Differential effects of dopamine dysfunction on context usage in people with autism and schizophrenia: A computational exploration

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Abstract: The ability to utilize contextual information in a flexible manner is vital for the successful navigation of our lives. People with autism demonstrate serious problems on tasks requiring the integration of contextual information across experiences. One such task is the determination of the proper meaning of an ambiguous word in a sentence. Homographs are words with one spelling, but different meanings, such as "bow" and "tear". People with autism appear unable to utilize sentential context in order to determine the correct meaning of a homograph. Instead, they rely on the statistically most frequent meaning. We present a neurocomputational model that suggests that these difficulties arise from a deficit in the flexible updating of attentional control, driven by dysfunctional interactions between the prefrontal cortex and the midbrain dopamine system. This work is compared to a previous computational account of the effects of abnormal dopamine levels on context processing difficulties in schizophrenia.