

# A Cognitive Account of the Lexical Polysemy of Chinese *Kai*

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## Abstract

Since polysemy has multiple but related senses, finding any coherent system would seem impossible. But its senses are not random. When we look at inferences among them, it becomes clear that there must be a systematic structure of some kind. Based on the prototype theory, which views lexical items as constituting natural categories of senses, the present work aims at proposing solutions to problems resulting from the polysemy of *kai*. After an in-depth analysis of the polysemy *kai*, we find that the links between polysemy senses are defined not only by shared properties (i.e. analogy), but also by conceptual connections (e.g. metonymy or metaphor). This study suggests that polysemy reflects human's categorization of things and can be successfully accounted for by a cognitive approach.

## 1. INTRODUCTION

It is very common for a single word to have multiple meanings. Take the Chinese word *zou* 'walk', for example. It is considerably different for *Zhangsan zou banmaxian* 'Zhangsan to walk the zebra crossing' and for *Zhangsan zou niourou shengyi* 'Zhangsan to run a beef business'. This single word with two senses is so related that we would hardly discern the difference. Such case is called polysemy, which is entered once but not separately in the dictionary with its multiple meanings in lexicography. But not all senses of a polysemous word look closely related in a systematical way, for example,

- (1) Zhengfu jiangyao zai zhe difang **kai** yi tiao lu.  
government is going to at this place open a CL road  
'The government will open a road here.'
- (2) Xiaoming yi huijia, jiu mashang **kai** dianshi.  
Xiaoming as soon as come home then immediately open TV  
'As soon as Xiaoming came back home, he immediately turned on TV.'
- (3) Na ge nuhai **kai** yi liang hongse paoche.  
that CL girl open a CL red sports car  
'That girl drives a red sports car.'
- (4) Ta **kai** le yi zhang zhipiao gei wo.  
he open ASP a CL check for me  
'He writes a check for me.'
- (5) Lisi de baba zai Taipei **kai** yi jia chaojishichang.  
Lisi DE father in Taipei open a CL supermarket  
'Lisi's father runs a supermarket in Taipei.'
- (6) Jintian xiawu gongsi **kai** le yi ge huiyi.  
today afternoon company open ASP a CL meeting  
'Our company held a meeting this afternoon.'

Apparently, *kai* in these examples is in several senses, i.e., the actions described by the verb *kai* are very diverse. What do they have to do with each other? According to the classical theory of categories, things are in the same category if only if they have certain properties in common. These properties are necessary and sufficient conditions for defining the category. However, multiple senses of a polysemous form do not seem to share objective truth-condition but they constitute a single lexical item, as the above examples show. Its relatedness of meaning cannot be completely made explicable in terms of a componential analysis of senses, because the use of common semantic features fails to specify how many components, or what kind of components, two senses must share in order for them to meet the criterion of relatedness of meaning (for details, see [7]:552-553). Polysemy has always been problematic to traditional truth-conditional semantics ([4,9]).

This study is an attempt to find a solution for the possible groupings of senses observed in a polysemous word *kai*. The following investigation on *kai* will illustrate that the existence and properties of polysemy follow directly from the characteristics of human cognition, that is, people tend to group things together not only by analogy, i.e., the properties they have in common, but also by cognitive strategies such as metonymy and metaphor. What we will try to show is that there is a coherent conceptual construction underlying all these expressions, and that much of it is metaphoric and metonymic in nature.

## 2. CATEGORIES OF SENSES IN THE TRANSITIVE *KAI*

If we look up a Chinese dictionary, we find that the transitive *kai* has a range of different meanings and can be roughly categorized as follows:

- Sense 1: to move (a door, window) from a shut or closed position so as to admit of passage; to allow a person or thing to pass through: *kai men* 'to open the door', *kai chuanghu* 'to open the window';  
 Sense 2: to render the interior of (a box, drawer, flower) readily accessible: *kai hezi* 'to open the box', *kai chouti* 'to open the drawer', *kai hua* 'to unfold or expand, as a blossom to reveal the interior';  
 Sense 3: to make (a passage) usable by moving the things that are blocking it; to make (a way, path etc.) by removing or pushing aside obstacles: *kai jianghe* 'to make streams', *kai lu* 'open a road';  
 Sense 4: to turn on an electric light or apparatus by means of a switch; to make a machine to start working: *kai deng* 'to turn on the light', *kai wasi* 'to turn on the gas tap', *kai lengqi* 'to turn on the air-conditioner', *kai dianshi* 'to turn on the TV';  
 Sense 5: to start the engine of vehicles; to drive: *kai feiji* 'to pilot an airplane', *kai che* 'to drive a car';  
 Sense 6: to begin something, especially, functioning on a regular basis; it starts operating for the first time; to establish: *kai yiyuan* 'to open a hospital', *kai dian* 'to run a shop';  
 Sense 7: to write: *kai fapiao* 'to make out an invoice', *kai shouju* 'to submit a receipt', or *kai zhangdan* 'to bill';  
 Sense 8: to begin a session or term, as a school: *kai ban* 'to offer classes', *kai ke* 'to offer courses';  
 Sense 9: to begin to take place, be shown for a limited period of time; to make something happen: *kai hui* 'to hold a meeting or conference'.

At first glance, it seems almost impossible to accommodate within structural theories of language. But, these senses can be put on a continuum in terms of the concreteness of their objects. The leftmost of the continuum is the most concrete action of *kai*, while the rightmost is the most abstract one, as manifested in Table 1.

<b>more concrete/physical</b>		<b>more abstract/mental</b>
to move from a shut position	to set going	to come to view
		to begin to happen
<div style="display: flex; justify-content: space-between; align-items: center;"> <span style="font-size: 2em;">→</span> </div>		
<i>kai men/chuanghu</i> ('a door/window')		
<i>kai hezi/hua</i> ('a box/flower')		
<i>kai lu/jianghe</i> ('a road/stream')		
<i>kai dianshi/lengqi/shouyinji</i> ('a TV/air-conditioner/radio')		
<i>kai che/feiji/chuan</i> ('a car/airplane/ship')		
<i>kai yiyuan/dian</i> ('a hospital/store')		
<i>kai shouju/fapiao</i> ('a receipt/invoice')		
<i>kai ke/ban</i> ('courses/classes')		
<i>kai hui</i> ('a meeting')		

Table 1. The Senses of Transitive *Kai*

As mentioned above, traditionally dominant has been the view that a category is defined by a set of criterial attributes, i.e. necessary and sufficient conditions for class membership. This model is assumed in truth-conditional semantics, which looks for an objective characterization of meaning independent of human conceptualization and cognitive processing. But recent cognitive psychologists find that membership in a category is determined by perceived resemblance to typical instance; categorization is then a matter of human judgment, and no attributes need be shared by all class members. On this ground, the following section is devoted to a cognitive-semantic study of the polysemy *kai* in uncovering motivation and order behind the random-looking groupings of meanings.

### 3. A COGNITIVE ACCOUNT OF *KAI*

People usually categorize things together on the basis of either what the things have in common or their experience and imagination. If we take the position that language is shaped by cognition, multiple meanings of a polysemous lexeme are by definition a matter of categorization. We postulate that lexical polysemy arises from the effects of relevance on categorization. The theoretical model adopted here is based on Lakoff and Johnson ([3]) and Johnson ([4]), which applied to polysemy the cognitive framework of prototypicality developed by Rosch and her associates (e.g. [8]). Rosch's work claims that central instances of a category are 'prototypical' for that category and such instances appear to be more salient for people, according to a wide range of tests. Consequently, natural categories are a product of the human perceptual and cognitive apparatus for dealing with the world. The following study on the polysemy *kai* implies that some senses of a word are related to one another more or less closely by various means, such as analogy, metonymy, and conceptual metaphor.

Among the senses of *kai*, we find that sense 1 has all of these shared features, whereas the other senses share some or few of the features. For instance, the main difference between sense 1 *kai men* 'to open a door' and sense 9 *kai hui* 'to hold a meeting' lies in that the change of state in the patient in the former is physical, while it is not in the latter. Moreover, in the sense of *kai yiyuan* 'run a hospital', the agent does not directly touch the patient either with his body or an instrument. If we take it that the predominant meaning of *kai* is sense 1, then the other senses have presumably derived through meaning extension of it, all of which are based on the common core sense. With the application of the theoretical model developed in the case study of *over* by Lakoff ([4]), the following sections concern an account of sense linkages from the viewpoint of human perception and understanding. First of all, we profile the concrete action of *kai* in sense 1 by means of Langacker's cognitive grammar model ([5,6]), which argues that meaning is equated with cognitive processing and specifies schematic images, such as trajectories or containers. With the passage of time, the trajector is caused to move from a position contiguous to the landmark to a final position apart from the landmark. The trajector is a concrete three-dimensional entity, caused to move apart from its landmark. And we will show that these senses are connected by adding information, particularly, (1) by further specifying the state change of the figure, i.e. the patient, (2) by specifying whether or not the patient is concrete, and (3) by specifying the nature of the ground (3-dimensions vs. 2-dimensions). For each case, we will consider two kinds of state change: physical (SC) and nonphysical (SC'). For example, the change of state in *kai hezi* 'to open a box' belongs to the former; whereas, change in *kai yiyuan* 'to run a hospital' belongs to the latter--originally the patient does not exist, it is set up by the agent. We will also consider the patients in these senses of *kai*, which can be categorized into concrete (abbreviated to C) and abstract (A) ones. And the concrete ones can be subcategorized into three dimensions (3D) and two dimensions (2D).

### 3.1 Analogical Transferring

Analogical transferring is one of strategies available to us to comprehend the world around us. If you open a box, you unfold it so that you can see the interior in a way similar to opening a door. Sense 1 and sense 2 are alike, because their patients are concrete objects and their state change is physical. But, the patient (=the affected participant) in sense 1 is the whole object, i.e. the door, and that in sense 2 is part of it, i.e., the lid of a box. We argue that the connection between opening a door and opening a box is based on analogy, which allows most of salient and core features to represent the whole. Notice that although sense 4 *kai deng* 'to turn on the light' share some features with sense 1, e.g., their patients are concrete and both of their state change in the patients is physical, the patient in the former is not totally affected by the agent. We think that the link between sense 1 and sense 4 is not based on analogy but on metonymy, which will be elucidated in the following.

### 3.2. Metonymy

In order to achieve the effects of being informative and relevant in conversation, people usually take one well-understood or easy-to-perceive aspect of something and use it to represent the thing as a whole ([4]: 77). For example, *hands* in (7), standing for 'the staff in the mentioned ship', is derived from THE PART FOR WHOLE metonymy, which allows to focus more specifically on certain aspects of what is being referred to.

(7) The ship was lost with all hands.

Lakoff and Johnson argue that "metonymic concepts are grounded in our experiences. In fact, the grounding of metonymic concepts is in general more obvious than is the case with metaphoric concepts, since it usually involves direct physical or causal associations" ([3]:39). In our data, we find that sense 4 picks out the core part of sense 1. The connection between sense 1 *kai men* 'opening a door' and sense 4 *kai deng* 'to switch on a light' is based on metonymy rather than on analogy or metaphor, because the latter focuses more specifically on only one aspect of its patient. To be more specific, the action which sense 4 conveys emphasizes on the starting point (starting-point focus (P) is added to yield this sense in our model) just like the action that we open a door by turning the knob. Although the expression does not denote a path to specify that the trajector and the landmark are caused to move apart as the typical *kai*, 'power (switch) on' indicates a point of starting working. When a switch of an apparatus or an engine is opened, the power is not blocked so that it can flow out to supply the machine for starting. The metonymy behind them is STARTING THE SWITCH STANDS FOR CONTROLLING.

### 3.3. Metaphoric Mappings

So far, we have seen that analogy and metonymy can provide motivation for extension of a category. Another important kind of motivation comes from metaphoric mappings. Metaphor involves a transfer from one domain of conceptualization onto another ([9]). Consequently, there is one meaning involved that is called "literal" and another one that is "transferred" or metaphorical. In our example, the former *kai* is literal in sense 1, but there appears to be transferred in sense 8. The mappings suggest that activities (e.g. *kai ke* 'to offer courses') are conceptualized metaphorically as substances. By treating human activities in terms of physical entities, we are able to describe phenomena that would otherwise be hard to understand. The conceptual mapping manifests that the source domain is concrete and the target domain is abstract, and the physical sense is viewed as being more basic. The verb *kai* in sense 1 denoting a physical action serves as a structural template for conceptualizing an abstract inception notion. The metaphor that applies to this is: OPENING IS STARTING.

Another metaphor observed in our examples is transformation of state change between sense 1 and sense 6. Opening a shop, building or institution represents that it starts operating for the first time. The agent is in charge of and cause to work the organization. But the change of state in sense 6 differs from sense 1 in that its change brings into being what do not exist originally, though both their patients are concrete. We conceive *kai yiyuan* 'to set up a hospital' in terms of *kai men* 'to open a door' via metaphoric mapping. The whole cubic space where a hospital is going to be set up can be imaged as a room; the process that a hospital is set up in this place so that its appearance can be seen is compared to the one that a door in a room is opened so that its interior can be seen. We conceptualize changes of this kind from one state into another in terms of metaphor ([3]). In the present case, the domain of physical change is used as a metaphoric vehicle to refer to the domain of nonphysical change.

### 3.4. Category Chaining

We have seen that extended senses of *kai* can be based on the central sense of *kai*. But extended senses may themselves serve as the basis for further extensions via category chaining. For example, *kai lu* 'to open a road' means that the obstruction is removed and you can pass through. The obstacles are viewed as the cover of a box. Different from sense 1 and sense 2, the landmark is not a three-dimensional container (we treat a room which a door links as a container). Rather, the landmark (i.e., the earth or the ground in *kai lu* 'to open a road') is treated as a two-dimensional plane. We claim that this transformation can be seen as 2D-3D metaphoric mapping, the landmark shifting from three-dimensional to a two-dimensional visualization. In a similar way of linking, *kai yiyuan* 'to open a hospital' and *kai fapiao* 'to write an invoice' are different in that the former object is three-dimensional, yet the latter is two-dimensional.

As for the relation between sense 4 and sense 5, they are linked by analogy. If you turn on something such as a radio, light, or heater, you move the switch or knob that controls it so that it starts working. Similarly, when you switch on the engine of a vehicle, which stands for the whole driving/steering action. But sense 5 further denotes that the agent sits inside a vehicle and controls it (we use 'IN' to stand for this added property). Another analogy is observed in the connection between sense 8 *kai ke* 'to offer courses' and sense 9 *kai hui* 'to hold a meeting', since both their patients are abstract. However, the period in sense 8 is longer and has more duration than sense 9, so a feature SHORT (S) is added to the latter.

### 3.5. Summary

To summarize, our data suggest that polysemy of *kai* comes about when the verb is used in a sense which is closely related to, but distinct from, the prototypical instance. For example, a condition which is essential to the prototype might not be met; a feature which is optional to the prototype now becomes important, or vice versa; or some additional feature might be required. By the same process, this derived meaning may in turn give rise to a further extension, and so on. The various senses of the word therefore radiate out from the central prototype, as shown in Figure 1. Senses at the periphery might have little in common with the central sense; they are merely related by virtue of the intervening members of the meaning chain (for discussion, see [2]:224).

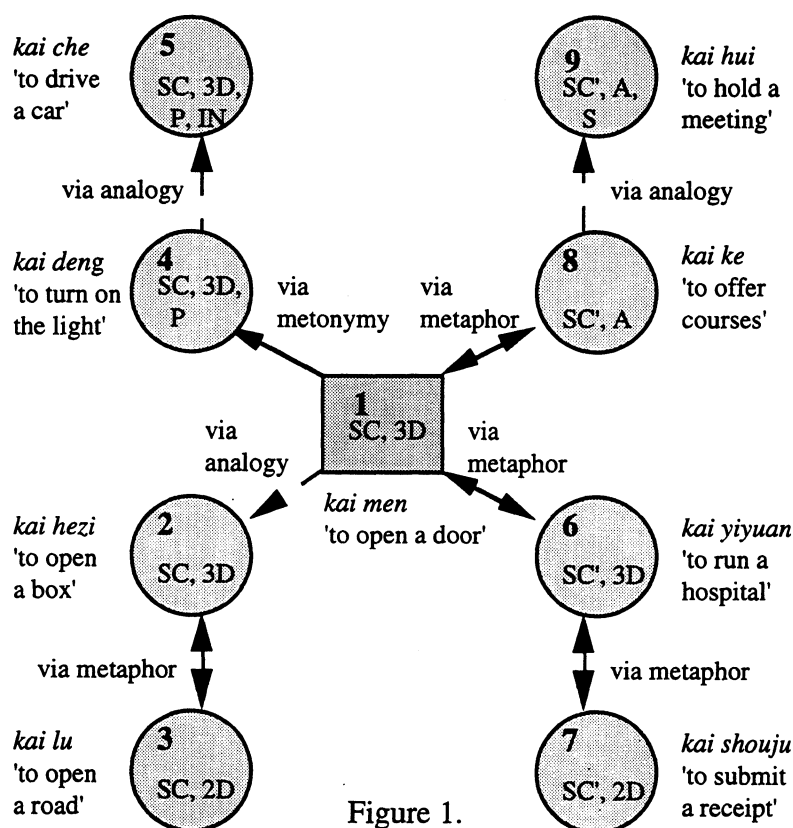


Figure 1.

#### 4. CONCLUDING REMARKS

People tend to draw on an already existing linguistic form for concepts for which no previous designation exists. The strategies for extending the use of existing forms for the expression of new concepts include analogical transfer, metonymy, metaphor, and the like. They essentially are used in reasoning to interpret new situations in terms of previously encountered and understood situations, so they are grounded in systematic correlations within our experience ([3]). Thus, language is systematically grounded in human cognition; i.e., it is deeply affected by human perception and understanding of the world. Although the polysemy displays flexible responses to novel situations, it is also highly organized, incorporating detailed information about the world. This study, making use of such a cognitive approach to meaning, shows that it can account in a unified fashion for polysemy. However, since it is a synchronic research on *kai*, we need to continue investigating etymology of *kai*. Semantic change will provide us a more transparent view of the general principle--the principle of exploitation of old means for novel functions--underlying polysemy.

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