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# Somewhere in COLDNESS Lies Nibbāna

### **Lexical Manifestations of COLDNESS**

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Abstract. This paper starts with an investigation of three coldness-related tactile words, viz. 寒 han2 'cold', 冷 leng3 'cold' and 涼 liang2 'cool', in their synaesthetic and metaphorical uses in Modern Chinese. It is found that 泠 leng3 'cold' is most versatile whereas 涼 liang2 'cool' is most inert with regard to their synaesthetic and metaphorical mappings, with 寒 han2 'cold' standing in the middle. Moreover, 寒 han2 'cold' tends to be object-oriented, while 涼 liang2 'cool' is likely to be subject-oriented, with 泠 leng3 'cold' allowing both subject- and object-oriented readings. We further conduct a study on the uses of these three tactile words in Buddhist texts of Āgamas, finding that 涼 liang2 'cool' was consistently employed to refer the nibbānic status. Apart from it, two counts of 泠 leng3 'cold' exhibit the nibbānic meaning. However, 寒 han2 'cold' is never attested in this philosophical meaning. It is interesting to note that a kind of tactile feeling is associated with nibbāna, even though nibbānic experience is supposed to transcend sensory experience. This finding, together with some other findings with regard to the relation between sensory expressions and nibbāna, can shed light on the linguistic expressions of the inexpressible nibbāna.

Keywords. COLDNESS, 寒 han2 'cold', 冷 leng3 'cold', 凉 liang2 'cool', nibbāna

#### 1 Introduction

The concept of COLDNESS embodies human beings' perception of temperatures and thus falls into the tactile domain, which parallels with other human sensory domains, such as visual domain, auditory domain, olfactory domain, gustatory domain and even mental domain. These sensory domains help to classify sensory data into different categories, which have their equivalent sense organs, viz., eye, ear, nose, tongue, and mind. Although the sensory classification is well-established, sensory data can transcend the meaning of one sensory category to express meanings in some other sensory domains. This phenomenon has been investigated in the linguistic field as synaesthesia (e.g. Ullmann [29];

Williams [31]). Synaesthesia, as a linguistic mechanism, is defined as the expression of a particular sense by means of using terms from another sense domain (Huang and Xiong [10]), such as *sweet voice* in English and 高音 *gaolyin1* 'high pitch' in Chinese. In the literautre, these expressions are also treated as a special type of metaphor (Cacciari [1]; Geeraerts [4]) and are thus accounted for under the embodiment theory (e.g. Popova [17]; Shen [23]). In this paper, we treat synaesthesia and metaphor separately, with the former being confined to the six sensory domains while the latter transcending sensory domains.

In section 2, we investigate three COLDNESS-encoding Chinese characters, viz. 寒 han2 'cold' 冷 leng3 'cold' and 涼 liang2 'cool' in Modern Chinese, especially with regard to their non-tactile sensory meanings, i.e., synaesthetic meanings. Moreover, their non-sensory metaphorical meanings are discussed. In Section 3, we move to the study of the COLDNESS-encoding characters in Āgamas, an early Buddhist texts, and figure out that COLDNESS in general, and 涼 liang2 'cool' in particular, can be associated with the philosophical meaning of nibbāna, i.e., the emancipation of the mind from all defilements as the ultimate goal of Buddhist practice (N̄āṇananda [16]).

#### 2 COLDNESS-related Tactile Words in Modern Chinese

We collect the data of 寒 han2 'cold' 冷 leng3 'cold' and 凉 liang2 'cool' in Modern Chinese from zdic.net. Specifically, we note down those lexical collocations which transcend their tactile meanings to extend to other sensory meanings. As shown in (1), 寒 han2 'cold' can modify visual nouns, such as 光 guang1 'light' and 色 se4 'color'. Also, it can collocate with another visual adjective, such as 稔 chen0 'ugly', to intensify the degree of ugliness. Note also that this visual meaning of 'ugly' can be further extended to auditory domain to indicate the action of "rediculing" or "deriding", which involves a secondary VISUAL-TO-AUDITORY synaesthetic transfer (Huang and Xiong, [10]). The whole process is noted down as TACTILE-TO-VISUAL-TO-AUDITORY transfer.

## (1) TACTILE-TO-VISUAL expressions of 寒 han2 'cold':

a. 寒光 han2guang1 cold light

'moon light; the light of the knives and sword; winter sight'

b. 寒色 han2se4 cold color 'stern look; winter sight'

c. 寒碜
han2chen0
cold ugly
'ugly, disgraceful' or 'ridicule, deride'

Moreover, the tactile word 寒 han2 'cold' can modify a gustatory word, such as 酸 suan1 'sour'. Intrestingly, the meaning of 寒酸 han2suan1 is neither tactile nor gustatory. Rather, it refers to a visual meaning of 'shabby' or 'poor', with regard to one's look or behavior. Quite on a par with (1c), (2) is also analyzed to involve a secondary transfer. The whole process is

TACTILE-TO-GUSTATORY-TO-VISUAL transfer. Unlike (1c), (2) can never express any gustuatory meaning but necessarily undergoes the secondary synaesthetic transfer.

# (2) TACTILE-TO-GUSTATORY expression of 寒 han2 'cold':

寒酸

han2suan1

cold sour

'poor; shabby'

寒 han2 'cold' modifies mental word 心 xin1 'heart' to express one's mental feeling of "disheartened".

# (3) TACTILE-TO-MENTAL expression of 寒 han2 'cold':

a. 寒心

han2xin1

cold heart

'disheartened'

#### (4) <u>TACTILE-TO-VISUAL expressions of 冷 leng3 'cold'</u>:

a. 冷色

leng3se4

cold color

'cold color'

b. 冷光

leng3guang1

cold light

'cold color'

c. 冷眉冷眼

leng3mei2 leng3yan3

cold eyebrow cold eye

'indifferently; cold-shoulder'

Unlike  $\not\equiv han2$  'cold',  $\not \geq leng3$  'cold' can modify an auditory verb, an adjective and a noun, as shown in (5a)-(5c), in that order.

#### (5) TACTILE-TO-AUDITORY expressions of *冷 leng3* 'cold':

a. 冷笑

leng3xiao4

cold laugh

'sneer; laugh with dissatisfaction'

b. 冷靜

leng3jing4

cold quiet

'calm'

c. 冷言冷語

leng3yan2 leng3 yu3

cold speech cold language

'mock; ironic words'

冷 leng3 'cold' can be gustatory, as exemplified in (6).

### (6) TACTILE-TO-GUSTATORY expression of ☆ leng3 'cold':

冷盘

leng3pan2

cold dish

'cold dish'

Crucially, it seems that 涼 *liang2* 'cool' can hardly be extended to other sensory domains under the synaesthetic mechanisms. 清凉 *qing1liang3* 'purely-cool; cool' is a case to illustrate the VISUAL-TO-TACTILE synaesthetic transfer. Differing from the foregoing examples, tactile domain is the target domain in this case.

For the sake of clarity, all the above data are presented in Table 1 below:

Table 1. Synaesthetic Uses of 寒 han2 'cold', 冷 leng3 'cold' and 涼 liang2 'cool'

synaesthesia			
sense domain	tactil	tactile	tactile
visual	寒	冷	凉
	寒光 han2guang1	冷艳 leng3yan4	清凉 qing1liang3
	寒色 han2se4	冷色 leng3se4	
	寒碜 han2chen0	冷眉冷眼 leng3mei2leng3yan3	
auditory	N/A	冷笑 leng3xiao4	N/A
		冷靜 leng3jing4	
		冷言冷语 leng3yan2leng3yu3	
gustatory	寒酸 han2suan1	冷盘 leng3pan2	N/A
olfactory	N/A	N/A	N/A
mental	寒心 han2xin1	心灰意冷 xin1hui1yi4leng3	心涼 xin1liang2

This table can lead to the following generalizations. First, among the three COLDNESS-related tactile words, 冷 *leng3* 'cold' seems to be most versatile in synaesthetic mappings, as it can be transferred to the visual, auditory, gustatory and mental domains. Furthermore, the collocation between 冷 *leng3* 'cold' and a sensory organ, such as 冷眉冷眼 *leng3mei2leng3yan3* 'indifferently', is attested.

Huang and Xiong [10] figure out the rarity of collocation between sensory epithets and sensory organs. If such a collocation occurs, it must transcend its sensory meaning and gives rise to a metaphorical meaning. This is corroborated by 冷眉冷眼 *leng3mei2leng3yan3*, which refers to a person's indifferent attitude, something equivalent to *cold-shoulder* in English.

Second, the three COLDNESS-related tactile words differ in their degrees of inclination towards either perceivers or sensory objects. In actuality, perception depends on the interactions between sensory stimuli and sense organs, with the assistance of one's mind. Consequently, sensory perception cannot be purely object-oriented, nor can it be purely subject-oriented. However, in actual language uses, sensory words might not always give due recognition to both sides. Some sensory words tend to be ascribed to objects as their epithets, such as colors, shapes and tastes. For example, the color term 緣 lv4 'green' is considered as an inalienable feature of an object, as evidenced by 綠葉 lv4ye4 'green leaves'. On the other hand, the tactile word 痛 tong4 'painful' seems to be restricted to (the feeling of) a perceiver. We seldom ascribe to an object, or a pain-trigger, the property of 痛 tong4 "painful". There are, however, a group of sensory words that can be associated with both sensory objects and perceivers. 苦 ku3 'bitter' is such a case in point. It can describe the taste of an object, such as 苦茶 ku3cha2 'bitter tea'. Simultaneously, it can modify a person's gustatory or mental perception, such as 覺得苦 jue2de2ku3 'feel bitter'. In the same vein, we may distinguish the tactile words along the line of temperature. 寒 han2 'chilly, winter', compared with 冷 leng3 'cold', is more object-oriented. The words containing 寒 han2 'chilly, winter', such as 寒光 han2guang1 'moon light; the light of the knives and sword; winter sight' and 寒碜 han2chen0 'ugly, disgraceful; ridicule', are basically properties of objects. By contrast, 冷 leng3 'cold' can be both objective and subjective. 冷光 leng3guang1 'cold light' and 冷菜 leng3cai4 'cold dishes' are more on the objective side. However, 冷笑 leng3xiao4 'sneer', 冷言冷語 leng3yan2leng3yu3 'mock, speak ironic words', 冷眼 leng3yan3 'indifferently' are clearly subject-oriented, as it either modifies human behaviors, such as 笑 xiao4 'laugh' and 言语 yan2yu3 'speak', or collocates with the human sensory organ 眼 yan3 'eye'. 涼 liang2 'cool' seems to be situated between 寒 han2 'chilly; winter' and 冷 leng3 'cold' in this regard. We argue that 涼 liang2 'cool' is more inclined to the subject than to the object, on the grounds that some objects modified by 涼 liang2 'cool', such as 涼鞋 liang2xie2 'sandal', 涼被 liang2bei4 'summer quilt' and 涼亭 liang2ting2 'summerhouse', may not be cool in temperature per se. Rather, these objects modified by 涼 liang2 'cool' are thus-called because they can bring cool comfort to people in the summer.

Apart from synaesthetic expressions, coldness-related tactile words are subject to metaphorical extensions, without the assistance of any synaesthetic mappings. Interestingly, both 寒 han2 'cold' and 冷 leng3 'cold' can collocate with 門 men 'door', as illustrated by 寒門 han2men2 'poverty' and 冷門 leng3men2 'unpopularity; unexpectedness'. These examples can be schematized as COLDNESS IS POVERTY, COLDNESS IS UNPOPULARITY and COLDNESS IS UNEXPECTEDNESS, which we argue are in an ascending order in terms of their degrees of subjectivity. The concepts of POVERTY and UNPOPULARITY are emotionally undesirable, whereas the concept of UNEXPECTEDNESS might be neutral in emotion. This also echoes our finding that 寒 han2 'cold' is more object-inclined and repulsive whereas 冷 leng3 'cold' is more subject-oriented and neutral.

# 3 COLDNESS-related Tactile Words in Agamas

In this section, we present the data of the three COLDNESS-related tactile words 寒 han2 'cold' 冷 leng3 'cold' and 涼 liang2 'cool' in the Buddhist texts of  $\bar{A}gamas$ .

In the  $\overline{A}$  gamas, 寒 han2 'cold' seems to be negative in meaning. For example, it indicates a type of illness in (7) and a kind of hell in (8). Also, lack of requisites is described as 寒乞 han2qi3 'lack of requisites', as exemplified in (9).

(7) 時,人當有九種病,一者寒,二者熱,三者飢,四者渴,五者大便,六者小便,七者欲, 八者饕餮,九者老。(佛說長阿含經卷第一;後秦弘始年佛陀耶舍共竺佛念譯:第一分初大 本經第一)

jiu zhong bing, yizhe han, Shi, ren dang you erzhe re. nine kind illness first then human supposedly have coldness second hotness sanzhe ji, sizhe ke, wuzhe dabian, liuzhe xiaobian, qizhe yu, third hunger fourth thirsty fifth defecation sixth urination seventh desire bazhe taotie, jiuzhe lao. eighth voraciousness ninth aging

'At that time, human beings are supposed to have nine types of shortcomings. They are coldness, hotness, hunger, thirsty, defecation, urination, desire, voraciousness and aging.'

(8) 地獄有十六小獄, ... 十六名**寒氷**。佛說長阿含經卷第十九;後秦弘始年佛陀耶舍共竺佛念譯:第四分世記經地獄品第四)

Diyu you shiliu xiao yu... shiliu ming han bing.

hell have sixteen small hell sixteenth name cold ice

'There are sixteen sub-types of hells ... The sixteenth is icy-cold hell.'

(9) 若聖弟子成就四不壞淨者, ... 不寒乞, 自然富足。(雜阿含經卷第三十;宋天竺三藏求那 跋陀羅譯:八三四)

Ruo shengdizi chengjiu sibu huai jing zhe, ... bu han qi, ziran fuzu.

if saint disciple attain stream-entry person NEG cold beg naturally rich

'If a disciple attains stream-entry... he will never end with insufficient requisites. Rather, he will have abundant requisites.'

By contrast,  $\gtrsim leng3$  'cold' is moderately cold and thus neutral, as shown in its examples in the  $\bar{A}$ gamas.

(10)阿難白言:「今拘孫河去此不遠,清**冷**可飲,亦可澡浴。」(佛說長阿含經卷第三;後秦弘 始年佛陀耶舍共竺佛念譯:遊行經第二中)

A nan baiyan: jin jusun he qu ci bu yuan, qing **leng** ke yin, Ānanda say now JUSUN river from here not far clear cold can drink yi ke zaoyu.

also can bath

'Venerable Ānanda said: Jusun River is not far away from here. The water in the river is clean and cool so that we can fetch water there for both drinking and showering.'

The most interesting finding of this study is that COLDNESS is employed to refer to mental tranquility, an instance of TACTILE-TO-MENTAL synaesthetic transfer. For example, in the Agamas, A leng3 'cold' is employed to modify the Tathāgata, the enlightened one. These two examples are presented in (11) and (12).

(11)如來是梵,如來是冷,如來不煩熱,如來是不異。(中阿含經卷第五十四;東晉罽賓三藏瞿 曇僧伽提婆譯大品:阿梨吒經第九)

Rulai shi fan, rulai shi rulai shi bu fan re, leng, Tathāgata be Brahma Tathāgata be cold Tathāgata be not upset hot rulai shi bu yi. Tathāgata be

not change

'Tathāgata is the Brahma, Tathāgata is cold, Tathāgata is free from the upsetting fever and Tathāgata is not changing.'

(12)身壞後,既由命盡,正於此處一切受不歡喜,當了知清冷。(增支部經典第四卷 0324a11) hou, ji you ming jin, zheng chu yu cichu yiqie shou bu Shen huai body break up after then for life end exactly exist at here all feeling not huanxi, dang lezhi qing leng. delight in should understand clean cold 'With the breakup of the body, following the exhaustion of life, all that is felt, not being delighted in, will become cool right here.'

Other than the examples of 冷 leng3 'cold' with the indication of nibbāna, the tactile word 涼 liang2 'cool' is much more frequently employed to refer to nibbāna, as exemplified in (13) and (14) below.

(13)「...又有一類人,不使自苦,不專修自苦之行;亦不使他苦,不專修使他苦之行;彼不使 自苦,不使他苦者,於現法(現在世)、無貪欲、達涅槃、清**涼**、感受樂,依自己成為最 高者(世尊)而住之。...」

You you yi lei ren, bu shi zi ku, bu zhuan xiu zi ku again have one type person not make oneself suffer not exclusively practice self suffer zhi xing; ku, bu zhuan xiu shi ta ku zhi bu shi DE practice again not make others suffer not exclusively practice make others suffer DE zhe, yu xianfa, bi bu shi zi ku. bu shi ku xing, ta practice others not make oneself suffer not make others suffer person at here and now wu tanyu da niepan, qing liang, ganshou le, yi ziji not have desire attain nibbāna clean cool feel pleasure depend on oneself chengwei zui gao zhe er zhu become most high person then abide in it

"... Here a certain kind of person does not torment himself or pursue the practice of torturing himself, and he does not torment others and pursue the practice of torturing others. Since he torments neither himself nor others, he is here and now hungerless, extinguished, and cooled, and he abides experiencing bliss, having himself become holy....'

#### (14)一切時樂寐, 圓寂婆羅門;

不為諸欲染,清**涼**無依止; 三漏總斷已,止息苦痛心; 寂靜而樂寐,心得安靜故。

Yiqie shi le mei, yuanji poluomen time happy sleep nibbāna Brahmin Bu wei zhu yu qing liang wu yizhi not for all desire taint clear cool not dependence San lou zong duan vi, zhixi ku tong xin three defilement all cut off finish end bitterness pain heart Jijing er le mei, xin de anjing gu. silent and happily sleep heart attain peace reason

'He always sleeps well, the Brahmin who has attained nibbāna, **cooled off**, without acquisition, not tainted by sensual pleasures. Having cut off all attachments, having removed anguish in the heart, the peaceful one sleeps well, having attained peace of mind.'

The above examples show that COLDNESS IS MENTAL TRANSQUILTY is attested in the Buddhist texts. Such usages, however, are not attested in Modern Chinese. Morever, mental tranquility is considered as the supreme bliss, which transends the ordinary sensory perceptions ( $\tilde{N}$ āṇananda [16]). Given this, the meaning is positive, with special regard to its evaluative emotional polarity (Xiong and Huang [32]). By constrast, the mental meanings of COLDNESS in Modern Chinese, such as 寒心 han2xin1 'disheartened' and 心冷 xin1leng3 'disppointed' are of negative emotion.

#### 4. Conclusions and Implications

It seems that nibbāna lies in the tactile feeling of COLDNESS, mostly in 涼 liang2 'cool' and occasionally in 冷 leng3 'cold'. According to the COLDNESS-encoding usages in Modern Chinese, 涼 liang2 'cool' is most inert in the sense that it is almost unlikely to undergo any synaesthetic transfers to express non-tactile meanings. By contrast, 冷 leng3 'cold' and 寒 han2 'cold' are relatively more versatile in their synaesthetic uses.

Nibbāna, which literally means "extinguishment of fire", refers to mental emancipation in Buddhist philosophy. In consideration of its literal meaning, it is not unexpected that COLDNESS, but not HOTNESS, is associated with nibbāna. Moreover, among the different types of COLDNESS, it is the moderate one with positive emotion (e.g., comfortable), viz. 凉 liang2 'cool', is selected as the most appropriate one for the expression of nibbāna. This is probably because 凉 liang2 'cool' can best represent the non-extreme sensory feelings.

Furthermore, it is particularly interesting to note that nibbāna, which transcends sensory perception, is however expressed by sensory words. Our preliminary study shows that a small group of sensory words, out of a rich repertoire of sensory vocabulary, has been selected to express the highest goal of Buddhist practice, i.e., nibbāna. The attested sensory words are listed in in Table 2 below.

Table 2: The Sensory Expressions of Nibbāna

	visual	auditory	gustatory	tactile
	明 ming2			
nibbāna	'lustrous'	寂靜 ji4jing4	無味 wu2wei4	清涼 qing1liang2
	圓寂 yuan2ji4	'silent'	'without taste'	'cool'
	'round-silence'			

In the future study, we are keen on investigating how these sensory words are able to encode nibbāna and in what way they are related to one another. Put differently, what features group those sensory words together under the category of mental tranquility?

## References

- 1. Cacciari, C. Crossing the senses in metaphorical language. In *The Cambridge handbook of metaphor and thought*, (ed.) Raymond G., 425–443. Cambridge University Press, New York (2008)
- 2. Cytowic, R.E. Synaesthesia: A union of the senses. MIT press, Cambridge (2002)
- 3. Cytowic, R. E. The man who tasted shapes: A bizarre medical mystery offers revolutionary insights into reasoning, emotion, and consciousness. Putman, New York (1993)
- 4. Geeraerts, D. Theories of lexical semantics. Oxford University Press, New York (2010)
- 5. Hong, J.-F., and C.-R. Huang. A study of Chinese sensation verbs used in linguistic synaesthesia. In *Chinese lexical semantics: The 16<sup>th</sup> CLSW revised selected papers LNAI 9332*, ed. Qin Lu and Helena H. Gao, 62–73. Springer, Cham (2016)
- 6. Hong, J.-F., and C.-R. Huang. 洪嘉馡, 黃居仁. The near synonym pair Sheng and Yin: A study of the relation between sense and concept「聲」與「音」的近義辨析: 詞義與概念的關係. Paper presented at the *Chinese Lexical Semantic Workshop: Current and Trends in Chinese Lexical Semantic Research 漢語詞彙語意研究的現狀與發展趨勢國際學術研討會*. Peking University, Beijing (2004)
- 7. Hong, J.-F., and C.-R. Huang. 洪嘉馡, 黄居仁. The near synonym pair Sheng and Yin: A study of the relation between sense and cognitive concept「聲」與「音」的近義辨析: 詞義與認知概念的關係。 To Appear In 何大安、姚玉敏、陳忠敏、孫景濤、張洪年編輯。《漢語與漢藏語前沿研究—— 丁邦新先生八秩壽慶論文集》. Beijing:社會科學文獻出版社(北京). (2018)
- 8. Huang, C.-R.黄居仁. Synaesthesia: Language, thought, cognition and culture 思考と言語. *IEICE Technical Report 信学技報* 116(368): 111–113 (2016)
- 9. Huang, C.-R., and S.-K. Hsieh. Chinese lexical semantics: From radicals to event structure. In: W. S.-Y. Wang and C.-F. Sun. (eds.) *The Oxford handbook of Chinese linguistics*, pp. 290–305. Oxford University Press, New York (2015)
- 10. Huang C.-R. and J. Xiong. Linguistic Synaesthesia in Chinese. In: Huang C.-R., J.-S. Zhuo and B. Meisterernst (eds.). *Routledge Handbook of Chinese Applied Linguistics*. Routledge. (to appear)
- 11. Karunadasa, Y. *The Buddhist analysis of matter*. Hong Kong: The University of Hong Kong, Hong Kong (2015)
- 12. Lakoff, G., and M. Johnson. Philosophy in the flesh: The embodied mind and its challenge to

- western thought. Basic Books, New York (1999)
- 13. Lakoff, G., and M. Johnson. *Metaphors we live by*. University of Chicago Press, Chicago, IL (1980)
- 14. Lynott, D., and L. Connell. Modality exclusivity norms for 423 object properties. *Behavior Research Methods* 41(2): 558–564. (2009)
- 15. Ñāṇananda, K. *The End of the World in Buddhist Perspective*. Pothgulgala Dharmagrantha Dharmasravana Mādhya Bhāraya. (2014)
- 16. Ñāṇananda K. *Nibbāna The Mind Stilled*. (library edition). Colombo: Pothgulgala Dharmagrantha Dharmasravana Mādhya Bhāraya. (2015)
- 17. Popova, Y. Image schemas and verbal synaesthesia. In: Beate H. (ed.) *Perception to meaning: Image schemas in cognitive linguistics*, 395–420. de Gruyter, Berlin (2005)
- 18. Rakova, M. *The extent of the literal: Metaphor, polysemy and the theories of concepts.* Palgrave Macmillan, Hampshire. (2003)
- 19. Ramachandran, V. S., and E. M. Hubbard. The emergence of the human mind: Some clues from synaesthesia. In: Lynn C. R. And N. Sagiv (eds.) *Synaesthesia: Perspectives from cognitive neuroscience*, pp. 147–192. Oxford University Press, New York (2005)
- 20. Ramachandran, V. S. and E. M. Hubbard. The phenomenology of synesthesia. *Journal of Consciousness Studies* 10(8) 49–57. (2003)
- 21. Ramachandran, V. S. and E. M. Hubbard.. Psychophysical investigations into the neural basis of synaesthesia. In: *Proceedings of the Royal Society of London B: Biological Sciences* 268(1470): 979–983. (2001a)
- 22. Ramachandran, V. S., and E. M. Hubbard. Synaesthesia A window into perception, thought and language. *Journal of Consciousness Studies* 8(12): 3–34. (2001b)
- 23. Shen, Y. Cognitive constraints on poetic figures. *Cognitive Linguistics* (includes Cognitive Linguistic Bibliography) 8(1): 33–71. (1997)
- 24. Strik Lievers, F., and C.-R. Huang. A lexicon of perception for the identification of synaesthetic metaphors in corpora. In: N. Calzolari, K. Choukri, T. Declerck, S. Goggi, M. Grobelnik, B. Maegaard, J. Mariani, H. Mazo, A. Moreno, J. Odijk, and S. Piperidis (eds.) *Proceedings of the 10th Language Resources and Evaluation Conference (LREC 2016)*, pp. 4032–4036. ELRA, Paris (2016)
- 25. Strik Lievers, F. Synesth sies: Croisements des sens entre langage et perception. *L'Information Grammaticale* 146: 25–31. (2015a)
- 26. Strik Lievers, F. Synaesthesia: A corpus-based study of cross-modal directionality. *Functions of Language* 22(1): 69–94. (2015b)
- 27. Strik Lievers, F. and B. Winter. Sensory language across lexical categories. *Lingua*. (2018) https://doi.org/10.1016/j.lingua.2017.11.002
- 28. Ullmann, S. Semantic universals. In *Universals of language (2nd edition)*, pp. 217–262. The MIT Press, Cambridge and London (1966 [1963])
- 29. Ullmann, S. Romanticism and synaesthesia: A comparative study of sense transfer in Keats and Byron. *Publications of the Modern Language Association of America* 60(3): 811–827. (1945)
- 30. Yu, N. Synesthetic metaphor: A cognitive perspective, *Journal of Literary Semantics* 32(1): 19–34. (2003)
- 31. Williams, J. M. Synaesthetic adjectives: A possible law of semantic change. *Language* 52(2): 461–478. (1976)

- 32. Xiong, J. and C.-R. Huang. Being assiduous: Do we have BITTERNESS or PAIN?. In: Q. Lu and H. H. Gao (eds.) *Chinese lexical semantics: Lecture notes in computer science LNAI 9332*, pp. 15–22. Springer, Cham (2015)
- 33. Xiong, J. and C.-R. Huang. The synaesthetic and metaphorical uses of 味 wei 'taste' in Chinese Buddhist Suttras. *PACLIC-30*. Seoul. (2016)
- 34. Xiong, J. and C.-R. Huang. The hardness of determination and reassurance: A corpus-based study of 硬 y ng. Paper presented at the 18th Chinese Lexical Semantics Workshop (CLSW). Leshan, China. (2017)
- 35. Zhao, Q., J. Xiong and C.-R. Huang 赵青青,熊佳娟,黄居仁. 通感、隐喻与认知——通感现象在汉语中的系统性表现与语言学价值 Linguistic Synaesthesia, Metaphor and Cognition: The systematicity and significance of linguistic synaesthesia in Chinese. To Appear in *Zhongguo Yuwen* 《中国语文》.(to appear)
- 36. Zhao, Q., C.-R. Huang, and Y. Long. Synaesthesia in Chinese: A corpus-based study on gustatory adjectives in Mandarin. *Linguistics*. (2018)
- 37. Zhao, Q. and C.-R. Huang 赵青青,黄居仁. 2018. 现代汉语通感隐喻的映射模型与制约机制 A Study on the Mapping Model and Underlying Mechanisms of Synaesthetic Metaphors in Mandarin. 《语言教学与研究》 Language Teaching and Linguistic Studies. 01(no. 189) pp: 44-55. (2018)
- 38. Zhao, Q. and C.-R. Huang. From linguistic synaesthesia to embodiment: Asymmetrical representations of taste and smell in Mandarin Chinese. Paper presented at *the 18th Chinese Lexical Semantics Workshop (CLSW)*. Leshan, China. (2017)