

Descriptive norms for 350 Chinese idioms with seven syntactic structures

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Abstract The most important forms of idioms in Chinese, *chengyus* (CYs), have a fixed length of four Chinese characters. Most CYs are joined structures of two, two-character words—subject–verb units (SVs), verb–object units (VOs), structures of modification (SMs), or verb–verb units—or of four, one-character words. Both the first and second pairs of words in a four-word CY form an SV, a VO, or an SM. In the present study, normative measures were obtained for knowledge, familiarity, subjective frequency, age of acquisition, predictability, literality, and compositionality for 350 CYs, and the influences of the CYs’ syntactic structures on the descriptive norms were analyzed. Consistent with previous studies, all of the norms yielded a high reliability, and there were strong correlations between knowledge, familiarity, subjective frequency, and age of acquisition, and between familiarity and predictability. Unlike in previous studies (e.g., Libben & Titone in *Memory & Cognition*, 36, 1103–1121, 2008), however, we observed a strong correlation between literality and compositionality. In general, the results seem to support a hybrid view of idiom representation and comprehension. According to the evaluation scores, we further concluded that CYs consisting of just one SM are less likely to be decomposable than those with a VOVO composition, and also less likely to be recognized through their constituent words, or to be familiar to, known by, or encountered by users. CYs with an SMSM composition are less likely than VOVO CYs to be

decomposable or to be known or encountered by users. Experimental studies should investigate how a CY’s syntactic structure influences its representation and comprehension.

Keywords Chinese idioms · Descriptive norms · Syntactic structures

Introduction

Idioms are fixed expressions that are standardized in meaning and form. Some idioms (e.g., *easy on the eyes*) can be understood directly through the constituent words, but the overall meanings of other idioms (e.g., *red herring*) seem to have nothing to do with the conventional meanings of the words of which they are composed. Therefore, differences seem to exist among idioms in terms of how they are represented and how they are understood. Indeed, several theories have been proposed on this point. For example, idioms can be treated like complex words and be represented and understood as whole units (e.g., *kick the bucket*; see, e.g., Swinney & Cutler, 1979). It is also argued that an idiom can receive different weights of contributions in representation from its constituent words (e.g., Gibbs & Nayak, 1989) and cannot be understood without the semantic relations between its constituent words being processed (e.g., *pop the question*; e.g., Gibbs, Nayak, & Cutting, 1989).

Recently, a hybrid view has begun to be well recognized; this theory assumes that idioms are both compositional *and* noncompositional. According to Cutting and Bock (1997), an idiom has its own representation of the lexical concept as a whole, the activation of which spreads to the representations for the constituent words at the lexical–syntactic (lemma) level. Sprenger, Levelt, and Kempen (2006) extended this theory, arguing that there are *superlemmas* between the representations for idioms as whole units and those for the constituent

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words. As separate representations for the syntactic properties of idioms, superlemmas are connected to the idioms' building blocks. As far as idiom comprehension is concerned, those that are predictable or familiar to the users are processed as whole units, but those that are not predictable or are unfamiliar to the users may have to be compositionally analyzed before being understood (Cacciari & Tabossi, 1988; Titone & Connine, 1999).

In fact, the characteristics of idioms, such as how familiar they are to the users and whether they are decomposable, seem to pertain to the development of theories of idiom representation and comprehension. It is even believed that norms such as those for the familiarity and compositionality of idioms could potentially be helpful for experimental studies into the cognitive mechanisms of how idiomatic expressions are represented and comprehended (see Bonin, Méot, & Bugajska, 2013, for a review), and several reports are available in this line of research (e.g., Bonin et al., 2013; Tabossi, Arduino, & Fanari, 2011), in which the users' knowledge, familiarity, subjective frequency, and age of acquisition (AoA) of idioms, and the idioms' predictability, literality, and compositionality, are among the most important variables. By *knowledge*, we mean the degree to which the users think they know the overall meaning of an idiom and can verbally explain it (Tabossi et al., 2011). The more familiar a speaker is with an idiom, the more likely that he or she obtains access to its overall meaning via direct lookup (Cronk & Schweigert, 1992). The *subjective frequency* of an idiom refers to how often users encounter it in everyday life (Bonin et al., 2013), and the AoA of an idiom is the age at which the users acquired it. By *predictability*, we mean the extent to which the users can complete an incomplete idiom, and by *literal*, we mean the degree to which the users think an idiom can be understood just through the literal meanings of its constituent words. The overall meanings of idioms of high *predictability* are retrieved more quickly than those of low predictability (Cacciari & Tabossi, 1988). Because the processing of linguistic information is obligatory (Miller & Johnson-Laird, 1976, as cited in Bonin et al., 2013), the literal meanings of an idiom's constituent words cannot be avoided. *Compositionality* refers to the degree to which the users think an idiom's overall meaning is composed of the meanings of its individual components. Decomposable idioms are different from noncompositional idioms in being understood by both children (Caillies & Le Sourn-Bissaoui, 2008) and adults (Caillies & Butcher, 2007).

For example, Tabossi et al. (2011) required 740 Italian speakers (ranging from 17 to 50 years in age) to participate in a study, and obtained descriptive norms for length, knowledge, familiarity, AoA, predictability, syntactic flexibility (the degree to which an idiom can be syntactically changed but still retain its overall meaning), literality, and compositionality for 245 idioms in Italian. By *descriptive norms*, we mean

descriptive statistics for the idioms' features, obtained by means of objective measurements. Tabossi et al.'s discussions on the descriptive statistics of and the correlations between the variables are of significant value to empirical studies on Italian idioms. By collecting descriptive norms for knowledge, predictability, literality, compositionality, subjective and objective frequency, familiarity, AoA, and length for 305 French idioms, and measuring the comprehension times for these idioms, Bonin et al. (2013) demonstrated the rich relevance of norms for psycholinguistic studies on idiomatic expressions in French. Libben and Titone (2008) used both offline and online measures to analyze the normative characteristics of 219 English idioms. They found that high familiarity is associated with good comprehension, and that decomposability only plays a limited role in the early stages of idiom comprehension.

Each language has a large repertoire of idiomatic expressions (Cacciari & Tabossi, 1988). To the authors' knowledge, however, few normative studies have reported on idioms in languages other than English (e.g., Cronk, Susan, Lima, & Schweigert, 1993; Libben & Titone, 2008; Titone & Connine, 1994b), French (e.g., Bonin et al., 2013; Caillies, 2009), and Italian (e.g., Tabossi et al., 2011). The present study was performed to provide a normative description of Chinese idioms.

Unlike alphabetic languages, written Chinese has a logographic script in which the basic units are characters. Although many characters are words on their own, most can join with one or more than one character, to form two-character words or words of more than two characters. Actually, more than 70 % of the 50,000 most frequently used words are two characters long (State Language Affairs Committee, 2008), and over 95 % of Chinese idioms are of four characters (Liu & Cheung, 2014). These four-character idioms are referred to as *chengyus* (CYs, hereafter).

One prominent feature of CYs is their fixed syntactic structures (Zhou, 2004). In 90 % of cases, a CY has a syntactic structure of two, two-character words—a noun followed by a verb to form a subject–verb unit (SV; e.g., 泾渭不分, *river Jing and river Wei-not separate*), a verb followed by a noun to form a verb–object unit (VO; e.g., 渐入佳境, *gradually enter into-a perfect condition*), an adjective followed by a noun or an adverb followed by a verb to form a structure of modification (SM; e.g., 蔚然成风, *luxuriantly-become a common practice*), or a verb–verb unit (VV; e.g., 积劳成疾, *accumulate labor-cause illness*)—or of four one-character words. Both the first and second pairs of words in a four-word CY form an SV (e.g., 言简意赅, *language-simple-meaning-thoughtful*), a VO (e.g., 扶危济困, *help-those in danger-aid-those in peril*), or an SM (e.g., 真才实学, *genuine-talent-sturdy-knowledge*). Since an idiom's syntactic structure plays a significant role in how it is represented and understood

(Holsinger, 2013; Konopka & Bock, 2009; Robert, Curt, Gary, & Kathleen, 2001), an investigation into the relationship between CYs' syntactic structures and their descriptive norms will be helpful to provide indications of CYs' representation and comprehension. For example, are four-word CYs similar to two-word CYs in their correlations between the seven features? In what way are SM CYs different from SV CYs in literality? Answers to such questions can inspire a new understanding of how idioms are represented in general and can be of significant value to the designs of experimental studies into the mechanisms of idioms' representation and comprehension.

Method

Participants

The participants were 735 college students (385 males, 350 females; $M_{\text{age}} = 18.9$ years, age range 18.2–20.3 years), who were recruited on campus by means of a flyer advertisement at a university in mainland China.

Materials and procedure

Inspired by Bonin et al. (2013), we recorded each measurement on a 7-point Likert scale. First, we roughly excluded those that might be unfamiliar to the participants from the 4,227 CYs in the *Normal Dictionary of Chinese Chengyu with Full Function* (Chen, 2009; one of the most popular dictionaries of CYs in the country) that are SV, SM, VO, VV, SVSV, SMSM, or VOVO in structure. The CYs were divided into 39 groups at random. Ten college students were then required to evaluate the familiarity of the idioms in each group on a 3-point Likert scale (1 = *unfamiliar*, 2 = *familiar*, 3 = *very familiar*). These students did not take part in the follow-up surveys. From the 3,694 CYs that had an average score of 2 or higher, 50 were selected at random for each of the seven syntactic structures.

Then, the 350 CYs were mixed at random and divided into five equal groups. The CYs chosen for each of the groups can be found in the [Appendix](#). Each group was printed on a sheet of paper in two columns with seven numbers ([1], [2], [3], [4], [5], [6], and [7]) at the right side of each CY. The instructions were printed at the top of the page. For each CY to be evaluated from the seven categories, the 735 participants were divided into 35 equal groups at random, and every one-piece-of-paper questionnaire was delivered to a group of students, who were required to make an evaluation response to each CY according to the instructions by putting a tick in one of the seven numbers. Table 1 summarizes the instructions for the seven kinds of surveys.

Results and discussion

The norms

The descriptive statistics of the participants' responses on each questionnaire and the corresponding scores for reliability are displayed in Table 2.

As is shown in Table 2, all of the norms yielded a reliability score over .94. As in Bonin et al. (2013), the compositionality and AoA norms had the highest and lowest reliabilities, respectively. Moreover, the reliability score for the AoA norm was still very high ($\alpha = .941$). Probably because the age range was wide for their participants, Tabossi et al. (2011) found that the AoA norm was significantly less reliable than their other norms. On the contrary, the high reliability scores across the seven scales in the present study seem to suggest a high degree of consistency among the college-student participants in their evaluations of the CYs.

The average evaluation scores for knowledge, familiarity, and predictability were quite high on the 7-point Likert scales. Furthermore, these three norms also had high absolute values of their skewness scores, suggesting that the participants were quite familiar with all the CYs, in agreement with Bonin et al. (2013). This was especially the case with the predictability norm ($6.52 \pm 0.57 [M \pm SD]$). That is, the last character of a CY was very easy for the participants to predict, partly because of the expressions' fixed length of four characters. The low absolute values of the skewness scores suggest that the norms for literality, compositionality, and subjective frequency embrace symmetric distributions.

Correlations

The Pearson correlations between the scores of the participants' responses to each questionnaire were calculated, and the results are displayed in Table 3.

As is indicated in Table 3, the seven variables were significantly correlated with one another, but the correlations did not seem to be of the same strength. First, as in Bonin et al. (2013), there were strong intercorrelations between the participants' scores on knowledge, familiarity, subjective frequency, and AoA. That is, the earlier the participants acquired a CY, the more familiar they were with it, the more frequently they encountered it, and the more able they were to verbally explain it. Given that the effect of AoA is strong in tasks that require semantic code activation (e.g., Bonin, Barry, Méot, & Chalard, 2004; Bonin et al., 2013; Johnston & Barry, 2006), we further speculate that the users' knowledge, familiarity, AoA, and subjective frequency of CYs might be strong indicators of semantic representations for CYs as wholes.

Table 1 Questionnaire instructions

| | |
|-----|---|
| KNO | Please decide the degree (1 = <i>very low</i> , 7 = <i>very high</i>) to which you think each CY is known by your peers and your peers can verbally explain it. The higher the number, the more likely you think your peers know its overall meaning and can verbally explain it. |
| FAM | Please decide how familiar (1 = <i>very unfamiliar</i> , 7 = <i>very familiar</i>) you are with each CY. The higher the number, the more familiar you are with it. |
| PRE | Please decide the extent (1 = <i>very small</i> , 7 = <i>very large</i>) to which you can complete each CY if its last character is missing. The higher the number, the more likely you are able to complete it. |
| LIT | Please decide the degree (1 = <i>very low</i> , 7 = <i>very high</i>) to which each CY means the same as its constituent words literally indicate. For example, the higher degree to which you think that 斩钉截铁 (<i>cut-nails-cut-iron</i>) and 走马观花 (<i>ride-horse-view-flowers</i>) mean “cut nails and cut iron” and “ride a horse and view flowers,” respectively, the higher the corresponding number should be. |
| COM | Please judge the extent (1 = <i>very small</i> , 7 = <i>very large</i>) to which the overall meaning of each CY is composed of the meanings of its individual components. The higher the number, the more you think that its constituent words contribute to its overall meaning. |
| SUB | For each CY, please judge the frequency (1 = <i>very low</i> , 7 = <i>very high</i>) you hear, read, or speak it in daily life. The higher the number, the more often you encounter it in everyday life. |
| AoA | For each CY, please indicate the time (the numbers 1, 2, 3, 4, 5, 6, and 7 refer to the ages of 8, 10, 12, 14, 16, 18, and 20, respectively) when you acquired it. The higher the number, the later you acquired it. |

In all of the tables and in the figure, KNO, FAM, PRE, LIT, COM, SUB, and AoA indicate *knowledge*, *familiarity*, *predictability*, *literality*, *compositionality*, *subjective frequency*, and *age of acquisition*, respectively. VO, SM, SV, and VV refer to CYs whose two, two-character words form verb-object units, structures of modification, subject-verb units, and verb-verb units, respectively. And in VOVO, SMSM, and SVSV CYs, the first and second pairs of one-character words in the idiom both form VOs, SMs, and SVs, respectively

As in Titone and Connine (1994a) and Tabossi et al. (2011), the participants' evaluation scores for familiarity were strongly correlated with those of predictability, suggesting that the more familiar they were with a CY, the more likely they were to be able to complete it if its last character was missing. Consistent with this, the CYs' predictability was strongly correlated with the participants' knowledge, AoA, and subjective frequency of the CYs. This finding seems to be in support of Sprenger et al.'s (2006) theory that superlemmas mediate the connections between the conceptual representations for idioms as wholes and those for the component words. In other words, the users' familiarity and knowledge of CYs' overall meanings activate the superlemmas, which in turn help retrieve the component words.

Second, the participants' evaluation scores for literality were strongly correlated with those for compositionality, apparently contrary to the negative correlations between literality and compositionality in Libben and Titone (2008) and Bonin et al. (2013). In addition, Tabossi et al. (2011) found no correlation between literality and

compositionality. The difference between the present study and the previous studies (Bonin et al., 2013; Libben & Titone, 2008; Tabossi et al., 2011) in terms of the correlations between literality and compositionality might be an indication of the specific nature of the Chinese written language. In Chinese, the meaning of an expression is more visually evident than in an alphabetic language (Zhang et al., 2013). The overall meaning of a CY is also likely to be induced through the meanings of its constituent words. Indeed, this result appears to be a piece of evidence in support of the superlemma theory, which predicts that the meanings of the constituent words predict production of the idiom (Sprenger et al., 2006).

Third, as in Tabossi et al. (2011), the participants' evaluation scores for familiarity and knowledge were strongly correlated with those for literality, indicating that college students' familiarity and knowledge of CYs are closely related to the literal meanings of the CYs' constituent words. Consistent with this finding, the participants' knowledge, AoA, and subjective frequency of CYs were significantly correlated with the CYs' literality and

Table 2 Statistics for all normed variables

| | <i>M</i> | <i>SD</i> | Min | Max | Range | Skewness | α |
|-----|----------|-----------|------|------|-------|----------|----------|
| KNO | 6.04 | 0.58 | 3.71 | 6.88 | 3.17 | -1.23 | .968 |
| FAM | 5.87 | 0.58 | 3.45 | 6.80 | 3.35 | -1.12 | .976 |
| PRE | 6.52 | 0.57 | 2.90 | 7.00 | 4.10 | -2.91 | .962 |
| LIT | 5.17 | 0.76 | 2.71 | 6.76 | 4.05 | -0.64 | .963 |
| COM | 5.00 | 0.61 | 3.00 | 6.20 | 3.20 | -0.46 | .979 |
| SUB | 4.61 | 1.03 | 1.75 | 6.74 | 4.99 | -0.41 | .964 |
| AoA | 2.67 | 0.74 | 1.38 | 5.86 | 4.48 | 1.00 | .941 |

Table 3 Correlation coefficient matrix

| | FAM | SUB | AOA | PRE | LIT | COM |
|-----|---------|---------|----------|----------|----------|----------|
| KNO | .709*** | .754*** | -.809*** | .603*** | .560*** | .545*** |
| FAM | | .733*** | -.687*** | .648*** | .483*** | .344*** |
| SUB | | | -.701*** | .583*** | .391*** | .420*** |
| AoA | | | | -.669*** | -.424*** | -.338*** |
| PRE | | | | | .129* | .133* |
| LIT | | | | | | .752*** |

* $p < .05$. *** $p < .001$

Table 4 One-way analysis of variance statistics of the scores for the seven norms under the influences of the CYs' syntactic structures

| | F^* | p | R^2 |
|-----|-------|------|-------|
| KNO | 2.98 | .007 | .050 |
| FAM | 7.76 | .000 | .120 |
| SUB | 5.85 | .000 | .093 |
| AoA | 1.32 | .249 | .023 |
| PRE | 1.74 | .110 | .030 |
| LIT | 6.41 | .000 | .101 |
| COM | 6.63 | .000 | .104 |

* $df_{\text{between}} = 6$, $df_{\text{within}} = 343$

compositionality. However, the participants' evaluation scores for predictability were relatively weakly correlated with those for literality and compositionality. That is, compositionality and literality are not as strong predictors of a CY's overall meaning as are knowledge, familiarity, AoA, and subjective frequency.

In addition, the factor analysis revealed two main components, which accounted for 80.86 % of the variances. Knowledge, familiarity, subjective frequency, AoA, and predictability mainly loaded onto the first factor, accounting for 61.95 % of the variances, and compositionality and literality onto the second factor, accounting for 18.12 % of the variances. Consistent with the discussions of the correlations, the first factor seem to reflect the participants' awareness of the CYs' noncompositional features, and the second factor their consciousness of the CYs' compositional characteristics.

The CYs' syntactic structures

Statistics from one-way analyses of variance (ANOVAs) of the participants' evaluation scores for the seven norms are shown in Table 4, with the CYs' differences in syntactic structure as the single variable. As is illustrated in Fig. 1, diversity existed between the scores for knowledge, familiarity,

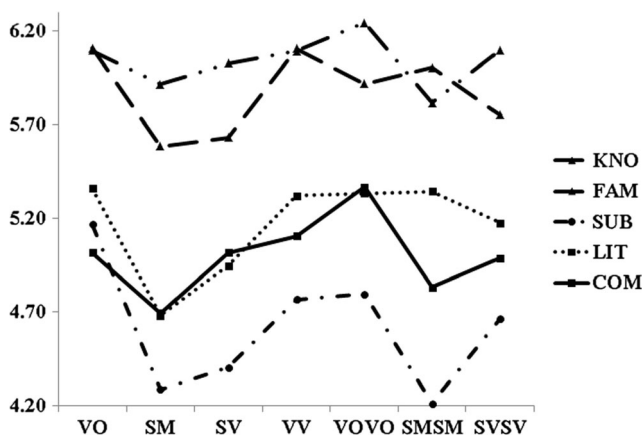


Fig. 1 Participants' scores for knowledge, familiarity, subjective frequency, literality, and compositionality under the influences of the CYs' syntactic structures

subjective frequency, literality, and compositionality under the influences of the CYs' syntactic structures. Post-hoc least significant difference tests revealed significance differences between the CYs with different structures for each of the five norms (see Table 5).

Knowledge The CYs with an SM structure were significantly lower than VOVO CYs, and SMSM CYs were as well, in the evaluation scores for knowledge, suggesting that college students are more confident of knowing the meaning of and being able to verbally explain CYs with a VOVO composition than of doing either with SM or SMSM CYs.

Table 5 Significance levels for the pair-wise comparisons

| | FROM | TO | p^* |
|-----|------|------|-------|
| LIT | SM | VO | .001 |
| | | VV | .001 |
| | | VOVO | .001 |
| | | SMSM | .001 |
| | | SVSV | .001 |
| | SV | VOVO | .005 |
| COM | SM | SMSM | .006 |
| | | VO | .006 |
| | | SVSV | .006 |
| | | VV | .001 |
| | | VOVO | .001 |
| | VO | VOVO | .003 |
| | | VOVO | .003 |
| | | VOVO | .003 |
| | | VOVO | .001 |
| | | VOVO | .001 |
| FAM | SM | VO | .001 |
| | | VV | .001 |
| | | VOVO | .003 |
| | | SMSM | .001 |
| | | SVSV | .001 |
| | SV | VO | .001 |
| KNO | SM | VV | .001 |
| | | VOVO | .010 |
| | | SMSM | .001 |
| | | SVSV | .001 |
| | | VO | .001 |
| | SV | VO | .001 |
| | | VV | .001 |
| | | VOVO | .001 |
| | | VOVO | .001 |
| | | VOVO | .001 |
| SUB | SM | VOVO | .004 |
| | | VOVO | .001 |
| | | VO | .001 |
| | | VO | .001 |
| | | VO | .001 |
| | SMSM | VO | .001 |
| | SV | VV | .005 |
| | | VOVO | .005 |
| | | VOVO | .003 |

The scores of the CYs of the structures in the FROM column were significantly lower than those in the TO column

Familiarity In familiarity evaluation scores, the CYs with an SM structure were significantly lower than the CYs with VO, VV, VOVO, and SMSM structures; SV CYs were significantly lower than VO, VV, VOVO, and SMSM CYs; and SVSV CYs were significantly lower than VO and VV CYs. This suggests that CYs with SM and SV compositions are less familiar than those with VO, VV, VOVO, and SMSM structures, and that SVSV CYs are less familiar than those with VO and VV structures, to college students.

Subjective frequency The CYs with SM and SV structures were significantly lower than those with a VO structure, and the CYs with an SMSM composition were significantly lower than those with VO, VV, and VOVO compositions in the evaluation scores for subjective frequency. These results mainly indicate that college students most frequently encounter VO CYs, and much less frequently encounter those with SM, SV, and SMSM structures in daily life.

Literality The CYs with an SM structure were significantly lower than those with VO, VV, VOVO, SMSM, and SVSV structures, and the CYs with an SV composition were significantly lower than those with VOVO and SMSM compositions in evaluation scores for literacy. This indicates that SM and SV CYs are more difficult to understand through the literal meanings of their component words in than are those with the other five structures, and that SM CYs seem even more so than SV CYs.

Compositionality The CYs with an SM structure were significantly lower than those with VO, SV, VV, and VOVO structures, and VOVO CYs were significantly higher than those with VO, SV, SMSM, and SVSV structures in compositionality evaluation scores. This mainly suggests that SM CYs are the most difficult to decompose, and that those with a VOVO structure are the most decomposable.

Explanations The participants' evaluation scores for AoA and predictability both tended to remain the same for the CYs of different syntactic structures. However, the CYs' syntactic structures had significant influences on the participants' evaluation scores for knowledge, familiarity, subjective frequency, literacy, and compositionality, which requires explanation.

The participants had low scores for SM CYs in each of the five norms. Users may have a low degree of familiarity and understanding and a low frequency of encounter with CYs having an SM composition, which are difficult to understand merely through their constituent words and are unlikely to be decomposed in meaning. In other words, an SM CY that is unfamiliar to, not known by, or not frequently encountered by a user is not easy to comprehend or is undecomposable. Similarly, CYs with an SMSM structure also seem less likely to be known or encountered by users and to be less decomposable than those with VOVO and VO structures. Unlike SM CYs, however, SMSM CYs may not be less familiar to users and may be more likely to be comprehended just through their constituent characters, in comparison with CYs with a VOVO or VO structure. The differences between CYs with SM and SMSM structures seem to suggest that literality and compositionality are not the same, and that familiarity is different from knowledge or subjective frequency in indicating CYs' psycholinguistic characteristics.

CYs with an SV composition are less likely to be familiar to or encountered by users than are those with a VOVO or VO structure. Similar to SV CYs, in being less familiar to users than VOVO or VO CYs, SVSV CYs are dissimilar to their SV counterparts in not being less frequently encountered by users than VOVO or VO CYs. The difference between CYs with SV and SVSV compositions appears to indicate that familiarity is different from subjective frequency in nature.

Moreover, the changes in literacy seem to have the same pattern as those in compositionality under the influence of CYs' syntactic structures, except that those with an SMSM structure were not significantly different from VOVO CYs in literacy evaluations, but had significantly lower scores than VOVO CYs in compositionality evaluations.

One might intuitively feel that there are overlaps between knowledge, familiarity, and subjective frequency, or between literacy and compositionality. However, the present study seems to provide a strong piece of evidence that neither knowledge, familiarity, and subjective frequency nor literacy and compositionality can be taken as being the same.

Implications

The normative statistics and the interactions between the norms and the CYs' syntactic structures have significant

implications for helping researchers do experimental studies into CYs' representations and comprehension. The apparent difference between CYs and idioms in other languages (Bonin et al., 2013; Libben & Titone, 2008; Tabossi et al., 2011) in the correlations between literality and compositionality is in agreement with the findings of Zhang et al. (2013) that the meaning of an expression is more visually evident in Chinese than in an alphabetic language. Obviously, more research will be needed on the specific features of idioms in other languages than is available from the few languages in which normative studies have been conducted.

In the present study, the influence of patterns of CYs' syntactic structures on CYs' descriptive norms might indicate particular mechanisms for how CYs are represented and how they are comprehended. Liu, Li, Shu, Zhang, and Chen (2010); Zhang, Yang, Gu, and Ji (2013); and Liu and Cheung (2014) set good examples of experimental investigations into the cause-and-effect relation between CYs' syntactic structures and CYs' comprehension, but more work is needed in this line of research to help enhance the development of theories on idiom representation and idiom comprehension in general.

On the basis of the interactions between the five norms and the CYs' syntactic structures (see Fig. 1), one may conduct a series of experimental studies to help specify the nature of the superlemmas between the representations for idioms as wholes and those for their constituent words (Sprenger et al., 2006). Theoretical differences could be made available between two- and four-word CYs, and comparisons could also be made between two-word CYs with different structures and between four-word CYs with different structures, regarding how the connections are mediated between the conceptual representations for idioms as wholes and those for the constituent words.

In cognitive tasks of idiom recognition with and without sentential contexts, for example, comparisons could be made between participants' reaction times and/or event-related potentials to CYs with different syntactic structures, as are outlined in Table 6. Furthermore, regression analyses on participants' online performance with the norms as predictors could also be very fruitful in reflecting the norms' contributions to how the CYs of each syntactic structure are represented and/or comprehended.

Similarly, studies on the relations between the syntactic structures and normative features of idioms promise to yield interesting results in languages other than Chinese. Moreover, it seems to be clearly evidenced in the interactions between the syntactic structures and norms of the CYs (see Fig. 1) that familiarity is different from subjective frequency and that literality cannot be taken as being the

Table 6 Comparisons of CYs of different syntactic structures

| | | | |
|---|------|----|------|
| 1 | SM | ←→ | SMSM |
| 2 | SV | ←→ | SVSV |
| 3 | VO | ←→ | VOVO |
| 4 | SM | ←→ | SV |
| 5 | VO | ←→ | VV |
| 6 | SM | ←→ | VO |
| 7 | SMSM | ←→ | VOVO |

Each line indicates a comparison of CYs of two different syntactic structures

same as compositionality. Both familiarity and subjective frequency and both literality and compositionality should be considered in normative studies of idioms, and probably in studies of words in general.

Conclusion

Our normative results for familiarity, knowledge, predictability, AoA, subjective frequency, literality, and compositionality among 350 CYs with seven structures (VO, SM, SV, VV, VOVO, SMSM, and SVSV) seemed to support the hybrid view of idiom representation and comprehension. The influence of the CYs' syntactic structures on the descriptive norms did not have the same pattern for all variables. We concluded that CYs with an SM composition are less likely than VOVO CYs to be decomposable, to be recognized through their constituent words, or to be familiar to, known by, or encountered by users. CYs with an SMSM structure are also less likely than VOVO CYs to be decomposable or to be known or encountered by users. The present study provides an outline of how CYs' characteristics are intercorrelated and how their features interact with their syntactic structures, which can be used as a reference for further studies on idioms in Chinese. Empirical studies can investigate how the syntactic structure of a CY influences its representation and comprehension, so that the hybrid view on idiom representation and comprehension can be finely specified. However, the participants' homogeneity in age and background education in the present study might impose some limitations on the generalization of these findings. Moreover, similar surveys with a control group of two-character words would probably have made the results even more meaningful.

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Appendix

| 350 CYs of seven syntactic structures | | |
|---------------------------------------|------|--|
| | CY | English translation |
| SM | 按图索骥 | by following up a clue |
| | 黯然失色 | be outshone |
| | 百里挑一 | one in a hundred |
| | 百年树人 | it takes a hundred years to educate people |
| | 半路出家 | switch to a job one was not trained for |
| | 遍地开花 | blossom everywhere |
| | 彬彬有礼 | be well-mannered |
| | 趁火打劫 | stir up trouble to serve one's ends |
| | 乘虚而入 | catch someone off guard |
| | 大家闺秀 | girl from a good family |
| | 东山再起 | stage a comeback |
| | 风流人物 | an outstanding personage |
| | 风流韵事 | love affair |
| | 好好先生 | one who tries not to offend anyone |
| | 虎口余生 | be snatched from the jaws of death |
| | 花花世界 | community dazzling with a myriad temptations |
| | 黄金时代 | golden age |
| | 恍然大悟 | suddenly see the light |
| | 斤斤计较 | haggle over every ounce |
| | 金字招牌 | gold-lettered signboard |
| | 津津乐道 | take delight in talking about |
| | 绝处逢生 | be rescued unexpectedly from a desperate situation |
| | 慷慨陈词 | speak in excitement |
| | 空洞无物 | be devoid of content |
| | 空头支票 | an empty promise |
| | 岿然不动 | steadfastly stand one's ground |
| | 寥寥无几 | few and far between |
| | 碌碌无为 | lead a vain and humdrum life |
| | 绿林好汉 | brigands |
| | 庞然大物 | a huge monster |
| | 钦差大臣 | imperial commissioner |
| | 倾盆大雨 | torrential rain |
| | 如意算盘 | indulge in wishful thinking |
| | 顺手牵羊 | steal something in passing |
| | 死里逃生 | have a close shave with death |
| | 跳梁小丑 | a clumsy mischief-doer |
| | 纨绔子弟 | a good-for-nothing from a wealthy family |
| | 蔚然成风 | become a trend or a common practice |
| | 狭路相逢 | come into unavoidable confrontation |
| | 相依为命 | depend on each other for survival |
| | 悬崖勒马 | pull back before it is too late |
| | 循循善诱 | be good at teaching |
| | 羊肠小道 | narrow meandering footpath |
| | 一网打尽 | (of criminals etc.) round up the whole lot |
| | 衣锦夜行 | parade with beautiful dress at night |
| | 以权谋私 | abuse of power for personal gains |

| | | |
|----|------|--|
| | 蝇头小利 | petty profits |
| | 与日俱增 | be steadily on the increase |
| | 再生父母 | great benefactor |
| | 中原逐鹿 | fight among rivals for the throne |
| | 百废俱兴 | full-scale reconstruction is underway |
| | 遍体鳞伤 | be beaten black and blue |
| | 草木皆兵 | be in a state of extreme nervousness |
| | 宠辱不惊 | not be moved by (official) honour or disgrace |
| | 臭名昭著 | of ill repute |
| | 寸丝不挂 | be stark naked |
| | 大气磅礴 | of great momentum |
| | 大势已去 | the game is as good as lost |
| | 斗志昂扬 | have plenty of fight in one |
| | 风云突变 | a sudden change in the situation |
| | 福星高照 | have a good luck |
| | 妇孺皆知 | everyone knows about it |
| | 肝脑涂地 | (in fighting for one's sovereign) lay down one's life |
| | 冠冕堂皇 | high-sounding |
| | 花样翻新 | retrofit |
| | 吉星高照 | the lucky star shines bright |
| | 健步如飞 | walk fast and vigorously |
| | 蛟龙得水 | be happy like a dragon in water |
| | 金榜题名 | succeed in a government examination |
| | 金屋藏娇 | live with the young wife in a plush apartment |
| | 泾渭不分 | fail to make a distinction between right and wrong |
| SV | 精神抖擞 | in good spirits |
| | 狼烟四起 | smoke signals rising on all sides |
| | 利欲熏心 | be blinded by greed |
| | 蓬荜生辉 | Friends grace sb.'s house with their presence |
| | 品学兼优 | excel in moral as academic performances |
| | 气势汹汹 | with an aggressive posture |
| | 气息奄奄 | at death's door |
| | 气宇轩昂 | dignified and distinguished-looking |
| | 热血沸腾 | burning with righteous indignation |
| | 人才辈出 | talented people are produced by each generation |
| | 神色自若 | look unperturbed |
| | 生灵涂炭 | the people are plunged into an abyss of misery |
| | 声势浩大 | an impressive display of power or influence |
| | 四大皆空 | the sensuous world is illusory, all physical existence is vanity |
| | 涕泗滂沱 | tears and mucus are flowing down rapidly |
| | 万马齐喑 | the people's voices are stifled |
| | 万象更新 | (with the advent of spring) all is fresh again |
| | 五彩缤纷 | blazing with color |
| | 旭日东升 | the sun is rising |
| | 学富五车 | have read five cartloads of books |
| | 学海无涯 | knowledge is boundless |
| | 血债累累 | have a mountain of blood debts |
| | 夜郎自大 | ignorant and boastful |

| | |
|------|---|
| 衣冠楚楚 | be immaculately dressed |
| 羽毛未丰 | be young and inexperienced |
| 众口难调 | it's difficult to make everyone feel satisfied |
| 众志成城 | unity is strength |
| 壮心不已 | in high aspirations |
| 壮志凌云 | with soaring aspirations |
| 搬弄是非 | tell tales |
| 别具慧眼 | have a special insight understanding |
| 别具匠心 | have great originality |
| 别具一格 | have a distinctive (or unique) style |
| 不成体统 | mannerless |
| 不落窠臼 | be unconventional |
| 不念旧恶 | to forgive and forget |
| 不省人事 | be in a coma |
| 不识大体 | ignore the general interest |
| 不识时务 | show no understanding of the times |
| 不务正业 | not attend to one's proper duties or business |
| 不遗余力 | spare no effort |
| 不远千里 | make light of traveling a thousand li |
| 不择手段 | by hook or by crook |
| 打破常规 | break free from convention |
| 大动干戈 | get into a fight |
| 大煞风景 | dampen the spirits |
| 大有文章 | there's more to this than meets the eye |
| 大展宏图 | ride on the crest of success |
| 颠倒是非 | confuse right and wrong |
| 独出心裁 | be-original |
| 顿开茅塞 | suddenly see the light |
| 各奔前程 | each goes his own way |
| 各持己见 | each sticks to his own viewpoint |
| 蛊惑人心 | confuse and poison people's minds |
| 好为人师 | like to lecture to people |
| 化为泡影 | go up in smoke |
| 荒无人烟 | desolate and uninhabited |
| 混淆黑白 | confuse black and white |
| 渐入佳境 | get on soundings |
| 捐弃前嫌 | bury old grudges |
| 夸大其词 | exaggerate |
| 浪迹天涯 | rove all over the world |
| 力排众议 | override all objections |
| 乱点鸳鸯 | misarrangement of matches |
| 略知皮毛 | have only a superficial understanding |
| 三顾茅庐 | call on someone repeatedly to enlist his help, etc. |
| 三缄其口 | with one's lips sealed |
| 深入人心 | sink deep into the hearts of the people |
| 稳操胜券 | certain or confident of winning |
| 虚度年华 | idle away one's time |
| 腰缠万贯 | wallow in money |

VO

| | | |
|----|------|--|
| | 杳无消息 | have no news |
| | 杳无音信 | without any news for a long time |
| | 义结金兰 | become sworn brothers [sisters] |
| | 勇冠三军 | the bravest of the whole army |
| | 崭露头角 | make a figure |
| | 支吾其词 | speak haltingly or ambiguously (in order to hide the truth) |
| | 重蹈覆辙 | follow the old road to ruin |
| | 坐收渔利 | play off one against another |
| | 抱薪救火 | do something to make the situation even worse |
| | 闭门造车 | act blindly by divorcing oneself from reality |
| | 惩前毖后 | learn from past mistakes to avoid future ones |
| | 出口成章 | one's tongue is the pen of a ready writer |
| | 出奇制胜 | defeat one's opponent by a surprise move |
| | 吹毛求疵 | find fault with |
| | 得过且过 | muddle along |
| | 得意忘形 | forget oneself in one's excitement |
| | 反目成仇 | fall out and become enemies |
| | 改过自新 | mend one's ways |
| | 顾名思义 | just as the name implies |
| | 过河拆桥 | abandon one's benefactor once his help is not needed |
| | 过目成诵 | have a photographic memory |
| | 画地为牢 | restrict one's activities to a designated area |
| | 画龙点睛 | add the finishing touch |
| | 积劳成疾 | fall ill from overwork |
| | 积土成山 | many sand piled up will make a mountain |
| | 继往开来 | carry forward the tradition and forge ahead into the future |
| | 见风使舵 | have it both ways |
| VV | 见贤思齐 | Seeing another better than oneself, one tries to equal him. |
| | 见义勇为 | never hesitate to do what is right |
| | 见异思迁 | be inconstant |
| | 劫富济贫 | rob the rich and help the poor |
| | 开门见山 | come straight to the point |
| | 克敌制胜 | gain mastery over the enemy |
| | 临阵磨枪 | make preparations at the last moment |
| | 论资排辈 | assign a job in accordance with qualifications and seniority |
| | 迷途知返 | realize one's errors and mend one's ways |
| | 弃暗投明 | to renounce a bad cause and join the camp of justice |
| | 浅尝辄止 | dip into or make a cursory study of something |
| | 三思而行 | think thrice before you act |
| | 杀一儆百 | execute one person as a warning to others |
| | 舍己为人 | sacrifice one's interests for others |
| | 随机应变 | adapt oneself quickly to changing condition |
| | 投鼠忌器 | fear the repercussions of certain actions |
| | 玩物丧志 | excessive preoccupation with trivia saps the will |
| | 望梅止渴 | console oneself with vain hopes |
| | 望洋兴叹 | feel powerless and frustrated |
| | 委曲求全 | make concessions in order to accommodate to a situation |
| | 信手拈来 | (of writing) have the words at hand |

| | |
|-----------|--|
| 一蹶不振 | unable to recover after a set-back |
| 一劳永逸 | accomplish something once to save future trouble |
| 越俎代庖 | go beyond one's duties to meddle with another's affairs |
| 造谣惑众 | cheat or mislead the people with rumours of one's own creation |
| 斩草除根 | stamp out the root of trouble |
| 仗势欺人 | bully others because one has power or powerful connections |
| 知过必改 | always correct an error when one becomes aware of it |
| 助纣为虐 | help the wicked perpetuate wicked deeds |
| 自作自受 | bear the ill consequence of one's own doings |
| 做贼心虚 | have a guilty conscience |
| 不慌不忙 | without hurry or bustle |
| 残兵败将 | remnants of a defeated army |
| 沧海桑田 | time brings great changes to the world |
| 愁眉苦脸 | pull a long face |
| 唇枪舌剑 | exchange heated words |
| 粗心大意 | be careless |
| 大彻大悟 | be greatly discerning and apprehending with |
| 东张西望 | glance this way and that |
| 多谋善断 | be resourceful and decisive |
| 丰功伟绩 | a great achievement |
| 凤冠霞帔 | chaplet and official robes |
| 高视阔步 | carry oneself proudly |
| 鸿篇巨制 | monumental work |
| 胡作非为 | act wildly against law and public opinion |
| 尖嘴猴腮 | have a mouth that sticks out and a chin like an ape's |
| 兼收并蓄 | to swallow anything and everything (uncritically) |
| 娇生惯养 | be pampered and spoiled |
| 惊涛骇浪 | terrifying waves |
| 苦心孤诣 | make extraordinary painstaking efforts |
| SMSM 老谋深算 | be experienced and astute |
| 漫山遍野 | scattered over hill and dale |
| 名存实亡 | exist in name only |
| 明眸皓齿 | (usually of a woman) have beautiful features |
| 能工巧匠 | skillful craftsman |
| 奴颜婢膝 | servile |
| 奇装异服 | bizarre dress |
| 起承转合 | introduction, elucidation of the theme |
| 千差万别 | differ in thousands ways |
| 轻举妄动 | act recklessly |
| 穷凶极恶 | be extremely violent and wicked |
| 如痴如醉 | out of one's mind |
| 三从四德 | the three obediences and four virtues imposed on women |
| 三皇五帝 | Three August Ones and the Five Lords |
| 三头六臂 | super ability |
| 深居简出 | live a secluded life |
| 生龙活虎 | full of vigor and vitality |
| 死去活来 | (of crying, beating etc.) half dead |
| 同舟共济 | pull together in times of trouble |

| | | |
|------|------|---|
| | 突飞猛进 | make phenomenal progress |
| | 文韬武略 | military expertise |
| | 闲情逸致 | be in a leisurely and carefree mood |
| | 新仇旧恨 | new hatred piled on the old |
| | 雄才大略 | great talent and bold vision |
| | 血雨腥风 | a foul wind and a rain of blood |
| | 一曝十寒 | do something in fits and starts |
| | 优柔寡断 | infirm of purpose |
| | 油嘴滑舌 | a smooth tongue |
| | 远见卓识 | foresight and sagacity |
| | 长治久安 | a long and peaceful reign |
| | 真才实学 | truly learned and genuinely talented |
| | 胆战心惊 | be terror-stricken |
| | 弹尽粮绝 | run out of ammunition and food |
| | 德高望重 | enjoy high prestige and command universal respect |
| | 耳闻目睹 | that which one sees and hears |
| | 风驰电掣 | move at great speed |
| | 风吹雨打 | exposed to the wind and rain |
| | 鬼使神差 | a curious coincidence |
| | 国富民强 | The nation is prosperous and the people are strong and powerful |
| | 海枯石烂 | strong-willed and determined (often suggesting ever lasting love) |
| | 海阔天空 | as boundless as the sea and sky |
| | 寒来暑往 | with the passage of time |
| | 魂牵梦绕 | be carried away into a region of dreams |
| | 酒足饭饱 | feast to satiety |
| | 口快心直 | blunt, outspoken, but honest |
| | 口是心非 | say one thing and mean another |
| | 理直气壮 | being self-confident on the strength of one's being right |
| | 柳暗花明 | hard time change into better time |
| SVSV | 龙盘虎踞 | a strategically situated place |
| | 龙吟虎啸 | dragons singing and tigers roaring |
| | 龙争虎斗 | a fierce struggle between two evenly matched opponents |
| | 面红耳赤 | be flushed with shame or anger |
| | 面黄肌瘦 | emaciation with sallow complexion |
| | 名正言顺 | perfectly justified |
| | 男尊女卑 | Man is superior to woman |
| | 日新月异 | never-ending changes and improvement |
| | 山盟海誓 | lovers' vows |
| | 山穷水尽 | be at the end of one's tether |
| | 身强力壮 | strong |
| | 神出鬼没 | (usually said of guerillas) appear and disappear mysteriously |
| | 势均力敌 | evenly matched |
| | 天旋地转 | very dizzy |
| | 天造地设 | (of a couple) ideally matched |
| | 头昏脑涨 | feel one's head swimming |
| | 头重脚轻 | top-heavy |
| | 土崩瓦解 | in total disintegration |
| | 心安理得 | have peace of mind |

| | |
|-------|---|
| 心狠手辣 | heartless and cruel |
| 心惊胆战 | tremble with fear |
| 心余力绌 | one's ability falls short of one's wishes |
| 心猿意马 | indecisive or restless |
| 烟消云散 | vanish completely |
| 言简意赅 | brief and to the point |
| 言听计从 | always follow sb.'s advice |
| 阴差阳错 | a strange combination of circumstances |
| 语重心长 | be sincere and earnest |
| 源远流长 | have a long history |
| 纸醉金迷 | (a life of) luxury and dissipation |
| 昼伏夜行 | conceal oneself by day and march by night |
| 自轻自贱 | belittle oneself |
| 罪大恶极 | a heinous crime |
| <hr/> | |
| 安家立业 | set up a home and establish a business |
| 安居乐业 | live and work in peace and contentment |
| 安营扎寨 | pitch a camp |
| 卑躬屈膝 | behave servilely or obsequiously |
| 除暴安良 | suppress the evil and pacify the good |
| 传宗接代 | to carry on the Stewart name |
| 待人接物 | the manner by which one deals with people |
| 当家作主 | wear the breeches |
| 盗名欺世 | gain fame by deceiving the public |
| 妒贤嫉能 | be jealous of the worthy and the able |
| 断子绝孙 | die sonless |
| 发号施令 | order people about |
| 奉公守法 | law-abiding |
| 扶危济困 | help those in danger and aid these in distress |
| 改头换面 | dish up the same old stuff in a new form |
| 感恩戴德 | be deeply grateful |
| 顾此失彼 | unable to attend to everything at one time |
| 含冤负屈 | suffer an unjust grievance |
| 行云流水 | a natural and flowing style of writing etc. |
| 回肠荡气 | (of music, poems etc.) inspirit and soul-stirring |
| 建功立业 | make contributions and start one's career |
| 开天辟地 | the first time in history |
| 口传心授 | oral teaching inspires true understanding |
| 立身处世 | the way of conducting oneself in society |
| 弄巧成拙 | outsmart oneself |
| 弄虚作假 | resort to deception |
| 披肝沥胆 | talk without reserve |
| 铺天盖地 | cover the sky and the earth |
| 强词夺理 | argue irrationally |
| 如饥似渴 | seek something eagerly |
| 如胶似漆 | be deeply attached to each other |
| 丧心病狂 | out of one's right mind, unscrupulous, perverse |
| 审时度势 | study and weigh the situation |
| 谈天说地 | chat about everything under the sun |

VOVO

| | |
|------|--|
| 偷梁换柱 | replace the beams and pillars (with inferior ones) |
| 涂脂抹粉 | doll up, whitewash |
| 无牵无挂 | carefree |
| 无情无义 | (saying) to have no emotion or sense of justice |
| 嫌贫爱富 | despise the poor and curry favor with the rich |
| 兴师动众 | mobilize one's forces |
| 幸灾乐祸 | rejoice in the calamity of others |
| 嘘寒问暖 | show a kind concern for another's comfort |
| 循规蹈矩 | observe all rules and regulations |
| 扬眉吐气 | feel proud and elated |
| 忆苦思甜 | call to mind past sufferings and think over the good times |
| 游山玩水 | make a sightseeing tour |
| 有眼无珠 | lack discerning power |
| 斩钉截铁 | speak or act with determination and courage |
| 张牙舞爪 | make threatening gestures like a beast of prey |
| 震天动地 | a loud noise rent the air |

Note. VO, SM, SV, and VV refer to *chengyus* (CYs) (Chinese four-character idioms) whose two two-character words form verb-object units, structures of modification, subject-verb units, and verb-verb units, respectively, and VOVO, SMSM, and SVSV CYs, the first and the second two one-character words of which both form VOs, SMs, and SVs, respectively

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