

## Extending Psychoanalysis with Theories on Sleep Functions

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Received date: Oct 19, 2015, Accepted date: Oct 22, 2015, Published date: Oct 25, 2015

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### Abstract

Cai's sleep theories suggested the slow-wave sleep(SWS) to regulate the emotional balance disrupted by emotional memories randomly accumulated during waking, while the rapid-eye-movement (REM) sleep in opposite, which would help revise and extend the psychoanalysis in both theory and therapy.

**Keywords:** Psychoanalysis; Sleep; Emotion; Memory; Noradrenaline; Serotonin

### Opinion

Psychoanalysis of Freudianism has been a traditional theory on and successful therapy to many psychotic diseases. Matching psychoanalysis to pertaining processes in neuroscience would help revise the contents and extend the potential of psychoanalysis as both theory and therapy.

Cai's theoretical analysis on sleep functions pertains to psychoanalysis more than other sleep theories. Through integrative review of various studies, Cai demonstrated that slow-wave sleep (SWS) played the function in regulation of emotional balance disrupted by emotional memories randomly accumulated during waking [1-3], while the rapid-eye-movement (REM) sleep played the opposite role, shifting the emotional balance toward depression with emotional memories [1-3].

In Cai's theoretical analysis on sleep functions, there reviewed the observations and experiments in many aspects [1-3]. For the emotional regulation of SWS, there was integratively reviewed [1-3] as: (1) SWS was frequently related with depression, while deprivation of SWS produced depression, but increase in SWS duration ameliorated depression [1-3]. (2) Hippocampal but not neocortical lesions caused impairment of SWS, while the neuronal activity in SWS increased in hippocampus but not in neocortex [1-3]. For the REM sleep, Cai and others reviewed it as tending to disrupt the emotional balance toward depression [1-5], with the REM sleep deprivation cited as therapeutic against depression [1-3].

For the coincident processing and reorganization of memories in sleep [1-3], it has been shown that SWS may favor LTD [6,7], whereas emotional memories are processed during REM sleep, as recently reviewed with many experiments [3], consistent with Freudianism.

In addition, Cai's theoretical analysis even revealed a new mechanism manifesting Freudian differentiation of conscious and subconscious conflict of memory and emotion in waking and sleep respectively. During waking, the memory traces were inhibited temporarily by the ascending noradrenergic and serotonergic systems [1-3], with the vigilant discharge of these systems regulated by limbic-reticular coupling [1,2,8]. Whereas during sleep, the noradrenergic and

serotonergic systems decreased and even ceased in discharge, releasing the suppressed memory traces [1-3], and turning the conscious conflict of memory and emotion into subconscious conflict of them.

Psychoanalysis of Freudianism would necessarily be consolidated and revised according to these theories of sleep functions. (1) The function of REM sleep matches to Freudianism that learned memories conflicted against disinhibited drives during dream sleep, consolidating the psychoanalysis of Freudianism. (2) The function of SWS in contrary to that of REM sleep supplements the neglect of Freudianism, and would result to scientifically revise and extend psychoanalysis, significantly important to further advancement of psychoanalytic theory and therapy in future. (3) Cai's new explanation on Freudian differentiation of conscious and subconscious conflict of memory and emotion as resulting from differentiation of the noradrenergic and serotonergic activities in waking and sleep may benefit to improvement of hypnotic treatment and therapy.

### Conflict of Interest

The author declares no conflict of interest nor financial support for this work.

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