

The Semantics of Shapes:

A Study based on Mandarin *Quan1zi5* (圈子)

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ABSTRACT

Mandarin shape nouns, such as a *fang1xing2* ‘square’ and *san1jiao3xing2* ‘triangle’, share a set of very interesting lexical semantic features. These nouns can refer to either the contour (i.e. the outside edge) or enclosed area of the shape. In this paper, we will try to explain this lexical semantic fact both in terms of the cognitive theory of grounding and the visualization. Our study will be focused on *quan1zi5* ‘circle’, which has the typical semantic behaviors of the shape nouns but also allow two additional interesting meaning extensions.

1. Background: the meaning of shape nouns

Shape is an instance of a visual configuration while people perceive or recognize an object (Zusne 1970). We name these visual forms in term of their stimulous properties that we identified, such as a triangle is composed by three co-terminated lines that form three angles, and a circle is a continuous curved line without angles. By studying the semantics of shape nouns, we can gain substantial knowledge about what prominent properties people perceive while identifying shapes, and what cognitive concept that underlying the meaning of shape nouns.

Mandarin shape nouns, such as a *fang1xing2* ‘square’ and *san1jiao3xing2* ‘triangle’, share a set of very interesting lexical semantic features. These nouns can refer to either the contour (i.e. the outside edge) or enclosed area of the shape. In this paper, we will try to explain this lexical semantic fact both in terms of the cognitive theory of grounding and the visualization. Our study will be focused on *quan1zi5* ‘circle’, which has the typical semantic behaviors of the shape nouns but also allow two additional interesting meaning extensions. In the following, Section 2 presents the data of *quan1zi5*. Section 3 describes the sense distinction of the meaning of *quan1zi5*. Section 4 explains the lexical semantics of shapes in term of the figure/ground theory and the visualization. Section 5 is a conclusion.

2. The Meaning of *Quan1zi5* 'Circle': the data

Like all shape nouns, *quan1zi5* has the basic meanings of a circular contour (1) or the area enclosed by the circular contour (2). In addition, its area meaning can be extended metaphorically to refer to an area defined by human activity (3), an abstract confinement (4), and a set of related people often defined by their social strata (5). And its linear contour meaning can be extended to refer to a path where the end point coincides with the start point (6).

- (1) 他們 圍成 一個 圈子 跳舞
tamen weicheng yige quanzi tiaowu
they surround-be a circle dance
'They made a circle to dance.'
- (2) 你 只 能 站 在 圈子 內， 不 可以 跑出來
ni zhi neng zhan zai quanzi nei bu keyi paochulai
you only allow stand circle inside NEG allow get out
'You can only stand inside the circle. Don't get out.'
- (3) 她 的 生活 圈子 就是 台大 和 公館
ta de shenghuo quanzi jiushi taida he gongguan
she DE living circle just NTU and GongGuan
'Her usual circle of activity just covers NTU (campus) and GongGuan.'
- (4) 交友 是 擴大 生活 圈子 的 一種 方式
jiaoyou shi kuoda shenghuo quanzi de yizhong fangshi
make-friends is expand life circle DE a way
'Making (new) friends is a way to expand (your) circle of life.'
- (5) 她 在 美國 的 華人 圈子 很 有名
ta zai meiguo de huaren quanzi hen youming
she BE America DE Chinese-people circle very famous
'She is famous in the Chinese societies in America.'
- (6) 我們 在 山上 迷路 了， 一直 在 繞 圈子
women zai shanshang milu le yizhi zai rao quanzi
we at mountain lost-way LE always ASP circle circle
'We got lost in the mountain and were going around in circles.'

quan1zi5 in (1) and (2) displays an original and physical meaning respectively, and has more abstract meaning in (3)~(6). Like all lexical polysemy, ambiguity between physical and metaphorical meanings of *quan1zi5* is attested, such as in (7). *Quan1zi5* has three possible readings: a professional group (7a), the area that dancing circle enclosed (7b), and the dancing circle itself (7c).

(7) 因為 跳 累 了，他 決定 離開 這 個 圈子
 yinwei tiao lei le ta jue ding likai zhe ge quanzi
 because dance tired LE he decide leave this CLASS circle

(7a) He decided to leave from the dancing circle (formed by dancers) because he is tired.

(7b) He decided to leave the dancing area circle because of being tired.

(7c) He decided to leave the dancing circle because he is tired of all the dancing.

Based on the above examples, *quan1zi5* seems to have four meanings. In next section, we will display the semantic representation of *quan1zi5* in terms of a semantic model and give a clear explanation.

3. Accounting for the Meaning of *Quan1zi5*

Quan1zi5 is an example of polysemy, which is a situation where a single word has a set of related meanings. According to Ahrens et al (1998), the lexical meaning of a polysemy can be distinguished into two levels: senses and meaning facets¹. They stated that a lexical sense entails the following properties:

(A) different sense cannot appear in the same context (unless the complexity is triggered deliberately);

(B) a sense is not an instance of metonymic or meronymic extension, but may be an instance of metaphorical extension (Lin and Ahrens, 2000);

(C) the link between two senses cannot be inherited by a class of nouns.

On the other hand, a meaning facet has the properties as follows:

¹ The 'meaning facet' used here differs from 'facet' of Cruse (2000). For Cruse, facet is an expression to indicate a degree of meaning distinctness. For example, 'book' in (i) and (ii) is referred to 'a physical object' and 'the text which the physical object embodies' respectively. These two readings for 'book', which are not ordinary ambiguity, but still represent two senses, are called facets by Cruse.

(i) Please put this book back on the shelf.

(ii) I find this book unreadable.

(Cruse, 2000, p.114)

In this paper, we use 'facet' to represent a meaning that extends from a particular sense. This concept is similar to Cruse's 'sense modulation' (2000, p. 120-123).

- (A) it can appear in the same context as other meaning facets;
- (B) it is an extension from a core sense or from another meaning facet;
- (C) nouns of the same semantic classes will have similar extension to related meaning facets.

In terms of the examples of *quan1zi5* given above, it is evident that the meaning in example (1) and (2) is locational (physical) sense, and meaning in example (3) to (6) is metaphorical (abstract) that is derived from locational sense. Physical concept and abstract concept belong to two knowledge domains. This means the meaning of *quan1zi5* should be categorized into two kinds of senses in accordance with sense property (B) mentioned above.

However, if we consider example (7), it seems that locational meaning and metaphorical meaning of *quan1zi5* are two meaning facets of one sense, because these meanings can occur in the same sentence (context). To resolve this dilemma, we need to make a distinction between independent ambiguous meanings and co-dependent meaning facets of a word form (Huang et al. 2003). Even though multiple meanings are available to humans in both cases, the multiple meanings can and must be resolved (called disambiguation) only in the case of genuine ambiguity. Co-dependent meaning facets, on the other hand, allow the multiple meaning to exist and be interpreted by the hearer. Take (7) for instance. If we add more sentences (contexts) to (7), like (8), the context would force readers to choose one meaning between physical circle (7a, b) or metaphorical circle (7c). In the case of (8), *quan1zi5* only has the meaning of a social group.

- (8) 因爲 跳 累 了，他 決定 離開 這 個 圈子，脫離 舞蹈 界
 yinwei tiao lei le ta jue ding likai zhe ge quanzi tuoli wudao jie
 because dance tired LE he decide leave this CLASS circle leave dancing circle
 'He decided to leave the dancing circle because he is tired of all the dancing.'

But, it is not easy to decide whether *quan1zi5* has the meaning of the area that the circle limits or the circle itself, even we add extra information in (7), which is illustrated in (9), or in other sentence, like (10).

- (9) 因爲 跳 累 了，他 決定 離開 這 個 圈子，坐 回 椅子 上 休息
 yinwei tiao lei le ta jue ding likai zhe ge quanzi zuo hui yizi shang xiouxi
 because dance tired LE he decide leave this CLASS circle sit back chair rest
 (9a) 'He decided to leave from the dancing circle (formed by dancers) and sat back to rest because he is tired.'
 (9b) 'He decided to leave the dancing area circle and sat back to rest because of being tired.'

(10) 由於 人數 越 來 越 多 , 圈子 越 圍 越 大
 youyu renshu yu lai yu duo quanzi yu wei yu da
 because amount of people more and more circle bigger and bigger

(10a) 'The circle (formed by people) became bigger and bigger because more and more people were joining in (the circle).'

(10b) 'The area of the circle became bigger and bigger because more and more people were joining in (the circle).'

Based on the discussion and sentences presented above, we can sum up that *quan1zi5* has three senses. One is core sense and refers to physical circle (ex.1, 2, 7a, 7b, 9 and 10); the other two are metaphorical sense extended from the core sense and refer to abstract circle about human activity (ex. 3-6, 7c and 8). The core meaning we assign to *quan1zi5* is 'a directional circle-like line with end point coinciding with start point'. The reason we take this definition as a core meaning for all the senses is based on the contrast between *quan1zi5* and *huan2* 'ring'. While both refer to a circular circumference, *huan2* is a perfect sense that has no beginning and ending; while *quan1zi5* always implies an end point coinciding with the start point. Hence, we can draw (*hua4*) a *quan1zi5* but not a *huan2*. In addition, with the drawing meaning, *quan1zi5* implies a center of the circle while *huan2* does not. It is this entailed centric point which allows a human reference point for the other two abstract meanings of *quan1zi5*. Furthermore, under the core sense, *quan1zi5* has two meaning facets. One refers to a physical object and the other refers to the area that the circle limits. According to Ahrens et al. (1998), they found that meronymic and metonymic extensions are two main ways that meaning facets extend from a sense. Meronymic extension is the part-whole relation that the whole stands for part, and part stands for whole. As for metonymic extension, it's "extended meaning is related to the origin of the basic sense, but is not inherent to the basic sense" (Ahrens et al., 1998, p.56). In the case of *quan1zi5* in (2), we use one directional line (part) to stand for two-dimensional area (whole), so this meaning extension is meronymic, and can be explained in terms of cognitive and conceptual saliency. We will discuss it in next section.

Based on the discussion, the meanings of *quan1zi5* are represented in (11), where we repeat example (1)~(6) to show the context that different meaning of *quan1zi5* appears in. The meaning representation is in accordance with Ahrens et al. (1998), which is elaborated in CKIP Technical Report 03-01 (2003).

(11) 圈子 *QUANIZI5* <ㄑㄨㄢˊ ㄗㄩˋ> ㄗ •²

SENSE 1: A directional circle-like line with end point coinciding with start point.

MEAMING FACET 1: Physical object, i.e. the circle.

² In CKIP (2003), there are only two senses being distinguished, where sense 2 in this paper was incorporated into sense 1.

EXAMPLE: 他們 圍成 一個 圈子 跳舞
 tamen weicheng yige quanzi tiaowu
 they surround-be a circle dance
 'They made a circle to dance.'

MEANING FACET 2: The area that a circle delimits.

EXAMPLE: 你 只 能 站 在 圈子 內， 不 可以 跑出來
 ni zhi neng zhan zai quanzi nei bu keyi paochulai
 you only allow stand circle inside NEG allow get out
 'You can only stand inside the circle. Don't get out.'

SENSE 2: A circle-like route or trace formed by an activity.

EXAMPLE: 我們 在 山上 迷路 了， 一直 在 繞 圈子
 women zai shanshang milu le yizhi zai rao quanzi
 we at mountain lost-way LE always ASP circle circle
 'We got lost in the mountain and were going around in circles.'

SENSE 3: A normal or a professional range.

EXAMPLE 1: 她 的 生活 圈子 就是 台大 和 公館
 ta de shenghuo quanzi jiushi taida he gongguan
 she DE living circle just NTU and GongGuan
 'Her usual circle of activity just covers NTU (campus) and GongGuan.'

EXAMPLE 2: 交友 是 擴大 生活 圈子 的 一種 方式
 jiaoyou shi kuoda shenghuo quanzi de yizhong fangshi
 make-friends is expand life circle DE a way
 'Making (new) friends is a way to expand (your) circle of life.'

EXAMPLE 3: 她 在 美國 的 華人 圈子 很 有名
 ta zai meiguo de huaren quanzi hen youming
 she BE America DE Chinese-people circle very famous
 'She is famous in the Chinese societies in America.'

Moreover, the meaning extension of *quanlzi5* can be illustrated in (12).

- (12) SENSE 1 *metaphorical extension*
 MEANING FACET 1 -----> SENSE 2
 MEANING FACET 2 -----> SENSE 3

In what follows we will explain the reasons that result in the meaning extension of *quan1zi5*.

4. Cognitive Explanation for the Lexical Semantics of Shapes

In this section, we will give a explanation regarding meaning extension of *quan1zi5*, which will base on cognition theories. In the beginning, we will discuss the meronymic extension of two meaning facets of *quan1zi5*.

4.1 Meronymic Extension of *Quan1zi5*

In the area of visual form research, both shape and figure are terms for a stimulus of visual perception. Shape is more general term for visual stimulus while figure has a specific use in the distinction between figure and ground in Gestalt psychology (Zusne 1970). Therefore, in terms of cognitive linguistics, a shape is a Figure that achieved prominence in front of a less well-defined two-dimensional Ground (Ungerer & Schmid 1996). However, the contour of shape (or the circumference of circle for *quan1zi5*), is the transition between the Ground and Figure. For an abstract shape as a Figure (such as a triangle, a square, a rectangle, a circle etc.) the two-dimensional area it defines is NOT different from its Ground. It is only the transition of the contour that defines this Figure. In other words, the most salient cognitive feature in this abstract space is the contour. This explains why cognitively the contour is prominent for all shape nouns and can be distinguished as a meaning facet.

In terms of visual perception, we know that human visual function identifies an object by identifying its shape (i.e. contour) first. This is represented in the above cognitive account of the prominence of transition. In other words, a homogenous area does NOT attract visual attention. It is the transitional feature that calls for visual attention. And when the transitional contour defines an area, we see a shape. This functional account of vision may be the fundamental motivation for language to encode the contour and the defined area as the two meaning facets of a shape.

In the following section, we will then explain the metaphorical extension of sense 2 and 3 about *quan1zi5*.

4.2 Metaphorical Extension of *Quan1zi5*

As for shape-process noun, such as *quan1zi5*, which includes in the meaning the process of making/drawing that contour, a human reference point is implied. This human reference point is either the drawer, or the central point from which a circle is defined (mathematically as all area within the same distance from that point). This is the basis for the metaphorical extension where the locational definition of circle and *quan1zi5*, can be extended to mean a certain set of social activities or relations centered on that reference point. Without the reference central point, no such extension is possible. Hence, we do not find the same extensions for triangle, square, rectangle, etc.

On the other hand, the meaning of PATH in sense 2 requires a start point and an end point. The shape-process noun of circle necessarily involves these points. Hence, its extension to take on a PATH role with verbs that require them is natural.

5. Conclusion

In this paper, we tried to investigate and distinguish the meaning of *quan1zi5*. First, through analyzing sentences, we differentiated three senses and two meaning facets for *quan1zi5*. Then, we explained and established the dual meaning facets of contour and area as cognitively based, both from functional and visualization point of views. The same generalization is applicable to all shape nouns. We also show that if the additional meaning of process (of creation of the shape) is added, further extensions involving PATH, and set member defined by human relation can be inferred. Although this study focused on *quan1zi5*, the cognitive explanation still works well on other shape nouns, and provides good understanding to the relation between shape perception and language.

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