

# Bio-Psycho-Social Aetiology of Schizophrenia

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July 07, 2017

Joining an interesting discussion on combined aetiologies of disorders related to learned helplessness. In addition to ADHD, sleep-related breathing disorders (SRBD) and periodic limb movement disorders (PLMD), I want to add another one to the group: schizophrenia/schizotypal disorders.

## **Neuroscientific Considerations**

The recurring theme I am seeing is serotonin and a dysfunction in glucose metabolism involving the brainstem. A serotonin hypothesis for schizophrenia has been proposed by Eggers (2013), induced via “stress-induced serotonergic overdrive” (p. 791). Evidence for this hypothesis has been found among others by Kim et al. (2017). A lack of insight that correlates with meta-cognition in schizophrenia has been suggested by Mahour et al. (2017). Reduced serotonergic excitation has been linked with reduced tension in the airways and hypoglossal muscles during sleep (Horner, 2000; Veasey et al., 1999). PLMD has been reported as a side-effect of selective serotonin reuptake inhibitors (SSRI) and serotonergic antidepressants (Vendrame et al., 2011). Restless legs syndrome has been associated with decreased serotonin transporter (SERT) availability in the pons and medulla (Jhoo et al., 2010). Likewise, stress-induced hypercortisolism, that also plays a role in learned helplessness, has been related to reduced glucose metabolism in neurons, contributing to major depression disorder (Wei et al., 2016). To add to the complexity, serotonin is primarily synthesized in the gut (> 90%), mediated by gut microbes (or their dysfunction),

and linked to the brainstem via the autonomous nervous system that regulates bowel movements (Yano et al., 2015).

### **Bio-Psycho-Social Aetiology**

As the above-described heavily looped circuitry has a cognitive component, psychological and life-style interventions should be able to influence the related systems. Serotonergic overdrive and hypercortisolism share a stress-related aetiology, particularly in the presence of dominance-hierarchies (Abbot et al., 2003). Dominance hierarchies create uncontrollable situations and diminished access to support that both relate to learned helplessness. There appear thus to be two different faces of learned helplessness: related to hypercortisolism and on the depressive spectrum (chronic) or serotonergic and hyperactive, but performing inefficient actions. This two-process theory has been proposed by Koller & Kaplan (1978), with a motivational and an informational component.

### **Psychological Intervention**

Empowerment (informational) programs using a modified patient empowerment program for schizophrenia (PEPS) have been found to be effective on both schizophrenia and helplessness (Park & Sung, 2013). Self-administered optimism training (motivational) was effective in reducing pessimistic attribution styles, reducing the risk for depression, but showed no direct effect on depression (Fresco et al., 2009). It may thus be a preventive intervention in the pre-depressive stages of learned helplessness. Supporting this two-process theory, a psycho-education program (informational) showed effect on irrational beliefs, but not existing learned helplessness (Ulusoy & Duy, 2013). Instead, active self-directed learning interventions, for example involving physical education, have been proposed by Gates & Suskiewicz (2017). From a dietary perspective, prebiotics have been shown ameliorate acquisition of learned helplessness via stress resistance (Mika et al., 2017), and bifidobacterium longum has been isolated as effective in alleviating depressive

symptoms (Pinto-Sanchez et al., 2017). A targeted diet with probiotics may thus be an important part of an empowerment program.

### **Conclusion**

A holistic approach dependent on the stages of learned helplessness appears as an appropriate intervention strategy to combat learned helplessness.

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