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# Habit reversal versus supportive psychotherapy in Tourette's disorder: A randomized controlled trial and predictors of treatment response

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**Abstract**

Tourette syndrome (TS) is characterized by chronic motor and vocal tics. Habit reversal therapy (HR) is a behavioral treatment for tics which has received recent empirical support. The present study compared the efficacy of HRT in reducing tics, improving life-satisfaction and psychosocial functioning in comparison with supportive psychotherapy (SP) in outpatients with TS. In addition, we investigated whether impairments in response inhibition in patients with TS predict response to HR treatment which specifically aims to inhibit tics. Thirty adult outpatients with DSM-IV TS were randomized to 14 individual sessions of HR ($n = 15$); or SP ($n = 15$). HR but not SP reduced tic severity over the course of the treatment. Both groups improved in life-satisfaction and psychosocial functioning during active treatment. Reductions in tic severity (HR) and improvements in life-satisfaction and psychosocial functioning (HR and SP) remained stable at the 6-month follow-up. The extent of pre-treatment response inhibition impairment in the HR group predicted reductions in tic-severity from pre- to post-treatment. Our results suggest that HR has specific tic-reducing effects although SP is effective in improving life-satisfaction and psychosocial functioning. Assessments of response inhibition may be of value for predicting treatment response to HR.
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*Keywords:* Tourette's disorder; Tics; Habit reversal; Treatment outcome; Predictors of treatment response

## Introduction

Tourette's disorder, also called Tourette syndrome (TS), is characterized by both motor and vocal tics that often interfere substantially with social or occupational functioning (APA, 1994) and frequently result in embarrassment, as well as low rates of self-esteem and life-satisfaction (e.g. Horn, 2001; Riddle & Carlson, 2001). Tics are recurrent, non-rhythmic, stereotyped motor movements or vocalizations that typically involve the head, torso and upper and lower limbs (APA, 1994). Common motor tics include eye blinking, touching,

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squatting or knee bends. Vocal tics often include uttering sounds or words such as grunts, yelps, sniffs, or throat clearing (Leckman, Peterson, King, Scahill, & Cohen, 2001).

To date, pharmacotherapy has been considered the treatment of choice for TS. Its efficacy has been demonstrated in placebo-controlled trials (Leckman et al., 1991; Sallee, Nesbitt, Jackson, Sine, & Sethuraman, 1997; Scahill, Leckman, Schultz, Katsovich, & Peterson, 2003; Shapiro et al., 1989). This includes randomized trials documenting the efficacy of haloperidol, pimozide, risperidone and clonidine (Leckman et al., 1991; Sallee et al., 1997; Scahill et al., 2003; Shapiro et al., 1989). However, many patients refuse or discontinue medication because of unwanted side effects; others are unresponsive to medication or suffer from residual tics despite pharmacotherapy. As a result, a behavioral treatment called habit reversal is becoming increasingly popular as a non-pharmacologic treatment alternative or adjunct to pharmacological treatments. Briefly, in HR patients learn to apply antagonistic, competing movements to inhibit the occurrence of tics. Although developed over 30 years ago (Azrin & Nunn, 1973), it's effectiveness has mostly been tested in studies using single-subject designs. To our knowledge, to date, there are only four randomized controlled trials that have investigated the effectiveness of HR in a controlled fashion. Using a waitlist-control design, Azrin and Peterson (1990) reported a 93% tic reduction in a group of patients treated with HR compared with no improvement of patients on a waiting list. O'Connor et al. (2001), who also used a waitlist-control design, found significant reductions in tic-frequency and intensity compared to waitlist in 47 patients with chronic tic disorder following a treatment that included HR. Wilhelm et al. (2003) conducted a randomized controlled trial comparing the effectiveness of HR with supportive psychotherapy (SP) in patients with TS. They found that HR but not SP significantly reduced tic severity following 14 individual sessions of HR. Follow-up data indicated that patients remained significantly improved at the 10-month follow-up. Recently, Verdellen, Keijsers, Cath, and Hoogduin (2004) compared the effectiveness of 10-session individual HR to exposure and response prevention therapy in patients with TS. They found that both HR and exposure treatment are effective in reducing tic severity.

Individuals with TS often report that tics cause marked embarrassment and are associated with low self-esteem and decreased life-satisfaction. To date, behavioral treatments of TS have exclusively focused on tic-reducing effects while improvements in psychosocial functioning and life-satisfactions have not been assessed. Although supportive psychotherapy may not have tic-reducing effects, it is conceivable to hypothesize that a treatment that is aimed at providing support for coping with TS may improve self-esteem and psychosocial functioning despite persisting occurrence of tics. The present study was in part designed to test this hypothesis by comparing the effectiveness of HR and SP on separate measures of tic frequency, psychosocial functioning, and life-satisfaction in individuals with TS.

From a neurobiological perspective, tics are believed to be a result of dysregulation of cortical-subcortical circuits (Mink, 2001; Graybiel & Canales, 2001). More specifically, tics are presumably due to failed inhibition within cortico-striato-thalamo-cortical circuits. Consistent with this view, there is converging evidence from neuropsychological studies that individuals with TS exhibit impairments in response inhibition (e.g., Johannes et al., 2001, 2003; Swerdlow, Magulac, Filion, & Zinner, 1996). For example, Swerdlow et al. (1996) used a visuospatial priming paradigm to investigate inhibitory and facilitatory effects of a pre-signal (prime) on subsequent reaction times to a probe. They found that, in comparison to healthy control participants, individuals with TS were characterized by reduced inhibitory effects in relation to increased facilitatory priming effects. Similarly, Johannes et al. (2001, 2003) reported that responses to the interference condition of the Stroop paradigm and a Go-NoGo paradigm were associated with enhanced frontal negativity as assessed by EEG in individuals with TS compared to healthy controls. Although the exact nature of the link between impairments in response inhibition and tics in individuals with TS remains to be elucidated, we hypothesized that impairments in response inhibition may be a predictor of response to HR which specifically teaches participants to withhold (or inhibit) tics via competing responses. More specifically, we hypothesized that individuals with greater impairment in response inhibition (or facilitation) in a visuospatial priming paradigm would exhibit a less favorable response to HR treatment.

In summary, the purpose of the study was threefold: (1) To replicate our previous findings (Wilhelm et al., 2003) of tic-reducing effects of HR compared to SP in a randomized controlled trial; (2) to extend our previous trial by investigating the impact of HR and SP on psychosocial functioning and life-satisfaction and (3) to investigate performance on a visuospatial priming task as a predictor of tic-reduction following HR.

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