go task, with both groups missing out more positive words in comparison to negative words.

From baseline to Week 4, there were no statistical differences in neuropsychological change between CBT and MCT groups. Both groups showed small improvements in their total number of errors on the Groton maze task and an increase in the number of correct identifications on the RVIP task. No other improvements were observed.

From baseline to Week 12, the only statistically significant difference between therapies was found for the Groton maze learning task, where the MCT group showed a significant reduction in the number of total errors whereas the CBT group showed no change at all. There was also a trend approaching significance for the MCT group to have greater improvements in the time taken to identify target sequences on the RVIP task, with the MCT group showing quicker identification times and the CBT group showing slower identification times. Due to the small sample size which was exacerbated by dropout, power was limited to detect statistical differences. Both groups demonstrated small to moderate improvements for the other measures of executive function and attention. In terms of emotional information processing, there were no differences found between the number of positive words missed and the number of negative words missed on the Affective go/no-go task for either group at Week 12; demonstrating a reduction in negative biases with both therapies.

Conclusions

Overall, we discovered that both groups demonstrated improvements in neuropsychological functioning over the 12 weeks of therapy. Despite the small sample size, we did find preliminary evidence in support of the idea that MCT may have a particular benefit in improving processes of executive function and attention in individuals with depression, although there was no evidence in support of more rapid changes with MCT. It is important that these findings are investigated further and that studies with larger sample sizes are conducted in the future, as this could have important implications for the treatment of depression.