Exploration on the relationship between Chinese characters and ergonomic affordances

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Abstract: - The process through which people understand the world tends to begin with their surrounding objects and activities, and often involves becoming aware of the function and usage of their hands. The idea of “hand” constantly enters a person’s thoughts and consciousness, as it can be seen as a necessity of life, a culture connected to thoughts, and a symbol of representation. In Chinese writing systems including Chinese characters, the oracle bone script and Chinese bronze inscriptions, many characters are constructed partially with the symbol of 手 (sou), which expresses thoughts and concepts richly associated with the hand. In the developmental history of Chinese characters, the hand has been continuously made more abstract and transformed into various symbols. Nevertheless, characters such as 手 (shou), 爪 (zhua), 又 (you), 勺 (shao) and characters containing these parts share many characteristic features. This paper seeks to discuss the meanings behind the common understanding of “images or situation models contained in Chinese characters,” and how these meanings are connected to the development of creativity in arts and design. The research process utilizes philology materials, assisted by semiotic studies and the affordance theory in ergonomics, to further describe and examine the topic. The research attempts to trace the various sources of ideas relating to “hand” in Chinese characters, and discuss these in terms of ergonomic affordances with the aim to explore the corresponding relationships within a situation model.

Key-words: Chinese characters, Motion Economy consists, hand radical

1 CHINESE CHARACTERS

The goal of this study not only explains the cognitive awareness people have of how pictograms and ideograms function in Chinese characters, but also describes how this understanding can be transformed and applied concretely to the development of creativity in arts and design. It also verifies that the situation under which a Chinese character is constructed can be used creatively by designers, in ways such as extracting a visual element from a traditional, cultural image, or interpreting a text through cultural knowledge and thereby transforming it into a source or method for producing a situation model. In addition, this study presents a diachronic and comparative analysis, and further examines the process through which the “hand” radical in Chinese characters was developed, replaced, and mixed with other characters.

（Chinese characters are applied to the planar design example）
The long history of Chinese civilization has resulted in the development of nearly 50,000 characters. Each radical within a character provides a significant symbol associated with its meaning.

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<table>
<thead>
<tr>
<th>hand (手) radical (手部形)</th>
<th>Motion Economy consists</th>
</tr>
</thead>
<tbody>
<tr>
<td>手 (sou)</td>
<td>1.Level One: Finger motions +Wrist motions + Forearm motions (elbow motions)</td>
</tr>
<tr>
<td></td>
<td>Explanation: Motions are limited to below the elbow; the upper arm remains unmovused</td>
</tr>
<tr>
<td>又 (you)</td>
<td>2.Level Two: Finger motions + Wrist motions + Forearm motions + Forearm motions (elbow motions)</td>
</tr>
<tr>
<td></td>
<td>Explanation: The upper arm and forearm remain unmovused; motions are limited to fingers and wrist</td>
</tr>
<tr>
<td>勺 (shao)</td>
<td>3.Level Three: Finger motions + Wrist motions + Forearm motions (elbow motions)</td>
</tr>
<tr>
<td></td>
<td>Explanation: Motions are limited to below the elbow; the upper arm remains unmovused</td>
</tr>
<tr>
<td></td>
<td>4.Level Four: Finger motions + Wrist motions + Forearm motions + Upper arm motions (shoulder motions)</td>
</tr>
<tr>
<td></td>
<td>Explanation: The object or tool is farther from the body and therefore cannot be obtained by Level Three motions; requires the motion of “extending the arm”</td>
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<td>5.Level Five: Finger motions + Wrist motions + Forearm motions + Upper arm motions + Body motions</td>
</tr>
<tr>
<td></td>
<td>Explanation: The highest level; requires the most energy; the slowest speed; motions involve the entire body</td>
</tr>
</tbody>
</table>

In my study of Chinese characters, I discovered that the development of characters is very closely related to many types of human activities. There are many characters and pictograms related to our five senses and various body parts, and these characters share a close relationship to our behavior and movements.
composed, we see that they are intricately linked to principles of motion economy in ergonomics.

Motion Economy consists of:
1. Level One: Finger motions
   Explanation: the lowest level; the fastest speed; precise motions
2. Level Two: Finger motions + Wrist motions
   Explanation: The upper arm and forearm remain unmoved; motions are limited to fingers and wrist
3. Level Three: Finger motions + Wrist motions + Forearm motions (elbow motions)
   Explanation: Motions are limited to below the elbow; the upper arm remains unmoved
4. Level Four: Finger motions + Wrist motions + Forearm motions + Upper arm motions (shoulder motions)
   Explanation: The object or tool is farther from the body and therefore cannot be obtained by Level Three motions; requires the motion of “extending the arm”
5. Level Five: Finger motions + Wrist motions + Forearm motions + Upper arm motions + Body motions
   Explanation: The highest level; requires the most energy; the slowest speed; motions involve the entire body

4. Relation between Chinese character and Motion Economy consists

P In the process of researching this topic, and with the help of my advisor I have gathered a great deal of information and reference materials. I have reorganized the acquired data and made a table categorizing these five levels of motions. For each level I provide an example of a Chinese character to discuss the relationship between the character and the motions involved.

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   Explanation: The object or tool is farther from the body and therefore cannot be obtained by Level Three motions; requires the motion of “extending the arm”

5. Level Five: Finger motions + Wrist motions + Forearm motions + Upper arm motions + Body motions
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5. CONCLUSIONS

1. The use of the hand (手) radical in Chinese characters
As a body part, the hand is one of the body parts most understood by mankind early on in history.
2. Correlations between the development of human behavior and the motions and directions of the hand
Human beings have used the hand as a tool to explore surrounding objects both close and far from the body, as well as meanings that are abstract and concrete, simple and complex.
3. The relationship between the meanings of Chinese characters and the behavior mechanisms of different motions
The development of the hand radical can be seen as a useful cognitive mechanism in terms of both metaphor and metonymy. Through the relationship of the hand with concrete, abstract, and spatial domains, people have developed a series of words and expressions linked to the hand, hence expanding and enriching the system of Chinese characters.
4. The perceptive (tactile, sensual) extension of the hand
Chinese characters that use the hand radical have become commonly used by Chinese speakers in their daily life, but few people notice the metaphorical meanings associated with these characters. This does not mean the role of metaphors has diminished in our everyday language, but rather, it could point to new developments and potentials for metaphorical usage. Expressions that contain metaphors which cannot be easily recognized without careful analysis actually serves as ample proof that metaphors exist because they serve as a cognitive mechanism in our daily life.
5. Hand (radical) of Chinese characters Left and right sides type attitude with movement principle
Hands are as to index of Chinese characters, it is one of the radicals. The hand belongs to and draws radicals four times.

This study discusses the correlation between certain Chinese characters and hand motions. It is still in the initial stage of preliminary research. I hope that in the future I can offer more insight and exploration on the evolution of Chinese characters and behavior and movements in ergonomics. Exploring the process by which metaphors have entered into our everyday language through customs and habits which people have accumulated over a long period of time should prove to be a novel and important discovery.

References: