

The “虚指 *Xuzhi*” of Number in Ancient China: Evidence from the *Yijing*

Yancheng Yang^{1,2&3}

¹ School of Foreign Languages/Institute of Language and Cognition, Hunan University, Changsha, China

² School of Foreign Languages, Luoyang Institute of Science and Technology, Luoyang, China

³ School of Foreign Languages, Hunan University of Science and Engineering, Yongzhou, China

Correspondence: Yancheng Yang, School of Foreign Languages, Hunan University, 410082 Changsha, China.
E-mail: yanchengyang@hnu.edu.cn

Received: November 29, 2019 Accepted: December 28, 2019 Online Published: January 18, 2020

doi:10.5539/ijel.v10n2p62 URL: <https://doi.org/10.5539/ijel.v10n2p62>

Abstract

Number, especially the number system has been an important part of the *Yijing* text, which can help us probe into the myth of the *Yijing*. The *Yijing* languages treat numerical notion from ‘one’ to ‘ten’ very special, especially about the “虚指 *Xuzhi*” (empty reference or implicit meaning) usage of ‘three’, ‘seven’, ‘nine’ and ‘ten’, etc. The numeral expressions and linguistic representations in the *Yijing* text indicate that the decimal system of numbers has been very popular at that time. From the analysis of the *Yijing* text, it can be seen that linguistic and cultural conceptualization of number exists and the usage of numbers at that time has reached “亿 *yi* 100 million”, which also indicates the strong numeral notions or ideas of the ancestors in ancient China. This paper mainly illustrates the “虚指 *Xuzhi*” (empty reference or implicit meaning) of the original number in the *Yijing* by linguistic and cultural conceptualization of number, dealing with historical aspects of number usage.

Keywords: number, decimal system, “虚指 *Xuzhi*”, numerical cognition, the *Yijing*

1. Introduction

Number is such a thing that we can't live without it. A lot of scholars from different fields have explored this area. Since ancient China, there is a long history of the definition of number, which can be connected with many fields. When people talk about the concept of number, it is natural to think of a type of calculation, deduction and counting activity. In the ancient works 汉书 *Han Shu* (80 AD), we notice that “数者，一十百千万也，所以算数事物。 *Shù zhě, yīshí bǎi qiān wàn yě, suǒ yǐ suànshù shìwù.* The number refers to one, ten, hundred, thousand and million, counting the number of things”, which is the best interpretation of the definition of number. This is also one of the basic properties or features of numbers. Number is once considered as a philosophical concept, and there is also a wide range of cultural attributes. According to volume 21 of 汉书 *Han Shu*, when the saints performed the 八卦 *bagua* (eight gua or trigram, the core in the *Yijing*, a symbolic artefact in ancient divination) in ancient times, they have the numeral concept in their mind. (“Han Shu” Volume 21, 律历志 *Lǜ lì zhì* Law Calendar) Number is the connection between symbols and notions. To some extent, the *Yijing* text is the book that discovers the will of the gods through numbers (Yu, 1994, pp. 3–4).

In ancient China, digitizing everything in the world can be traced back to the original *Yijing* text (Li, 1997). Digitization may be not an innovation from Leibniz's binary system, nor a new creation of modern scientists, but from the “changing number” in the *Yijing* (Wang & Song, 2019). The decimal system and binary system are the other applications of numbers in the *Yijing*. There is ample evidence that the *Yijing* text adopts the decimal system for its numerals, which are my focus in this paper.

My general hypothesis is that the ancestors in ancient China always borrowed the spatial symbol as the representation of the numerical concept expression, as in the 八卦 *bagua* (eight gua or trigram), and considered the symbol of the spatial orientation concept as the basic domain or scale of the understanding of time and number. This paper is to test one part of my hypothesis, which more or less helps us identify my whole hypothesis in the future. My aim in this study is to analyze the linguistic and cultural quantification system and counting system in the *Yijing* text, especially about the “虚指 *Xuzhi*” or empty reference of number, in the context of everyday quantificational practices.

2. Literature Review

The numeral system is also an important area of interdisciplinary research. These interdisciplinary studies are currently very active and have yielded many results, covering anthropology (e.g., Everett, 2005), ethnology (e.g., Pica et al., 2004), cognitive science (e.g., Wang, 1984), developmental psychology (e.g., Frank et al., 2008), and mathematical philosophy (e.g., He, 2015).

There is much more cross-linguistic literature both on the number and on numerals that would deserve being critically surveyed as a preliminary for my work, such as Corbett's 2000 monograph *Number* (CUP). Corbett (2000) held that "Number is the most underestimated of the grammatical categories", which was also recognized by Jespersen (1924); For linguistic and culture study, Hurford's (1975, 1987, 2007) did the earlier researches on the linguistic theory of numerals; Menninger (1992) discussed in number words and number symbols; Rothstein (2010, 2013) focused on counting and number words from the semantic view, etc.; Zhu (1958) proposed the coefficient (系数 *xishu*) structure for the first time, and he believed that the coefficient structure is a kind of numeral structure, and divided the numbers into four categories, which are coefficient words, digit (位数 *weishu*) words, approximate words (概数 *gaishu*) and semi- (半 *ban*) and ten- (十 *shi*) class words. The coefficient words include "one, two, three, four, five, six, seven, eight, nine, ten, 两 *liang* (two), 几 *ji* (several), and 多少 *duoshao* (how many)". The coefficient structure is generally composed of two sequential and continuous coefficient words, and may also be composed of discontinuous coefficient words. This analysis method is not only applicable to modern Chinese, but also ancient Chinese (including the *Yijing* text) (Hong, 1979). What is more, Zhang (1999) considered the number as a special cultural language. Number or numerical word, used as a type of language, is a symbol used to distinguish the relationship between things and is as arbitrary as any language symbols.

The numeral referential problem (including "虚指 *Xuzhi*") is very important, there have been a number of previous studies, involving the complex relationship between language and mind, as well as the philosophical issues and epistemology (He, 2015). According to the experience provided by the natural philosophy of the Milesian School, we can not restore all things to numbers in any way, but we have to admit that there are a number of presuppositions in all things, and the quantitative relationship also restricts the nature of all things. The number of Pythagoras is not just a simple emotional thing, the ancients have elaborated more on this point. Aristotle once argued "All things that feel are constantly changing. Knowledge about them does not exist", when discussing with Heraclitus and Plato, he mentioned, "The number is distinguished by its eternal, unchanging and perceptual things" (Aristotle, 2003).

The most essential reference of numeral words is "集合 *jihe* set or large number", the numeral reference is the second one (Hofweber, 2005; Moltmann, 2013). The two basic functions of number are "实指 *shizhi*" (real reference) and "虚指 *xuzhi*" (empty reference). The Chinese numerical "虚指 *xuzhi*" refers to express the vague or empty concept with exact, specific or precise numbers. Zhu (1958) once said, "This kind of vague expression is actually a manifestation of language elasticity. Natural language can become a means for humans to exchange ideas. An important reason is that there is such flexibility." Polish linguist Adam Schaff (1979) proposed in the book *Introduction to Semantics* that "completely eliminating the ambiguity of words will make our language much poorer"; Piazza (2011) held that Humans come to life with strong intuitions on approximate numerical quantities, including using "Symbolic Number Representations" (one way of empty reference). In the *Yijing*, the numeral notion "three, seven, nine, ten and hundred, etc." can show us the usage of empty reference in a clear way. Li's study (2003) showed that there are "虚数 *xushu* vague number" and "实数 *shishu* real (specific) number" in the Chinese grammar of the pre-Qin period, which can help us probe into the "虚指 *xuzhi*" usage of the number in the *Yijing*.

Different scholars defined "虚指 *Xuzhi*" only slightly differ in the expression (for example, empty reference, indefinite denotation or implicit meaning, etc.), but generally, the basic meaning is similar. That is, "虚指 *Xuzhi*" refers to the fact that the numeral word does not represent the actual specific number, but some kind of extended meaning. Moreover, real numbers (实数 *shishu*) can refer to the specific number of things, while vague numbers (虚数 *xushu*) can represent a variety of different degrees, such as "three, seven, nine, one hundred, one thousand, ten thousand", which can be used to represent the usage of "虚指 *xuzhi*". However, few scholars studied the number from the ancient Chinese, especially about the number in the *Yijing* text.

My claim in this paper is that in the ancient Chinese text of the *Yijing*, several numerals or digits were used to indicate "many" without meaning an exact number.

3. The “虚指 *xuzhi*” Usage of Number in the *Yijing*

3.1 Materials and Method

The Shanghai Museum version of the *Yijing* (Pu, 2014) is the earliest one, as my main reference text, a good text for us to study ancient Chinese. In-depth analysis and research of these numeral words not only help us to understand the language characteristics of the *Yijing* text, but also help us trace the language profile of ancient Chinese.

My main method in this paper is to combine qualitative (interpretation of these examples in the Leipzig Glossing Rules) with quantitative (concordance and collocation) analysis. And give a full account of the number in the *Yijing* text, including a full account of the textual sources and corpus analysis to understand how the number domain was employed.

3.2 Linguistic and Cultural Conceptualization of Number in the *Yijing*

In this paper, I mainly introduce the decimal system (quantification system and counting system) in the *Yijing* text, especially about how the “虚指 *xuzhi*” is related to the linguistic and cultural conceptualization of number in the *Yijing*.

From a scientific point of view, numeral should be a real number that represents an exact or specific concept. However, from the perspective of language usage in the *Yijing*, numeral has some uncertainty and ambiguity, for in the language field the numerals are no longer real numbers in the simple sense, but have ambiguity and general reference, which role is mainly to play the function of rhetoric usage. In this part, I will mainly do the qualitative analysis like the following examples (interpretation of these examples in the Leipzig Glossing Rules) and consider them as my main pieces of evidence in this paper.

— *yi* One

The numerical notion “一 *yi* One” appears four times in the *Yijing* text. “一人 *yi ren* one person”, “一车 *yi che* one carriage”, “一矢 *yi shi* one arrow” and “一握 *yi wo* one grip or grasp” in examples (1), (2), (3) and (4) are the main linguistic representations. Here, we can consider cardinal numbers and indefinite determiners used with countable nouns as quantifiers, which were commonly incorporated in the ancient text.

(1) 损·六三，三人行则损一人，一人行则得其友。

Sǔn · Liùsān, sān rénxíng zé sǔn yīrén, yīrén xíng zé dé qí yǒu.

Six three, three people walk then lose one person, and one person walk then gain a friend.

Third six, when three people journey together, their number decreases by one. When one man journeys alone, he finds a companion. (Baynes & Wilhelm 1997, the following examples' translations are from the same source, omitting quotations. The I Ching, or Book of Changes – Yi Jing I. 41.)

In Zhou Dynasty, especially in the early *Yijing* era, “一 *yi* One” is mainly about numeral usage (though appear non-numeral usage at that time), which can express the specific and vague number. Here, “一人 *yi ren* one person” in example (1) can express the specific number ‘one’.

(2) 睽·上九，睽孤，见豕负涂，载鬼一车，先张之弧，后说之弧，匪寇婚媾，往遇雨则吉。

Kuí · Shàng jiǔ, kuí gū, jiàn shǐ fù tú, zǎi guǐ yī chē, Xiān zhāng zhī hú, hòu shuō zhī hú, fěi kòu hūn gòu, wǎng yù yǔ zé jí.

Top nine, walk alone, see pig smear with mud, pack ghost one cart, first pulling up your bow, after pulling down your bow, bandit and suitors, go over and meet rain, then auspiciousness.

Topmost nine, I left home. As I walked alone, I saw a pig whose back was smeared with mud and a cart packed with people from the Kingdom of Guifang. You were alerted and pulled up your bow, but soon you happily greeted them holding a vessel of wine in your hand because they were not bandits. They were suitors. As you went over, it began to rain. That was an omen of auspiciousness. (The I Ching, or Book of Changes – Yi Jing I. 38.)

Based on the interpretation of example (2), it is important to consider that “一车 *yi che* one carriage” is a vague number notion here, with degree expression, which can express the meaning of “full, a lot of, many”. What is interesting is that the numeral here is used as an indefinite article or not? ‘One’ or ‘a’?

(3) 旅·六五，射雉，一矢亡，终以誉命。

Lǚ · Liùwǔ, shè zhì, yīshǐ wáng, zhōng yǐ yù mìng.

Six five, shoot pheasant, one arrow death, ultimately get praise life.

Fifth six, he shoots a pheasant. It drops with the first arrow. In the end, this brings both praise and office. (The I Ching, or Book of Changes – Yi Jing I. 56.)

“一矢 *yi shi* one arrow” in example (3) means the first arrow, here “一 *yi* One” can indicate the ordinal number “first”, which is the basic usage of number words in ancient (There will be more examples for a statement of this kind in the following numerals, like “八月 *bayue* August”, referring to the eighth month.) “一 *yi* One” can be considered as the usage of an attribute, expressing the number of objects.

(4) 萃·初六，有孚不终，乃乱乃萃，若号，一握为笑，勿恤，往无咎。

Cui · Chū liù, yǒu fú bù zhōng, nǎi luàn nǎi cuì, ruò hào, yī wò wéi xiào, wù xù, wǎng wú jiù.

Beginning six, there is sincere no end, then confusion so gathers together, if a number, one grasp as smile, NEG regret, go not have blame.

First six, if you are sincere, but not to the end, there will sometimes be confusion, sometimes gathering together. If you call out, then after one grasp of the hand you can laugh again. Regret not. Going is without blame. (The I Ching, or Book of Changes – Yi Jing I. 45.)

As early as in the Shang and Zhou dynasties, there was the usage of the “一 *yi* One” as a non-numeral word. There is quite a corpus of the linguistic literature on numerals, classifiers and their diachronic development in Chinese (see e.g., Xu, 2006). I may say that until now no satisfactory answer has ever been given to it. Here in example (4), non-numeral usage “一 *yi* One” is used as an adverb before the predicator “握 *wo* grip or grasp”, and can be used to indicate that another action occurs immediately, indicating that the time is short and the speed is fast. What is more, “一 *yi* one” can be used adverbially, may simply mean “once”, but may also have extended implications such as “once and for all” or “completely”.

二 *er* Two

“二 *er* Two” often appears at the beginning of every 爻辞 *yao ci* (hexagram statement), for example, “六二 *liu er*, 九二 *jiu er*” at the beginning of every *yao* statement, we can call these numeral expressions as “爻题 *yao ti* hexagram theme”. There is also one example like (5) in the rest part of *yao* statement.

(5) 损卦辞：损，有孚，元吉，无咎，可贞，利有攸往。曷之用二簋，可用享。

Sǔn guà cí: sǔn, yǒu fú, yuán jí, wú jiù, kě zhēn, lì yǒu yǒu wǎng, hé zhī yòng èr guǐ, kě yòng xiǎng.

Diminution, have enemy, Yuan auspicious, not have blame, could predict, suitable have AUX go towards. What ZHI use two-vessel food, could use enjoy.

Diminution. You captured enemies. It was auspicious from the beginning and no mistakes were made. The future could be predicted: it is suitable to go ahead. What shall we offer to the sacred? Two vessels of food. (The I Ching, or Book of Changes – Yi Jing I. 41.)

In the *Yijing* text, we can also find “二 *er* Two” appears in a lot of binary opposition concepts from the cultural view, such as the spatial and temporal concepts pairs “往来 *wang lai* go and come/ 出入 *chu ru* exit and enter/ 进退 *jin tui* advance and retreat/ 上下 *shang xia* up and down/ 外内 *wai nei* outside and inside/ 远近 *yuan jin* far and near/ 东西 *dong xi* east and west/ 南北 *nan bei* south and north/ 日月 *ri yue* sun and moon/ 昼夜 *zhou ye* day and night/ 始终 *shi zhong* beginning and end”. In ancient, the ancestor lives in a world of duality (二元 *eryuan*). For the length of the article, this point is not my focus in this paper, there is no specific analysis about it, I will discuss this point in the future.

三 *san* Three

The number ‘three’ is the most commonly used in the *Yijing* text. “三 *san* Three” appears 21 times, besides the cases like “六三 *liu san* and 九三 *jiu san*” at the beginning of every *yao ci* in example (6).

The number ‘three’ is generally used to refer to “more or the majority”, which may be related to the origin of the ancient number (The 八卦 *bagua* is made of numeral notion “one, two and three”, ‘three’ is the maximum number). This will be further explained in the future and evidence has to be given for the proposal that in Chinese ancient history counting only went up to the number ‘three’. There are many instances of higher numbers in the Early Archaic Chinese literature. Usually, if the numbers “two or three” together are attested in an archaic Chinese text, they can have the indeterminate meaning “some”. When the ancestors began to learn to use abstract numbers to express numeral notions, the number they could count was only “one, two, and three”. The number more than three can only be expressed by “multiple or lots of”. It can be seen that the notion ‘three’ should be a fairly large number at that time, indicating the “majority”. The ‘three’ does not refer to “实数 *shishu* a

specific or real number”, but always “虚数 *xushu* a virtual or imaginary number” in the *Yijing*, which is closely connected with “虚指 *xuzhi* the empty reference”. We can identify this point in later studies. The number ‘three’ is mainly used in these situations of the *Yijing* text, and we can find the following semantic representations of number ‘three’.

Before temporal nouns

三岁 *sansui* three years old 5 times (like examples 6, 7, 8, 9 and 10)

三年 *sannian* three years 2 times (like examples 11 and 12)

三日 *sanri* three days 5 times (like examples 13, 14, etc.)

三百户 *saibaihu* three hundred households 1 time (like example 15)

(6) 同人·九三，伏戎于莽，升其高陵，三岁不兴。

Tóng rén · jiǔ sān, fú róng yú mǎng, shēng qí gāo líng, sān suì bú xìng.

Nine three, hide army in hill, climb up the high hill, three years NEG march.

Third nine, the Fellows hiding their weapons in the bushes, going up in the high hills [to lay low] and not rising for a long time. (The I Ching, or Book of Changes – Yi Jing I. 13.)

In example (6), “伏戎于莽，升其高陵，三岁不兴。*fú róng yú mǎng, shēng qí gāo líng, sān suì bú xìng.*” means that the soldiers were lurking in the grasshoppers, and some people arbitrarily boarded Gaoling, exposing the target, leading to a big defeat, and no longer starting wars for many years (Liao, 2012, 2015). The so-called “三岁不兴” does not mean that only three years for the defeat, but war can not last for many years.

(7) 坎·上六，系用徽绳，真于丛棘，三岁不得，凶。

Kǎn · shàng liù, xì yòng huī shéng, zhēn yú cóng jí, sān suì bú dé, xiōng.

Top six, tie use cord rope, place among thorny bush, three years NEG gain, woe.

Topmost six, tied up with rope and cord and placed among thorny bushes, for three years not achieving [anything]. This is bad. (The I Ching, or Book of Changes – Yi Jing I. 29.)

(8) 困·初六，臀困于株木，入于幽谷，三岁不覿。

Kùn · chū liù, tún kùn yú zhū mù, rù yú yōu gǔ, sān suì bú dí.

Beginning six, buttocks stocked in woods, step into deep valley, three years NEG meet.

First six, your buttocks are sore from sitting alone for a very long time on a tree-stump in a secluded valley. (The I Ching, or Book of Changes – Yi Jing I. 47.)

(9) 渐·九五，鸿渐于陵，妇三岁不孕，终莫之胜，吉。

Jiàn · jiǔ wǔ, hóng jiàn yú líng, fù sān suì bú yùn, zhōng mò zhī shèng, jí.

Nine five, wild goose gradually towards the hillock, woman three years NEG pregnant, final no one MOD win, weal.

Fifth nine, the wild goose gradually advances towards the hillock. The woman is not pregnant for three years, but in the end nothing can hinder it and all will be well. (The I Ching, or Book of Changes – Yi Jing I. 53.)

As illustrated in example (9) “鸿渐于陵，妇三岁不孕，终莫之胜，吉。*Hóng jiàn yú líng, fù sān suì bú yùn, zhōng mò zhī shèng, jí.*” means that *Hongyan* gradually entered the hill; the wife was difficult to fall pregnant for many years, but in the end no one could stop her from getting pregnant, fortune (Liao, 2012, 2015). “三岁不孕” is not to say that only three years of infertility, in the fourth year she was pregnant, but that falling pregnant is difficult, for many years she could not fall pregnant.

(10) 丰·上六，丰其屋，部其家，闚其户，阒其无人，三岁不覿，凶。

Fēng · shàng liù, fēng qí wū, bù qí jiā, pǔ qí hù, qù qí wú rén, sān suì bú dí, xiōng.

Top six, award his home, open his door, peep his window, hear MOD no one, three years NEG see, woe.

Topmost six, abundance to a degree where the [luxury] of your house is screening off the [outside world]. It is bad if you peer into the house and it is quiet with no people, and there has been no one visiting for a long time. (The I Ching, or Book of Changes – Yi Jing I. 55.)

There are some commentaries of the ancient Chinese literature that support the theory that ‘three years’ is sometimes interpreted as ‘a long time’ and sometimes as ‘three years’, like the evidence in example (11).

(11) 既济·九三，高宗伐鬼方，三年克之，小人勿用。

Jì jì · jiǔ sān, gāo zōng fá guǐ fāng, sān nián kè zhī, xiǎo rén wù yòng.

Nine three, GAO ZONG attack GUIFANG, three years win it, small men NEG use.

Third nine, King Wu Ding attacked the devil's land and could do it in three years; [for such a task] less capable men cannot be used. (The I Ching, or Book of Changes – Yi Jing I. 63.)

Here, there is still a conflict view about “three years” in example (11), since Wang Bi (226-249) and Kong Yingda (574-648), people think that it is really three years (specific usage) (Lin, 1999), but there is no convincing evidence. According to the book 今本竹书纪年 *Jin Ben Zhu Shu Ji Nian*, “武丁三十二年伐鬼方，次于荆，三十四年，王师克鬼方，氏羌来宾。 *Wǔdīng sānshí'èr nián fá guǐ fāng, cì yú jīng, sānshísi nián, wángshīkè guǐ fāng, dī qiāng lái bīn*”, from “三十二年 thirty two years to 三十四年 thirty four years”, it is just “three years” (Gao, 2007).

However, Yao Peizhong (1792-1844) of the Qing Dynasty had already pointed out that the book 今本竹书纪年 *Jin Ben Zhu Shu Ji Nian* is also based on Shijing and Yijing (Yao, 1995). That is to say, the idea of 今本竹书纪年 *Jin Ben Zhu Shu Ji Nian* can not be found in the 古本竹书纪年 *Gu Ben Zhu Shu Ji Nian*, which is compiled from the texts of 既济 *Ji Ji* in the *Yi Jing* and 荡 *Dang* in the *Shi Jing*. It is invalid for Yao's statement from “三十二年 thirty two years to 三十四年 thirty four years”.

Cheng (2011) analyzed and compared various aspects of the system, volume, year, text, academic, quotation, compilation, engraving, and calendar. He held that 今本竹书纪年 *Jin Ben Zhu Shu Ji Nian* is developed from the 古本竹书纪年 *Gu Ben Zhu Shu Ji Nian* (when it is lost, missing some parts), so we can not only judge “三年” is just counting from “三十二年 thirty two years” to “三十四年 thirty four years”.

(12) 未济·九四，贞吉，悔亡。震用伐鬼方，三年有赏于大国。

Wèi jì · jiǔ sì, zhēn jí, huǐ wáng. zhèn yòng fá guǐ fāng, sān nián yǒu shǎng yú dà guó.

Nine four, persist weal, regret to lose (trouble gone). Rouse use attack devil's land, three years have reward by a great country.

Fourth nine, correct things for the better then regret will vanish. Use great power when attacking the Devil's land. It may take three years, but then you will have the reward of a greater country. (The I Ching, or Book of Changes – Yi Jing I. 64.)

(13) 明夷·初九，明夷于飞，垂其翼；君子于行，三日不食。有攸往，主人有言。

Míng yí · chū jiǔ, míng yí yú fēi, chuí qí yì; jūn zǐ yú háng, sān rì bú shí. yǒu yǒu wǎng, zhǔ rén yǒu yán.

Beginning nine, Ming yi at fly, left down its wing. Gentleman at behavior, three days NEG eat. Have go on, master have words to say.

First nine, [While on a campaign] to enlighten barbarians, [although progressing like if you were] flying [you should] lower your wings [and come down]. While the wise person is walking for three days he doesn't eat because he has a set goal. However, his landlady has something to say [about not eating her food]. (The I Ching, or Book of Changes – Yi Jing I. 36.)

Here, “三日不食 Not eating for three days” in example (13) does not mean that there are only three days not eating, but there are many days eating nothing or not eating for many days. The “three days” here is not “实指 *shizhi*” (actual or specific usage), but expressing the meaning of “many days”.

(14) 巽·九五，贞吉，悔亡，无不利，无初有终。先庚三日，后庚三日，吉。

Xùn · jiǔ wǔ, zhēn jí, huǐ wáng, wú bú lì, wú chū yǒu zhōng. xiān gēng sān rì, hòu gēng sān rì, jí.

Nine five, persist weal, regret lose, without NEG benefit, without beginning have end. Before Geng three days, after Geng three days, weal.

Fifth nine, correct things for the better; then regret disappears and all is beneficial. Not much of a beginning but there will be an end. Allow three days before the seventh day and three days after; this way things turn out good. (The I Ching, or Book of Changes – Yi Jing I. 57.)

(15) 讼·九二，不克讼，归而逋其邑人三百户，无眚。

Sòng · Jiǔ'èr, bù kè sòng, guī ér bū qí yì rén sān bǎi hù, wú shěng.

Nine two, NEG bring down lawsuits, return and leave away, the other people were arbitrarily [three]hundred, no problem.

Second nine, one cannot engage in conflict; One returns home, gives way. The people of his town, three hundred households, remain free of guilt. (The I Ching, or Book of Changes – Yi Jing I. 06.)

Since the *Yijing* era in Zhou Dynasty, ancient people have always used ‘three’ to express and describe the temporal notions “years, ages and days, etc” like examples from (6) to (14). As they have used any other number from two to nine, too in combination with “年 *nian* year, 岁 *sui* year, 日 *ri* day.” The number ‘ten’ is also frequently attested. The number ‘three’ is indeed apparently slightly more frequent, which might be due to the fact that it possibly can also express “some, a few” (but the detail about this has not been argued for in this article, maybe in future). We can also identify this in other ancient texts, such as the *Shijing*, etc.

Before spatial nouns

三驱 *sanqu* three sides 1 time (like example 16)

(16) 比·九五，显比。王用三驱，失前禽，邑人不诫，吉。

Bi · Jiǔwǔ, xiǎn bǐ. Wáng yòng sān qū, shī qián qín, yì rén bù jiè, jí.

Nine five, significantly better. King use three drive, lost front poultry, citizen people NEG warn, fortune.

Fifth nine, manifestation of holding together. In the hunt the king uses beaters on three sides only, and foregoes game that runs off in front. The citizens need no warning. Good fortune. (The I Ching, or Book of Changes – Yi Jing I. 08.)

In this example, the number “三” and the spatial noun “驱” can be combined together, forming a compound word, “三驱 *sanqu*” here means “three sides”, which also belongs to the spatial notion in general.

Before the other nouns

三人 *sanren* three persons 2 time (like example 17 and 18)

三狐 *sanhu* three foxes 1 time (like example 19)

三品 *sanpin* three kinds 1 time (like example 20)

(17) 需·上六，入于穴，有不速之客三人来，敬之，终吉。

Xu · Shàng liù, rù yú xué, yǒu bùsùzhīkè sān rén lái, jìngzhī, zhōng jí.

Top six, enter into the hole, there are uninvited guests [three] people come, respect, finally fortune.

Topmost six, one falls into the pit. Three uninvited guests arrive. Honor them, and in the end there will be good fortune. (The I Ching, or Book of Changes – Yi Jing I. 05.)

(18) 损·六三，三人行，则损一人；一人行，则得其友。

Sun · Liù sān, sān rénxíng, zé sǔn yīrén; yīrén xíng, zé dé qí yǒu.

Six three, three people walk will lose one person, and one person walk will gain a friend.

Third six, when three people journey together, their number decreases by one. When one man journeys alone, he finds a companion. (The I Ching, or Book of Changes – Yi Jing I. 41.)

Here in examples (17) and (18), “三 three” in “三人 *san ren* three persons” refer to the usage of an attribute, expressing the number of people.

(19) 解·九二，田获三狐，得黄矢，贞吉。

Jiě · Jiǔ'èr, tián huò sān hú, dé huáng shǐ, zhēn jí.

Nine two, field won three foxes, got yellow arrow, persist fortune.

Second nine, one kills three foxes in the field, and receives a yellow arrow. Perseverance brings good fortune. (The I Ching, or Book of Changes – Yi Jing I. 40.)

(20) 巽·六四，悔亡，田获三品。

Xun · Liùsì, huǐ wáng, tián huò sānpǐn.

Six four, regret lose, field won three products.

Fourth six, remorse vanishes. During the hunt, three kinds of game are caught. (The I Ching, or Book of Changes – Yi Jing I. 57.)

Most of the cardinal words like “三” in these examples are directly used as an attribute of the nouns or the adverbials of the verbs, there are no classifiers between the cardinal words and the nouns.

Before the verbs, it mainly expresses times.

三褫 *sanchi* deprive three or many times 1 time (like example 21)

三锡 *sanxi* bestow three or many times 1 time (like example 22)

三接 *sanjie* meet three or many times 1 time (like example 23)

三就 *sanjiu* three or many times can complete 1 time (like example 24)

The construction “三+V” here can be closely related to the adverbials of the verbs, which is a very special category in ancient. To express the times of the action, the ancient people like using the numeral before the verbs. Examples (21)-(24) are powerful pieces of evidence that can identify the adverbials of the verbs in ancient Chinese, especially in the early *Yijing* era.

(21) 讼·上九，或锡之鞶带，终朝三褫之。

Sòng · shàng jiǔ, huò xī zhī qìng dài, zhōng zhāo sān chǐ zhī.

Top nine, someone bestow you the belt, whole day three times deprive.

Topmost nine, someone bestows on you a fine ceremonial belt, but before noon you will be deprived of it three times. (The I Ching, or Book of Changes – Yi Jing I. 06.)

One thing we should note is that we should properly distinguish between the Archaic language of the *Yijing* (with strata of Early Archaic and Late Archaic Chinese, depending on the sections) and later stages of Chinese. For example, “或 *huo*” in example (21) means “someone”, the first attestation of “或 *huo*” according to *Gudai Hanyu xuci cidian* is in *Lunheng*, (1st c. CE), i.e. in the Early Middle Chinese.

(22) 师·九二，在师中，吉，无咎。王三锡命。

Shī · Jiǔ'èr, zài shī zhōng, jí, wú jiù. Wángsānxī mìng.

Nine two, in the army, fortune, not have blame. King three bestow life.

Second nine, in the midst of the army. Good fortune. No blame. The king bestows a triple decoration. (The I Ching, or Book of Changes – Yi Jing I. 07.)

(23) 晋卦辞：康侯用锡马蕃庶，昼日三接。

Jìn · guà cí: kāng hóu yòng xī mǎ fān shù, zhòu rì sān jiē.

Kanghou use horses breed a multitude, day and night three times meet.

Progress is similar to when the Marquis Kang used the horses he was bestowed with, to breed a multitude. He mated horses three times every day. (The I Ching, or Book of Changes – Yi Jing I. 35.)

(24) 革·九三，征凶，贞厉。革言三就，有孚。

Ge · Jiǔ sān, zhēng xiōng, zhēn lì. Gé yán sān jiù, yǒu fú.

Nine three, force misfortune, persist stern. The remarks [three] finish, have belief.

Third nine, starting brings misfortune. Perseverance brings danger. When talk of revolution has gone the rounds three times, one may commit himself, and men will believe him. (The I Ching, or Book of Changes – Yi Jing I. 49.)

“三Three” in these four examples from (21) to (24) all refer to the usages of adverbials, indicating the number or times of actions.

The other cases

Combining “再 *zai* again” and “三 *san* three” together can be considered as temporal adverb in ancient Chinese. For example, in example (25) “再三渎 *zai san du*” can be interpreted as the meaning “importunes two or three times”.

(25) 蒙卦：蒙，亨，匪我求童蒙，童蒙求我，初筮告，再三渎，渎则不告，利贞。

Méng, hēng, fěi wǒ qiú tóngméng, tóngméng qiú wǒ, chū shì gào, zàisān dú, dú zé bù gào, lì zhēn.

Meng, Heng, not me asking for a child, a child asking for me, first divination report, and three importunes, importune but will NEG instruct, benefit persistence.

Meng, there will be progress and success. I do not (go and) seek the youthful and inexperienced, but he comes and seeks me. When he shows (the sincerity that marks) the first recourse to divination, I instruct him. If he applies a second and third time, that is troublesome; and I do not instruct the troublesome. There will be an

advantage in being firm and correct. (The I Ching, or Book of Changes – Yi Jing I. 04.)

What is more, we can find the other cultural number notion like “鼎 *ding* tripod” in the *Yijing*, which can indicate the numeral notion ‘three’, expressing stability, peaceful and good fortune in terms of the tripod’s physical features.

Generally, for a long time the notion ‘three’ is an important number in ancient (Wu, 1995, 2013; Zhang, 1999; Du, 2006, etc.). The specific examples are like the explanations from (6) to (25). 老子 *Laozi* once mentioned that “Dao generates one, one generates two, two generates three, three generates everything in the world.” Early in Zhou dynasty, we can also find ‘three’ can express the meaning of “many or majority”, and just as in the ancient works 国语 *guoyu* “人三为众, 兽三为群。 *Rén sān wèi zhòng, shòu sān wèi qún.*”, that is, three persons can be called as “众 *zhong* public or mass”, three animals can be called as “群 *qun* a group”.

Cardinal number word ‘three’ can express non-referential meaning like “few” and “more” in the above examples. From the *gua* graphs (卦象 *gua xiang*) we can find that, for eight basic *gua*, every *gua* is made up of three *yao*, and every two basic *gua* can form into one of 64 *gua* (made up of six *yao*) by overlapping, in this way we can get 64 *gua* (64 *gua* can help us know the whole changing world), and here a model or notion “three can produce everything” is obvious.

“四 *si* Four” only appears at the beginning of every *yao ci* or *yao* statement, for example, “六四 *liu si*, 九四 *jiu si*”. “五 *wu* Five” also only appears at the beginning of every *yao ci*, for example, “六五 *liu wu*, 九五 *jiu wu*”, “六 *liu* Six” at the beginning of every *yao ci*. In one word, these three numbers “四五六 four five six” only appear at the beginning part of every *yao* statement (爻题 *yaoti*), for example,

(20) 巽·六四, 悔亡, 田获三品。

Xun · Liùsì, huǐ wáng, tián huò sānpǐn.

Six four, regret death, field won three products.

Fourth six, remorse vanishes. During the hunt, three kinds of game are caught. (The I Ching, or Book of Changes – Yi Jing I. 57.)

However, we should note that the number ‘four’ appears regularly in the contemporary texts *Shijing* and the old parts of *Shujing*; additionally, the number is attested in “four seasons”, “four directions”, “four states”, and independently. Although the number ‘five’ appears mostly in the mentioned combinations in the *Yijing*, there are exceptions, and it regularly appears in other contemporary texts.

七 *qi* Seven

“七 *qi* seven” in the *Yijing* appears three times. They are mainly expressed by “七日 *qiri* seven days” like example (26), (27) and (28). In terms of rules in the *Yijing*, every six *yao* can form into one of 64 *gua*, the ‘seven’ can represent another new beginning to some extent, the new beginning of one cycle, so here “七日 *qiri* seven days” is not referring to the specific seven days, but a period of time or a cycle. This point was also identified by Ma (1999), who believed that the empty reference of ‘seven’ is based on the ancient concept “seven is a cycle of changing things.” As a new beginning of one cycle, ‘seven’ also represents a “满数 *manshu* full number”, so it is used to mean “more”.

(26) 震·六二, 震来厉, 亿丧贝。跻于九陵, 勿逐, 七日得。

Zhèn · liù èr, zhèn lái lì, yì sàng bèi, jī yú jiǔ líng, wù zhú, qī rì dé.

Six two, thunder come strong, billion lose treasure, surpass at Mount Jiuling, NEG look for, seven days gain.

Second six, thunder is coming; it can be dangerous [but only one in] a million would strike us. It is just like if you lose some money, then just climb over nine hills not seeking it; after seven days you will get [money again]. (The I Ching, or Book of Changes – Yi Jing I. 51.)

Here “震来厉, 亿丧贝。跻于九陵, 勿逐, 七日得。 *zhèn lái lì, yì sàng bèi, jī yú jiǔ líng, wù zhú, qī rì dé*” means that “Thunder comes suddenly, there will be danger, it is estimated that it will lose money; climb and look up, do not take care of it, and soon the lost things will return back.” (Liao, 2012, 2015). Judging from the calmness of “勿逐 *wu zhu* Do not follow”, “Seven Days” means that time is not so long, and it doesn’t last long. It’s only a few days, but not necessarily for seven days.

(27) 既济·六二, 妇丧其茀, 勿逐, 七日得。

Jì jì · liù èr, fù sàng qí bó, wù zhú, qī rì dé.

Six two, a woman loses her ornament, NEG look for, seven days gain.

Second six, the woman loses her carriage curtain but she should not look for it, she will get [another] after a few days. (The I Ching, or Book of Changes – Yi Jing I. 63.)

As illustrated in example (27), “妇丧其茀，勿逐，七日得。*fù sàng qí bó, wù zhú, qī rì dé.*” means that the woman lost her jewelry and didn’t have to pursue it. It will be recovered and gained again in a few days. (Liao, 2012, 2015) “Seven days” here cannot be identified to be specific or real points (实数 *shishu*). On the contrary, it is just referring to the general seven days, and it should be a few days or many days. What is more, “七 seven” in these two examples all belong to the usage of an attribute, expressing the number of times.

(28) 复卦辞：复，亨。出入无疾，朋来无咎。反复其道，七日来复，利有攸往。

Fù guà cí: fù, hēng, chū rù wú jí, péng lái wú jiù. fǎn fù qí dào, qī rì lái fù, lì yǒu yǒu wǎng.

Fu, smooth, out and in no illness, friends come not have a disaster. Repeat again this rule, seven days come to return, good for go towards.

Returning [from a journey] that went well; you went out and came back unharmed. When friends have come and all went well, they turn back and return to their own way. Then, after seven days they return again. It is beneficial to have a destination to go towards. (The I Ching, or Book of Changes – Yi Jing I. 24.)

As illustrated in example (28), “七日来复” means I will reply in a few days. It is not the specific usage expressing “seven days”, just indicates that “time is not long”.

八 *ba* Eight

“八 *ba* eight” in the *Yijing* appears one time like in example (29). It is mainly represented by the language expression “八月 *bayue* August”.

(29) 临卦辞：元亨，利贞。至于八月有凶。

Lín guà cí: yuán hēng, lì zhēn. zhì yú bā yuè yǒu xiōng.

Very smooth, benefit harmony. Arrive in August have misfortune.

To oversee [things] is a basic requirement of making things go well. It will be beneficial to [ensure that everything] is correct. Otherwise, when the eighth month arrives there will be misfortune [of a bad harvest]. (The I Ching, or Book of Changes – Yi Jing I. 19.)

Here “八 *ba* eight” is the ordinary number, which expresses “the eighth”, in this vein “八月” is the usage of 实指 *shizhi* real reference, but not representing the eighth month in the whole year. Ancient “eighth month” does not correspond directly to “August”. The months are counted according to the respective ancient calendar. The “eighth month” is associated with “autumn”. We should not associate the month with its modern equivalent.

九 *jiu* Nine

Besides the cases like “初九 first nine, 九二 second nine, 九三 third nine, 九四 fourth nine, 九五 fifth nine, 上九 top nine.” “九 *jiu* nine” appears only one time like example (30) in the *Yijing* text. It is mainly represented by language expression “九陵 *jiuling* nine hills”.

(30) 震·六二，震来厉，亿丧贝。跻于九陵，勿逐，七日得。

Zhèn · liù èr, zhèn lái lì, yì sàng bèi. jī yú jiǔ líng, wù zhú, qī rì dé.

Six two, thunder come strong, billion lose treasure, surpass at Mount Jiuling, NEG look for, seven days gain.

Second six, thunder is coming; it can be dangerous [but only one in] a million would strike us. It is just like if you lose some money, then just climb over nine hills not seeking it; after seven days you will get [money again]. (The I Ching, or Book of Changes – Yi Jing I. 51.)

In this example, “九陵 *jiuling* nine hills” does not refer to the only nine hills (specific number), but refer to many hills (vague number), which is the usage of “虚指 *Xuzhi*”. “十 *shi* ten” in the *Yijing* has the same usage.

十 *shi* Ten

“十 *shi* ten ” appears five times. They are mainly represented by “十年 *shinian* ten years” and “十朋 *shipeng* ten money units” like examples from (31) to (35).

(31) 屯·六二，屯如遭如，乘马班如，匪寇，婚媾，女子贞，不字，十年乃字。

Tún · liù èr, tún rú zhān rú, chéng mǎ bān rú, fěi kòu, hūn gòu, nǚ zǐ zhēn, bú zì, shí nián nǎi zì.

Six two, village RU no move forward, carry horse carriage separate RU, bandit and suitors, girl persist, NEG marry, ten years will marry.

Second six, [He tries to] build up [her confidence in him] by driving around [her] in a horse carriage. Although he is not a bandit but a suitor, a woman acting correctly will not agree [because of his behavior], but after a long time she will. (The I Ching, or Book of Changes – Yi Jing I. 03.)

Here “女子贞，不字，十年乃字。 *nǚ zǐ zhēn, bú zì, shí nián nǎi zì.*” in example (31) means that the woman was always not pregnant, and she did not have children for a long time after marriage. After many years, and finally, she gave birth to a child. The “十年 decade” here does not represent the tenth year. It only means a long time to express “不字 *buzì*”.

(32) 复·上六，迷复，凶，有灾眚。用行师，终有大败，以其国君凶，至于十年不克征。

Fù · shàng liù, mí fù, xiōng, yǒu zāi shěng. yòng háng shī, zhōng yǒu dà bài, yǐ qí guó jun xiōng, zhì yú shí nián bú kè zhēng.

Top six, lost return, woe, have disaster. Use march army, final have great defeat, cause MOD the country's lord woe, arrive in ten years NEG march and fight.

Topmost six, if you return [to the battle ground] with an unfocused [attack], it will go badly. If there is a natural disaster or an eclipse and the army is being sent forth [in spite of this], it will end with a great defeat caused by the country's lord [who gave the order]. This will be bad; for a very long time you cannot attack. (The I Ching, or Book of Changes – Yi Jing I. 24.)

In this example (32), the expression “迷复，凶，有灾眚。用行师，终有大败；以其国，君凶，至于十年不克征。 *mí fù, xiōng, yǒu zāi shěng. yòng háng shī, zhōng yǒu dà bài, yǐ qí guó jun xiōng, zhì yú shí nián bú kè zhēng.*” means losing the right path and returning, there will be danger and disaster. Combating will eventually be defeated. When governing the country, the monarch is in danger and the national strength cannot be restored for a long time. The so-called “十年不克征” here expresses the slogan of “迷复” and means not been able to fight for many years. “Ten years” here is not the specific usage (not referring to the specific ten years), but it just means a long time.

(33) 颐·六三，拂颐，贞凶，十年勿用，无攸利。

Yí · liù sān, fú yí, zhēn xiōng, shí nián wù yòng, wú yǒu lì.

Six three, clear nourishment, suffer woe, ten years NEG use, no good benefit.

Third six, clearing a path to where the nourishment is, [may be considered] correct but is still not good to do because [out there] you can accomplish nothing for a very long time, [and there is really] nothing much to find [on the hill]. (The I Ching, or Book of Changes – Yi Jing I. 27.)

As illustrated in example (33), here “拂颐，贞，凶，十年勿用，无攸利。 *fú yí, zhēn xiōng, shí nián wù yòng, wú yǒu lì.*” means that there is no need to support the nourishment, persisting not changing, there will be sinister dangers, and it will not do anything for many years. There is also no benefit. (Liao, 2012, 2015) The “ten years” here also means a long time for “勿用 *wu yong* do not use”, not saying that it is just ten years. Therefore, the “ten years” in these three examples express the meaning of “many years” or “long time”, which is not the specific ten years.

(34) 损·六五，或益之十朋之龟，弗克违，元吉。

Sǔn · Liùwǔ, huò yì zhī shí péngzhī guī, fú kè wéi, yuánjí.

Six five, or increase MOD ten Peng MOD turtle, not oppose, Yuan fortune.

Fifth six, someone does indeed increase him. Ten pairs of tortoises cannot oppose it. Supreme good fortune. (The I Ching, or Book of Changes – Yi Jing I. 41.)

(35) 益·六二，或益之十朋之龟，弗克违。永贞吉。王用享于帝，吉。

Yì · liù èr; huò yì zhī shí péngzhī guī, fú kè wéi. Yǒng zhēn jí. Wáng yòng xiāng yú dì, jí.

Six two, or increase MOD ten Peng MOD turtle, not oppose. Permanent perseverance fortune. King use enjoy YU god, fortune.

Second six, someone does indeed increase him; Ten pairs of tortoises cannot oppose it. Constant perseverance brings good fortune. The king presents him before God. Good fortune. (The I Ching, or Book of Changes – Yi Jing I. 42.)

From the interpretations of these five examples from (31) to (35), we can find that “十年 *shinian* ten years” and “十朋 *shipeng* ten money units” are not the specific number usages. “十年 *shinian* ten years” indicate a long time, and “十朋 *shipeng* ten money units” indicate a lot of money. Overall, this study claims that “Ten” and

“Hundred” do not simply mean “many” meaning, but also “complete” and “full or total”, etc.

百 *bai* hundred

“百 *bai* hundred” as numeral word appears two times. “三百户 *sanbaihu* three hundred households” and “百里 *baili* a hundred miles” in examples (36) and (37) are the main linguistic representations, which actually refer to “many” in terms of the context.

(36) 讼·九二，不克讼，归而逋其邑人三百户，无眚。

Sòng · Jiǔ'èr, bù kè sòng, guī ér bū qí yìrén sān bǎi hù, wú shěng.

Nine two, NEG bring down lawsuits, return and leave away, the other people were arbitrarily three hundred, no problem.

Second nine, one cannot engage in conflict; One returns home, gives way. The people of his town, three hundred households, remain free of guilt. (The I Ching, or Book of Changes – Yi Jing I. 06.)

(37) 震卦：亨，震来虩虩，笑言哑哑，震惊百里，不丧匕鬯。

Zhèn guà: Hēng, zhèn lái xì xì, xiào yán yā yā, zhèn jīng bǎi lǐ, bù sàng bǐ chāng.

Heng, shock come Xixi, laugh word dumb, shocked hundreds of miles, NEG lost spoon and chalice.

SHOCK brings success. Shock comes—oh, oh! Laughing words—ha, ha! The shock terrifies for a hundred miles, and he does not let fall the sacrificial spoon and chalice. (The I Ching, or Book of Changes – Yi Jing I. 51.)

Here in appearance “三百户 *sanbaihu* three hundred households” refers to the specific numeral while “百里 *baili* a hundred miles” refers to large numeral, but both of them actually refer to “many” or “majority”.

亿 *yi* hundred million

“亿 *yi* hundred million” appears two times. “亿丧贝 *yi sang bei* lose hundred millions of money” and “亿无丧 *yi wu sang* not lose billions” in examples (38) and (39) are the main linguistic representations.

(38) 震·六二，震来厉，亿丧贝。跻于九陵，勿逐，七日得。

Zhèn · liù èr, zhèn lái lì, yì sàng bèi. jī yú jiǔ líng, wù zhú, qī rì dé.

Six two, thunder comes strong, **hundred million** lose treasure, surpass at Mount Jiuling, NEG look for, seven days gain.

Second six, Thunder is coming; it can be dangerous [but only one in] a million would strike us. It is just like if you lose some money, then just climb over nine hills not seeking for it; after seven days you will get [money again]. (The I Ching, or Book of Changes – Yi Jing I. 51.)

(39) 震·六五，震往来厉，亿无丧，有事。

Zhèn · liù wǔ, zhèn wǎng lái lì, yì wú sàng, yǒu shì.

Six five, thunder go come strong, **hundred million** no lose, have something.

Fifth six, the thunder was strong. No big loss is expected, but you will have something to do. (The I Ching, or Book of Changes – Yi Jing I. 51.)

“1, 2, 3, 4, 5, 6, 7, 8, 9 and 0”, these are ten numeral symbols which all peoples use to record numbers, symbolize the world-wide victory of an idea. For Chinese numerals or number signs, there are two kinds: small (一、二、三、四、五、六、七、八、九、十) and capital numeral (壹、贰、叁、肆、伍、陆、柒、捌、玖、拾. **We can also find numerals in capitals of Chinese characters (大写 *daxie*)**, but sometimes not referring to numeral notions in terms of the specific context like “陆(六) *liu* six”. “贰(二) *er* two” appears only one time like in example (40). In this example, “贰 *er*” refers to the number “二 *er*”, which expressed the numerical notion “簋贰 two bowls of rice”.

(40) 坎·六四，樽酒、簋贰、用缶。纳约自牖，终无咎。

Kǎn · liù sì, Zūn jiǔ guǐ èr, yòng jiǔ, nà yuē zì yǒu, zhōng wú jiù.

Six four, Zun wine, Gui two bowls of rice, using hit, send in and out from window, finally not have blame.

Fourth six, a jug of wine, a bowl of rice with it; Earthen vessels, simply handed in through the window. Finally, there is certainly no blame in this. (The I Ching, or Book of Changes – Yi Jing I. 29.)

“贰 *er*” here in ancient Chinese can also be interpreted as the predicator usage. “陆(六) *liu* six” appears three times like examples from (41) to (43).

(41) 夬·九五，菟陆夬夬，中行无咎。

Guài · Jiǔwǔ, Xiàn lù guài guài, zhōngxíng wú jiù.

Nine five, xiàn Lu resolute in the line not have blame.

Fifth nine, in dealing with weeds, firm resolution is necessary. Walking in the middle remains free of blame. (The I Ching, or Book of Changes – Yi Jing I. 43.)

(42) 渐·九三，鸿渐于陆，夫征不复，妇孕不育，凶。利御寇。

Jian · Jiǔ sān, Hóng jiàn yú lù, fū zhēng bù fù, fù yùn bù yù, xiōng. Lì yù kòu.

Nine three, Hong gradually in the land, husband march NEG recover, maternal pregnancy infertility, fierce. Benefit fight off robbers.

Third nine, the wild goose gradually draws near the plateau. The man goes forth and does not return. The woman carries a child but does not bring it forth. Misfortune. It furthers one to fight off robbers. (The I Ching, or Book of Changes – Yi Jing I. 53.)

(43) 渐·上九，鸿渐于陆，其羽可用为仪，吉。

Jian · Shàng jiǔ, Hóng jiàn yú lù, qí yǔ kěyòng wèi yí, jí.

Top nine, Hong gradually in the land, its feathers can be used as an instrument, fortune.

Topmost nine, the wild goose gradually draws near the cloud heights. Its feathers can be used for the sacred dance. Good fortune. (The I Ching, or Book of Changes – Yi Jing I. 53.)

In the above three examples, all the “陆 *lu*” are not the numeral usages, for in example (41) “菟陆” is one kind of plant in ancient, and “陆 *lu*” in examples (42) and (43) often refer to the land.

The other numeral notions in the *Yijing* (Besides the pure numbers)

众 *zhong* mass

(44) 晋·六三，众允，悔亡。

Jin · Liùsān, zhòng yǔn, huǐ wáng.

Six three, the public, regret.

Third six, all are in accord. Remorse disappears. (The I Ching, or Book of Changes – Yi Jing I. 35.)

群 *qun* group

(45) 乾·用九，见群龙无首，吉。

Qian · Yòng jiǔ, jiàn qún lóng wú shǒu, jí.

With nine, see the group dragon without a head, fortune.

When all the lines are nines, it means: There appears a flight of dragons without heads. Good fortune. (The I Ching, or Book of Changes – Yi Jing I. 01.)

(46) 涣·六四，涣其群，元吉。涣有丘，匪夷所思。

Huàn · Liùsì, huàn qí qún, yuánjí. Huàn yǒu qiū, fěiyí suǒ sī.

Six four, dissolve his group, supreme fortune. Dispersion has a hill, incredible it is.

Fourth six, he dissolves his bond with his group. Supreme good fortune. Dispersion leads in turn to accumulation. This is something that ordinary men do not think of. (The I Ching, or Book of Changes – Yi Jing I. 59.)

庶 *shu* multitude

(47) 晋卦辞：康侯用锡马蕃庶，昼日三接。

Jìn guà cí: kāng hóu yòng xī mǎ fān shù, zhòu rì sān jiē.

Kanghou use horses to breed a **multitude**, day and night three times meet.

Marquis Kang used the horses he was bestowed with, to breed a **multitude**. He mated horses three times every day. (The I Ching, or Book of Changes – Yi Jing I. 35.)

几 *ji* uncertain number or almost

“月几望 *yue ji wang* Moon **almost** full” and “几不 *ji bu* almost not” is the main linguistic representation like examples (48), (49) and (50).

(48) 小畜·上九，既雨既处，尚德载，妇贞，厉。月几望，君子征凶。

Xiǎo chù · shàng jiǔ, jì yǔ jì chù, shàng dé zǎi, fù zhēn, lì. yuè jǐ wàng, jun zǐ zhēng xiōng.

Top nine, already rain already stays here, good moral carry, woman persists, harmful. Moon almost full, gentleman go on, inauspicious.

Topmost nine, now it has started raining and you have reached a place [to rest], [you should stay here], value for your good deeds. To carry the woman on [through this weather] may seem correct but will be harmful. Furthermore, the moon has just come out, it will be bad for the wise person to go on [at such a late time]. (The I Ching, or Book of Changes – Yi Jing I. 09.)

(49) 中孚·六四，月几望，马匹亡，无咎。

Zhōng fú · liù sì, yuè jǐ wàng, mǎ pǐ wáng, wú jiù.

Six four, moon almost full, horse equipment lose, not have blame.

Fourth six, a group of horses run away when it is nearly full moon, and who can blame them? (The I Ching, or Book of Changes – Yi Jing I. 61.)

Here “月几望” in examples (48) and (49) refer to the notion “nearly full moon”, which expresses vague meaning “uncertain number or almost”.

(50) 屯·六三，即鹿无虞，惟入于林中，君子几不如舍，往吝。

Tūn · liù sān, jí lù wú yú, wéi rù yú lín zhōng, jun zǐ jǐ bú rú shě, wǎng lìn.

Six three, hunt deer no forester, only into forest middle, gentleman if NEG choose to stop, go trouble.

Third six, having gone to hunt deer without a forester. Only coming into the middle of the forest, the wise person begins to realize that it is better to stop. Going on will cause regret. (The I Ching, or Book of Changes – Yi Jing I. 03.)

In the above three examples “几 *ji* uncertain number or almost” means an indefinite number, and its meaning is vague. It is generally necessary to add quantifiers like “望 *wang*” in the back to express fuzzy semantics.

4. Discussion

4.1 The Numerical Cognition in the Yijing

“数始于一，终于十，成于三。Shù shǐ yú yī, zhōngyú shí, chéng yú sān. The number begins with one, ends with ten, and generates with three.” was recorded in 史记·律书 *Shiji·Lǜshu*. This is the most primitive understanding of the numeral for the Chinese ancestors. In their views, the notion ‘three’ is the most basic expression that represents “majority”, commonly used to represent the meaning of “more or many”.

Initially, the ancestors had few numerals and only single digits. These numbers are often encountered in the ancestors’ daily life, and the ancestors have an empirical understanding of these numbers. The entire symbol system of the *Yijing* is based on the simplest and least images, and they are combined in different numbers and ways to form a set of rich and varied sixty-four hexagrams or 卦 *gua*. The “—” and “- -” can be considered as the two basic numeral symbols (representation forms of number) in the *Yijing*, which are used to express the knowledge of changes in the universe. The whole line “—” is considered as the number ‘one’; the broken line “- -” is ‘two’ (two lines); combining the whole line and broken line together (the three lines) is ‘three’. The trigrams made up of three lines, the basis of eight *gua* (八卦 *ba gua*), are the numerical notion of “one, two and three”. Eight 卦 *gua* are made up of three whole horizontal lines (阳爻 *yang yao*) and three broken lines (阴爻 *yin yao*). In this way, eight *gua* are given their names, that is, ☰Qian, ☷Kun, ☱Xun, ☴Zhen, ☵Kan, ☲Li, ☳Dui, and ☶Gen. Sixty-four hexagrams of the *Yijing* are all based on a combination of different variations of the simple symbols “—” and “- -”, which are odd-numbered and even-numbered. The calculation and deduction of numbers is the basis for the formation of these sixty-four *gua*. Six lines (or any two trigrams combinations from the basic eight *gua*) can form one real *gua* of 64 *gua*, and the symbolic system of 64 *gua* is based on the number ‘three’ and ‘six’ in general (one of 64 *gua* is made up of two *gua* of the eight basic *gua*, that is the combination rule. For example, the different combinations of ☰Qian and ☷Kun can form into two *gua* “泰 *tai* and 否 *pi*” of 64 *gua*). The six lines in one *gua* are called six *yao*, according to yin (the core symbol number is six) and yang (the core symbol number is nine), they can be divided into two kinds in general, one is called *yin yao*, from the below line to the above line are like the “初六 *chuliu* first six or six in the first place, 六二 *liu er* second six or six in the second place, 六三 *liu san* third six or six in the third place, 六四 *liu si* fourth six or six in the fourth place, 六五 *liu wu* fifth six or six in the fifth place, 上六 *shang liu* topmost six or six at the top”, while *yang yao* is like “初九 *chujiu* first nine, 九二 *jiu er* second nine, 九三 *jiu san* third nine, 九四 *jiu si* fourth nine,

九五 *jiu wu* fifth nine, 上九 *shang jiu* topmost nine”. (According to Shaughnessy, these identifications only appeared in the 3rd c. BCE.)

All of these in numerical sequence can form into the special symbolic number systems in the *Yijing*, which will appear at the beginning of every 爻辞 *yao ci* or *yao* statements, these special symbolic number systems can be called as 爻题 *yaoti* (hexagram theme). What is more, we can find a lot of the time concept using “Cardinal number + the temporal unit word” construction, such as “三年 *sanian* three years”, “三日 *sanri* three days”, “七日 *qiri* seven days”, “十年 *shinian* ten years”, etc.

By the arrangement of the numbers in 64 *gua* (like the arrangement of the Shanghai Museum and Mawangdui manuscript, etc.), the ancient people observed and probed into the changing rules of the whole world. In ancient China, they divide the numerals from one to ten into two categories, the odd and even. Odd numbers symbolize heaven and positive things, while even numbers symbolize the earth and negative things. It is believed in Chinese traditional cultures that all things are composed of both *yin* and *yang*. Only when *yin* and *yang* meet and match, can we breed everything. At the same time, the development rules of things are based on the concept “一化为二, 二化为四, 四化为八. *Yi huà wéi èr, èr huà wéi sì, sì huà wéi bā*. One changes into two, two into four, four into eight.” The Chinese ancestor admires the even number (also advocating the odd number nine), and regards the even number as the good thing or fortune.

In ancient works, we can also find some other language expression (besides numeral words) can indicate the sequence of numbers. For example, *bagua* in the *Yijing*, the numeral sequence is like the following order, “乾 *qian*、坎 *kan*、艮 *gen*、震 *zhen*、巽 *xun*、离 *li*、坤 *kun*、兑 *dui*”; some use 阴阳 *yin yang* and 五行 *wuxing* five elements to indicate the order like “金 gold、木 wood、水 water、火 fire、土 earth”; some use *guaci* in *Qian* hexagram like “元 *yuan*、亨 *heng*、利 *li*、贞 *zhen*” to express the sequence of number. It is also very common in China to use Heavenly Stems and Earthly Branches to indicate the sequence of numbers. Ten Heavenly Stems 天干十个: 甲 *jia*、乙 *yi*、丙 *bing*、丁 *dīng*、戊 *wu*、己 *ji*、庚 *geng*、辛 *xin*、壬 *ren*、癸 *kui*; Twelve Earthly Branches 地支十二个: 子 *zi*、丑 *chou*、寅 *yin*、卯 *mao*、辰 *chen*、巳 *si*、午 *wu*、未 *wei*、申 *shen*、酉 *you*、戌 *xu*、亥 *hai*. The ten and the twelve match each other, and they are matched and formed into sixty groups, such as “甲子 *Jiazi*、乙丑 *Yichou*、丙寅 *Bingyin*、丁卯 *Dingmao*、戊辰 *Wuchen*”. They are used to indicate the order of the year, month and day, and are often used repeatedly. This method was originally used for counting the day, and later used for the year.

4.2 The Conceptualization about “虚指 *xuzhi*” of the Number in the *Yijing*

In the first volume of *Wang Li Wen Ji*, Wang Li (1984) once divided the numerals into two kinds, one is called the “满数 *manshu* full number”, that is, try to express the meaning of “more”; the other is called the “欠数 *qianshu* less number”, that is, try to express the meaning of “less”. When a number is used for “虚指 *xuzhi*”, it does not mean the actual or specific number, but using a number to indicate the amount (大小 *daxiao* large and small) or how much (多少 *duoshao* more and less). Generally, in the *Yijing* text ‘one’ is opposite to “more or multiple”. It can be seen here that the ‘one’ here means “less”. The ‘three’ is generally used to refer to the “many or majority”, which may be related to the origin of the number. When the ancestors began to learn to use abstract notions to express numbers, the number they could count was only the numerical expression “one, two, and three”. “more than three” can only be expressed by “multiple”. It can be seen that the ‘three’ should be a fairly large number at that time, so ‘three’ is used to indicate the “majority”. The ‘three’ in the *Yijing* does not represent a specific number, but a “虚数 *xushu*” or virtual number. However, the notion ‘three’ can be also used to refer to “minority” in some individual cases. “Four, five, six, seven and eight” can also be an empty reference, expressing the “majority”. ‘Nine’ is the largest single digit in the decimal system. The ancients thought that the number begins with one and ends with nine, so it is customary to use ‘nine’ to indicate the “majority”. ‘Ten’ often refers to the “majority”, too. Since the ancients used fingers for counting in the past, and the decimal system is more common in mathematics. When you encounter a decimal, ‘ten’ is easy to be considered as the meaning of “completely full”. Therefore, the “虚指 *xuzhi*” of ‘ten’ means the “majority”, also including the meaning of “completely full”.

Though the ancient people used the decimal system at that time, one question still remains unanswered here: how did they count from the numeral one to ten? It seems that number in the *Yijing* itself appears in the form of natural philosophy. The number in the *Yijing* is more like a measuring standard of all things. The calculation and deduction of “number” is the basis for the formation and reappearance of the sixty-four *gua* of the *Yijing*, and also the basis for the writing and application of the *Yijing*.

5. Conclusion

Overall, this study has provided insights into the numerical cognition in the *Yijing* text, and their related

knowledge fully demonstrated the situation of the traditional Chinese mathematics from the Western Zhou Dynasty to the Spring and Autumn period. We can find a lot of cardinal numbers in the *Yijing* text, especially at the beginning of each *yaoci* (爻題 name of yao). The present paper evaluates the claim that the numerical representations “三 *san* three”, “七 *qi* seven”, “九 *jiu* nine”, “十 *shi* ten”, and “百 *bai* hundred” in the *Yijing* text are “实数 *shishu*” or exact number in appearance, but their real usages are “虚指 *Xuzhi*” or empty reference and indicates large number (sometimes it can be interpreted as 不定数 *budingshu* indefinite number), which can help us know the numerical cognition and fuzzy thinking in Ancient China. That is, the time quantifiers like “day”, “year”, and “month” are specific, but the cardinal numbers like ‘three’, ‘seven’, ‘nine’ and ‘ten’ are “虚指 *Xuzhi*”, which is also one kind of pragmatic usage about number in the ancient. The mathematics of the pre-Qin period in China lacked more first-hand information, especially the traditional mathematics materials like the decimal system from the Western Zhou Dynasty to the Spring and Autumn Period. The topic of an ancient number system, the exact meaning and usage of the different numbers is, naturally, very interesting, but one question still remains unanswered here: it ought to be discussed at a more theoretical level for a general audience. If the account we developed in this paper is correct, then the numbers in the *Yijing* and related knowledge can fill the gap to some extent.

Acknowledgement

This research was financially supported by The General grant project of Hunan Provincial Social Science Achievements Review Committee in 2019 (Grant Number: XSP19YBZ080) - A Study of Time and Space Language Representation in Ancient China-Taking ShiJing and YiJing as an Example; Humanities and Social Science Fund of Ministry of Education of China in 2017 (Grant Number: 17YJCZH221). The author would like to thank the referees and editors for their valuable comments, and support from CSC in China and CRLAO, Inalco, in France.

There is no conflict of interest to publish this paper in this Journal.

References

- Aczel, A. (1963). *Fermat's Last Theorem: Unlocking the Secret of an Ancient Mathematics problems*. Dedekind, Richard. *Essays on the Theory of Numbers*. New York: Dover.
- Adam, S. (1979). *An introduction to semantics* (Luo Lan and Zhou Yi translated). Beijing: Commercial Press.
- Aristotle. (2003). *The metaphysics* (Miao Litian, translated). Beijing: Renmin University of China Press.
- Baynes, C. F., & Wilhelm, R. (trans.). (1997). *The Yi Ching*. New Jersey: Princeton University Press.
- Cheng, P. S. (2011). A Review of Studies on the Authenticity and Value of the Zhushu jinian. *Research Trends of Chinese History*, 6, 25–30.
- Condry, K. F., & Spelke, E. S. (2008). The development of language and abstract concepts: the case of natural number. *Journal of Experimental Psychology: General*, 137(1), 22–38. <https://doi.org/10.1037/0096-3445.137.1.22>
- Coupe, A. R. (2012). Overcounting numeral systems and their relevance to sub-grouping in the Tibeto-Burman languages of Nagaland. *Language and Linguistics*, 3(1), 193–220.
- Dehaene, S. (1997). *The Number Sense: How the Mind Creates Mathematics*. New York: Oxford University Press.
- Du, Q. (2006). *The cultural semiotics of “Three or four”*. Beijing: International Cultural Publication Press.
- Edward, L. S. (2014). *Unearthing the Changes: Recently Discovered Manuscripts of the Yi Jing (I Ching) and Related Texts*. New York: Columbia University Press. <https://doi.org/10.7312/shau16184>
- Everett, D. L. (2005). Cultural constraints on grammar and cognition in piraha: another look at the design features of human language. *Current Anthropology*, 46(4), 621–646. <https://doi.org/10.1086/431525>
- Frank, M. C., Everett, D. L., Fedorenko, E., & Gibson, E. (2008). Number as a cognitive technology: evidence from pirahã language and cognition. *Cognition*, 108(3), 819–824. <https://doi.org/10.1016/j.cognition.2008.04.007>
- Gao, H. (2007). *The Modern Interpretation of the Ancient Jing of Zhouyi*. Beijing: Zhong Hua Book Company.
- Greville, G. C. (2000). *Number* (Cambridge Textbooks in Linguistics). Cambridge: Cambridge University Press.
- He, C. S. (2015). Recent developments in the studies of the syntax-semantics interface of numerals. *Contemporary Linguistics*, 3, 253–272.

- He, C. S. (2015a). Complex numerals in mandarin Chinese are constituents. *Lingua*, 164, 189–214. <https://doi.org/10.1016/j.lingua.2015.06.014>
- Hofweber, T. (2005). Number determiners, numbers, and arithmetic. *The Philosophical Review*, 114(2), 179–225. <https://doi.org/10.1215/00318108-114-2-179>
- Hong, C. Y. (1979). The Coefficient Structure in ancient Chinese. *Language Teaching and Research*, 2, 115–124.
- Hurford, J. (1975). *The linguistic theory of numerals*. Cambridge: Cambridge University Press.
- Hurford, J. (1987). *Language and number*. Oxford: Blackwell.
- Hurford, J. (2007). A performed practice explains a linguistic universal: Counting gives the Packing Strategy. *Lingua*, 117, 777–783. <https://doi.org/10.1016/j.lingua.2006.03.002>
- Li, X. Q. (2005). Unearthed Artifacts and the Study of Zhou Yi. *Qilu Xuekan*, 2, 5–9.
- Li, Y. (1997). *The Illustrated Book of Changes*. Beijing: Foreign language Press.
- Li, Z. F. (2003). *The Study of Ancient Chinese Grammar*. Beijing: Commercial Press.
- Liao, M. C. (2012). *The Fifteen Lectures on Zhou Yi Jing and Commentary books*. Peking University Press.
- Liao, M. C. (2015). The Imagination and Reality of the Time Expressed in the Zhou Yi's Hexagrams and Liner statements. *The Social Science Front*, 08, 11–18.
- Lin, H. S. (1999). *Explore into Yi and Commentary books· Jiji Hexagram (water and fire)*. Taipei: Culture, History and Philosophy Press.
- Ma, S. Z. (1999). On the Grammaticalization of Numeral Words. *Yuwen Research*, 3, 28–31.
- Menninger, K. (1992). *Number Words and Number Symbols: A Cultural History of Numbers* (Translated by Paul Broneer). New York: Dover.
- Moltmann, F. (2013). Reference to numbers in natural language. *Philosophical Studies*, 162(3), 499–536. <https://doi.org/10.1007/s11098-011-9779-1>
- Nan, H. J. (2011). *The modern interpretation notes and translations of Zhouyi*. Chongqing: Chongqing Press.
- Piazza, M. (2011). Neurocognitive start-up tools for symbolic number representations. In *Space, Time and Number in the Brain* (pp. 267–285). Academic Press. <https://doi.org/10.1016/B978-0-12-385948-8.00017-7>
- Pica, P. C., Lemer, V. I., & Dehaene, S. (2004). Exact and approximate arithmetic in an amazonian indigene group. *Science*, 306(5695), 499–503. <https://doi.org/10.1126/science.1102085>
- Pu, M. Z. (2014). *Zhouyi of Chu Bamboo Books in the Shanghai Museum*. Shanghai: Chinese and Western Bookstores.
- Rothstein, S. (2010). Counting and the mass count distinction. *Journal of Semantics*, 27, 343–397. <https://doi.org/10.1093/jos/ffq007>
- Rothstein, S. (2013). A Fregean semantics for number words. In M. Aloni, M. Franke & F. Roelofsen (Eds.), *Proceedings of the 19th Amsterdam Colloquium* (pp. 179–186). Amsterdam: Universiteit van Amsterdam.
- Wang, D. S., & Song, J. (2019). The Art and Digital Age in the YiJing. *Baicheng Normal College Xuebao*, 1, 1–6.
- Wang, L. (1984). *The Grammar Theory in China*. Jinan: Shandong Education Press.
- Wiese, H. (2003). *Numbers, Language and the Human Mind*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511486562>
- Wilhelm, R., & Baynes, C. F. (1950). *The I ching, or, Book of changes*. published for Bollingen Foundation Inc. by Pantheon Books.
- Wu, H. Y. (1995/2013). *The Number Culture in China*. Yuelu shushe.
- Xu, D. (2006). *Typological change in Chinese Syntax* (p. 260). Oxford University Press. Reprint in China. (Contract signed by Oxford and World Publishing Corporation)
- Yao, P. Z. (1995). *The Crucial Things in the Zhouyi* (Volume 13). Shanghai: Shanghai Guji Press.
- Yu, N. (2012). The metaphorical orientation of time in Chinese. *Journal of Pragmatics*, 44(10), 1335–1354. <https://doi.org/10.1016/j.pragma.2012.06.002>
- Yu, X. Q. (1994). *The Exploration of Numbers: the mysterious significance of numbers in ancient China*. Sanlian

Bookstore.

Zhang, D. X. (1999). *The Qiankun in the Number*. Beijing University Press.

Zhu, D. X. (1958). *The Number Words and Numeral Structure*. Chinese yuwen.

Copyrights

Copyright for this article is retained by the author, with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).