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Queen's Psychology first year PhD student **Chelsea Wood-Ross** has recently published her work, "[Brain of Thrones: Cognitive Effort and Perceived Performance During a Cognitive Task in Major Depressive Disorder](#)" in the journal *Cognitive Therapy and Research*.

"I'm so excited to see this research published", Chelsea says. "It was an incredible experience to be involved in all aspects of this study, from the conceptualization and design to final publication".

The research focuses around a lesser-known part of mood disorders - difficulties with attention, memory, and problem solving skills. These problems persist even when a person is no longer in an episode of depression.

"We still don't know a lot about the experience of trying to improve cognition from the perspective of those with depression", Chelsea explains. Our lab has published studies showing that those with depression have a more difficult time engaging with tasks that are perceived to be more cognitively challenging".

In their clinical work, Chelsea and her colleagues in Dr. Christopher Bowie's Cognition in Psychological Disorders Lab, noticed that many of their patients with depression had a lot of negative evaluations of their performance during cognitive remediation, consistent with negative thought patterns characteristic of the disorder. The team heard reports such as: 'Well, if I got

better, it was because the computer helped me' (rather than attributing success to one's own effort).

A key feature of cognitive remediation is finding ways for patients to approach cognitive challenges both in sessions and in daily life. Chelsea's team didn't know how cognitive effort avoidance might manifest in a cognitive remediation environment, so they decided to test it.

"We designed a novel cognitive training task and named it 'Brain of Thrones'", Chelsea recalls. The task is an interactive game where participants were told they were the battlefield commander and had to search for their ally on a series of maps that mimicked the TV program 'Game of Thrones'".

A spatial working memory task was chosen because it is one of the cognitive domains that is not often found to be impaired in depression, unlike other types of memory. This allowed the team to observe how those with depression approached or avoided cognitive challenges even when it was expected that they would not struggle any more than the general population. The team found that despite having performance that was not significantly impaired, those with depression avoided cognitive challenge compared to healthy comparison participants.

"The choices that they made in selecting training difficult led them toward easier levels, meaning that the training environment would be insufficient for them to receive the cognitive challenge that is critical for treatment to work", Chelsea notes. "And this notion of cognitive effort avoidance was also suggested by the study's measure of brain activity".

Participants conducted the tasks while electrical activity in the brain was recorded. The team found evidence that as the cognitive task difficulty increased, brain activity associated with disengagement increased.

Chelsea and her team feel that the results from this study give have given them new insights into how they might need to adjust their treatment programs to consider not only cognitive difficulties, but also how to address the avoidance of cognitive challenges that might limit the power of these treatments.

"Even at this early stage of her career, Chelsea is carrying out ambitious and creative experimental studies that will lead to changes in how we provide treatment for those with depression", Dr. Bowie commented. "Her work combines clinical insights, rigorous and multi-method approaches, and a focus on critical questions to help improve lives."

Working with Dr. Bowie and our amazing team on this project taught me so much", Chelsea says. "I'm excited to continue to explore how avoidance may contribute to cognitive impairments experienced by those with depression as I begin my PhD!"