

Implicit sequence learning in young people with Tourette syndrome with and without co-occurring attention-deficit/hyperactivity disorder

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Abstract

Impaired habit-learning has been proposed to underlie the tic symptoms of Tourette syndrome (TS). However, accounts differ in terms of how habit-learning is altered in TS, with some authors proposing habit formation is impaired due to a deficient 'chunking' mechanism, and others proposing habit-learning is overactive and tics reflect hyperlearned behaviours. Attention-deficit/hyperactivity disorder (ADHD) frequently co-occurs with TS and is known to affect cognitive function in young people with co-occurring TS and ADHD (TS + ADHD). It is unclear, however, how co-occurring ADHD symptoms affect habit-learning in TS. In this study, we investigated whether young people with TS would show deficient or hyperactive habit-learning, and assessed the effects of co-occurring ADHD symptoms on habit-learning in TS. Participants aged 9-17 years with TS (n = 18), TS + ADHD (n = 17), ADHD (n = 13), and typical development (n = 20) completed a motor sequence learning task to assess habit-learning. We used a 2 (TS-yes, TS-no) × 2 (ADHD-yes, ADHD-no) factorial analysis to test the effects of TS, ADHD, and their interaction on accuracy and reaction time indices of sequence learning. TS was associated with intact sequence learning, but a tendency for difficulty transitioning from sequenced to non-sequenced performance was suggestive of hyper-learning. ADHD was associated with significantly poorer accuracy during acquisition of the sequence, indicative of impaired habit-learning. There were no interactions between the TS and ADHD factors, indicating young people with TS + ADHD showed both TS- and ADHD-related atypicalities in habit-learning.