

# Investigating the effects of tic suppression on premonitory urge ratings in children and adolescents with Tourette's syndrome

Michael B. Himle\*, Douglas W. Woods, Christine A. Conelea,  
Christopher C. Bauer, Kevin A. Rice

*University of Wisconsin-Milwaukee, USA*

Received 8 May 2007; received in revised form 3 August 2007; accepted 7 August 2007

---

## Abstract

Tics represent a complex class of behaviors that have a neurobiological origin and are influenced by factors both internal and external to the individual. One factor that has gained recent attention is the premonitory urge. Contemporary behavioral models suggest that some tics are preceded by aversive somatic urges that increase in severity when tics are suppressed and are attenuated by performance of the tic. It has been proposed that the removal of premonitory urges may strengthen or maintain tics via negative reinforcement. This investigation is the first to empirically evaluate the effect of tic suppression on the premonitory urge phenomenon. Five children and adolescents, ages 8–17 years, participated in the study. Using an ABAB reversal design, tic frequency and subjective premonitory urge ratings were recorded under conditions of free-to-tic baseline (BL) and reinforced tic suppression (differential reinforcement of zero-rate behavior). Results show that four of the five children demonstrated reliable suppression. Of the four children who achieved suppression, three demonstrated a pattern in which subjective urge ratings were higher during suppression than during BL. Results provide preliminary support for the negative reinforcement view of tic function for some children.

© 2007 Elsevier Ltd. All rights reserved.

*Keywords:* Tourette; Tic; Behavior; Therapy; Suppression

---

## Introduction

Chronic tic disorders (CTDs), including Tourette's syndrome (TS), are characterized by involuntary motor and/or vocal tics. Although there is substantial evidence that tics arise from neurobiological dysfunction, there is a growing body of research showing that tic expression can be influenced (both exacerbated and attenuated) by environmental contingencies involving both internal and external stimuli (Himle & Woods, 2005; O'Connor, Brisebois, Brault, Robillard, & Loiselle, 2003; Piacentini et al., 2006; Silva, Munoz, Barickman, & Friedhoff, 1995; Woods & Himle, 2004). Such findings have led to an increased recognition that existing models of TS will need to account for behavioral processes to more fully understand the development,

---

\*Corresponding author. Department of Psychology, University of North Dakota, Grand Forks, ND 58202-8380, USA.  
Tel.: +1 701 777 3289.

*E-mail address:* [michael.himle@und.edu](mailto:michael.himle@und.edu) (M.B. Himle).

maintenance, and treatment of the disorder (Evers & van de Wetering, 1994; Woods, Himle, Piacentini, & Chang, 2005).

One internal stimulus that may exert functional influence over tics is the premonitory urge. Although observable tics are the defining features of TS, many individuals report experiencing “urges,” which are described as unpleasant somatic phenomena that “build up” prior to the tic (or upon attempts to resist ticing) and are temporarily alleviated by performance of the tic (Leckman, Walker, & Cohen, 1993). In some instances, premonitory urges are more bothersome than the tics themselves (Kane, 1994).

Existing research on premonitory phenomena has stemmed primarily from phenomenological reports provided by individuals with TS. Bliss (1980) described sensory signals that preceded his tics along with “a very rapidly escalating desire to satisfy the sensations with movements intended to free oneself from the insistent feeling” (p. 37). Kane (1994) echoed this description and added, “these sensations are not mere precursors to tics; they precipitate tics...more than providing a signal of imminence, the pre-tic sensation acts as the aversive stimulus toward which tics are directed” (p. 806).

In one of the first formal investigations of the premonitory urge, Leckman et al. (1993) conducted a cross-sectional study in which they asked 135 individuals with TS (ages 8–71 years) to identify and localize their premonitory urges and found that 93% of respondents reported having an urge to tic. In a more recent study, Kwak, Vuong, and Jankovic (2003) administered a questionnaire to 50 individuals (mean age  $23.6 \pm 16.7$  years) with TS and found that 92% reported the presence of a premonitory urge. Children with tics also report premonitory urges. Banaschewski, Woerner, and Rothenberger (2003) administered a questionnaire to 254 children with TS and found that 24% of those aged 8–10 years, 34% of those aged 11–14, and 57% of those aged 15–19 reported a premonitory urge. Woods et al. (2005) evaluated premonitory urge phenomena in 42 children and adolescents with TS or CTD (age 8–16 years) and found that 41 of 42 children (98%) reported the presence of urges.

Although the exact relationship between tics and premonitory urges is not yet known, there is indirect evidence to suggest that premonitory urges develop over time and become functionally related to the performance of tics. For example, Leckman et al. (1993) found that the respondents in their study reported having first become aware of the premonitory urge an average of 3.1 years after tic onset, suggesting that premonitory urges are absent during early stages of the disorder and emerge over time. Woods et al. (2005) found that although both younger ( $\leq 10$  yrs) and older children ( $> 10$  yrs) reported the presence of premonitory urges, urge ratings and tic severity were correlated only for the older children. This further supports the notion that premonitory urges become functionally related to tics over time.

The exact nature of the premonitory urge is unclear, but it appears to play a significant role in tic expression. In fact, most of the participants in both Leckman et al.’s (1993) and Kwak et al.’s (2003) studies (92% and 68%, respectively) reported that their tics eliminated premonitory urges. If this is the case, then it is possible that tics begin as non-functional responses which, with the development of premonitory urges, become strengthened and maintained by automatic negative reinforcement (Evers & van de Wetering, 1994; Woods et al., 2005). This may begin to explain the tendency for some tics to change in topography, location, and complexity over time.

Unfortunately, the functional relationship between premonitory phenomena and tics has not been experimentally verified. One barrier to testing the relationship is that there is no known method for reliably inducing an urge in order to observe its impact on tic expression. Such inductions would be necessary to determine the functional control of the urge over tics. Nevertheless, it may be possible to circumvent this methodological problem by inducing tic suppression and observing the impact of suppression on premonitory urge ratings. If the urge is indeed aversive and the removal of the urge negatively reinforces tics, then blocking the tics should temporarily increase the salience of the urge, thereby increasing the likelihood that an individual will tic to remove the urge (i.e., increases the reinforcing value of urge removal; Michael, 1993). Conversely, if a child with TS is allowed to tic freely, then the urge should be relatively low in salience and strength, as the tics will occur more frequently in the service of urge reduction. An analogous process might be seen in eating behavior. When prevented from eating (i.e., food deprivation), both the positive reinforcer (i.e., food) and negative reinforcer (i.e., removal of hunger) will momentarily become more salient and more effective reinforcers (i.e., increase the likelihood that an individual will eat). Conversely, relative to such

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات