

# A contemporary neurobiological model of psychological stress and trauma: street view and map view asynchrony

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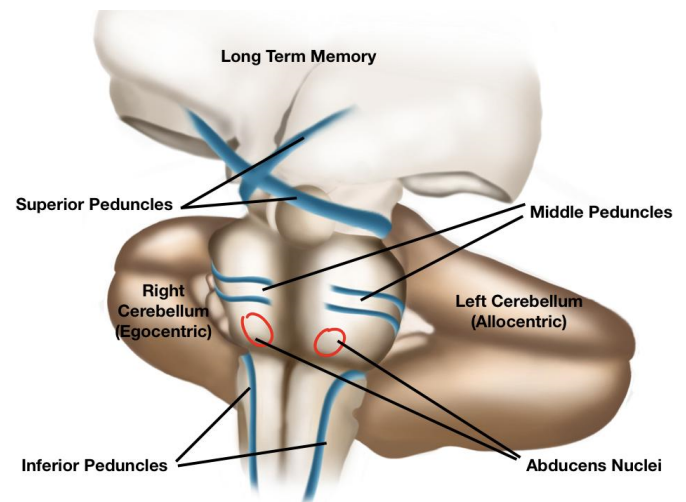
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A new neurobiological model of psychological stress is proposed. Spatial Short Term Memory (SSTM) is lateralised [1] with the Left Cerebellar Hemisphere (LCH) holding allocentric data (Map View) and the Right Cerebellar Hemisphere (RCH) holding egocentric data (Street View). Before transfer of Short Term Memory (STM) to Long Term Memory (LTM) it is proposed that allocentric and egocentric data must be synchronised. When unsynchronised STM data is not transferred from cerebellar neural networks, those networks cannot be re-allocated to hold new data, thereby compromising total cerebellar STM capacity and, therefore, function.

The Middle Cerebellar Peduncles (MCP) provide anatomical connections between the cerebellar hemispheres permitting synchronisation of allocentric and egocentric data. MCP nerve fibres are juxtaposed with the abducens (VI) cranial nerve nuclei (**Figure 1**) suggesting that activity in one affects the other. It is argued that REM sleep (during which the abducens nerves are alternately stimulated) represents increased synchronisation activity in the MCPs. Interestingly, Eye Movement Desensitisation and Reprocessing Therapy (EMDR) [2] is consistent with a reversal of this process, permitting cerebellar peduncular activity to be driven by alternating bilateral stimulation of the abducens nuclei.

Efficient STM function requires sufficient available Cerebellar Neural Networks. When available cerebellar STM capacity becomes insufficient for current need, stress is experienced. Cerebellar capacity can be overloaded when STM data is not released from Cerebellar Neural Networks to LTM (stress) or by sudden, overwhelming, uncontrolled download of LTM data to the STM (trauma).

Synchronisation of Egocentric and Allocentric Short Term Memory data via the middle cerebellar peduncles enables clearing of cerebellar neural networks naturally and spontaneously during sleep or therapeutically with newer processing therapies such as EMDR.



**Figure 1:** Anterior Schema of Cerebellar connections (outlines represent deep structures).

## References

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2. Shapiro F. Eye Movement Desensitization and Reprocessing (EMDR) Therapy, Third Edition: Basic Principles, Protocols, and Procedures – 19 Jan 2018 Guilford Press; 3 edition (19 Jan. 2018) ISBN-13: 978-1462532766

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