

## Executive functions and basic symptoms in adolescent antisocial behavior: A cross-sectional study on an Italian sample of late-onset offenders

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### Abstract

Executive cognitive functions (ECFs) and other cognitive impairments, such as lower IQ and verbal deficits, have been associated with the pattern of antisocial and delinquent behavior starting in childhood (early-onset), but not with late-onset antisocial behavior. Beyond objective measures of ECF, basic symptoms are prodromal, subjectively experienced cognitive, perceptual, affective, and social disturbances, associated with a range of psychiatric disorders, mainly with psychosis. The goal of the present study was to examine ECF and basic symptoms in a sample of late-onset juvenile delinquents.

Two-hundred nine male adolescents (aged 15–20 years) characterized by a pattern of late-onset delinquent behavior with no antecedents of Conduct Disorder, were consecutively recruited from the Social Services of the Department of Juvenile Justice of the city of Messina (Italy), and compared with nonantisocial controls matched for age, educational level, and socio-demographic features on measures for ECF dysfunction and basic symptoms.

Significant differences between late-onset offenders (completers = 147) and control group (n = 150) were found on ECF and basic symptoms measures. Chi-square analysis showed that a significantly greater number of late-onset offending participants scored in the clinical range on several ECF measures.

Executive cognitive impairment, even subtle and subclinical, along with subjective symptoms of cognitive dysfunction (basic symptom), may be contributing factor in the development and persistence of antisocial behaviors displayed by late-onset adolescent delinquents. The findings also suggest the need for additional research aimed to assess a broader range of cognitive abilities and specific vulnerability and risk factors for late-onset adolescent offenders.

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### 1. Introduction

In the development of antisocial behavior, emotional disturbances are frequently associated with neuropsychological dysfunctions and disruptive behaviors. In juvenile offender samples, symptoms of frontal lobe dysfunctions, such as inability to plan, poor insight, inflexible thinking, attentional difficulties, and impulsivity, were found [1,2]. Executive cognitive functioning (ECF) is a complex construct involving several dissociable abilities, such as cognitive flexibility, attention, planning abilities, concept

formation, set-shifting, selective attention, abstract reasoning, problem-solving, inhibitory control, and working memory [3]. Subclinical impairment in ECF, which is diagnosable by neuropsychological assessments, may derive from a variety of biological and environmental factors in the context of a biosocial model of vulnerability in which genetic influences interact with perinatal complications and psychosocial factors [4].

Beyond objective measures of executive cognitive functions, little attention has been paid to subjective cognitive impairment in antisocial adolescents. A well-known trend in research on psychosis focuses attention on subjective complaints described as Basic Symptoms (BS). Basic symptoms are subjectively experienced cognitive, perceptual, affective, and social disturbances often recognized by the affected person long time before the outbreak of full-blown psychosis [5]. Several dimensions of the basic

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symptoms can be regarded as the subjective expressions of a pre-existing neuropsychological deficit in schizophrenia; cognitive and perceptive dimensions, such as thought interference, thought pressure, or decreased ability to discriminate between ideas and perception, are considered the most sensitive and specific basic symptoms for transition to psychosis, and they are reported by the 65% of those subjects who progress from prodromes to the psychotic illness [6]. On the other hand, recent evidence showed that basic symptoms are prevalent in adolescent general population, as 30.2% have at least one [7], in patients affected by Bipolar I and Bipolar II disorders [8], and in euthymic bipolar patients [9]. Furthermore, it has been shown that, in adolescents, basic symptoms in association with personality traits present as a nonspecific indicator of psychopathology rather than as an indicator of vulnerability to schizophrenia [10]. It actually seems that basic symptoms should be viewed as infrequent experiences not commonly occurring in adolescence and, consequently, they might possess a broad psychopathological meaning [11].

From a developmental point of view, Moffitt [12] outlined a dual taxonomy consisting of two major offending patterns: late-onset, adolescence-limited (AL), and early-onset, life-course persistent (LCP) antisocial behaviors. The first group consists of adolescents whose late-onset antisocial behavior is thought to be transient, representing a pattern of rebellious behavior arisen as a result of the social mimicry of deviant peers and of poor parental monitoring. The Author considered this pattern restricted to adolescence, characterized by sporadic crime-free periods and recovery by early adulthood, and largely contingent on environmental influences; the prevalence of adolescent-limited trajectory is high, as it is thought to include 15% to 30% of the adolescent population [13]. With the progression of chronological age, the assumption of more legitimate adult roles induces adolescence-limited delinquents to desist from criminal behavior.

Early-onset, life-course persistent (LCP) group includes youths with conduct problems whose developmental trajectories are characterized by the influence of multiple risk factors. It has been suggested that prenatal and perinatal disruptions in neural development lead to executive and verbal deficits, engendering differences between children in emotional reactivity, behavioral regulation, level of activity, self-control, motor coordination, and cognitive abilities [12,14]. The main distinctive features of these offenders include early intense aggressiveness, cognitive deficits and impulsivity, severe family adversity, childhood violence exposure, and social disadvantages [15]. The distinction between the two patterns of offending offered significant developmental insights into the nature of delinquent behavior: in particular, the poor long-term prognosis for early-onset disruptive behaviors has been repeatedly confirmed [16,17].

It has been widely accepted that early- and late-onset offence trajectories differ in a number neuropsychological and psychopathological features; however, in the most recent

literature the evidence of marked differences between the two patterns is less consistent [18], since also late-onset offenders displayed enduring problems at follow-up [19], and some of the same risk factors as persistent offenders, notably a convicted parent, a disrupted family, low verbal and nonverbal IQ, and hyperactivity in childhood [20].

Based on this background, the aim of the present research was to compare late-onset offenders with non-offending youths on a range of measures pertaining to executive cognitive functioning and basic symptoms. In light of previous findings summarised above, the broad prediction was that late-onset offenders would differ from non-antisocial controls matched for age and educational level on neuropsychological tasks and on basic symptoms measures.

## 2. Method

### 2.1. Participants

Participants were male adolescents referred to the Department of Juvenile Justice, Messina (Italy). The initial data collection covered 24 months between 2007 and 2009. All male delinquents (209 youths) who were brought to the Department of Juvenile Justice for the first time during that period were contacted and asked to participate in the study. The potential subjects and their parents were given an outline of procedures, informed of their right of refusal, and were assured that refusal to participate would not influence their legal status. The study was introduced as a neuropsychological and psychometric investigation on cognitive functions and on personality features. Inclusion criteria were a pattern of late-onset antisocial behaviour (after age fourteen) [21], and the absence of mental disorders. Subjects were excluded if they had a history of disruptive childhood disorders (Conduct Disorder [CD], Oppositional Defiant Disorder [ODD] and Attention Deficit Hyperactivity Disorder [ADHD]), were currently affected by any major psychiatric disorder or were currently using psychotropic medications, had significant concurrent medical illnesses, reported a history of organic brain disorder including traumatic head injury (with loss of consciousness or cognitive sequelae) or central nervous system pathology, exhibited current substance and alcohol abuse, and had mental retardation. 41 subjects who incurred antisocial behaviors prior to age fourteen (early-onset) and/or reported symptoms of CD, ODD and ADHD were excluded from the study. Only 21 subjects were excluded for current substance and/or alcohol abuse; considering the high prevalence of substance use disorders in young offenders [22–24], the small number of subjects excluded was due to the high percentage of subjects (up to 66.5%) who had completed a residential detoxification program in therapeutic communities before detention.

The final sample was formed by 147 Italian-speaking male subjects, aged 15–20 years. Control subjects were recruited from the general population via advertisements

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