

## Temperament dimensions in stuttering and typically developing children

Kurt Eggers<sup>a,b,\*</sup>, Luc F. De Nil<sup>b,c</sup>, Bea R.H. Van den Bergh<sup>d,e,f</sup>

<sup>a</sup> Department of Speech-Language Therapy and Audiology, Lessius University College, Belgium

<sup>b</sup> Experimental Otorhinolaryngology, Department of Neurosciences, University of Leuven, Belgium

<sup>c</sup> Department of Speech-Language Pathology, University of Toronto, Canada

<sup>d</sup> Department of Psychology, Tilburg University, The Netherlands

<sup>e</sup> Department of Welfare, Public Health, and Family, Flemish Community, Belgium

<sup>f</sup> Department of Psychology, University of Leuven, Belgium

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### Abstract

**Purpose:** The purpose of this study was to determine whether children who stutter (CWS) and typically developing children (TDC) differ from each other on composite temperament factors or on individual temperament scales.

**Methods:** Participants consisted of 116 age and gender-matched CWS and TDC (3.04–8.11). Temperament was assessed with a Dutch version of the Children's Behavior Questionnaire (CBQ-D; Van den Bergh and Ackx, 2003), a caregiver rating scale.

**Results:** Results indicated significant differences between participant groups on the composite temperament factors of Negative Affectivity, and Effortful Control. Analysis of the individual temperament scales showed that CWS, compared to the TDC, scored significantly lower on the scales of 'Inhibitory Control' and 'Attentional Shifting' and higher on the scales of 'Anger/Frustration', 'Approach' and 'Motor Activation'. Stuttering severity and months of therapy were not associated with either of the temperament dimensions.

**Conclusions:** The present study provides data that support the hypothesis that CWS and TDC differ on both composite temperament factors and temperament scales. The findings were interpreted within existing frameworks of temperament development, as well as with regard to previous studies of temperament in CWS.

**Educational objectives:** After reading this article, the reader will be able to: (1) describe the concept of temperament, including Rothbart's temperamental model, and its functional significance; (2) explain the CBQ-based (Children's Behavior Questionnaire) temperamental differences between CWS and CWNS; and (3) explain possible pathways for interaction between temperament and the development of stuttering.

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\* Corresponding author at: Dept. of Speech-Language Therapy and Audiology, Lessius University College, Sanderusstraat 45, 2018 Antwerp, Belgium. Tel.: +32 491 56 36 11.

E-mail addresses: kurt.eggerts@lessius.eu (K. Eggers), luc.denil@utoronto.ca (L.F. De Nil), Bea.vdnBergh@uvt.nl (B.R.H.V.d. Bergh).

## 1. Introduction

The purpose of this study was to investigate the relationship between temperament and developmental stuttering, using the Children's Behavior Questionnaire—Dutch (CBQ-D; Van den Bergh & Ackx, 2003), a parental temperament questionnaire. Because temperament has been defined and interpreted differently in the last decades, we start the introduction by addressing the concept of temperament. This is followed by a brief review of the role of temperament in the development of behavioral disorders, followed by a review of current research on temperament and developmental stuttering.

### 1.1. The concept of temperament

At present, most theorists agree that temperament refers to biologically based individual differences that are relatively stable over time, and appear early in the child's development (e.g., Goldsmith et al., 1987). Early approaches stressed the importance of stability of these traits (Buss & Plomin, 1984; Costa & McCrae, 2001) and saw it as a behavioral (Thomas & Chess, 1977) or primarily emotion-oriented style (Goldsmith & Campos, 1982). More recent models acknowledge that temperament itself develops over time (Goldsmith, 1996; Plomin & Dunn, 1986; Rothbart, 1989), incorporates motivational and self-regulatory systems (Posner & Rothbart, 1998) and is influenced by environmental interactions (Arcus, 2001; Halverson & Deal, 2001; Saudino, 2005).

Rothbart defines temperament as 'constitutionally based individual differences in reactivity and self-regulation' (Rothbart, Ahadi, Hershey, & Fisher, 2001). In her definition, 'reactivity' refers to the arousability of physiological and sensory response systems, and 'self-regulation' are those processes that can modulate (facilitate or inhibit) one's reactivity. 'Constitutional', in turn, is referring to the individual's biological basis, influenced over time by genetics, maturation, and experience. In other words, the temperament structure changes over time, from a predominantly reactivity-driven concept in infants to a structure with more emphasis on self-regulatory processes in older children (Putnam, Ellis, & Rothbart, 2001). In order to assess temperamental characteristics, Rothbart developed a number of questionnaires aimed at different age ranges. The Children's Behavior Questionnaire (CBQ; Rothbart et al., 2001) assesses temperament in early to middle childhood and consists of 15 temperament scales. Factor-analyses of these scales repeatedly have revealed 3 composite temperament factors, namely positive reactivity (i.e., the tendency to actively and energetically approach new experiences in an emotionally positive way), negative reactivity (i.e., the tendency to be sad, fearful, easily frustrated, and irritable), and effortful control (i.e., the ability to sustain attention, control one's behavior, and regulate one's emotions) (Ahadi, Rothbart, & Ye, 1993; Eggers, De Nil, & van Den Bergh, 2009; Kusanagi, 1993; Rothbart et al., 2001; Van den Bergh & Ackx, 2003). In the CBQ, Positive Reactivity (or Extraversion/Surgency) comprises the scales Impulsivity, Activity Level, High Intensity Pleasure, Motor Activation, Shyness, Approach, and Smiling/Laughter. Negative Reactivity (or Negative Affectivity) comprises the scales Anger/Frustration, Discomfort, Sadness, Fear, and Falling Reactivity/Soothability. Low Intensity Pleasure, Inhibitory Control, Perceptual Sensitivity, Attentional Focusing, Attentional Shifting, and Excitatory Control cluster under Effortful Control (Van den Bergh & Ackx, 2003; for scale definitions and questionnaire sample items see Table 1).

### 1.2. Temperament as a moderator in the development of behavioral disorders

Child temperament researchers recognize how both innate individual differences and the environmental context shape children's behavior. In particular, temperamental concepts are being used to explain behavioral and physiological patterns, and responses that are evoked under conditions of stress (e.g., novelty situations, interaction with unfamiliar persons, intense stimuli), and conditioned responses to certain stimuli (Gray, 1987; Strelau, 2001). Moreover, the idea of temperament predisposing the susceptibility for or moderating the development of certain disorders (e.g., anxiety disorders) has received widespread attention in health psychology literature (e.g., Kubzansky, Martin, & Buka, 2009; Puttonen et al., 2008; Smith & Williams, 1992; Williams, Wiebe, & Smith, 1992). Recent integration of temperamental research and childhood psychopathology (Frick, 2004; Nigg & Goldsmith, 1998; Rettew & McKee, 2005) has created new insights in possible ways of temperament interaction. For instance, there is mounting empirical evidence that both reactive temperamental factors (Extraversion/Surgency and Negative Affectivity) as well as regulative processes (Effortful Control) play an important role in the onset, development and maintenance of disorders such as anxiety disorders (Bijttebier & Roeyers, 2009; Lonigan & Vasey, 2009). Temperament dimensions have also been identified

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