

# When Synesthesia and Savant Abilities Are Mistaken for Hallucinations and Delusions: Contribution of a Cognitive Approach for Their Differential Diagnosis

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## Abstract

**Objective:** Schizophrenia is characterized by hallucinations, delusions, disorganized speech and behavior, and other symptoms that cause social or occupational dysfunction. However, some of these symptoms, such as hallucinations and delusions, can be indicative of other phenomena such as synesthesia and savant abilities. The aim of this paper is to highlight how neurological and psychiatric conditions can be confused and how formal neuropsychological evaluations can be necessary to distinguish them. **Method:** We report the case of a young woman, VA, who perceived sounds as colors and claimed to have elaborated complex astrophysical reasoning, despite having experienced difficulties at school, especially in mathematics. VA also had difficulties to orient herself, to develop social relationships, and often became confused by daily life situations. These elements were considered as symptoms of schizophrenia. **Results:** Evaluations revealed that VA exhibited savant abilities in astrophysics and colored-hearing synesthesia. We also found evidence of higher-than-average cognitive functioning. **Conclusions:** In complex cases, neuropsychological and formal evaluations are necessary to establish a differential diagnosis. Moreover, the case highlights the link between synesthesia and savant abilities.

## Introduction

Neurological and psychiatric symptoms are sometimes difficult to dissociate. Indeed, many neurological diseases cause psychiatric symptoms, and, conversely, some psychiatric illnesses such as schizophrenia and autism involve neuropsychological impairment (Reichenberg, 2010; Wilson et al., 2014). Additionally, some neurological conditions, such as dementia with Lewy bodies and Parkinson's disease, can be confused for psychopathological conditions such as psychosis, especially due to the presence of hallucinations (Weintraub & Hurtig, 2007). The aim of this paper is to demonstrate how neurological and psychiatric conditions can be sometimes confused, and that neuropsychological and formal evaluations could be important for a differential diagnosis. For this, we report the case of a woman who presented as schizophrenic but whose objective and neuropsychological assessments rather revealed synesthesia and savant abilities.

It is well known that schizophrenia is a psychiatric disorder characterized by hallucinations (hearing voices or seeing things that are not there), delusions (false beliefs, grandiose ideas), negative symptoms (affective and emotional exhaustion), and disorganized speech and motor behavior (APA, 2013). Different forms of schizophrenia have been described (disorganized, catatonic, paranoid, and undifferentiated), and these are diagnoses assigned according to the dominant symptom. In addition to these symptoms, schizophrenia is often accompanied by cognitive deficit (Fioravanti, Carlone, Vitale, Cinti, & Clare,

2005; Heinrichs & Zakzanis, 1998; Reichenberg, 2010). According to Reichenberg (2010), the incidence of cognitive deficit in patients with schizophrenia is 55–80%. For instance, a general impairment is observed, with an IQ score below the general population (specifically, the performance IQ score). Executive function and memory are also impaired in this pathology. Nonetheless, the diagnosis of schizophrenia can be difficult given that there is no known etiology and no universally accepted test. Hallucinations and delusions are key symptoms of this psychiatric disease, the main criterion being the distortion of reality. For most patients, inappropriate thoughts and distorted perception are easy to diagnose. However, some patients may report unusual perceptions and abilities that, while being exceptional and disconcerting, are not necessarily the same as hallucinations and delusions. We will now discuss how two such exceptional phenomena, syn-

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