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
		SMSM	.006
COM	SM	VO	.006
		SVSV	.006
		VV	.001
		VOVO	.001
		VO	.003
	SVSV	VOVO	.003
		SMSM	.001
		VOVO	.001
	FAM	VO	.001
		VV	.001
KNO	SM	VOVO	.004
		SMSM	.001
		VOVO	.001
		SV	.001
		SMSM	.001
	SUB	VO	.001
		VV	.005
		VOVO	.005
		VOVO	.001
		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 literality. 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, literality, 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 literality 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 literality 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 literality and compositionality. However, the present study seems to provide a strong piece of evidence that neither knowledge, familiarity, and subjective frequency nor literality 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
VO	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

	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

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
VOVO 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

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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