Development of novel metaphor and metonymy comprehension in typically developing children and Williams syndrome

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A R T I C L E   I N F O

A B S T R A C T

This study investigated the development of novel metaphor and metonymy comprehension in both typically developing (TD) children and individuals with Williams syndrome (WS). Thirty-one TD children between the ages of 3;09 and 17;01 and thirty-four individuals with WS between the ages of 7;01 and 44 years old were administered a newly developed task examining novel metaphor and metonymy comprehension, as well as a range of standardised tests that assess semantic knowledge. This age range and the background measures allowed construction of developmental trajectories to investigate whether chronological age or mental age, represented by word knowledge, relate to novel metaphor and metonymy comprehension. The results showed that comprehension of figurative language did not increase with chronological age in WS, in contrast to TD. Although there was no difference for the different types of metaphors, certain metonymy expressions were found to be easier than others in the TD group. In addition, semantic knowledge was a reliable predictor for novel metaphor and metonymy comprehension in the TD but only for metonymy in the WS group. In sum, development of novel metonymy in the WS group is only delayed while comprehension of novel metaphor is both delayed and atypical. However, future research should further investigate differences between sub-types, as well as what cognitive factors relate to novel metaphor comprehension in individuals with Williams syndrome.

1. Introduction

Metaphor and metonymy are two types of figurative expressions in which an expression normally associated with one concept (target) is used to communicate something about another concept (vehicle), without expressing an explicit link between the two concepts. In a metaphor, the target and vehicle belong to two different conceptual domains and a common ground (or link) is established through comparison or analogy (Warren, 1992). For example, in the metaphor "John is a lion.", *John* (target) is being compared to *a lion* (vehicle), as both are strong. In contrast, in a metonym, one salient aspect is used to refer to the whole or some other aspect of that entity (Frisson & Pickering, 1999), and thus the target and vehicle belong to the same conceptual or experiential domain (Barcelona, 2003). For example, in the metonym "The palace gave a speech.", the term *palace* (vehicle) is used to refer to the people within the palace (target). Metaphors and metonyms provide a way to understand and organise new ideas (Glucksberg, 2001; Ortony, 1975), and thus occur frequently as a tool within education to

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teach new concepts (Jakobson & Wickman, 2007; Pramling, 2010). In addition, they occur frequently in daily conversations (Blasko, 1999; Shelestiuk, 2005; Winner, Engel, & Gardner, 1980). Thus, failure to understand metaphor and metonyms could result in serious impairments in conceptual learning and social communication.

Two causal explanations for the development or failure of metaphor comprehension (and by extension also metonymy) have been proposed, namely Social Inference theory and Weak Central Coherence (WCC) theory. According to the latter, failure to understand figurative language has been linked to a more general cognitive inability to use context to derive meaning. Context is important in the processing of metaphor and metonymy, in that it provides a clue for the interpreter whether the sentence has to be understood literally or non-literally (Giora, 2002). In addition, context aids the selection of the correct target and vehicle features in order to establish the common ground between them and the common ground between the target and vehicle may differ from situation to situation. For example, depending on the context, in the expression "John is a lion." John could be referred to as a lion because he is as strong as a lion or alternatively because his hair looks like a heavy mane. The similarity between target and vehicle is therefore greatly enhanced by the context in which both are presented (Gluckberg & McGlone, 1999). Due to the fact that meaning is constructed by context and thus context is an important factor in language comprehension, WCC theory predicts that people who have a local processing bias, and thus fail to process information globally or within context, will have problems with metaphor and metonymy comprehension (Frith, 1989). Studies on individuals with Autism Spectrum Disorders have investigated the explanations provided by adults with high-functioning autism and Asperger's Syndrome on the *Strange Stories Task* (Happé, 1994) and found that the participants in the clinical group failed to use context to provide context-appropriate interpretations for stories including jokes, lies, figures of speech and sarcasm (Happé, 1994; Joliffe & Baron-Cohen, 1999). However, other studies have failed to find evidence for a correlation between non-literal language comprehension and WCC. For example, Martin and McDonalds (2004) reported that young adults with Asperger's Syndrome showed both a deficit in comprehension of ironic jokes, as well as evidence of WCC, as they failed to benefit from putting pieces together of a meaningful puzzle (e.g., the puzzle pieces make the picture of a tree) compared to a non-meaningful puzzle (e.g., the puzzle pieces make a random picture), in contrast to a TD group of a similar chronological age. However, no correlation was found between a local processing bias and comprehension of irony.

In contrast, Social Inference theory proposes that speakers use figurative expressions because they allow the speaker to convey a certain intended meaning, which would have been difficult to express using any other kind of expression (Wilson, 1994). It has been argued that comprehension of metaphor and metonymy relies upon understanding of the communicative intent of the speaker (MacKay & Shaw, 2004). This means that the recipient needs to attribute mental states to the speaker in order to arrive at the correct meaning of the expression (Papafragou, 1996; Winner, 1988). Social Inference theory therefore suggests that there is a direct link between comprehension of non-literal language and Theory of Mind (ToM), i.e., the ability to attribute mental states (such as beliefs and intentions) to others (Happé, 1993a). Some studies have demonstrated that there is a direct link between comprehension of metaphors and first-order ToM tasks (e.g., Happé, 1993a). For example, it was found that individuals with autism who failed both first- and second-order ToM tasks performed significantly worse on a sentence completion task that included metaphors and irony compared to those participants who passed either first-order or both first- and second-order ToM tasks. In contrast, there was no difference in performance on metaphor comprehension between those participants who passed first-order and those who passed both first and second-order ToM tasks (Happé, 1993b). However, a study by Norbury (2005), which compared children with autism aged 9–17 years old to aged matched controls, failed to replicate the findings by Happé (1993a) and did not find any evidence that the possession of first-order ToM skills guarantees the ability to comprehend metaphors using a similar but more controlled task. Similarly, a recent study by Rundblad and Annaz (2010a) has shown that there was no correlation between the understanding of lexicalised metaphors and metonyms and performance on first-order ToM abilities in children with autism.

Instead, it has been argued that broad semantic knowledge is required in order to establish some common ground between two referents that belong to either different (for metaphor) or the same conceptual domains (for metonymy), as one needs to be able to interpret words on multiple levels in order to select potential relevant properties and similarities (Norbury, 2005; Vosniadou, 1987; Winner, 1988). The importance of semantic knowledge in the understanding of metaphors has been shown by Evans and Gamble (1988). In this study, children from three different age groups (8;05, 10;06, and 12;08 years old) were asked to list the salient attributes of targets and vehicles of 22 metaphors. After 6 weeks, the same children were then asked to verbally explain the metaphors. This study showed that when children listed the attributes of the vehicle as salient, they were more likely to interpret the metaphor correctly. Furthermore, when children had listed a different attribute as salient for the target or vehicle they interpreted the metaphor incorrectly. Norbury (2005) compared children between the ages of 9 and 17 years old with language impairment to those with autism and found that children who had language impairment had more difficulty in metaphor comprehension than children with autism of a similar chronological age. In addition, the results showed that broad semantic knowledge was a better predictor of metaphor comprehension than ToM abilities or the severity of autism (Norbury, 2005). Furthermore, vocabulary comprehension scores were found to be a good predictor for lexicalised metaphor and metonymy comprehension in typically developing children (Rundblad & Annaz, 2010b) and semantic knowledge was also a good predictor for the production of figurative language in general (Naylor & Van Herwegen, 2012). In sum, specific abilities, such as broader semantic and conceptual knowledge, might be better indicators for metaphor and metonymy comprehension compared to the use of context or social inference abilities. A solid understanding of what abilities predict successful metaphor and metonymy comprehension is important for the development of interventions.