From Linguistic Synaesthesia to Embodiment:

Asymmetrical Representations of Taste and Smell in Mandarin Chinese

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Abstract. This paper applied the embodiment theory of metaphor to the study of linguistic synaesthesia. In particular, we tried to account for the distribution of synaesthetic uses of Mandarin adjectives for taste and smell in terms of the degree of embodiment of different bodily experiences. We have found that taste is involved frequently both as the source domain and as the target domain in linguistic synaesthesia of Mandarin adjectives, while smell is productive only as the target domain. Besides, the synaesthetic transfer from taste to smell has also been attested to be more predominant than the transfer in a reverse direction, i.e., from smell to taste. We have thus proposed that a finer-grained theory of embodiment is sorely needed to account for the subtle differences in synaesthetic patterns of taste and smell in Mandarin adjectives. That is, the degree of embodiment is not only relevant in terms of the traditional dichotomy of bodily versus non-bodily events in the embodiment theory. The degree of embodiment is also a crucial concept to differentiate physiologically-based events such as those involving sensory modalities, which thus should also be taken into consideration in the theory of embodiment.

Keywords: Linguistic synaesthesia, Embodiment, Taste, Smell, Mandarin.

1 Introduction

The important role of bodies in structuring human language and cognition has been widely recognized (Johnson, 1987; Gibbs, 2005; among others), which is also one of the basic tenets in Cognitive Linguistics (Lakoff and Johnson, 1980; Wang, 2002). Linguistic studies supporting the embodiment theory mainly focus on the conceptualization of non-bodily experiences in terms of concepts representing human bodily perceptions and interactions with surrounding environments (e.g., Sweetser, 1990; Lien, 2005; and so forth). For instance, English verb *see* illustrates the mapping from the visual activity to the mental thinking/understanding in the phrase *to see no reason*, and Mandarin gustatory adjectives 苦 *ku3* 'bitter' and 甜 *tian2* 'sweet' are used to characterize

the situation of life in the idiom 憶苦思甜 *yi4-ku3 si1-tian2* 'recalling the sufferings in the past and contrasting them with happiness at present'.[1] However, as noted by Caballero and Paradis (2015), the relationship and interaction between different bodily experiences concerning embodiment have received less attention in linguistics, although they have been demonstrated to be more challenging and fundamental issues with respect to the theory of embodiment by extensive psychological and neuroscientific studies (e.g., Ramachandran and Hubbard, 2001; Seitz, 2005).

Linguistic synaesthesia, called synaesthetic metaphors alternatively, such as *sweet voice* in English and 冷色 *leng3-se4* 'cold color' in Mandarin Chinese, involves the use of lexical items for the perception in one sensory modality to describe perceptions in others (Ullmann, 1957; Williams, 1976). The associated characteristic of different sensory perceptions in linguistic synaesthesia, thus, would be well-suited to investigate the explanatory power of the theory of embodiment within bodily experiences. Therefore, our study focuses on the application of the embodiment theory to the study of linguistic synaesthesia. Specifically, we will explore: (1) to what extent, adjectives originally for gustatory (and olfactory) perceptions can be employed in linguistic synaesthesia, i.e., used to describe perceptions in other sensory modalities; (2) to what extent, gustatory (and olfactory) perceptions can be characterized by adjectives from other sensory domains; and (3) whether synaesthetic representations of gustatory and olfactory experiences in Mandarin adjectives can be predicted by the embodiment theory.

2 Method: A Corpus-based Approach

Our study adopted a corpus-based approach for data collection, which included extraction and classification of Mandarin sensory adjectives from lexical thesauri and sensory uses of these adjectives from a balanced corpus.

Specifically, two Chinese lexical thesauri were employed, namely, HIT-CIR Tongyici Cilin (Extended) (Che et al., 2010) and HowNet (Dong and Dong, 2003), to extract sensory words. Then, each morpheme in the extracted sensory words was manually examined to identify morphemes that are used for specific senses etymologically. To ensure that correct etymology was identified, we consulted both 說文解字 *Shuo1-wen2 jie3-zi4* (Xu, 1963 [156]) and 說文解字注 *Shuo1-wen2 jie3-zi4 zhu4* (Duan, 2007 [1735–1815]) through the online interface of 漢典 *Han4-dian3*[2] and Hantology (Chou and Huang 2010).[3] Besides, an additional Chinese philological resource, i.e., 漢語大字典 *Han4-yu3 da4 zi4-dian3* (Xu, 2010), was also consulted to double-check the original meaning of the morphemes and to identify the original meaning of the morphemes that are not included in 說文解字*Shuo1-wen2 jie3-zi4* or 說文解字注 *Shuo1-wen2*

[1] Examples used in this paper are from two balanced corpora, of which English expressions were extracted from the BNC corpus (accessed at: http://www.natcorp.ox.ac.uk/) and Mandarin expressions from the Sinica corpus (accessed at http://app.sinica.edu.tw/kiwi/mkiwi/, Chen et al., 1996).

[2] Accessed at: http://www.zdic.net/.

[3] Accessed at: http://hantology.ling.sinica.edu.tw/.

jie3-zi4 zhu4. In principle, we only included adjectives composed of morphemes with the same and attested uses for senses etymologically. Adjectives, such as 苦澀 *ku3-se4* 'bitter', were thus excluded, since in the example word 澀's etymological meaning of 'not flowing smoothly' is related to the tactile sense, while 苦 originally meaning 'bitter vegetable' indicates the gustatory modality.

We then extracted sensory usages for the Mandarin adjectives obtained in the last step from the Sinica corpus, by manually checking the distributions of the adjectives in five senses (i.e., touch, taste, smell, vision, and hearing). For example, the adjective 酸 *suan1* 'sour' was identified to have distributions in the tactile domain, such as 腰酸腿疼 *yao1 suan1 tui3 teng2* 'feeling sore in the waist and pain in the legs'; the gustatory domain, such as 酸菜 *suan1-cai4* 'the sour vegetable (pickles)'; the olfactory domain, such as 酸臭味 *suan1 chou4 wei4* 'the sour and smelly odor'; and the auditory domain, such as 酸酸…一聲 *suan1-suan1…yi1 sheng1*'the sour (...) sound'.

3 Synaesthetic Representations in Mandarin Adjectives for Taste and Smell

3.1 Synaesthetic Representations in Adjectives for Taste

There are 24 Mandarin adjectives attested with constituent morphemes all related to taste etymologically, as shown in Table 1, such as 鮮 'tasty' and 甜美 *tian2-mei3* 'tasty'. The distribution of these adjectives in the Sinica corpus shows that adjectives originally for taste can also be used for touch, smell, vision, and hearing. Precisely speaking, the olfactory domain is the highest target concerning the synaesthetic transferability, where 15 of 24 (62.5%) gustatory adjectives can be utilized to characterize olfactory perceptions, such as 淡淡的花香 *dan4-dan4 de hua1-xiang1* 'the slight fragrance of flowers'. By contrast, the tactile domain is the lowest target for Mandarin gustatory adjectives, with the synaesthetic transferability of 20.8% (5/24). Therefore, it can be concluded that taste is a productive source domain in Chinese synaesthesia, as adjectives originally conceptualizing gustatory experiences can be employed to describe perceptual experiences in all other four sensory modalities. In addition, the synaesthetic transferability from taste to other four senses is all over 20%.

Taste can not only be the source domain in linguistic synaesthesia of Mandarin adjectives, but also can be the target domain, based on the sensory usages of adjectives etymologically for other senses. As illustrated in Table 2, except for hearing, gustatory perceptions in Mandarin can be characterized by adjectives from touch (e.g., 澀 *se4* 'not flowing smoothly'), from smell (e.g., 香 *xiang1* 'fragrant'), and from vision (e.g., 厚 *hou4* 'thick'). Among the 18 synaesthetic adjectives for taste, the numbers of adjectives mapping from vision and from touch are close (i.e., nine and eight respectively), while only one adjective transfers from smell.

Mandarin adjectives that can represent gustatory experiences, thus, include two categories: one is adjectives originally for taste, and the other is synaesthetic uses of ad-

jectives from other sensory modalities. In terms of the adjectives composed of morphemes with the same sensory etymology investigated in this study, original adjectives for taste occupy a larger percentage, i.e., with 57.1% (24/42), than synaesthetic adjectives for taste, i.e., with 42.9 % (18/42), with respect to lexical types.

Table 1. Taste as the source domain in linguistic synaesthesia.

Source Domain	**Target Domain**			
TASTE (24)	TOUCH	SMELL	VISION	HEARING
Number of adjectives	5	15	11	10
Synaesthetic transferability	20.8% (5/24)	**62.5% (15/24)**	45.8% (11/24)	41.7% (10/24)
Examples	一身膩汗 'greasy sweat all over the body'	淡淡的花香 'the slight fragrance of flowers'	鮮黃色 'bright yellow'	甜美的歌聲 the sweet singing'

Table 2. Taste as the target domain in linguistic synaesthesia.

Target Domain	**Source Domain**			
TASTE (18)	TOUCH	SMELL	VISION	HEARING
Number of adjectives	8	1	9	0
Percentage	**44.4% (8/18)**	5.6% (1/18)	**50% (9/18)**	0
Examples	澀柿子 'puckery persimmons'	口感香 'the taste is appetizing'	酒的厚薄 'thick and thin tastes of wine'	-

3.2 Synaesthetic Representations in Adjectives for Smell

The synaesthetic representation in adjectives for smell exhibits different patterns compared with that for taste in Mandarin. There is only one original olfactory adjective with synaesthetic distributions in taste as discussed above, and one original olfactory adjective in vision (i.e., 臭 *chou4* 'smelly'), as shown in Table 3. Thus, the synaesthetic transferability of olfactory adjectives to taste and vision is the same, both in 10% (1/10). Smell is, therefore, not as productive as taste to be the source domain in linguistic synaesthesia of Mandarin adjectives.

Table 4, however, can demonstrate that smell is a predominant target domain in linguistic synaesthesia of Mandarin adjectives. There are 42 Mandarin adjectives originally for other senses attested with synaesthetic usages for olfactory perceptions in the Sinica corpus. Among the adjectives, touch is the largest source with 17 adjectives having distributions in smell, and vision is the smallest source with ten adjectives mapping to smell.

Table 3. Smell as the source domain in linguistic synaesthesia.

Source Domain	**Target Domain**			
SMELL (10)	TOUCH	TASTE	VISION	HEARING
Number of adjectives	0	1	1	0
Synaesthetic transferability	0	10% (1/10)	10% (1/10)	0
Examples	-	鮮香口感 'the tasty and fragrant taste'	一張臭臉 'an unpleasant facial expression'	-

Table 4. Smell as the target domain in linguistic synaesthesia.

Target Domain	**Source Domain**			
SMELL (42)	TOUCH	TASTE	VISION	HEARING
Number of adjectives	17	15	10	0
Percentage	**40.5% (17/42)**	35.7% (15/42)	23.8% (10/42)	0
Examples	煤味太重 'the odor of coal is too strong'	微苦氣香 'the slightly bitter fragrance of air'	清香 'a slight (delicate) fragrance'	-

The representation of olfactory experiences can also be realized by both adjectives originally for smell and synaesthetic uses of adjectives from other senses in Mandarin. The synaesthetic adjectives for smell, however, are much more than original adjectives for smell in terms of lexical types, where the synaesthetic adjectives occupy 80.8% (42/52) of all collected adjectives conceptualizing the olfactory experience, which is different from the representation of taste in Mandarin adjectives.

It should also be noted that smell is the highest target for Mandarin gustatory adjectives with respect to the synaesthetic transferability, of which 15 adjectives exhibit the transfer from taste to smell in Mandarin. However, there is only one adjective showing the transfer from smell to taste in Mandarin (See Tables 1 and 3).

3.3 From Synaesthetic Patterns of Taste and Smell to Embodiment

Asymmetrical patterns can be observed in the synaesthetic representations of taste and smell in Mandarin adjectives. Specifically, the asymmetries lie in that: (1) taste can be involved in linguistic synaesthesia as both the source domain and the target domain, while smell is only productive as the target domain in linguistic synaesthesia of Mandarin adjectives; (2) gustatory experiences in Mandarin are conceptualized more by adjectives originally for taste than by adjectives mapping from other senses, whereas olfactory experiences in Mandarin are represented overwhelmingly by synaesthetic adjectives originally for other sensory domains (with the percentage over 80%); and (3) the synaesthetic transfer from taste to smell occurs more frequently and predominantly than the transfer in a reverse direction, in terms of both the synaesthetic transferability (i.e., 62.5% vs. 10%) and the number of adjective types (i.e., 15 vs. one).

Such asymmetrical patterns in linguistic synaesthesia of taste and smell are not isolated in Mandarin. That is, two other facts exhibit corresponding asymmetries. Among 24 adjectives originally for taste (see Table 1) and ten adjectives originally for smell (see Table 3), lexical gaps can be found in both the conceptualization of the perceptual intensity and the neutral sentiment. That is, there are lexicalized items representing the gustatory intensity (i.e., 濃 *nong2* ‘of intense taste’, 醇 *chun2* ‘of intense taste’, and 淡 *dan4* ‘of mild taste’) in Mandarin, while there is none for the olfactory intensity. In other words, the olfactory intensity needs to be conceptualized through linguistic synaesthesia in Mandarin, such as 重 *zhong4* ‘heavy’ from touch in the expression 煤味太重 *mei2-wei4 tai4 zhong4* ‘the odor of coal is too strong’, and 清 *qing1*‘clear’ from vision in the expression 清香 *qing1-xiang1*‘a slight (delicate) fragrance’. Besides, there are lexical items among adjectives originally for gustatory experiences to represent the positive taste (e.g., 鮮 *xian1* ‘tasty’), the negative taste (e.g., 膩 *ni4* ‘greasy’), and the neutral taste (e.g., 辣 *la4* ‘hot (in taste)’). Mandarin adjectives with etymology in smell, however, only conceptualize the positive odor (e.g., 芬芳 *feng1-fang1* ‘fragrant’), and the negative odor (e.g., 臊 *sao1* ‘of the smell related to urine’), but not for the neutral odor. Therefore, the asymmetries in linguistic representations for taste and smell are systematic in Mandarin, which would in fact indicate the asymmetry of gustatory perceptions and olfactory perceptions in human bodily experiences.

The embodiment theory in Cognitive Linguistics has proposed that experiences with more bodily contact and more bodily interactions with surrounding environments are more embodied, and concepts representing these experiences tend to be used to structure less embodied experiences (Lakoff and Johnson, 1980). Although the theory has been widely supported to account for conceptual metaphors in language (Johnson, 1987), a few researchers, such as Teng (2006) and Gibbs (2011), pointed the potential limitation of the embodiment theory applying to metaphors with domains exclusively

for physiological and neural events. Zhao et al.'s corpus-based study (2018, in press), however, demonstrated that the embodiment account could predict most synaesthetic regularities of Mandarin and English gustatory adjectives, since sensory experiences can also be differentiated in different degrees of embodiment. That is, touch and taste necessarily involve physical contact between the sensory organ and the perceived object, while smell, vision, and hearing do not require such physical contact (Shen, 1997; Popova, 2005). In addition, taste is less embodied than touch, since the sensory receptors of the gustatory perception are only in the mouth, while those of the tactile perception are all over the body (Lehrer, 1978). Following these two features, the synaesthetic patterns of taste and smell in Mandarin adjectives could be predicted by the embodiment theory. Specifically speaking, taste productive as both the source domain and the target domain in linguistic synaesthesia, is consistent with the fact that taste is not on the endpoint of the embodiment scale (i.e., neither the most embodied nor the least embodied). Smell, however, is close to the least end of the embodiment scale, which thus motivates the olfactory domain to be more predominant as the target in linguistic synaesthesia than as the source. Additionally, the more frequent transfer direction from taste to smell in Mandarin adjectives is also predictable, since taste is more embodied than smell.

4 Conclusion

This study adopted a corpus-based approach to investigate the embodiment theory within bodily experiences. Based on the asymmetrical patterns of synaesthetic representations for taste and smell in Mandarin adjectives, we have found that embodiment is also supported within bodily perceptions.

One of implications of this study to the embodiment theory is that the traditional dichotomy of bodily versus non-bodily or concrete versus abstract notions are not sufficient to account for metaphors with source domains and target domains both related to physiological or neural experiences. Instead, the degree of embodiment is also a crucial concept, which should be included to enrich the theory of embodiment.

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