

# The Embodied Motivation of Synesthetic Metaphors on Gustatory Adjective “suan (酸/sour)” in Chinese

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## Abstract

*Synesthetic metaphor is an important research topic in recent years. Yet, there is almost no discussion on the underlying motivation for the occurrence of synesthetic metaphor. Embodied cognition theory (EC) views that cognition is shaped by the kind of body possessing the organisms. According to EC, people can conceptualize things based on bodily experience, where the more abstract and less direct experience is understood by means of the concrete and more direct experience. In order to address the gap, this paper tends to choose gustatory adjective “suan (酸/sour)”, one of the gustatory experience, which is also extensively used to express people’s feeling and life experiences in Chinese, to further study the motivation that stimulates the synesthetic mapping from the gustatory domain to another sensory domains.*

**Keywords**— *synesthetic metaphor, embodied cognition theory, embodied motivation, “suan (酸/sour)”, gustatory domain.*

## I. INTRODUCTION

Synesthetic metaphor becomes a hot-point and frontier in the field of cognitive metaphor. In recent years, linguistic researchers focus on the elaboration on its definition, the classification on the types of synesthetic metaphor and the investigation of cross-sensory mapping models, such as the mapping from visual domain to auditory domain, from gustatory domain to psychological domain, etc. Yet, the analysis on the underlying motivation on the occurrence of synesthetic mapping remains

underexamined. To address this gap, this paper founded on the embodied cognition theory (EC) provides a valuable lens. In accordance with EC, the cognition originates from bodily experiences, and abstract concepts can be comprehended through concrete physical experiences. This perspective provides a foundational explanation for why synesthetic metaphor emerge. It is because they are rooted in people’s embodied interactions with the world. For instance, when we use “心酸” in Chinese to describe sad feelings, we are mapping a gustatory experience onto an mental domain, a process that EC theory frames as a

product of embodied cognitive mechanisms.

The common sense of “suan (酸/sour)” refers to “an acid taste like lemon or vinegar” or “(food, especially milk) having gone bad because of fermentation, a gustatory adjective in Chinese, which is now used widely to express emotion and social experiences. The synesthetic usage of “suan (酸/sour)” in Chinese is a typical case that presents the mapping type from gustatory domain to other sensory domains or abstract domains. Therefore, this paper choose the gustatory adjective “suan (酸/sour)” in Chinese as research object to reveal the embodiment motivation of synesthetic metaphor.

## II. LITERATURE REVIEW

The cognitive foundation of synesthetic metaphors lies in the theory of embodied cognition theory (EC), which posits that human cognition is rooted in bodily experience. Cross-domain mappings of gustatory adjectives in Chinese are typical manifestations of this theory by which individuals could understand abstract concepts such as emotions and social interactions through concrete taste sensations (Zhao, 2001). In existing studies on Chinese gustatory metaphors, researchers have predominantly paid attention to analyze the synesthetic characteristics of “tian (甜/sweet)” (mapping positive emotions) and “ku (苦/bitter)” (mapping suffering experiences). However, specialized analyses of “suan (酸/sour)” remain scattered, failing to form a systematic research framework. This gap creates opportunities for in-depth exploration of the embodied motivations behind the synesthetic metaphors of “suan (酸/sour)”. In the view of previous research, the studies on “suan (酸/sour)” centers on two dimensions: diachronic semantic mapping and historical-cultural connections. Therefore, this part will analyze the previous literature in terms these two parts.

### 2.1 Semantic Mapping Types of “Suan (酸/sour)” in Chinese

According to the search of “suan (酸/sour)”’s semantic meaning in *Modern Chinese Dictionary*, *Dictionary of Ancient Chinese*, and *Great Dictionary of Chinese*, this paper found its semantic meanings including: (1) vinegar; (2) tastes like vinegar or has an acid taste; (3) the unpleasant and pungent smell; (4) a feeling of weakness due to slight pain in the body caused by illness or fatigue; (5) grievance and sorrow; (6) poor and pedantic; (7) abbreviation for acids in chemistry, which are compounds that produce only hydrogen ions as positive ions when ionized in electrolytes. They can react with bases to form salts and water, react with certain metals to form salts and hydrogen gas, have a sour taste in aqueous solutions, and can turn litmus paper red. Among them, the second semantic meaning: tastes like vinegar or has a sour taste, is proved to be the basic meaning and the prototype in the categorization of “suan (酸/sour)”’s perceptual meaning (Mo, 2018).

In terms of semantic mapping, current studies generally categorize “suan (酸/sour)”’s synesthetic mapping into four types. First is from the gustatory domain to olfactory domain, such as “suanchou xuntian (酸臭熏天)” and “hansuanwei (汗酸味)”. These usages connect the gustatory sensations of “suan (酸/sour)” (e.g., astringency in the mouth, or slight discomfort in the stomach) with olfactory experience of unpleasant or pungent smelling. Second is from the gustatory domain to pain domain. It is represented by expression like “yaosuan beitong (腰酸背痛)” and “shouwan suantong (手腕酸痛)”, regarding the taste of “suan (酸/sour)” as a sort of bad experience and linking it to the uncomfortable body pain. Third is from the gustatory domain to the emotional domain. For example, “xinsuan (心酸)” and “suanchu (酸楚)”, expressions like these are all used to convey people’s sorrow or unhappy emotions during the interactions with the outer world. The emotional semantic meaning of “suan

(酸/sour)” is expanded from the gustatory experience, where the acid taste of fragmented food or unripe fruit might acidify or tart people’s tongue and stomach, and therefore, such similarity evokes unpleasant associations on emotion. The fourth is from the gustatory domain to visual domain, with the typical examples like “suanmiankong (酸面孔)” describing a harsh facial expression. The mapping is caused by the comparison between irritating taste and displeasure in one’s expression. However, the fourth mapping type is less frequently documented in literature and are often mentioned as supplementary types.

Concerning to the mechanism of semantic formation, researchers mostly adopt the conceptual blending theory to argue that the semantic meaning and synesthetic meaning of “suan (酸/sour)” are integrated on the basis of “feature similarity” and gradually developed into stable metaphorical usages in the end. However, the underlying logic of “how similarity is established” has not been further elaborated.

## 2.2 Diachronic Change of “Suan (酸/sour)”’s Semantic Meaning

In *Shuo Wen Jie Zi*, “suan (酸/sour)” primarily refers to vinegar, and takes “you(酉)”, representing a wine jar, which indicates fermented things as its radical and “qun (羃)” as its phonetic component.

The earliest appearance of “suan (酸/sour)” is in Zhou Dynasty. From the Zhou Dynasty to Spring and Autumn Period, “suan (酸/sour)” refers to sour taste. For example, in *Zuo Zhuan*, “Sidai zhuizhi, ji Suanzao (驷带追之, 及酸枣)”, “suanzao (酸枣)” is used to refer to the sour flavour of jujube. As time goes on, the new meaning of “suan (酸/sour)” appear in Warring States Period, describing the acid smell. For instance, in the Annotation of *LvShi ChunQiu*, “Fou Xi Huang, sui juzhi, yousuan, tushui ze bibuke (缶醯黃, 蚊聚之, 有酸, 徒水则必不可)”, the meaning of “suan (酸/sour)” is identified as a kind of sour smell. In the period of Han

Dynasty, “suan (酸/sour)” is defined to a new meaning, except for the the meaning concerning taste and smell. According to the annotation in *HuangDi NeiJin*, “Qi suanzhe, yi xinsan (其酸者, 宜辛散)”, “suan (酸/sour)” is used to describe muscle soreness. Besides that, in the annotation of *Houhan Ji*, “Chengzhong laomu yinger, kou yi wanshu, binghuo dazong, kewei suantong (城中老母婴儿, 口以万数, 兵火大纵, 可为酸痛)”, “suantong (酸痛) is used for the emotional sorrow because of war. In Song Dynasty, the semantic meaning of “suan (酸/sour)” evolves to describe a visual scene, such as in *FoYu Lu*, “jinli hansuan, bu shang renyan (今例寒酸, 不上人眼)”. “hansuan (寒酸) ” refers to shabby or poor scene.

However, from Pre-Qin Dynasty to Tang Dynasty and Song Dynasty, the synesthetic usage of “suan (酸/sour)” is mainly confined to intra-sensory mappings, including the meaning for pain which is also classified into the meaning related to touch in some researches like Wang (2007), Mo (2018) and Zhou (2025). Until the Ming Dynasty and Qing Dynasty, the meaning of “suan (酸/sour)” widely extend to the emotional domain. A typical example is in *Dream of the Red Chamber*, a lot of expressions like “niansuan chicu (捻酸吃醋)”, “ban hansuan (半含酸)”, “xinsuan luolei (心酸落泪) ”, etc. The frequent appearance of “suan (酸/sour)”’s emotional usage can be seen as a formal establishment for negative emotions. Deng et al (2021) believes that this transformation is related to the trend of vernacular literature focusing on individual emotions. In modern times, the meaning of “suan (酸/sour)” for pain like “yaosuan beitong (腰酸背痛) ” and jealous or envious emotion such as “ shuo xie suanliu de hua (说些酸溜溜的话) ” are frequently used by people (Yang, 2017). Such evolution might account for the more and more interactions and the popularization of expressions for jealousy in current cultural context of society.

## III. THEORETICAL FOUNDATION

This paper is based on the embodied cognitive theory

(EC), which provides a valuable lens to the explanation of the underlying motivation on the production of synesthetic mapping. The theory emerged relatively late and has only been studied in the last two decades. The discussion on embodiment became increasingly frequent since 1990 in philosophy, psychology, neuroscience, linguistics, etc. The beginnings of EC was in the 1980s for philosophical work in phenomenology, and advances in cognitive psychology and cognitive linguistics, emerged as the idea of the mind as embodied and situated. The advent of the embodiment prompted a shift to embodied cognitive linguistics, which has greatly enriched the system of cognitive linguistics.

The human mind is deeply dependent upon features of the body, which have causal and constitutive roles in cognitive processing (Varela, Thompson, & Rosch, 1991). According to Francesco (2010), the modality-specific systems are involved in the cognitive processing which gives rise to "embodied" mental representations. For example, when observing a given object, people will unconsciously activate the congruent motor information required to interact with it. In *Philosophy in the Flesh—The Embodied Mind and Its Challenge to Western Thought* (Lakoff & Johnson, 1999), they synthesized the a number of previous findings in metaphors, image schema, categorization, etc., broadening the scope of embodiment research. Their studies gave specific meaning to the embodied minds by showing the importance of the human motor and perceptual mechanism for language understanding. Embodied cognition theory (EC) views that cognition is shaped by the kind of body possessing the organisms. As a complement to CMT, EC is intended as a response to the dominance of the classic representational and computational theories of the mind (RCTM) in cognitive science (Borghi & Caruana, 2015). Atkinson (2010), "we experience, understand, and act on the world through our bodies." This implies that the mind is not only closely linked to the body, but the body also influences the mind. According to Borghi & Caruana

(2015), there are two commonalities among all of the embodiment thesis: the one is that cognitive processes are constrained by perception and motor processes so that the kind of body possessed by organisms shapes their cognition; the other one is that the refusal of the information processing model of the mind and of the metaphor of the mind are equal to the software that manipulates symbols. EC suggests that all concepts rely on the simulation of the sensorimotor experience with objects or events they refer to.

According to Lakoff and Johnson (1999), they distinguished three levels of the embodiment: neural, phenomenological, and "the cognitive unconscious". The neural level refers to the neurological structures supporting the embodied thinking structure. The phenomenological level concerns everything that people are conscious of, for instance: physical bodies, mental stage, the surroundings and their interaction with the environment. The unconscious level involves all the unconscious mental operations underpinning the possible conscious experience.

Kövecses (2010) proposed that conceptual metaphor is constrained by two distinct and concomitant pressures: one is from the embodiment, the other is from the context. The context is decided by local culture which plays an important role in prompting the metaphors with the variations of intracultural and intercultural interaction. Besides people's physical body, interaction with the environment and cultural contexts are also at the same level of the embodiment. However, the issue of cultural context is not the central part concerned by current researches and fails to receive much attention.

The advance of embodiment thesis enriches the system of the cognitive linguistics research by providing the motivation for central concern to linguists. In contrast, the embodiment thesis is also expanded by the increasing converging linguistic researches.

#### IV. MOTIVATIONS BEHIND THE SYNAESTHETIC METAPHOR OF THE GUSTATORY ADJECTIVE “SUAN (酸/SOUR)” IN CHINESE

According to the previous analysis about the extending of “suan (酸/sour)”’s semantic meaning through different dynasties, it is found that “suan (酸/sour)” extends radially around the prototype meaning—the gustatory meaning for tastes like vinegar or a sour taste. The extending of a word’s meaning is not only caused by the economical principle, but also a result of metaphorical conception (Guo, 2023). This paper tends to categorize the mapping types of “suan (酸/sour)” for four types: from the gustatory domain to olfactory domain, from the gustatory domain to pain domain, from the gustatory domain to emotional domain, from the gustatory domain to visual domain. To reveal the underlying motivation that evokes different synesthetic mappings on the gustatory adjective “suan (酸/sour)” in Chinese, this section will focus on the example analysis of “suan (酸/sour)” from CCL corpus.

##### 4.1 Example Analysis on “suan (酸/sour)”’s Synesthesia Mapping from the Gustatory Domain to Four Target Domains

(1) “一进车间大门，一股热浪夹着刺鼻的醋酸味迎面扑来。”《人民日报》

“Yi jin chejian damen, yigu relang jiazhe cibi de cusuanwei yingmian pulai.”

“Into the workshop door, a heat wave with a pungent acetic smell head on.”

(2) “沟里凉气袭人，还有股腥酸味。”《野火春风斗古城》

“Gouli liangqi xiren, haiyou gu xingsuanwei.”

“The air in the ditch was cold and sour.”

(3) “跨进这座大楼，迎面扑过来一阵夹杂着汗酸和烟酒味的臭气”《人民日报》

“Kuajin zhezuo dalou, yingmian puguolai yizhen jiazazhe hansuan he yanjiuwei de chouqi.”

“As I stepped into the building, I was greeted by a stench of sweat, smoke and alcohol.”

(4) “回家打开盒盖，一股腐酸扑鼻而来”《人民日报》

“Huijia dakai hegai, yigu fusuan pubi erlai.”

“When I went home and opened the box, a smell of rotten acid came to me.”

(5) “整个化工厂被浓浓的黑烟罩住，并有刺鼻的酸味向四周弥漫。”《新华社》

“Zhengge huazhongchang bei nongnongde heiyan zhaozhu, bing you cibide suanwei xiang sizhou miman.”

“The whole chemical plant was covered with thick black smoke, and there was a pungent sour smell spreading around.”

Examples from (1) to (5) all belong to the mapping type from the gustatory domain to olfactory domain, founded on the chemical perception of taste, through the association of common “pungency” and “corruption” or “fermentation”, mapping to the olfactory domain. In example (1) and (5), “cusuanwei (醋酸味/acetic acid odor)” and “suanwei (酸味/acid smell) refers to the pungent smell of a chemical medicine in a workshop. Example (2) “xingsuanwei (rank sour odor/腥酸味)” describes an unclean environment. Example (3) “hansuan (汗酸/sweat acid) is connected to the physiological state of person or animal, referring to the acidic odor produced when sweat is broken down by bacteria on the skin. Example (4) with “fusuan (腐酸/sour and putrid smell)” is the smell as a result of organic decay. Concluded from the foregoing example analysis, the synesthetic mapping from the gustatory domain to olfactory domain is based on the following four core logic: (1) common chemical foundation, a lot of organic materials will release acid odor like acetic acid or lactic acid when they decay; (2) pungency, the taste of lemon or vinegar obviously has tingling and pungent sense, which could be automatically

transferred from tongue to nose; (3) the implication of physiological state, smells like “hansuanwei (汗酸味/sweat acid odor)”, “naisuanwei (奶酸味/sour milk odor), etc., directly connect certain physiological state or metabolite product with “suan (酸/sour)”, and hence becomes a intuitive description. Therefore, when we use “suan (酸/sour)” in daily conversation or in literature work, we may not indeed taste with our tongue, but it is our brain that automatically invoke a cross-sensory shared experience repository.

(6) 如果走得乏力，双腿酸痛。《路亭》

“Ruguo zou de fali, shuangtui suantong.”

“If you walk weakly, your legs ache.”

(7) 擦擦嘴角，捶捶有些酸胀的腰。《作家文摘》

“Caca zuijiao, chuichui youxie suanzhang de yao.”

“Wipe my mouth and give my aching, stiff back a rub.”

(8) 她那空空如也的胃在热辣辣的胃酸刺激下酸涩疼痛。《厄兆》

“Ta na kongkongruye de wei zai relala de weisuan ciji xia suanse tengtong.”

“Her empty stomach burned with a sharp, sour pain from the fiery gastric acid.”

The usage of “suan (酸/sour) in examples from (6) to (8) is the synesthesia mapping from the gustatory domain to the pain domain, which captures a sort of discomfort that is not sharp, but dull, diffusive and erosive. The foundation of this mapping type lies in the transformation of sourness—the chemical stimuli, into a physiological deep sensation. “suantong (酸痛/sore)” in examples (6) and “suanzhang(酸胀/aching and swollen) in (7) imply direct physiological soreness, resulting from excessive exercise or lack of oxygen on muscle, which are common metaphors in terms of the mapping from the gustatory domain to the pain domain. “Suanse (酸涩/stomach sourness)” in example (8) is used for stomach pain caused

by hyperacidity.

The interior motivation resulting the mapping from the gustatory domain to the pain domain is as followed: (1) common physiological basis, the lactic acid, produced during muscle fatigue literally connects “suan (酸/sour)” (taste/chemical) and “pain” (somatosensory sensation); (2) similar sensory qualities, including persistence, where neither sourness or soreness is fleeting but persists for a period of time, diffusion, where none of them is a single point, but diffuses into an area, such as the entire mouth or whole muscle, and deepness, where the soreness does not occur on the surface of skin like tingling, instead feel from deep inside; (3) similar alarming function, the excess sourness on gustatory sensation and the sour soreness of the body both signaling body being overloaded and developing problems. Therefore, when we use “suanzhang(酸胀/aching and swollen)”, we are describing a physiological a sensation by virtue of the primal and immediate sensory experience, i.e. sour taste.

(9) 想起来一阵心酸，直掉眼泪。《评讲聊斋》

“Xiang qilai yizheng xinsuan, zhi diao yanlei.”

“I felt a little sad and started to cry.”

(10) 提起这些往事，真使俺心酸鼻酸。《人民日报》

“Tiqi zhixie wangshi, zhen shi an xinsuan bisuans.”

“Talking about these past events really tugs at my heartstrings and chokes me up.”

(11) 每日辛劳不得一饱，此景此情不胜酸楚。《人民日报》

“Meiri xinku bu de yi bao, ci jing ci qing bu sheng suanchu.”

“Daily labor brings no relief from hunger; the scene before me stirs deep sorrow.”

(12) 那一股醋火酸溜溜地从脚心里一直冲到头顶上。《汉代宫廷艳史》

“Na yigu cuhuo suanliuliu de cong jiaoxin li yizhi

chongdao touding shang.”

“A surge of jealousy flared up, sharp and acrid, rising from the soles of her feet right to the top of her head.”

(13) 你再说，他便尖酸刻薄地讽刺你几句。《人民日报》

“Ni zai shuo, ta bian jiansuan kebo de fengci ni jiju.”

“You say it again, and he will sarcastically and bitterly satirise you.”

(14) 把那些晦气、怨气、穷酸气都吹干净！《人民日报》

“Ba naxie huiqi, yuanqi, qiongsuanqi dou chui ganjing!”

“Blow away all the bad luck, all the resentment, all the poverty!”

(15) 因为里面经过这许多年的辛酸刻苦。《红玫瑰与白玫瑰》

“Yinwei limian jingguo zhe xuduonian de xinsuan keku.”

“That's because it's been through so many years of hardship and bitterness inside.”

Examples from (9) to (15) belong to the mapping type from the gustatory domain to the emotional domain. When “suan (酸/sour)” transfers from the gustatory domain to the emotional domain, it demonstrates some negative and complex emotional experience, usually integrated with sadness, jealousy, grievance, hardship and slight irony. “Xinsuan (心酸/hearbroken)” in example (9), which refers to the grieved feeling as if the heart is soaked in acid liquid, contracting slightly and aching, is a classical type of mapping to the pain domain. “Bisuan (鼻酸/nose stings)” in example (10) usually a implication for crying, expresses the irritative sense on the rear part of nose cavity when people feel sorrowful or moved. “Suanchu (酸楚/bitterness)” in example (11) carries a deeper degree of sorrow than that on “xinsuan (心酸/hearbroken)”,

describing a sort of clear and profound grievance and bitterness. Emotions portrayed in examples from (12) to (14) are jealousy and carping. “Suanliulu (酸溜溜/jealousy)” in example (12) describes people's mental state and demeanor of jealousy. When using this word combination, it seems like users could taste the sourness in one's words because of enviousness. “Jiansuan (尖酸/acrimony)” in example (13) refers to sharp and prickly words that can sting others. The “suan (酸/sour)” here transfers the irritation on the taste to the aggression of the language. The example word combinations don't absolutely correspond to a certain meaning as shown previously, but are decided by the context they are in. When “qiongsuan (穷酸/shabby-genteelism)” in example (14) is used with other two abstract nouns, it does not refer to a man, but implies a kind of spiritual temperament and mentality, which is established by poverty, pedantry and unfulfillment. “Xinsuan (辛酸/heartache)” in example (15) is used to illustrate the bitterness and hardship of life experience.

The core logic that elicits the mapping from the gustatory domain to the emotional domain is as followed: (1) common stimulation, the way that the gustatory sourness tickles person's taste buds is as same as the way that the “emotional acid” stir the mind; (2) shared “corrosiveness”, acids can corrode objects, and in the same way the negative emotions could also erode people's inner world; (3) shared “negative evaluation”, the overly sour food results taste discomfort and the “sour emotions” are as well as unpleasant; (4) cultural solidification, vinegar has been associated with the “jealousy” since the ancient times, which has greatly strengthened this metaphorical usage.

(16) 一张脸又黄又瘦，看来就像是个穷酸秀才。  
《多情剑客无情剑》

“Yizhang lian you huang you shou, kanlai jiu xiangshi ge qiongsuan xiucai.”

“His face was sallow and gaunt, making him look just

like a shabby, down-at-heel scholar."

(17) 那些车夫、小贩，穿着寒酸的人。《日出》

"Naxie chefu, xiaofan, chuanzhuo hansuan de ren."

"Those rickshaw pullers, vendors, and people dressed in shabby clothes."

(18) 酸绿相间的颜色让小编的口水瞬间流出来了！

来自网络语料,微信公众号【Art 小咖秀第十三期】如果将酸与甜碰撞在一起会怎么

"Sun lv xiangjian de yanse rang xiaobian de koushui shunjia liu chulai le!"

"The color of sour acid made my mouth water!"

Examples from (16) to (18) serve for the mapping type from the gustatory domain

to the visual domain. "Qiongsuan (穷酸/shabby-looking)" in (16) and "hansuan (寒酸/shabby-looking)" in (17) describe the men shabbily dressed and in straitened circumstances. "Qiongsuan (穷酸/shabby-looking)" in (16) here is used differently from the previous example in (14) that refer to a kind of mentality. It expresses a poor looking which could be recognized visually at the first sight.

"Suanlv (酸绿/color of sour and green)" refers to the food that is not fully marinated, eliciting people's association on "suan (酸/sour)"'s chemical sensation transferring to the sensation on the judgement on texture and colour through visual observation.

The underlying motivation initiating people's association follows two mapping pathways: (1) the sour flavour closely connects to food not fully marinated or less-ripe, and such experience will be projected to certain colors lacking vitality, luster and freshness; (2) a strong sour taste induces a tightening and dry tactile sensation (i.e., astringency) in the oral mucosa, which will transform this internal dry and astringent tactile sensation into the visual texture of an subject's surface being rough, dull, and dehydrated, further extending to a person's poor situation. The synesthesia of "suan (酸/sour)" from the gustatory domain to the visual domain allows us to "see" a furrowed

face, a faded hue and a parched landscape through the sensation of the tongue, greatly enriching our language of visual expression.

#### 4.2 Summary

The mapping from the gustatory domain to four target domains: the olfactory domain the pain domain, the emotional domain and the visual domain, are represented by various word combinations as shown in the foregoing examples. However, it does not mean there is a one-to-one relationship between certain word combinations. The mapping type should be analyzed according to specific context. For instance, "qiongsuan (穷酸/shabby-looking)" in example (16) and (14) belong to different types: one is for the emotional domain, and the other is for the visual domain. Besides, there is never a clear-cut boundary on the division of mapping type. For example, when word combination like "hansuan (寒酸/shabby-looking)" is used in example (17), which is classified into the mapping type to the visual domain, there is a slight overlapping usage to the emotional domain that signals a kind of disdainful and mean attitude.

## V. CONCLUSION

The usage of the gustatory adjective "suan (酸/sour)" can be extended to different meanings in the olfactory domain, pain domain, emotional domain and pain domain as a result of the inspiration of similar body experience on the basis of embodiment. This paper systematically analyze this cross-sensory synesthesia mapping in virtue of careful investigation the usage of "suan (酸/sour)" in Chinese. The analysis shows that these seemingly scattered mapping pathways are not in casual, but follow an uniform and systemic cognitive motivation: embodiment. People's bodily experience, specially the physiological interaction with the chemical stimulus of "suan (酸/sour)", lays the cornerstone for the comprehension of abstract concepts and expression.

According to the previous investigation, the shared core logics that elicit the mapping to four domains all originate people's immediate bodily experience: chemical stimulation logic, physiological reaction logic, and evaluative judgement logic. The common irritation is the most basic physical precondition for the cross-sensory mapping. The shared physiological reaction model bridges the analogy between different sense domains. The widespread evaluative judgement of "suan (酸/sour)" has a close link with the negative state like decay, less-ripeness, excessive metabolism such as muscle fatigue, etc., accounting for its metaphoric usage of negative attitude or emotion. EA proposes that cognition roots in the body, and all concepts rely on the simulation of the sensorimotor experience with objects or events they refer to. The mapping network of "suan (酸/sour)" perfectly verifies its hypothesis. All of the people's understanding on "suan (酸/sour)" including sense of pungency, uncomfortable sense, even the negative evaluation, originates from their gustatory experience of "suan (酸/sour)" by tongue. In order to comprehend and construct the abstract domain, our brain will automatically deploy the concrete body experience, and maps its construction to the abstract domains. In this way, sadness can be expressed by "xinsuan (心酸)" and jealousy can be expressed by "suanliuliu (酸溜溜)" through synesthetic mapping.

Synesthesia is a norm of cognition. This study strongly demonstrates that the boundaries between senses are blurred and mutually permeable at the deep cognitive level. Such permeability is not as a result of literary rhetoric, but rooted in bodily experience. The reason why we can use "xinsuan (心酸)" for sadness and "hansuan (寒酸)" for shabby looking lies in the fact that our cognitive system itself is a multi-sensory integrated synesthetic system. In summary, the process of this cross-sensory mapping vividly reveals that language is not only an abstract symbol system, but also a product of embodied cognition. Our bodies shape the abstract concepts and

thoughts through their most primitive senses interacting with the external world. This research could deepen the understanding of people's cognition on the Chinese, as well as provide an example for EA from the practice on Chinese.

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