"He killed the chicken, but it didn't die": An empirical study of the lexicalization of state change in Mandarin monomorphemic verbs

Online Proceedings of UK-CLA Meetings
http://uk-cla.org.uk/proceedings
Vol 4: 36 – 47

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Abstract

Languages vary systematically in how semantic information is "packaged" in verbs and verb-related constructions (Levin & Rappaport Hovav, 1995; Pinker, 1989; Talmy, 1985, 2000). Mandarin contrasts typologically with English in its lexicalization of state change (Talmy, 2000). The majority of Mandarin monomorphemic verbs is moot about or only implies a state change, whereas English has many monomorphemic verbs (e.g., kill, break) that entail the fulfillment of a state change. This study investigates empirically if there is a nuanced lexicalization of state-change implicature in Mandarin monomorphemic verbs and what the Mandarin-specific lexicalization reveals about the typology of the crosslinguistic encoding of state-change events. Two experimental studies were conducted to elicit adult native Mandarin speakers' semantic knowledge of monomophemic Mandarin verbs. The first study was an online rating task about the acceptability of sentences that expressed a failure of attainment of a state-change (e.g. ta sha le ji, ke shi ji mei si 'he killed the chicken, but it didn't die') and the second study was a multiple-choice task that probed the preferred interpretation of monomorphemic state-change verbs. The results of both studies reveal a significant effect of verb types on the acceptability of the target sentences and the preferred interpretations, and post hoc comparisons show a cline of state-change implicature in the target verbs. This study is the first to show nuanced state-change implicature among monomorphemic verbs in Mandarin and has implications for crosslinguistic studies of lexicalization of state change.

Key words: event representation, state change, lexical semantics, Mandarin

1. Introduction

The meaning of a verb is generally assumed to be internally structured, and it is often represented as a set of semantic components combined in a certain configuration (Levin & Rappaport Hovav, 1995; Pinker, 1989; Talmy, 1985). Across languages, there is variation in how this information is "packaged" (i.e. lexicalized) in verbs and verb-related constructions (Talmy, 1985, 2000). Native speakers of different languages thus have to discover how to pack or unpack the relevant information in a specific language, e.g. to isolate the components within a combination and identify their contribution to the meaning of the whole, and to discover the regularities in how the forms and their meanings are combined (Bowerman, 1982; Chen, 2008, 2016; Clark, 1993; Pinker, 1989; Tomasello, 1992). This study aims to explore the language-

specific lexicalizations in the semantic domain of state change from a crosslinguistic perspective. Lexicalization is defined as the systematic association of particular components of meaning with particular morphemes or constructions (Talmy, 1985, 2000). State change is a basic type of events that human beings experience and talk about every day.

State change events: A state-change event consists of a change in or the unchanging continuation of a certain property associated with a particular object or situation (Talmy, 2000). Linguistic representations of these situations include *The door swung shut* (change) and *The door is shut* (stasis). Talmy observes that the way state change is expressed is analogous to the way motion is expressed. For example, the entity that undergoes a state change is often presented as a Figure that (metaphorically) moves to a state specified by a satellite or other verb complement, e.g., *She entered (a state of) ill health, She became ill* (the static counterparts of these are expressions like *She is in ill health*) (Talmy, 2000, p. 238). Talmy suggests that this conceptual analogy motivates a syntactic and lexical analogy: to a great extent, state change is expressed in a language by the same constituent type as Path, and often by homophonous forms. Thus, in accordance with the general typology (Talmy, 2000), the core schema of an event of state change appears in a satellite in satellite-framed languages, and in the main verb in verb-framed languages. For example, in the satellite-framed English construction *The door swung/creaked/slammed shut*, the state change is represented by the adjectival complement *shut* (i.e., a satellite), whereas the Manner in which the state change takes place is represented by the main verb. Similarly in *He choked to death on a bone*, the state change 'die' is represented by the satellite *to death,* while the causal event is represented in the main verb *choke*. In verb-framed languages like Spanish, in contrast, the state change 'die' is expressed in the main verb, while the Manner or Cause is encoded in an adverbial phrase, as in *Murió atragantado por un hueso* 'he died choked by a bone'.

Mandarin state-change verbs: Mandarin typically uses resultative verb compounds (RVCs) to encode state changes (which include the completion of a causal action and the resulting state change of the affected object). Mandarin monomorphemic counterparts of English verbs like *pick, break,* and *kill* do not entail a state change. This is illustrated by the feasibility of (1):

(1) *Ta*	***sha***	*le*	*ji,*	*danshi*	*ji*	*mei*	***si.***
He	do.killing	PFV	chicken	but	chicken	not	die

'He attempted to kill a chicken, but it did not die.'
(PFV = perfective aspect marker)

The RVC *sha-si* 'kill-die' entails a state change of becoming dead, which clashes with the claim in the second clause that the chicken did not die, as illustrated by the semantic anomaly in (2) below.

(2) *#Ta*	***sha-si***	*le*	*ji,*	*danshi*	*ji*	*mei*	*si.*
He	do.killing–die	PFV	chicken	but	chicken	not	die

'He killed the chicken, but it did not die.' (e.g., he shot it, but it did not die.)
(The symbol cross-hatch (#) is used to indicate semantic anomaly (as opposed to *, which indicates ungrammaticality).

In prior studies of children's acquisition of the meaning of state-change verbs (Chen, 2008, 2016), I found that Mandarin children showed adult-like interpretation of RVCs as entailing a state change from a young age, in sharp contrast to the difficulties that English and German children experienced in figuring out the state change meaning in state-change verbs. English and German children tended to treat state-change verbs as encoding either an action or implying a state change. But Mandarin children had trouble distinguishing exactly where the state-change meaning is encoded inside the RVCs. They tended to treat the first verb (V1) of an RVC as entailing a state change and they also do not treat all V1s as equally entailing a state change. So what factors contribute to Mandarin children's misinterpretation of monomorphemic action verbs as state-change verbs? And why do Mandarin children show varied interpretations of different monomorphemic verbs? To solve these puzzles, it is important to examine and understand the input, i.e. adult speakers' semantic knowledge of the meanings of the monomorphemic verbs in Mandarin. Tai (1984) observed that the strength of the implicature of state change varies across Mandarin action verbs, e.g. the verb *sha* 'do.killing.action' has an implicature stronger than that of many other action verbs. No studies have systematically explored the lexical semantics of monomorphemic verbs in Mandarin. This study aims to address this issue empirically. Two main research questions are investigated in this study:

1. Is there a nuanced state-change implicature lexicalization in Mandarin monomorphemic action verbs?
2. If yes, how does the Mandarin-specific lexicalization reveal about the typology of crosslinguistic encoding of state-change events?

2. The current study

2.1. Study 1: Semantic acceptability rating survey

A semantic acceptability rating survey was conducted to investigate if native speakers of Mandarin interpret monomorphemic action verbs as entailing or implying a state change.

Participants: The participants of the semantic acceptability rating survey were 100 adult native speakers of Mandarin (mean age 19.5 years, age range 18 – 23). Only 84 out of the 100 participants completed all the questions in the online survey and were included in the analysis. All the participants speak mainly the standard Mandarin (Putonghua) daily.

Stimuli. The rating task included 16 target sentences that contained 8 verbs tested in Chen (2008, 2016) (i.e. *guan* 'do.closing', *zhai* 'do.picking', *jia* 'hold.tightly', *dao* 'pour', *chui* 'hammer', *nao* 'make.noise', *da* 'shoot', and *chui* 'blow') and 8 frequent action verbs (i.e. *sha* 'do.killing', *si* 'do.tearing', *qie* 'do.cutting', *bai* 'break.by.hand', *kao* 'bake', *chi* 'eat', *zhu* 'cook', and *xi* 'wash'), which are often used to describe typical state-change events involving the destruction or creation of an object. Each target sentence was composed of two clauses, the first clause stating someone did an action, and the second clause stating that the intended result did not occur. Table 1 shows 8 examples of the

target sentences. Chinese characters are used to illustrate the actual sentences in the experiment and target verbs are highlighted in bold below the character line in the Pinyin transcription, the official system used in P. R. China to transcribe Mandarin into Roman alphabet.

Acceptance of the target sentences suggests that the resultant state change is not crucial to the meaning of the target verb and thus can be cancelled. Rejection of these sentences, on the other hand, indicates the opposite. Three warm-ups and seven control sentences were also included to ensure that the participants understood the rating task and did not show a bias or reject all the test sentences equally. The rating survey was conducted online via *qualtrics.com* and the order of the test sentences for each participant was randomized by the *Qualtrics* program.

Procedure: Each participant was instructed to read each sentence carefully and rate them on a 5-point scale one by one, 1 being "completely acceptable", 2 "acceptable", 3 "unsure", 4 "unacceptable" and 5 "completely unacceptable". Before they started the rating task, each participant completed a brief background survey, which gathered information about their age, gender, education level, and language background.

张三用钳子夹了那个核桃，可是核桃没开。
*Zhangsan yong qianzi **jia** le na ge hetao, keshi hetao mei kai.*
'Zhangsan craked the walnut with a nutcracker, but the walnut didn't break.'
李四用枪打了张三，可是张三没死。
*Lisi yong qiang **da** le Zhangsan, keshi Zhangsan mei si.*
'Lisi shot Zhangsan, but Zhangsan didn't die.'
李四吹了蜡烛，可是蜡烛没灭。
*Lisi **chui** le lazhu, keshi lazhu mei mie.*
'Lisi blew out the candle, but the candle didn't go out.'
张三在杯子里倒了水，可是杯子里的水没满。
*Zhangsan zai beizi li **dao** le shui, keshi beizi li de shui mei man.*
'Zhangsan poured water into the cup, but the cup was not filled.'
张三用锤子锤了那个盘子，可是盘子没碎。
*Zhangsan yong chuizi **chui** le na ge panzi, keshi Lisi mei xing.*
'Zhangsan used a hammer to break the plate, but the plate didn't break.'
张三用闹钟闹了李四，可是李四没醒。
*Zhangsan yong naozhong **nao** le Lisi, keshi Lisi mei xing.*
'Zhangsan used an alarm clock to wake Lisi, but Lisi didn't wake up.'
张三关了门，可是门还开着。
*Zhangsan **guan** le men, keshi men hai kai zhe.*
'Zhangsan closed the door, but the door was still open.'
张三摘了树上的苹果，可是苹果还在树上。
*Zhangsan **zhai** le shu shang de pingguo, keshi pingguo hai zai shu shang.*
'Zhangsan picked the apple on the tree, but the apple was still on the tree.'

Table 1. Sample target sentences in the rating task

Analysis and results: The rating score for each target sentence by each participant was recorded and analysed. The total responses received were 1344 (84 participants x 16 target sentences). The frequency counts of the ratings, the means, and the standard deviations (SD) for each target sentence are summarized in Table 2. The overall rate of acceptance of the target sentence is 64% (=870/1344), which suggests that the Mandarin speakers tend to accept the cancelation of a resultant state even though the causal action has occurred, i.e. they generally treat the target verbs as not entailing a state change.

		Rating frequency counts							
Verbs		**1**	**2**	**3**	**4**	**5**	**Total**	**Mean**	**SD**
zhai	'do.picking'	9	10	11	29	25	84	3.61	1.32
guan	'do.closing'	11	13	12	28	20	84	3.39	1.35
sha	'do.killing'	14	17	11	20	22	84	3.23	1.46
qie	'do.cutting'	14	18	11	29	12	84	3.08	1.35
nao	'make.noise'	13	37	9	20	5	84	2.61	1.18
si	'do.tearing'	22	33	8	13	8	84	2.43	1.29
chi	'eat'	26	32	3	17	6	84	2.35	1.3
bai	'break.by.hand'	28	32	3	19	2	84	2.23	1.21
kao	'do.baking'	32	32	6	12	2	84	2.05	1.12
zhu	'do.cooking'	29	37	5	12	1	84	2.04	1.05
chui	break.by.hammer	36	30	6	8	4	84	1.98	1.15
dao	'pour'	35	31	7	9	2	84	1.95	1.07
chui	'blow'	37	31	5	8	3	84	1.92	1.1
da	'shoot'	37	32	4	9	2	84	1.89	1.06
xi	'wash'	31	41	6	4	2	84	1.87	0.92
jia	'hold.tightly'	35	35	6	8	0	84	1.85	0.92
Total		409	461	113	245	116	1344		
Proportion		30%	34%	8%	18%	8%			

Table 2. Frequency counts, means, and standard deviations of the ratings by verb

Table 2 also reveals that the acceptance rating varies by the specific verb. For example, sentences containing the verbs such as *zhai* 'do.picking', *guan* 'do.closing', *sha* 'do.killing', and *qie* 'do.cutting' were rated with much higher means (3.61 – 3.08) than the rest of the verbs, indicating a strong preference for rejecting the scenarios where the state change failed to occur. Verbs such as *jia* 'hold.tighly', *xi* 'wash', *da* 'shoot', *chui* 'blow', *dao* 'pour', and *chui* 'break.by.hammer' were rated with a low mean scores (1.85-1.98), indicating a preference for accepting the events where the state change failed to occur.

A one-way ANOVA was conducted to see if the 16 target sentences differed significantly based on the participant' rating scores. The result shows a significant effect of the variable *sentence* on the ratings ($F = (15, 1328) = 21.37$, $p < .001$). Post-hoc comparisons using the Tukey HSD test reveal significant differences in the rating between sentences containing four sets of verbs ($p < .05$): (1) *zhai* 'do.picking' and *guan* 'do.closing', (2) *sha* 'do.killing', *qie* 'do.cutting', and *nao* 'make.noise', (3) *si* 'tear', *chi* 'eat', *bai* 'break.by.hand', *kao* 'bake', and *zhu* 'cook', and (4) *chui* 'hammer', *dao* 'pour', *chui* 'blow', *da* 'shoot', *xi* 'wash', *and jia* 'hold.tightly'. The sentences containing the verbs *zhai*

'do.picking' and *guan* 'do.closing' were rated as more likely to be associated with a strong state-change implicature – if the resultant state change did not occur, participants tended to rate the sentence as unacceptable. The sentences containing the verbs *sha* 'do.killing', *qie* 'do.cutting', and *nao* 'make.noise' received significantly lower rejection than *zhai* 'do.picking' and *guan* 'do.closing', but a higher rejection than the sentences containing the verbs *si* 'tear'*, chi 'eat', break, kao* 'bake'*,* and *zhu* 'cook' which received significantly higher rejection than the verbs *chui* 'hammer', *dao* 'pour', *chui* 'blow'*, da* 'shoot', *xi* 'wash'*, and jia* 'hold.tightly'. This result suggests that Mandarin speakers are more likely to reject the cancelation of a state change with verbs in set (1) than the verbs in the other three sets, and that they are also more likely to reject the cancelation of state change with verbs in set (2) than (3) and (4), and so on and so forth. Thus the result reveals a continuum of state-change implicature from strong state-change implicature (verbs like *zhai* 'do.picking' and *guan* 'do.closing') to weak state-change implicature verbs (e.g. *xi* 'wash', *chui* 'blow', *dao* 'pour'), with intermediately strong/weak state-change implicature verbs in between (e.g. verbs like *sha* 'do.killing', *qie* 'do.cutting', *nao* 'make.noise', etc.)

2.2. Study 2: Multiple-choice task of verb meaning

The continuum of state-change implicature revealed in Study 1 confirms Talmy's (2000) proposal that Mandarin monomorphemic verbs are either moot or at the best only imply a state change. It also provides empirical evidence to support Tai's (1984) intuitive observation of the varied degree of the implied state change among Mandarin action verbs. A further question remains: what is the default or preferred interpretation of a monomorphemic verb even if speakers generally accept the cancellation of the resultant state change? A methodological concern with Study 1 is that it might be quite rare to encounter sentences that contained a second clause encoding a failed state-change event. It is also unclear how frequently a failed state-change event may even occur and be talked about in real life. Therefore, a multiple-choice task was designed and conducted to elicit the preferred interpretation of the monomorphemeic action verbs in Mandarin.

Participants: A group of 74 native speakers of Mandarin participated in the study (mean age 20.5, age range 18 – 23). Only 65 participants complete all the questions in the survey and were thus included in the analysis. All the participants speak mainly the standard Mandarin (Putonghua) daily.

Stimuli: The multiple-choice task included a total of 20 target sentences that contained the same 16 verbs in Study 1 and 4 common action verbs (*mai* 'buy'*, xie* 'write'*, kan* 'watch', and *qu 'go'*). The 4 extra verbs were included due to a related study of the second language acquisition of the verbal semantics by American learners of Mandarin. These 4 verbs are among the first semester vocabulary of Mandarin for foreign language learners (Liu, Yao, Bi, Ge, & Shi, 2008).

Each test sentence is composed of a simple clause, in which the target verb is used with the perfective aspect marker *le* to describe that someone has completed an action. Three choices are provided to tap participants' preference for the most likely result of the action: attainment, no attainment, and moot

attainment of a state change. Two sample survey questions are illustrated below (PFV = perfective aspect marker, CLF = classifier):

(3) 张三杀了一只鸡。	(Zhangsan kill PFV one CLF chicken)
a. 鸡死了。	(chicken die PFV)
b. 鸡可能死了，也可能没死。	(chicken may die PFV, may not die PFV)
c. 鸡没死。	(chicken no die)
(4) 张三洗了衣服。	(Zhangsan wash PFV clothes)
a. 衣服洗干净了。	(Clothes clean PFV)
b. 衣服可能洗干净了，也可能没洗干净。	(Clothes may clean PFV, may not clean)
c. 衣服没洗干净。	(Clothes not wash clean)

In (3) and (4), for example, choice *a* is considered *attainment* of a state change (i.e. the resultant state change of death has been realized), choice *b moot attainment* (i.e. the resultant state change of death may or may not have occurred), and choice *c no attainment* (i.e. the resultant state change of death did not occur).

Procedure: The multiple-choice task was also conducted in an online survey via *qualtrics*.com. Participants were instructed to read each sentence carefully and choose the most likely result of the completed action as entailed in the test sentence. The order of the choices for each verb and the order of the target sentences were both randomized by the *Qualtrics* program. Similar to Study 1, each participant also completed a brief background survey, which gathered information about their age, gender, education level, and language background.

Analysis and results: The choices for each target sentence were recorded and coded into one of the three categories, i.e. attainment, no attainment, or moot attainment. The total number of responses is 1300 (65 participants x 20 target sentences). Figure 1 presents the proportions of preferences for the three choices for each target sentence. For ease of presentation, the Mandarin verbs are shown in their approximate English counterparts in Figure 1. The choice of no attainment is overall very minimal (mean proportion 3%), which suggests that speakers attribute a certain state-change meaning to the target verbs and do not treat them as purely action verbs. Figure 1 also clearly shows a decreased preference for attainment and an increased preference for moot attainment for the verbs from the left to the right ends on the horizontal axis. For example, verbs like *mai* 'buy', *sha* 'kill', *xie* 'write', *si 'tear', guan* 'close', and *zhai* 'pick' received about 90% or above the choice of attainment, whereas the verbs like *da* 'shoot' and *dao* 'pour' received only 9% or 14% respectively the choice of attainment.

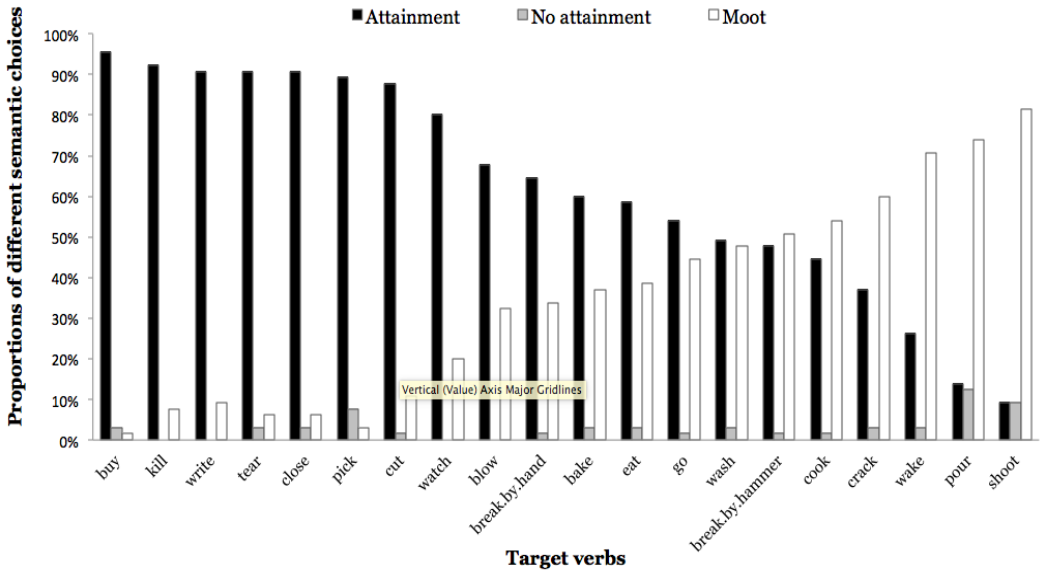

Figure 1. The distribution of preference for attainment of state change by verb

A Chi-square analysis of independence was conducted to examine the relation between the preferred interpretations (choices) and the target verbs. The result shows a significant effect of *verb* on the preference ($X^2(38, N=1300) = 422.57$, $p < .001$). This confirms that the speakers' interpretation of the verb meanings is significantly related to specific verbs.

A logistic regression analysis was further conducted to evaluate the effects of two predictor variables, *verb* and *participant*, on the choice response (i.e. attainment, no attainment, and moot attainment). The variable *participant* was included as a predictor variable to see if the preferred interpretations of the verb meanings are also individual-specific, as in addition to verb-specific. The results in Table 3 show a significant effect of *verb* ($\beta = 2.188$, *z*-value = 24.175, $p < .000$), but no significant effect of *participant* ($\beta = 0.003$, *z*-value = 0.639, $p = 0.424 > .05$) (For ease of presentation, the Mandarin verbs are shown in their approximate English counterparts).

Table 3 also reveals that 7 verbs, *sha* 'do.killing', *qie* 'do.cutting', *si* 'do.tearing', *guan* 'do.closing', *zhai* 'do.picking', *mai* 'buy', and *kan* 'watch', do not differ significantly in the preferred meaning of attainment of a state change from the verb *xie* 'write', the default base verb selected for the pairwise comparison in the logistic regression analysis. In contrast, the remaining 12 verbs are significantly less likely to receive interpretations of an attainment of a state change ($p < .00$). The results thus confirm the *verb* effect in the prior Chi-square analysis and the pairwise comparisons corroborate the intuitive observation in Figure 1 that the difference in the proportions of attainment readings is significant between the first 8 verbs (85% or above choice of attainment) and the rest of the verbs.

			95% Confidence Interval				
	Estimate	Std. Error	Lower	Upper	*z*-value	*p*-value	
(Intercept)	2.188	0.445			24.175	0.000	***
Participant	0.003	0.004	0.996	1.010	0.639	0.424	
verb=bake	-1.801	0.501	0.062	0.441	12.928	0.000	***
verb=shoot	-4.468	0.608	0.003	0.038	54.046	0.000	***
verb=pour	-3.963	0.562	0.006	0.057	49.748	0.000	***
verb=wake	-3.283	0.514	0.014	0.103	40.791	0.000	***
verb=crack	-2.773	0.501	0.023	0.167	30.635	0.000	***
verb=cook	-2.475	0.497	0.032	0.223	24.830	0.000	***
verb=hammer	-2.350	0.496	0.036	0.252	22.419	0.000	***
verb=wash	-2.256	0.497	0.040	0.278	20.578	0.000	***
verb=go	-2.099	0.497	0.046	0.325	17.853	0.000	***
verb=eat	-1.868	0.500	0.058	0.411	13.960	0.000	***
verb=break	-1.640	0.503	0.072	0.520	10.633	0.001	***
verb=blow	-1.547	0.504	0.079	0.572	9.418	0.002	***
verb=watch	-0.900	0.529	0.144	1.147	2.893	0.089	
verb=buy	1.841	1.095	0.737	53.956	2.826	0.093	
verb=pick	1.081	0.837	0.571	15.209	1.667	0.197	
verb=close	0.405	0.671	0.402	5.590	0.364	0.546	
verb=tear	0.405	0.671	0.402	5.590	0.364	0.546	
verb=cut	-0.189	0.587	0.262	2.614	0.104	0.748	
verb=kill	0.199	0.633	0.353	4.218	0.099	0.753	

Table 3. Effects of two predictor variables, *verb* and *participant*, on the choice of attainment of state change

3. Discussion and conclusions

Studies 1 and 2 complement each other in revealing the semantic knowledge of the monomorphemic action verbs among native Mandarin speakers. The results, taken together, seem to suggest a paradox. Mandarin speakers generally accept the cancelation of an implied state change in monomorphemic verbs (Study 1), which suggests that the state-meaning is not entailed, but they prefer the meaning of the attainment of a state change when no cancelation is explicitly mentioned (Study 2). This paradox may be explained by speakers' remarkable sensitivity to the strength of the state-change implicature of each verb – for verbs with a stronger state-change implicature (e.g. verbs like *zhai* 'do.picking', *guan* 'do.closing', *sha* 'do.killing', *qie* 'do.cutting', *si* 'do.tearing'), the cancelation of the result is more likely to be rejected and speakers are more ready to assign an entailed state-change meaning to these verbs, whereas for verbs with a weaker state-change implicature (e.g. *chui* 'blow', *xi* 'wash', *dao* 'pour'), the cancellation of the result is more likely to be accepted and speakers are more ready to assign a moot state-change meaning. It seems that the subtle strength of the state-change implicature plays a crucial role in speakers' interpretation of the verb meanings. The results thus provide empirical evidence that there is a nuanced state-change implicature lexicalized in Mandarin monomorphemic verbs and speakers of Mandarin are sensitive to the cline of the implicature of state change.

The existence of a continuum in the lexicalization of state change in a language is not unique to Mandarin. Based on his analysis of English verbs, Talmy (2000) argued that the implicature associated with English implied-fulfillment verbs follows a cline. For example, the verbs in the sentence *He choked/stabbed/strangled/drowned him* show an increasingly strong implicature of the realization of the state change from alive to dead: *choke* and *stab* imply death only weakly; *strangle* entails death for some speakers but not for others; and *drown* clearly entails death and is an "attained fulfillment verb' by Talmy. Mandarin monomorphemic action verbs, i.e. implied-state-change verbs and moot-fulfillment verbs, follow a similar cline.

How does the Mandarin-specific lexicalization reveal about the crosslinguistic encoding and representation of state-change events? The comparisons between English and Mandarin shows that the conceptual domain of state change can be divided into a three-way distinction, including moot, implied, and entailed state change (cf. Talmy, 2000). But each language offers different lexicalization options. Germanic languages like English encode state change in a number of ways: (1) with monomorphemic verbs (e.g. *pick, break, crack*), which conflate both a causal action and resultant state change; (2) by combining a monomorphemic state-change verb with a particle or complement phase which adds further information about the state change encoded by the verb (e.g. *pick off, break into pieces*); and (3) by combining a verb that only specifies an action with a particle or a complement phrase that specifies the result state (e.g. *blow out (a candle)*). Mandarin, on the other hand, has very few monomorphemic state-change verbs like English *pick, break,* and *kill*, and RVCs as a whole constitute the semantic counterpart of an English monomorphemic state-change verb. The state-change meaning of an RVC is entailed and indefeasible (e.g. *sha-si* 'kill-die'), just as it is in English monomorphemic state-change verb. Mandarin RVCs, by their composition, neatly divide a state-change event into two subevents – the cause and the result, each encoded with a separate verb, i.e. the first verb indicating the causal action and the second verb the resultant state change. The typology of lexicalization of state change can be schematized as in Figure 2.

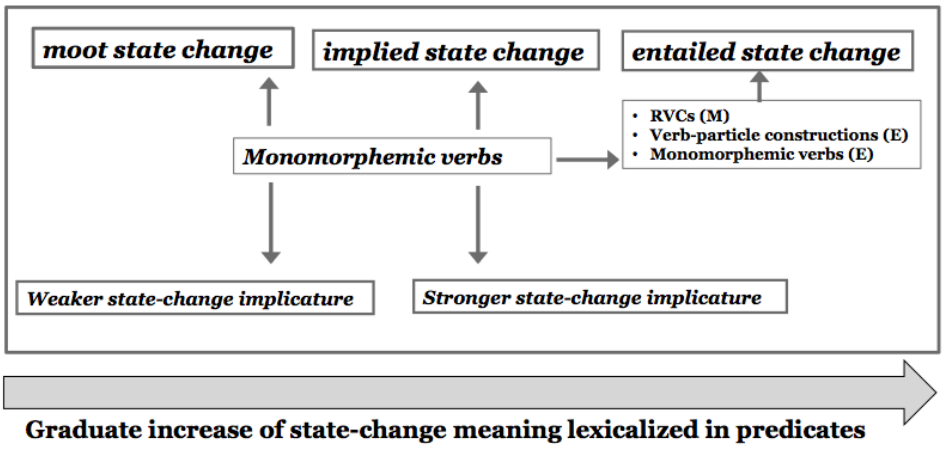

Figure 2. A schematic illustration of the typology of state-change lexicalization in Mandarin (M) and English (E)

Talmy (2000) suggests that in the domain of state change, English exhibits a mixed system of conflation characteristic of both the satellite-framed pattern and the verb-framed pattern, and both patterns are colloquial. For example, the verb-framed pattern is seen in many monomorphemic state-change verbs that encode state change directly, such as *break* in *He broke the door (by kicking it)*. Talmy treats Mandarin as a "far more a thoroughgoing exemplar of the satellite-framed type" (Talmy, 2000: 241), since state change is consistently encoded in the satellite. What Talmy calls satellites are the complement (i.e., second) verbs of RVCs, such as *po* 'be.broken' in *ti-po* 'kick-be.broken'.

To conclude, this study is the first to empirically show the nuanced state-change implicatures and the existence of such a continuum among Mandarin monomorphemic verbs. The finding corroborates Talmy's (2000) proposal that English implied-fulfillment verbs follow a cline in the strength of the state-change implicature. This study further argues for a typological implicational hierarchy in the event representation of state change crosslinguistically.

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*This research was supported by the Provost's award for research release time from the California State University at Fresno. I gratefully acknowledge Xiaolu Yin and Ying Zhang for invaluable assistance in recruiting the participants of the study. I also thank the participants of the 6th UK Cognitive Linguistics who offered helpful comments and suggestions. Part of the result of the first study was reported in Chen (2016).