Cognitive Behavioral Therapy (CBT) and Neuroscience: Integrating new and old idea

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Introduction

In recent years, interdisciplinary research in the field of neuroscience has expanded our knowledge about neurobiological correlates of mental processes and changes occurring in the brain due to therapeutic interventions. The studies are largely based on non-invasive brain imaging techniques, such as functional magnetic resonance imaging (fMRI) and functional neuroimaging technologies of positron emission tomography (PET).
Modern CBT is an umbrella term of empirically supported treatments for clearly defined psychopathologies that are targeted with specific treatment strategies (Hofmann, Asmundson, & Beck, 2013).
More recently, CBT has included a more trans-diagnostic/process-based and personalized approach, with the ultimate goal of linking the therapeutic technique to the process and the individual client (Hayes & Hofmann, 2017).

Objectives

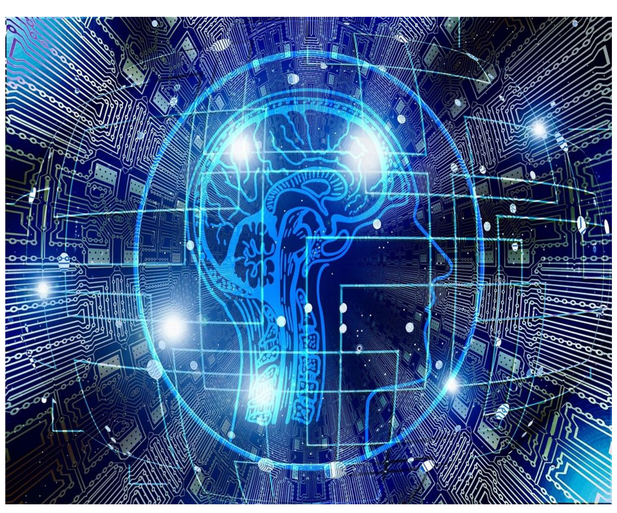
The goal of this review paper is twofold.

- First, to bring coherence and integration to the broad field of Cognitive behavioral therapy (CBT) practice based on the constraints of neuroscience. This goal was articulated over 100 years ago but is one that can now be realistically envisioned due to advances in neuroscientific knowledge.

- The goal of our paper is also to delineate the mechanisms involved in optimizing the degree and duration of clinical improvement. We will introduce some key topics and describe a selection of findings from CBT-related research using tools from neuroscience (Nadel & Lane, 2020).

Method

A literature review, search, and evaluation of the available literature, including old and contemporary publications on a referent basis and books were performed.



Results

In this paper, we argue that CBT is the gold-standard psychological treatment—as the best standard we have in the field currently available—for the following reasons [Hofmann et al., 2013]:

- ✓ CBT is the most researched form of psychotherapy.
- ✓ No other form of psychotherapy has been shown to be systematically superior to CBT; if there are systematic differences between psychotherapies, they typically favor CBT.
- ✓ Moreover, the CBT theoretical models/mechanisms of change have been the most researched and are in line with the current mainstream paradigms of human mind and behavior (e.g., information processing).

The neuroscientific investigations of basic CBT hypotheses have shown that:

- ❖ functional and non-functional behavior and experiences may be learned through lifelong learning, due to brain neuroplasticity that continues across the entire lifespan;
- ❖ cognitive activity contributes to dysfunctional behavior and emotional experience through focusing, selective perception, memory and recall, and characteristic cognitive distortion; on a neurobiological level, there is a relationship between top-down and bottom-up regulation of unpleasant emotional states; and
- ❖ cognitive activity may be changed, as shown by therapeutic success achieved by metacognitive and mindfulness techniques, which also have their neurobiological correlates in the changes occurring in the cortical and subcortical structures and endocrine and immune systems.

Conclusions

- **Recent neuroscience discoveries and approaches may pave the way in clinical development to improve the therapeutic outcomes of CBT**

(a) Understanding: the biological basis of CBT,
(b) Enrichment: how we can enrich CBT with neuroscience-based techniques (enhancing CBT),
(c) Why some patients respond better to CBT than others (predictors of therapeutic outcomes), would pave the way for more personalized and effective treatments.

- **The field of neuroprediction (with studies using the latest techniques from "machine learning" (AI) to achieve personalized treatment selection**

We believe that new neuroscience studies will emerge to better understand CBT and mechanisms of change, as well as clinical implementations that will benefit our clients/patients.
A possible next step forward in CBT is modality prediction, and is a particular modality more likely to be more appropriate for an individual than an SSRI or vice versa?

References

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