Research on Cognitive Method of Synesthetic Metaphors

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Abstract: Synesthesia is a very special cognitive phenomenon, reflected in the chain reactions from one sensory domain to another or other sensory domains. The study of synesthesia can be incorporated into a framework of cognitive linguistics, especially the theory of conceptual metaphor. This article mainly discusses some of the existing problems in treating synesthesia as a kind of metaphorical mapping.

Keywords: synesthesia; synesthetic metaphor; conceptual metaphor theory; mapping

1. Introduction

The word "synesthesia" comes from the Greek (syn-) "union", and (aesthesis) "sensation", thus meaning something akin to "a union of the senses". It is a cognitive state in which stimulus from one sensory domain, such as smell, can trigger response from another or other sensory domains, such as vision or/and hearing. The stimulus that can elicit synesthetic experience is called inducer and the resulting experience concurrent. Day (1995) maintains that synesthesia is additive, that is, it adds to the initial sensory perception, rather than replacing one sensory perception for another. In a synesthetic experience, sensory perceptions become affected and altered in the ways they function and integrate with other senses. More commonly, however, the mixing of sensory experiences in synesthesia occurs for different perceptual properties within the same modality; for instance, letters and digits may elicit synesthetic experiences of color. The synesthetic colors may be induced by the visual appearance of a printed item, or by its sound when spoken aloud (Rich, et al 2005). Another characteristic of synesthesia is that it is generally unidirectional, that is to say, for a given synesthete (a person who has synesthetic experiences), tastes may elicit synesthetic sounds but not the other way round (Day, 1995).

Researches in synesthesia have also revealed that it may possess other associated characteristics. Cytowic (2002) has noted that synesthetes tend to be female, left-handed, often poor at mathematics and direction finding, and prone to 'precognitive' experiences such as predictive dreams. Baron-Cohen et al. (1996) have conducted a research which shows that among people discovered to be synesthetes, there exists a gender bias of appropriately 6 female to every male, and the general percentage of synesthesia in adults may be 1 in 2000 (0.05%); other researches indicate that the percentage may be much higher for some specific forms of synesthesia, for example, grapheme–color synesthesia (the triggering of colors by letters or/and numerals) may be experienced by 1 to 2 percent of the general population (Julia Simmer, 2006). Baron-Cohen et al. (1996) have also found a higher prevalence (48.6%) among biological relatives of some of the samples, which strongly indicates that synesthesia is genetically transmitted. This may also explain to a certain extend why there is a gender bias between female and male synesthetes.

So far we have observed synesthesia mainly from the perspectives of biology and neurology, besides these, synesthesia can also be approached from a purely linguistic, or more specifically, a cognitive linguistic perspective. Literary synesthesia, as a figure of speech, has long established itself as one of the traditions of rhetoric study. However, the traditional study of literary synesthesia mainly focuses on it as a means of achieving rhetorical or stylistic effects, not as a significant way of perceiving the world. Cognitive linguists think otherwise. They view literary synesthesia as a kind of metaphor, hence the name synesthetic metaphor, that literary synesthesia is not merely a means of linguistic decoration, but more importantly, a means in understanding and reasoning about the world. The next section of the article focuses on explaining synesthetic metaphor from a cognitive linguistic framework.

2. Synesthetic Metaphor

Metaphor is for most people a figurative device, a rhetoric ornament for achieving aesthetic purposes. But the past two decades of metaphor research has led to the reorganization that metaphor is not merely a figure of speech, but rather a matter of thought, "human thought processes are largely metaphorical" (Lakoff, 2003). The theory which we call the theory of conceptual metaphor reveals that metaphorical thoughts are pervasive and ubiquitous in our everyday language and thought, and we understand the world in which we live and our relations with this

world largely in terms of metaphor. Metaphor is primarily conceptual in nature, with surface manifestations in language. It is the main mechanism through which abstract concepts are comprehended and abstract reasoning is performed. One cannot think abstractly without thinking metaphorically. As a basic cognitive structure, metaphor allows us to understand a relatively abstract concept in terms of a more concrete or more structured concept (Ning Yu, 2003). For example, we can talk about LOVE, a relatively abstract concept, in terms of other more concrete concepts. Structurally speaking, metaphors are mappings across different conceptual domains, involving projections from a source domain to a target domain. In the following are some examples from Lakoff (2003):

LOVE IS A PHYSICAL FORCE
I could feel the electricity between us.
There are sparks.
They lost their momentum.
LOVE IS WAR
He is known for his many rapid conquests.
She fought for him, but his mistress won out.
He made an ally of her mother.
(Lakoff, 2003: 49)

Although metaphor involves mappings across different conceptual domains, we must keep in mind that these mappings are asymmetrical, that is, they are unidirectional; linguistic metaphors are verbal devices based on a sensory logic at the semantic level, and this entails a movement from abstract to concrete, the mappings are from the more concrete to the more abstract, rarely the other way round. Metaphorical mappings are also not arbitrary, but grounded in the body and bodily experience in the physical and cultural world (Lakoff 2003, Kovecses 2005). Recent work in metaphorical analysis makes it clear that many of our most basic concepts (and our reasoning via those concepts) are embodied: lived experiences in our bodies inspire and constrain the way we conceive and articulate many of our other experiences. Metaphor has the capacity to introduce a sensory logic at the semantic level alluding to a more complex scenario of interrelated meanings and experiences of the world (Carmen, 2001). As we mentioned in the first section, synesthesia as a cognitive process also involves cross-modular associations, it is this transfer of information from one sensory domain to another that characterizes synesthesia as one kind of metaphor. Some examples from Ning Yu (2003) and Carmen Bretones (2001) are listed in the following to demonstrate this kind of cross-modular mappings:

(1) The house was full of bubbling-hot stench, like a dead chicken or duck being scalded by boiling water. (*Ball-Shaped Lightning*) touch → smell

(2) The music was light and bright, exquisite and emotive, stroking people's faces like a gentle breeze in warm and flowery March. (*Folk Music*) color + touch → sound
(Ning Yu, 2003:24)

(3) The cold smell of potato mould, the squelch and slap
Of soggy peat, the curt cuts of an edge
Through living roots awaken in my head.
(*Digging*, lines 25-27) smell → temperature
(Carmen Bretones, 2001:4)

Ullmann (1959) discovered several overall tendencies through his study in poetic synesthesia. One of the tendencies he calls "hierarchical distribution" is that synesthetic transfers tends to go from the "lower" to the "higher" sensory domains, that is to say, touch → taste → smell → sound → sight, and the "lower" the sensory domain, the more possible that it gets transferred. Williams (1976), through study of synesthetic adjectives in English as well as some other Indo-European languages, has summarized his findings in the following figure:

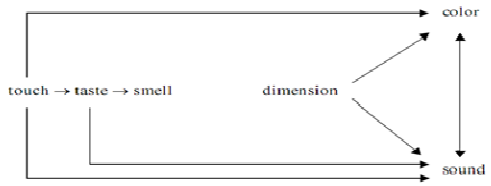

Figure1. General Routes for Synesthetic Transfer. (Williams 1976)

Williams' (1976) study of ordinary synesthetic metaphor reinforces Ullmann's (1959) research about poetic synesthesia, and it seems that synesthetic transfers exhibit a general tendency to move up-ward, from the "lower" senses (or more distinctive sensory domains) to the "higher" senses (or less distinctive sensory domains). Studies in neurology have also validated this tendency. In virtually all cases, the roles of inducer and concurrent are fixed. So, whereas particular digits, letters or words can induce synesthetic colors, the converse is not true: colors do not elicit digits, letters or words (Rich & Mattingley, 2002).

3. Some Problems

The data in the above section all seem to validate what Ullmann (1959) and Williams (1976) have observed, that synesthesia is unidirectional. But further evidence shows that it may not be as simple as we first perceived. In this section we will talk about some of the problems involved in synesthetic metaphor study.

Julius and Basbaum (2001) have conducted research in pain, and their research results reveal the site of capsaicin (a chemical in chilli peppers which produces a hot and painful sensation) action in nociceptors (sensory neurons

involved in detecting pain-producing stimuli), which they call the "capsaicin receptor" and which is known as vanilloid receptor subtype 1 (VR1). Their researches suggest that heat-evoked and vanilloid-evoked responses are probably mediated by the same entity. They further suggest that apart from being a chemical transducer, VR1 may also act as a thermal transducer in living organisms. This may explain why when we eat chilli peppers, we fill "hot" (spicy) and "hot" (sharp) at the same time. Rakova (2004) have examined synchronic as well as diachronic materials as regards the relation between "hot" and "spicy", and her finding points to that, despite some minor diversity, a pattern that is common to all the sample languages can be easily detected. In all the sample languages, words for taste sensations caused by spicy foods are also words for sensations caused by either noxious thermal or mechanical stimuli. Based on these evidences, Rakova suggests that the gustatory meanings of "hot" and "sharp" should not be considered metaphorical. Hence the expression "burning pain", at least in terms of spicy food, is not synesthetic; although from the surface level it seems to involve mappings from the domain of temperature to the domain of pain.

Another problem arises in the study of literary synesthesia. Ning Yu (2003) has examined some examples extracted from a contemporary Chinese novelist Mo Yan. His finding can be illustrated by the following figure:

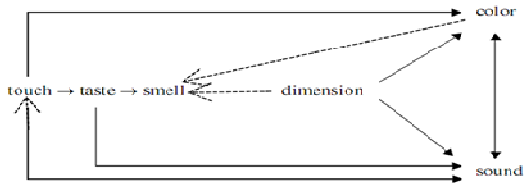

Figure 2. Model of Metaphorical Transfers According to Ning Yu (2003).

Ning Yu (2003) has discovered 11 types of synesthetic metaphors through his study of Mo Yan's representative novels, 8 of which confirm the general tendencies we observe in figure 1; 3 of which do not confirm to the general tendencies, they are shown in dotted arrows in figure 2. As maintained by Ning Yu, the samples that he collected to a large extent can validate the unidirectionality of synesthetic mappings. The three downward mappings cannot be simply classified as abnormal, but rather can be explained from a physiological point of view: touch, but not dimension, is physiologically closely related to taste and smell.

If Ning Yu's (2003) findings can still be explained in a way more adhering to the general tendencies in synesthetic mappings, then Carmen Bretones' (2001) findings may pose more problems. He studied 50 poems by Seamus Heaney, Irish poet and Nobel Prize Laureate, and his findings can be illustrated by the following figure:

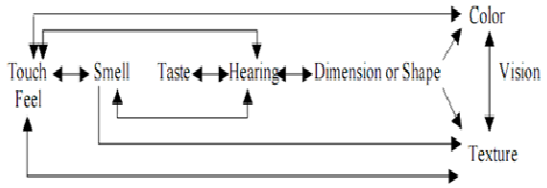

Figure 3. Model of Metaphorical Transfers According to Carmen Bretones (2001).

Here we have a much more complicated picture than either figure 1 or figure 2 shows. Almost all kinds of mappings are possible in Heaney's works, whether upward or downward. It seems that the general tendencies proposed by Ullmann (1959) and Williams (1976) are out of function to a certain extent here. It is true that there is a systematic directionality in the mapping, but not showing that the meaning that the metaphor conveys is presented by a term that belongs to the highest in the scale of distinction, while the modifying term belongs to the lowest modality in the scale. It is true that a mapping from more accessible or basic concepts seems more natural, and is preferred to its opposite, but that accessibility will function according to the meaning intended or perceived, never according to more or less accessible sensory modalities (Carmen Bretones, 2001:12), that is to say, there is no absolutely dominant sensory domain. Although smell is a comparatively lower sensory domain, the sense of smell is not weaker than that of other sensory domain like hearing or vision. In terms of the connection with memory, Heiz (quoted in Ibarretxe, 1999: 37) has found that memories evoked by the sense of smell are more emotional than those evoked by other senses, including vision, hearing and touch.

Yet another problem facing the study of synesthesia is that although synesthetic experiences to some extent involve mappings from one sensory domain to another, we have to keep in mind that this refers to literary synesthesia, not the synesthesia in the neurological sense. We have mentioned in previous sections that neurologically speaking, most of the synesthetic experiences occur within the same sensory domain, like grapheme–color synesthesia. While in metaphorical mappings, concepts that belong to very different domains are mapped. For example, when we use the expression "They lost their momentum" to describe marriage, we talk about LOVE, which belongs to the conceptual domain of EMOTION, in terms of PHYSICAL FORCE. Even though some synesthetic experiences are cross-modular, such as colored hearing, we can still incorporate them in the same SENSORY DOMAIN, if it can be viewed as a more abstract cover term or hypernym. If it is the case, then synesthetic mappings will no longer be metaphorical, but metonymic instead.

Further evidences from neurological and psychological study suggest that synesthetic experience may be holistic, rather than a mapping from one domain to another. Mulvenna & Walsh's (2006) experiments support the hypothesis that the theory that feedback from a multimodal association region, like the parietal cortex, contributes to the perception of a synesthetic photism. fMRI studies have shown that during the synesthetic experience, automatic co-activation occurs in brain areas usually associated with both the trigger sensation and the secondary sensation. Esterman et al.'s (in Mulvenna & Walsh, 2006) study is particularly noteworthy in providing evidence of involvement of multimodal cortex, supporting the theory of an atypical use of normal perceptual mechanisms.

4. Concluding Remarks

The study of synesthesia, or rather, synesthetic metaphor, can be incorporated into the framework of conceptual metaphor theory, which "characterizes meaning in terms of embodiment, that is, in terms of our collective biological capacities and our physical and social experiences as beings functioning in our environment." (Lakoff, 2003: 267). The theory of conceptual metaphor provides a theoretical framework that can account for to some extent the general tendencies in synesthetic metaphors discovered by Ullmann (1959) and Williams (1976) in their studies. But the samples provided by Ning Yu (2003) and Carmen (2001) contradict with Ullmann's (1959) and Williams' (1976) findings, which suggest that the application of synesthetic metaphors is under constraint of biological as well as social-cultural factors.

However, to incorporate synesthetic metaphor study into a framework of conceptual metaphor is by no means free of problems. One is that the mappings in synesthetic metaphors are not always unidirectional, that is, sometimes they involve upward to downward mappings. This may indicate that synesthetic metaphors, although rooted in synesthesia as a biological and neurological phenomenon, might subject more to social-cultural as well as personal factors. These uses, seemingly abnormal to a certain culture or language, or a certain person, may become entrenched and fixed, thus appear to be absolutely normal.

Another problem for synesthetic metaphor study comes from neurological study. Researches in psychology and neurology suggest that synesthetic mappings might not be as simple as we first consider, it might be metonymic instead of metaphorical, like mentioned in Rakova (2004). Also, other studies in neurology have suggested that synesthetic experience might be a holistic process, involving some multimodal cortex and atypical use of normal perceptual mechanisms. It is true that we have rather conflicting evidences in the field of synesthetic metaphor study and all the above mentioned problems await clear and definite solutions. Further researches in cognitive science, psychology, and neurology need to be conducted to reach this goal.

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