



Review

# Neurocognitive mechanisms of figurative language processing—Evidence from clinical dysfunctions

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## Abstract

The interpretation of proverbs has a long tradition in the assessment of abstract thinking, particularly in schizophrenia. Although the usefulness of proverb interpretation as a diagnostic tool has been questioned over the years, the comprehension of non-literal language nevertheless plays an important role in social interactions. Thus, researchers remain interested in the neurocognitive mechanisms mediating comprehension and use of figurative language.

The present paper summarizes and evaluates the evidence from behavioral, lesion and imaging studies including data for compromised figurative language processing derived from clinical populations. One main focus is on studies of figurative language comprehension in schizophrenia. Several theoretical explanations proposed to account for the difficulties schizophrenia patients experience when confronted with figurative language will be addressed. An integration of the evidence from different areas of research is attempted and directions for future investigation are outlined.

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*Keywords:* Figurative language; Proverbs; Idioms; Schizophrenia; Right hemisphere

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## 1. Introduction

### 1.1. Aims and scope of the article

Non-literal expressions form an integral part of everyday language, conveying features of the conventional wisdom, social norms and rules characterizing a given society (Gibbs and Beitel, 1995). A great deal of our everyday communication is figurative rather than literal with figures of speech occurring at an estimated rate of about 6 per minute of speech (Pollio et al., 1977). Most people find non-literal language easy to understand presumably because most of their thinking is conceptualized through metaphor, proverbs, irony and other instances of non-literal language (Lakoff and Johnson, 2004).

The ability to effectively use figurative communication may promote personal and professional success. In healthy adolescents, for instance, idiom comprehension has been positively associated with academic achievement (Nippold and Martin, 1989). On the other hand, the inability to efficiently cope with this form of communication may substantially contribute to the poor social competence of individuals suffering from disorders like schizophrenia (Mitchell and Crow, 2005; Vallance and Wintre, 1997).

Acknowledging the relevance of non-literal language for social interaction, an increasing amount of research has addressed the neurocognitive mechanisms mediating the processing of non-literal language. The present review primarily aims to summarize and critically evaluate the evidence derived from a range of cognitive neuroscience methods. In the first section, relevant terms and definitions will be introduced, a brief outline of the available theories about the cognitive and linguistic mechanisms underlying figurative language comprehension will be given and the development of non-literal language comprehension across the lifespan will be briefly described. In the second section, evidence of impaired figurative language processing in neurodevelopmental and neurodegenerative disorders will be reviewed. The third section addresses impaired figurative language comprehension in schizophrenia, the disorder in which this topic has been comprehensively investigated. A summary of the most relevant findings and suggestions for future investigations will be outlined in the concluding section.

### 1.2. Definitions of relevant terms

It has proved surprisingly difficult to elaborate the distinction between literal and non-literal language (Glucksberg, 2001). Two major criteria have been established. First, literal statements are supposed to express a truth (e.g. “Tim is in Canada.”) while non-literal language usually expresses a falsehood (e.g. “Tim is on cloud nine”), although this distinction has not remained without contradiction (Gibbs and Beitel, 1995). Second, literal language conforms to linguistic constraints while non-literal language tends to violate them. For instance, in the sentence “This car is very thirsty.” the linguistic constraint regarding the use of the adjective “thirsty” is violated, because only creatures can be thirsty (Fass, 1999).

Although the terms “non-literal” and “figurative” language are sometimes used synonymously, the term “figurative language” originally applies only to expressions containing “figures of speech” or “metaphors”, which are not necessarily involved in all non-literal statements (e.g. “Where there’s a will there’s a way”) (Gibbs and Beitel, 1995). A “metaphor” can be constituted by a single word, a phrase, a sentence or a whole text and makes an explicit (“My love is like a fever.”) or implicit (“My life is a roller-coaster ride”) comparison between ideas from different knowledge domains which are usually not associated with one another (Gibbs, 1999; Glucksberg, 2003). To put it more strongly, metaphors not only compare certain unrelated categories with one another but also make class inclusion assertions by attributing salient properties of one category to another (Glucksberg and Keysar, 1990). Most neuroscience research focuses on figurative language rather than on non-figurative, non-literal language because it occurs more frequently in everyday interactions and because its comprehension is supposed to place higher demands on cognitive abilities (Lakoff and Johnson, 2004).

This review will also focus predominantly on the comprehension of metaphors in general and particularly in association with proverbial and idiomatic expressions. Research dealing with irony will be taken into account to a lesser extent, because additional cognitive factors, like the adequate perception of affective prosody, play a greater role in the interpretation of irony (Wang et al., 2006).

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