

# Animosity and suffering: Metaphors of BITTERNESS in English and Chinese

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## Abstract

This pilot study attempts a novel comparison on how metaphors of BITTERNESS are used in English and Mandarin Chinese, in order to identify subtle cross-linguistic differences. Using dictionary definitions and WordNet databases, we conduct a lexical semantic analysis and establish the various senses “bitter words” can convey. Then, with the help of corpus data we explore the typical themes and contexts the two languages utilize sensory words related to this concept. We observed that figurative uses of *bitter* in English tend to revolve around ANIMOSITY, while Chinese 苦 *ku3* ‘bitter’ frequently expresses SUFFERING. Due to the displeasing character of this human taste experience, conceptualizations of BITTERNESS are overwhelmingly negative. However, we also found that BITTERNESS does not always transmit negative polarity, expressions such as “a bitter pill to swallow” and “良藥苦口 good medicine tastes bitter” carry an evaluative positivity. Related to linguistic synaesthesia, we found that *bitter* in English has origins in the tactile sensory domain, and channels this modality when used as a conceptual metaphor for HARSHNESS, describing *colds* and *winds*, or sometimes *words*.

## 1 Introduction

In the present pilot study, we are looking into cross-linguistic differences and similarities regarding the usage of words for BITTERNESS. We investigate the literal and figurative uses pertaining to this concept across a range of dictionaries and WordNets,

and two very large corpora of English and Mandarin Chinese. We are interested in how people use BITTERNESS figuratively to describe difficult, displeasing, or desperate – overwhelmingly negative – events and emotions. First, we delve into the origins of these sensory words from a lexicographical point of view, briefly touching on the topic of linguistic synaesthesia. Then, we have a closer look at the myriad of narrow senses of these words in both English and Chinese and present a comprehensive list of them, while establishing a taxonomy of broader sense categories for both languages. Finally, we turn towards analyzing empirical data from language corpora using collocation analysis, and apply our taxonomy on datasets to see in what context, and to what extent our categorizations appear in common usage. The paper will also touch on questions of polarity, whether or not BITTERNESS metaphors always retain their negative overtones. We pose the following research questions: How is BITTERNESS in the figurative sense used in English and Mandarin Chinese? What can the figurative uses tell us about metaphors of BITTERNESS as the source domain in both languages? We conclude with a comparison of typical figurative usage associated with BITTERNESS, which will show us how differently or similarly the two languages use “bitter words”, and what can we learn about their metaphoric use.

## 2 Literature review

Cross-linguistically, uses and conceptualizations of BITTERNESS appear to overlap to some degree, and they are expected to do so. Since the taste primary of bitter is nature’s cue for poisons, it carries a

negative polarity due to its natural and arguably universal disagreeableness to the palate (Glendinning, 1994; Lee & Cohen, 2016). However, different languages seem to use terms related to BITTERNESS in different ways, with slightly different connotations. Words with a wide range of uses pose a challenge for concept-to-concept translations on a lexical level. This problem is well illustrated by a study of cross-sensory domain mappings, comparing the contrasts between near synonyms *bitterness/bitter* and *pain/painful* in English with 苦 *ku3* ‘bitterness; bitter; bitterly’ and 痛 *tong4* ‘pain; painful; painfully’ in Chinese (Huang & Wang, 2020) and their relation to the concepts of EFFORT and INTENSITY. The present study aims to dig deeper into the complex lexical semantics of words of BITTERNESS, and contrast some of their common figurative uses across two languages.

## 2.1 On linguistic synaesthesia

Previous studies also showed that the original sensory meaning of *bitter* and *ku3* can be transferred to other sensory domains, such as auditory, tactile, and mental (Xiong & Huang, 2015). The phenomenon that words of gustatory sensation commonly transfer to other modalities makes way for a wide range of synaesthetic and conceptual metaphors. In contrast to conceptual metaphors where we understand one idea by referring to another, synaesthetic metaphors are a type of linguistic metaphors based on sensory experiences, where there is a modality transfer in the source-target domain mappings, e.g. “sweet voice”; *sweet* representing a gustatory-auditory mapping (Cacciari, 2008; Huang & Xiong, 2019).

How do words of BITTERNESS relate to these types of metaphors? An obvious extension of this study would be to apply the Conceptual Metaphor Theory (Lakoff & Johnson, 1980) and Mapping Principles (Ahrens, 2010) and discuss how BITTERNESS metaphors are processed in many different languages.

## 3 Methods

We start out by briefly exploring words and phrases related to the concept of BITTERNESS and their origins using lexicographic and etymological dictionaries to get familiar with the core meanings of

these “bitter words”. Then, as a second step, we establish word senses with the help of the WordNet lexical semantic database and dictionary definitions. For mapping word senses and semantic networks, we make use of the Princeton WordNet<sup>1</sup> (Fellbaum, 1998, 2005; Miller, 1995), the Chinese WordNet<sup>2</sup> (Huang et al., 2010), the Open Multilingual WordNet<sup>3</sup> (Bond and Paik, 2012) and its extended version<sup>4</sup> (Bond and Foster, 2013). See Figure 1 for an illustration of semantic network representations of the noun *bitterness* and the adjective *bitter* in English. The aim of this step is to identify a comprehensive set of literal and figurative uses of words related to the concept of BITTERNESS. Following this, we will attempt a broader categorization around a few core ideas conveyed by the senses, and create a taxonomy of these broad senses. This generalization will give us a clearer picture of the recurring “themes” and contexts in which words of BITTERNESS are typically used in the two languages.

Next, in step four we apply our taxonomy to corpus data. We investigate what nouns are modified by adjectives of *bitter* and 苦 *ku3* ‘bitter, bitterness, bitterly’ by examining a list of the strongest<sup>5</sup> collocations, and assign to them the broad sense categories we previously identified. For the collocation analysis we use two gargantuan language corpora via the Sketch Engine<sup>6</sup> (Kilgarriff et al., 2014; Kilgarriff et al., 2004) from the TenTen corpus family (Jakubiček et al., 2013): English Web 2020 (enTenTen20) and Chinese Web 2017 Simplified (zhTenTen17). In both cases, we query for Work Sketches and the top terms in the ‘modified by’ relation with the keywords: *bitter* and 苦 *ku3*. In the case of Chinese, where grammatical categories are more blurred, we manually filter for nouns. Here, we assign our categorizations of broad senses to the top 30 strongest collocations in the dataset. Finally, we compare the two datasets and present our findings in the form of a contrastive chart showing in what way BITTER-

<sup>1</sup>PWN: <http://wordnetweb.princeton.edu/perl/webwn>

<sup>2</sup>CWN: <https://lope.linguistics.ntu.edu.tw/cwn2/>

<sup>3</sup>OMW: <http://compling.hss.ntu.edu.sg/omw/>

<sup>4</sup>EOMW: <http://compling.hss.ntu.edu.sg/omw/summx.html>

<sup>5</sup>For the statistics used, see the documentation at <https://www.sketchengine.eu/documentation/statistics-used-in-sketch-engine/>.

<sup>6</sup>SkE: [www.sketchengine.eu](http://www.sketchengine.eu)

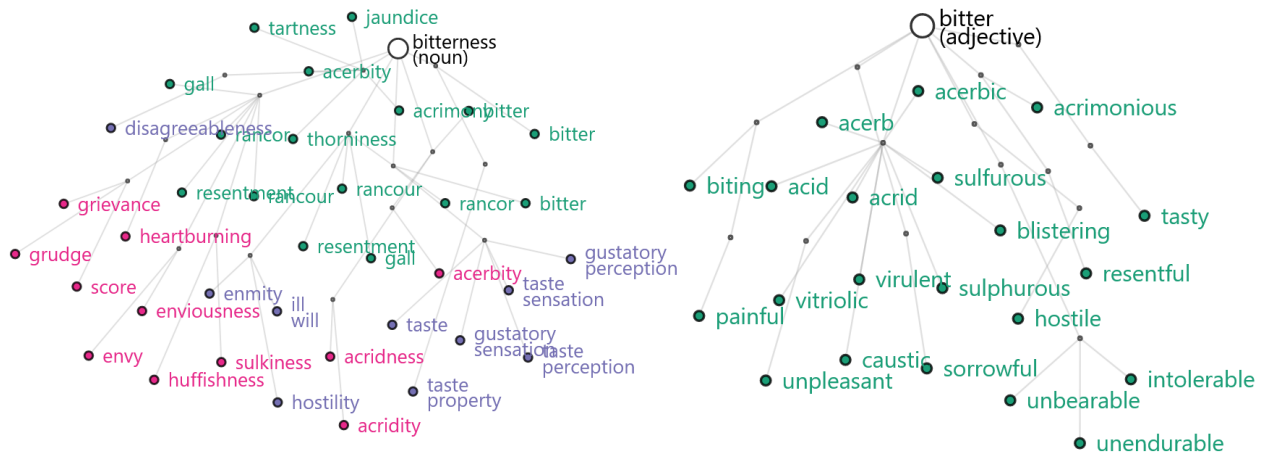


Figure 1: An illustrative overview of words related to BITTERNESS: Semantic networks of the words *bitterness* (left) and *bitter* (right). Data from PWN, visualization with Lexical Graph (<https://github.com/aliiae/lexical-graph>).

NESS is used in each language – what are the typical conceptual metaphors.

## 4 Lexical semantic analysis

### 4.1 “Bitingly bitter”, origins in English

In English, words referring to the bitter taste come in various forms, nominal (*bitterness*), verbal (*to bitter*; *embitter*), adjectival (*bitter*), and adverbial (*bitterly*), all of which frequent figurative use. Interestingly, the etymology of the English word *bitter* seems to go back to a Proto-Germanic origin meaning ‘biting, cutting, sharp’, with the Proto-Indo-European root: *\*bheid-* ‘to split’ (Harper, n.d.). In Old English *biter* meant ‘having a harsh taste, sharp, cutting; angry, full of animosity; cruel’, a cognate of Old English *bītan* ‘to bite’. This suggests that the word for a primary taste, pertaining to gustation was in fact transferred from the tactile sensory domain, pointing to an intriguing cross-modality jump and led the shift in meaning from ‘biting and pungent’ to ‘acrid and acrimonious’.

The Oxford English Dictionary emphasizes that *bitter* “within the historical period [is] only used of taste”, and that modern usage no longer refers to ‘biting’ (OED, n.d.-a). However, certain examples show parallels between the tactile sensory modality represented by HARSHNESS and SHARPNESS (e.g. “biting/bitter cold/winter”). This could be an example for an early case of linguistic synaesthesia, and needs further investigation. We also know that

the figurative sense applied to states of mind and one’s words is attested in literature earlier than the literal sense for the perception of a taste (cf. Old English *biternys* ‘bitterness, grief’) (Harper, n.d.), and might indicate that BITTERNESS as an emotion emerges from mental PAIN.

Bitterness of words (and therefore the speaker of such words, a person) seems to mark an gustatory-auditory-mental transfer, but if we examine the terms given trying to explain this sense (*stinging*, *cutting*, *harsh*, etc.), it is more likely that this meaning is connected to the original tactile domain, and could be categorized as having a tactile-auditory-mental mapping, similar to the example of “bitter winds” illustrated with akin words (*sharp*, *keen*, *cutting*, *severe*). Therefore, synonyms related to sharpness and harshness seem to support the tactile origins of *bitter* in English.

### 4.2 The taste of herbs, origins in Chinese

In Chinese, formal distinctions by grammatical class are more blurred. The character 苦 *ku3* ‘bitter; hardship, suffering’ can take on several part-of-speech categories, and conveys ideas of bitterness, hardships, pain and suffering as a noun. It can also be translated as ‘painful, miserable’ as an adjective; ‘to suffer’ as a verb; and ‘painstakingly, intensely’ as an adverb. Besides as a monosyllabic word of a single character (or with the particle 的 *de*), we often find 苦 *ku3* in disyllabic words, such as 苦味 *ku3wei4* ‘bitter taste, bitterness’ (noun), 苦澀 *ku3se4*

‘bitter and astringent, pained, agonized’ (adjective) or 受苦 *shou4ku3* ‘to suffer hardships’ (verb). The character’s radical and semantic component 艹 *cao3* ‘grass, herb, weed, plant’ hints on the herbal origins of most bitter compounds, while the phonetic component 古 *gu3* ‘ancient, old’ points to the pronunciation. In Mandarin Chinese, 苦 *ku3* is noted in the earliest dictionary, the *Shuowen Jiezi* (early 2nd century) in a brief entry described as 大苦 *dalu3* ‘great suffering’, and appears in later works as well, such as the *Guangyun* (early 10th century), and *Kangxi* dictionaries (1716), listing meanings and pronunciations from earlier times<sup>7</sup>. Contrary to the case of English, we have no attestation for early transfers between sensory domains in Chinese, and lexical evidence such as 吃苦 *chiku3* ‘to suffer, bear hardships’ (literally ‘to eat bitter’) alludes to a strong gustatory modality, from which other transferred meanings emerged.

The expression 吃苦 *chiku3* suggests that the negative polarity drawn from the displeasing character of bitter flavour is an experiential (physical or mental) marking of a natural bodily response to taste. In spite of the spontaneous response of rejection, we might gain benefits by overcoming the initial instinct, and endure the unpleasant taste. Whether the reward emerges in form of an advice from someone (spiritual), or as medicine (corporeal), they are evaluatively positive. This is the only case where metaphorical bitterness could be considered positive, and there is a parallel here with English phrases, such as “bitter truth” or “a bitter pill hard to swallow”. Xiong & Huang (2015) gave the example for this sense with 良藥苦口 *liang2yao4ku3kou3* (good-medicine-bitter-mouth), literally ‘good medicine tastes bitter’, figuratively ‘frank criticism is hard to swallow’.

After this brief introduction on the origins and core meanings of these words, let us investigate the senses they convey more closely.

### 4.3 Senses of *bitter(ness)* in English

In the followings we present a comprehensive list of senses these languages use words of BITTERNESS and propose a list of more general, broad sense categories that deliver the themes and context these

words usually operate in. We identify the set of narrow senses using WordNets and dictionary entries, and group them under umbrella terms. Effectively, a taxonomy of broad sense categories is created grouping the uses for these words. Table 3 shows the results of the broad sense taxonomies.

Table 1 shows all the senses words of BITTERNESS have in English based on data from the English WordNet, grouped by grammatical classes. Discarding senses related to beverages, we can identify the followings: Literal meanings related to the experience, perception, or qualities of the bitter taste; we will call this category TASTE (3, 4, 7, 13). The rest constitute categories of figurative and metaphorical usage: Feelings and attitudes marked by resentment, hostility, anger, acrimony, ill-will, roughness, or cynicism towards others; we term this ANIMOSITY (5, 6, 8, 12, 15). Internalized feelings of sadness, regret, grief, and despair; we name this GRIEF (11). We can also identify synaesthetic senses marking sensations that are described by being harsh, corrosive, sharp, painful, stinging, and biting, which appear to describe sensory experiences of auditory and tactile domains, we name this HARSHNESS (10, 14, 17). Next, we can identify a metaphoric sense that describes words that are difficult to “swallow”, i.e. to hear and and truths that are hard to admit, bear, and accept. We use the term RELUCTANCE (9, 16). Lastly, we can find an adverbial meaning that supposedly just retains the negative polarity of the bitter taste experience and acts as an intensifier. We name this INTENSITY (17), alluding to extreme unpleasantness. Now, we turn to dictionaries to augment our list of identified broad senses. The combination of these two sources shall yield a comprehensive list of all possible meanings and broad sense categories.

In the Oxford English Dictionary, the primary definition of *bitter* as an adjective, referring to the sensory domain of gustation is described as “obnoxious, irritating, or unfavourably stimulating to the gustatory nerve [...]” (e.g. “bitter melon”) (OED, n.d.-a), which equals to our previously established literal sense, TASTE. *Bitter* can refer to other domains as well, such as auditory (“bitter laugh”), tactile (“bitter winds”), and mental (“a bitter experience”), which matches the HARSHNESS category of sharp and painful sensations (or memories). The figurative sense of bitter is something that is “unpalatable to

<sup>7</sup>Lexicographical information for Chinese is via the Chinese Text Project (<https://ctext.org/dictionary.pl?if=en&char=苦>)

#	lexname	synset	definition
1	noun.food	bitters#1	alcoholic liquor flavored with bitter herbs and roots
2	noun.food	bitter#1	dry sharp-tasting ale with strong flavor of hops
3	noun.cognition	bitter#2, bitterness#3	the taste experience when coffee or quinine is taken
4	noun.attribute	bitter#3, bitterness#4	the property of having a harsh unpleasant taste
5	noun.feeling	bitterness#1, resentment#1	a feeling of deep and bitter anger and ill-will
6	noun.attribute	bitterness#2, acrimony#1	a rough and bitter manner
7	verb.perception	bitter#1	make bitter
8	adjective	bitter#1, acrimonious#1	marked by strong resentment or cynicism
9	adjective	bitter#2	very difficult to accept or bear
10	adjective	bitter#3, acrid#2	harsh or corrosive in tone
11	adjective	bitter#4	expressive of severe grief or regret
12	adjective	bitter#5	proceeding from or exhibiting hostility, animosity
13	adjective	bitter#6	causing a sharp and acrid taste experience
14	adjective	bitter#7, biting#2	causing a sharply painful or stinging sensation
15	adverb	bitterly#1	with bitterness; in a resentful manner
16	adverb	bitterly#2	indicating something hard to accept
17	adverb	bitterly#3	extremely and sharply

Table 1: Concise overview of word senses for the words *bitter*, *bitters*, *bitterness*, and *bitterly* via (abbreviated) synsets in the English WordNet (PWN). A synset is a word sense mapped to collections of synonymous words. We group them by lexicographer information, (for example noun.animal, noun.feeling, verb.motion) which are grammatical-semantic categories based on human annotation taken from the “List of WordNet lexicographer file names and numbers” (also known as lexnames in short, see documentation at <https://wordnet.princeton.edu/documentation/lexnames5wn>).

the mind; unpleasant and hard to ‘swallow’ or admit” (i.e., “bitter truth”), what we termed RELUCTANCE above. In consequence, a transferred meaning of bitter would be: “of anything that has to be ‘tasted’ or endured; attended by severe pain or suffering; sore to the borne; grievous, painful, full of affliction”. We will call this category PAIN, a new addition to our broad sense categories marked by pain and suffering. A phrase of doubtful history: “to the bitter end”, which the OED explains as “to the last and direst extremity; to death itself” seems to describe a situation intensely mournful and pitiable (“bitter cry”), also characterised by hopelessness. In addition, *bitter* can refer in particular to extreme sadness, misery, or affliction of the spirit (“bitter tears”), which we will consider here as GRIEF. Finally, consulting the dictionary we understand that derived words of BITTERNESS most frequently characterize resentment and hostility, lengthy and undesirable situations detrimental to both parties (“bitter rivalry”), in coherence with ANIMOSITY.

*Bitter* can also be used as a noun in lieu of *bitterness*, both in the literal and in the figurative sense. As a plural it usually signifies herbal liquors and medicinal substances (“almond bitters”), or in the singular, a type of ale. The word *bitterness* as a noun, per expectation, refers to a “quality or state of being bitter”, literally to TASTE, and figuratively to the mind and feelings (OED, n.d.-b). More closely, definitions are given as: ‘deep sorrow or anguish of heart’, the category of GRIEF; ‘acrimony of temper, action, or words’, what we termed ANIMOSITY; and ‘intensity of frost or cold wind’: HARSHNESS.

We have examined a comprehensive list of senses and definitions for words of BITTERNESS in English, and we grouped the numerous narrow senses into 6 broad categories. Besides the literal usage, the figurative senses are grouped into: ANIMOSITY, GRIEF, HARSHNESS, INTENSITY, PAIN, RELUCTANCE.

#	part-of-speech	definition
1	intransitive verb (VH), noun (nom)	describes the taste or smell of <i>Coptis</i> , one of the basic tastes
2	noun (Na)	a smell or taste of <i>Coptis</i>
3	adjective (A)	something that is difficult to accept but is helpful
4	noun (Na)	situation of material or mental discomfort
5	intransitive verb (VA)	being concerned with material or mental discomfort
6	intransitive verb (VH)	lack of material comfort
7	transitive verb (VHC)	its object describes a person as painful and uncomfortable
8	intransitive verb (VH)	extreme weather phenomena that influence life or livelihood
9	intransitive verb (VA)	time duration that is contrary to the speaker's expectations
10.1	adverb (D)	expression to continue after the occurrence of a difficult event
10.2	adverb (D)	overcome a difficult event in the face of material deprivation
11	intransitive verb (VH)	affected by fate and endure material or mental discomfort
12	intransitive verb (VH), noun (nom)	feeling pain and sadness
13	transitive verb (VC)	expressing reluctance or sadness
14	intransitive verb (VH)	causing feelings of suffering or helplessness to a viewer
15	intransitive verb (VH)	causing feelings of suffering or helplessness to the listener
16	noun (Na)	everything that troubles the body and mind

Table 2: Senses of 苦 *ku3* in Chinese according to the Chinese WordNet 2.0, listed according to their sense number. For examples, please query the website at <https://lope.linguistics.ntu.edu.tw/cwn2/>.

#### 4.4 Senses of 苦 *ku3* in Mandarin Chinese

Table 2 shows the various senses of 苦 *ku3*, according to the Chinese WordNet with translated definitions. Here, we can identify the following broad sense categories: Describing the taste and smell of *Coptis chinensis*, the prototypical bitter medicinal herb for Chinese people – TASTE (1, 2). A substantial portion of senses revolve around material or mental discomfort, these usually refer to physical hardships of labour, poverty, weather, and living conditions; we group these under HARDSHIPS (4, 5, 6, 8, 11, 16). Closely related to the latter are senses that revolve around overcoming these hardships, we will use the word EFFORT to refer to these (10.1, 10.2). Feelings of suffering, pain, and helplessness will be marked with SUFFERING (7, 14, 15, 16). Context of sadness, troubles of the mind will be termed GRIEF (12, 13, 16), and the sense denoting things that are beneficial but difficult to accept will be considered as RELUCTANCE (3). A special case in Chinese would be the case marked by sense no. 9, where it is explained that discomfort arises if a time-frame does not match the speaker's expectations. For lack of a better term, we will name this

category UNEXPECTED DURATION. Now we examine dictionary entries to finalize our categories.

In Chinese dictionaries 苦 *ku3* is usually described as tasting like bile or Chinese goldflower (黄連 *huang2lian2*; *Coptis chinensis* a common medicinal herb in China). We can find it in compound words, such as 苦膽 *ku2dan3* 'gall bladder'; 苦瓜 *ku3gual* 'bitter melon'. 苦 *ku3* is the antonym of the character and radical 甘 *gan1* 'sweet, willing; sweetness; tasty' in the Han Dian (<https://www.zdic.net/>). Related to this primary, literal meaning pertaining to TASTE, the word 甘苦 *gan1ku3* (noun) lit. 'sweet-bitter' points to these two tastes as archetypical markers for good and bad, meaning 'good times and hardships, joys and tribulations, for better or for worse', here we see an example for the HARDSHIPS category. Chinese lacks a tactile sensory modality transfer, however there is an olfactory meaning, which is in turn completely absent in English (苦味 *ku3wei4* 'bitter-smell').

Besides designating a bitter taste property, another important sense category of 苦 *ku3* is SUFFERING, synonymous to 難受 *nan2shou4* (adj.) 'feeling unwell, suffering pain, difficult to bear'. 苦

Broad sense categories in English	Broad sense categories in Chinese
ANIMOSITY	EFFORT
<b>GRIEF</b>	<b>GRIEF</b>
HARSHNESS	HARDSHIPS
INTENSITY	SUFFERING
PAIN	
<b>RELUCTANCE</b>	<b>RELUCTANCE</b>
<b>TASTE*</b>	<b>TASTE*</b>

Table 3: An overview of broad sense categories of BITTERNESS in English and Mandarin Chinese. Categories in bold appear in both languages. The asterisk (\*) marks the literal senses.

*ku3* appears in many disyllabic words, including 苦闷 *ku3men4* (adj.) ‘depressed, dejected, despirited, feeling low’, 苦恼 *ku2nao3* ‘worried, distressed’, and 苦海 *ku2hai3* (noun) lit. ‘bitter-ocean’. 苦海 *ku2hai3* is originally from Buddhist terminology, and it refers to the “sea of bitterness”, endless painful conditions, suffering, “an abyss of misery” i.e. the real world. Nowadays it is a metaphor for difficult circumstances, or HARDSHIPS. Examples include 苦境 *ku3jing4* (noun) ‘hard situation, grievance, dire straits’. 苦 *ku3* can also act as a verb, in the sense of ‘to cause suffering’ (那件事可苦了你啦! ‘That incident really made you suffer, lah!’). Related to this, one can find more rare, poetic examples that hint on the cause of the hardships, e.g. 苦雨 *ku2yu3* ‘bitter rain’, or 苦旱 *ku3han4* lit. ‘bitter drought’, which is described as very arid, drought stricken land<sup>8</sup>.

Another sense invokes endurance and patience, circling around the concept of EFFORT we mentioned already. Here, 苦 *ku3* is defined as ‘patiently; doing one’s best, trying one’s hardest’. Examples include 苦劝 *ku3quan4* (verb) ‘to plead intensely’, 刻苦 *ke4ku3* lit. ‘carving-bitter’ fig. ‘hardworking, assiduous’, and 苦心 *ku3xin1* (noun) lit. ‘bitter-heart’, ‘painstaking efforts; troubles; pain’. We should note that in the latter connotations of 苦 *ku3* are positive; in order to achieve something, patience, endurance and effort are undoubtedly virtues, across cultures.

Thus, for Chinese, we have identified 5 broad figurative sense categories: EFFORT, GRIEF, HARDSHIPS, RELUCTANCE, SUFFERING, and UNEXPECTED DURATION.

<sup>8</sup>Han Dian. (n.d.). 苦. In *Han dian* [Chinese dictionary]. Retrieved July 24, 2021, from <https://www.zdic.net/>

After we established our taxonomy of broader sense categories for both English and Chinese (as seen in Table 3, we test how these categories conform to a small set of corpus data: Which of the above identified broad metaphoric senses dominate collocational datasets from corpora?

## 5 Findings

In this paper, we selected words typically modified by *bitter* and 苦 *ku3*, with the help of the Word Sketch tool of the Sketch Engine. Table 4 shows two lists of the top 30 terms modified by the keywords, ranked according to the strength of the collocation, English and Chinese respectively. We assigned the previously identified broad sense categories to the corpus examples and found examples that hint on a noticeable dominant usage in both language.

<sup>9</sup>Literally ‘[study hard by] a chilly window’, fig. ‘[study hard in] a harsh environment’. See the expression 寒窗苦读 ‘hardships that a poor student has to go through in his studies; a life of strenuous studies’

<sup>10</sup>Also in expressions 良药苦口 lit. ‘bitter medicine is good medicine’ fig. ‘frank criticism is hard to swallow’ and 苦口良言 ‘harsh truth, earnest warning or advice, truthful but sharp language (opposite of polite)

<sup>11</sup>See 胸膈苦满 ‘medical condition, chest tightness’ (medical terminology).

<sup>12</sup>See 春宵苦短 ‘spring nights are bitterly short; joyful time goes fast’.

<sup>13</sup>The quality of *sattva* from Hindu philosophy.

<sup>14</sup>Moksha; to escape the cycle of suffering.

<sup>15</sup>Lit.: ‘girl-heart’, fig. the bitter seeds inside the lotus flower representing a bitter heart: metaphor for loneliness.

<sup>16</sup>Preta, demon in Hinduism and Buddhism suffering from hunger and thirst.

#	Term	Score	Cat.	Term	Gloss	Score	Cat.
1	taste	9.12	TS	寒窗	<i>[study by] a cold window</i> <sup>9</sup>	9.09	HD
2	<i>cold*</i>	9.03	HR	口	<i>mouth</i> <sup>10</sup>	8.52	TS/HR/RL
3	<i>disappointment</i>	8.21	GR/IN	心裏	<b>heart</b>	8.22	<b>SF</b>
4	<b>rival</b>	8.11	<b>AN</b>	味	taste	8.16	TS
5	orange	8.04	TS	胸脅	<b>chest</b> <sup>11</sup>	7.57	<b>SF</b>
6	<i>pill</i>	8.03	TS/RL	春宵	<i>spring night</i> <sup>12</sup>	7.55	UD
7	<b>enemy</b>	7.97	<b>AN</b>	离别	<i>departure</i>	7.42	GR
8	<b>irony</b>	7.81	<b>AN/HR</b>	衆生	<b>sentience (Bud.)</b> <sup>13</sup>	7.37	<b>SF</b>
9	melon	7.78	TS	日子	<i>days, times</i>	6.82	HD
10	<b>rivalry</b>	7.74	<b>AN</b>	地獄	<b>hell (Bud.)</b>	6.72	<b>SF</b>
11	<i>aftertaste</i>	7.67	TS/IN	農桑	<i>farming (hard labour)</i>	6.54	HD
12	almond	7.60	TS	輪回	<b>rebirth (Bud.)</b> <sup>14</sup>	6.49	<b>SF</b>
13	gourd	7.57	TS	無常	<b>impermanence (Bud.)</b>	6.46	<b>SF</b>
14	<b>feud</b>	7.53	<b>AN</b>	病	<b>illness</b>	6.32	<b>SF</b>
15	<b>dispute</b>	7.50	<b>AN</b>	春茶	summer tea	6.01	TS
16	<i>tear</i>	7.48	GR	衆	<i>masses, the people</i>	6.00	HD
17	herb	7.48	TS	風霜	<i>frost (poetic)</i>	5.98	HD
18	<b>fighting</b>	7.34	<b>AN/IN</b>	輩子	<b>one's life</b>	5.92	<b>SF/HD</b>
19	<b>struggle</b>	7.00	<b>AN/IN</b>	芳心	<b>loneliness</b> <sup>15</sup>	5.73	<b>SF</b>
20	chocolate	6.88	TS	世間	<b>lifetime on earth (Bud.)</b>	5.69	<b>SF</b>
21	<b>divorce</b>	6.82	<b>AN</b>	餓鬼	<b>hungry ghost (Bud.)</b> <sup>16</sup>	5.55	<b>SF</b>
22	<b>hatred</b>	6.71	<b>AN/IN</b>	命	<b>fate, destiny (Bud.)</b>	5.36	<b>SF</b>
23	<b>battle</b>	6.69	<b>AN/IN</b>	蒼生	<i>common people</i>	5.31	HD
24	<i>end</i>	6.66	GR	罪	<b>sin (Bud.)</b>	5.24	<b>SF</b>
25	<b>resentment</b>	6.64	<b>AN</b>	氣味*	<i>odor</i>	5.18	HR
26	<i>winter*</i>	6.63	HR	嘴巴	mouth	5.01	TS
27	<i>truth*</i>	6.51	HR/RL	皮肉	<b>skin &amp; flesh (Bud.)</b>	4.93	<b>SF</b>
28	flavor	6.51	TS	光棍	<b>bachelor (in song-title)</b>	4.91	<b>SF</b>
29	<b>fight</b>	6.38	<b>AN/IN</b>	苦瓜	gourd	4.88	TS
30	<b>foe</b>	6.35	<b>AN</b>	藥味	<i>medicine</i>	4.74	TS/RL

Table 4: Top terms modified by *bitter* in English (left) and by 苦 *ku3* in Chinese (right), ranked by score of collocation strength. Broad sense categories (Cat.): AN=ANIMOSITY, GR=GRIEF, HD=HARDSHIPS, HR=HARSHNESS, IN=INTENSITY, RL=RELUCTANCE, SF=SUFFERING, TS=TASTE (i.e. the literal sense), UD=UNEXPECTED DURATION. Words belonging to the category with the most instances in the top 30 are with bold and highlighted, figurative senses are in italic. The asterisk (\*) marks synaesthetic metaphors. Buddhist terminology is marked by (Bud.).

## 5.1 Collocation analysis

For both English and Chinese, it is apparent that there is one-one figurative sense that dominates the top collocations, we highlighted these in Table 4. In English, 14 of the 30 falls into the category of ANIMOSITY, while in Chinese, 15 of the 30 examples were assigned to the category of SUFFERING. Interestingly, they are both exclusive, there is no ANIMOSITY sense occurring on the Chinese side, and

no apparent collocation implies SUFFERING.

Moving on, from examples of English data, we learn that *bitter* sometimes completely loses its original gustatory or transferred meaning in other sensory domains (e.g. “bitter hatred”, “bitter struggle”). In such cases, it rather acts as an intensifier, going beyond linguistic synaesthesia, but retaining the negative polarity. One will find it difficult to come across collocations where *bitter* mod-



Conceptual metaphor	English	Chinese
BITTERNESS is ANIMOSITY	+++	
BITTERNESS is INTENSITY	++	
BITTERNESS is GRIEF	++	+
BITTERNESS is HARSHNESS	++	+
BITTERNESS is RELUCTANCE	+	+
BITTERNESS is HARDSHIPS		++
BITTERNESS is SUFFERING		+++

Table 5: Typicality in different metaphoric uses of BITTERNESS, based on the dataset of the 30 strongest collocations and their analysis, as see in Table 4. Legend: +++ = the most prevalent broad sense category in the dataset; ++ = three or more instances in the dataset; + = one or two instances in the dataset; Ø = no instance of this type of metaphoric use.

ifies a word with positive meaning, and still maintain a positive tone, take for example “a bitter smile”. The adverbial form *bitterly* also conveys this notion of INTENSITY. *Aftertaste* is an interesting example usually appearing in the literal sense, however, concordances show that figuratively it can refer back to experiences of various kinds of discomfort. GRIEF appears in both lists, although English has a wider range of applications (3, 16, 24). Next, we consider HARSHNESS, and there are examples on both sides. In English this sense goes hand in hand with synaesthetic metaphors, where gustatory domain is transferred and results in a tactile (2, 26) and auditory/mental (27) mapping. However, as we discussed before, the tactile modality might be the source and persist in these sensory words. In Chinese, this sense is similar and occurs frequently in expressions (2). The top collocations also carry the olfactory mapping, unique to Chinese (25). We also discussed before the special case of RELUCTANCE, where words of BITTERNESS refer to hard to accept things, whether literally (*medicine, pills*) or figuratively (*truth, words*). The two languages operate very similarly here, although arguably the weight in Chinese is on the HARSHNESS of words (i.e. not polite ones), while for English it is the discomfort they carry (i.e. “hard to swallow/admit”).

Finally, we arrive to concepts that frequent Chinese usage, HARDSHIPS and SUFFERING. As the data shows, metaphors of BITTERNESS are connected heavily to enduring HARDSHIPS, and being subjected to physical and mental SUFFERING. To emphasize the difference between the two uses, we ought to think of HARDSHIPS as circumstan-

tial causes of discomfort beyond our control, while SUFFERING is something we experience inside, not exclusively caused by the environment.

PAIN and EFFORT were identified as broad sense categories, the lists of the top 30 strongest collocations did not bring examples for BITTERNESS is PAIN in English, and BITTERNESS is EFFORT in Chinese. This shows that for a full study, one must examine other grammatical relations, broaden and expand the tools used in the corpus analysis. An account of the findings is summarized in Table 5.

## 5.2 On polarity – Is *bitter* always bitter?

So far, seemingly all the examples have a negative polarity, arguably derived from the original physiological experience. Synaesthetic metaphors, such as the auditory-mental “bitter words” refers to sarcasm or cynicism, and the conceptual metaphor “bitter disappointment” also sounds awfully off-putting. Table 4 shows the overwhelming negative polarity retained where *bitter* and 苦 *ku3* are used figuratively. However, “bitter truth” and “bitter pill” are outliers in the sense that they are arguably beneficial and thus carry positive connotations, as we briefly discussed above. Truth (and truthfulness as a virtue) is usually valued across cultures, even when it is hard to hear it. The emotional experience of (unintentionally) learning a new piece of information can be hurtful – just like a bitter taste experience – but knowing the truth ought to be evaluatively positive. Similarly, invoking the memory of foul tasting herbal drinks from the past or modern medicine tablets, a “bitter pill that’s hard to swallow” is an equivalent expression referring to accepting the facts, describing an

experiential negativity while also alluding to the fact that it is beneficial for us – evaluative positivity.

## 6 Conclusion

Table 5 summarizes our findings about the typicality of conceptual metaphors in these languages and offers a minute glance to the findings of this pilot study.

Back to the question of how BITTERNESS is used in the figurative sense, we saw that in the case of English, the most prevailing uses of BITTERNESS metaphors revolve around ANIMOSITY, characterized by resentment, malice, and feelings or actions of hostility towards others, and this notion is completely lacking in Chinese. On the other hand, Mandarin Chinese commonly uses the concept of BITTERNESS to refer to SUFFERING – enduring physical, but mostly mental and emotional torment, which is deficient in English. These are key differences when comparing the two languages, and according to the results, these are the typical themes and contexts that words of BITTERNESS are used in figuratively. Apart from these two “extremes”, Table 5 reveals that English also uses *bitter* as an intensifier (INTENSITY), and Chinese uses 苦 *ku3* to describe difficult circumstances and environments (HARDSHIPS).

Uses that refer to GRIEF and HARSHNESS appear in both collocation lists, although more visible in English when looking at the top 30 in the ‘modified by KWIC’ relation. Moreover, HARSHNESS was identified as the figurative use using synaesthetic metaphors. The category of RELUCTANCE, a situation or fact difficult to bear or accept (“bitter pill/medicine/truth”) was identified as showing parallel usage in both languages, and the corpus data yielded examples for both of them. This category was also the only one having any kind of positive connotations in collocations.

Our second question was: “What can the figurative uses tell us about metaphors of BITTERNESS as the source domain in both languages?”. First of all, it is evident that the Chinese broad sense category of SUFFERING is tightly knit around Buddhism. Our dataset of collocations contains 9 concepts from the Buddhist tradition, mostly religious terminology that entered daily use. This is evidence

that the metaphoric use in Chinese is interlaced with cultural charges of Buddhist worldview.

### 6.1 Limitations and future work

As this is a short pilot study, we wanted to establish groundwork for future research on the concept of BITTERNESS and other sensory words pertaining to taste and smell. We are interested in their ties to cognition, metaphoric use, linguistic variation, and links to socio-cultural backgrounds.

We explored terms of BITTERNESS from a lexical-semantic approach, and we identified broad sense categories and thus in turn, conceptual metaphors. Defining these metaphors are based on interpretation and can be done in different ways, and certainly on a more fine-grained level. What was done here is preliminary comparison based on a constricted set of corpus data. Tables 1 and 2 list multiple grammatical classes; in the future, we shall amend this research by studying words from more angles, adding more grammatical functions into our investigation, not only taking adjectival uses.

An evident critique would be the limitations of the corpora of choice. Could it be that the structure of the TenTen corpora of English and Chinese are divergent resulting in the findings? We settled on the biggest web corpora available in hopes of plenty of collocations. Choosing different corpora could steer us in a more balanced direction in the future.

Since differences between senses are sometimes subtle, arguments for modifying and improving the methods of categorization are welcome and needed. However, certain decisions must be made so the findings can be relayed in a clear way.

We plan to expand this paper and conduct a more detailed comparison, with adding further languages and discussing cultural references. For example, work to include Arabic into the fold is on the way, and a philological perspective on “bitter words” would help us gain insights into the influence of literature. From the 1st century Roman poet Lucretius and his *On the Nature of Things* to the *Annals of the Warring States* (戰國策) in around the 1st century BC, philosophers told the “parable” of a bitter medicine again and again. A fascinating questions to ask would be: Do Christian, Buddhist, and Islamic traditions influenced the way different languages use words of BITTERNESS?

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