A Study of Eating Styles with Spoons, Forks, and *Hashi* by the Extended Function Diagram and the Extended Function Analysis

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Biography

Keiko Ishii is a merchandiser at a leading organic vegetable delivery company in Japan, where she has been working since graduating with a B.S. in biochemistry. Her work consists of developing food products through logistics planning and quality control of farms and food factories, as well as being in charge of multiple aspects of production, from planning and manufacturing, to sales. As a FA-Trainer at Functional Approach Institute Co., Ltd., Tokyo, she conducts VE studies on daily meals and their related things. Her VE articles include 'Study by the VE Application to Quality Control in the Distribution of the Egg' 'A New Method to Apply VE for Use Function and Esteem Function in *Yakiguri*'.

Abstract

Every day, a variety of eating utensils are used over the world. Two typical examples of such utensils with which people carry food to the mouth include spoons and forks. What are their functions and achievements? In the author's country of Japan, people use *hashi*, or chopsticks, another popular utensil for the same purpose. Starting from childhood, Japanese people go through rigorous practice, in order to be able to use these two mere sticks. To truly understand the function of *hashi*, a function analysis of *hashi* alone may not be enough. Employing a VE to analyze these three popular eating utensils – 'spoons, forks, and *hashi*', one can find each relation between the *mono* (or shape) function and the *koto* (or use) function. Furthermore, the author has developed a technique to clarify their effects on the entire functional theme. In this paper, the author would like to share their significant findings.

Keywords: spoons, forks, *hashi*/chopsticks, radar chart analysis, *mono*/shape function, *koto*/use function, Extended Function Diagram, Extended Function Analysis

Introduction

As a food-distribution merchandiser, I have an array of duties, ranging from product development to purchases and sales. Being a food expert, I am currently developing food products with a special focus on both what food customers would want, and how they would want to eat it. To this end, I frequently get to meet with many farmers and food factory workers throughout Japan. While I was performing these duties, a nagging question began to form in my mind: "Does the mother/father really think of what utensil she/he wants her/his family to eat with at each daily meal?" In other words, I pondered if people would imagine even 'eating styles' of the food they had prepared, let alone the food itself.

Statistics show that roughly 40% of the world population eat with hands, 30% of them eat with chopsticks, and another 30% of them eat with knives, forks, and spoons. In Japan, over 90% of people use *hashi*, or chopsticks, at even two or three meals a day. To give another example of the world's famous French cuisine, it was not until the Italian Catherine de Médicis had married Henry II, King of France in 1533 that French cuisine made a great leap. After their marriage, not only chefs and recipes, but also various silverware and table manners were brought to France from Italy. Later, sophisticated French cuisine was developed. This causes the question to arise – "Did food develop utensils? Or did utensils develop food?" To blend 'daily eating styles' into food development, one must think of the functions of eating utensils. Therefore, I conducted a VE study to help in clarifying the functions and achievements of three popular utensils with which people carry food to the mouth – spoons, forks, and *hashi*.

2. VE analysis

2.1. Defining functions

I assumed that each function of 'spoons', 'forks', and '*hashi*' would resemble one another. I then compared their functions by shape (*mono*). Judging from their shapes (*mono*), both spoons and forks can be divided into two parts: the 'handle' and the 'tip'. Furthermore, the tips of spoons can be divided into the 'thin-surface' tips and the 'oval' tips, while the tips of forks can be divided into the 'thin-surface' tips and the 'split-tip' tips. Meanwhile, *hashi* possess three shapes (*mono*): 'two-piece', 'thin', and 'long'. I defined each function of the three components of spoons, forks, and *hashi* (Figure 1), in the scenario that their users were the average household dwellers.

Spoons

	Component	Function
Tip	A ：Oval	Gain indent
		Extend contact length
		Taper tip
		Help move
	B ： Thin-surface	Gain surface
		Increase handgrip area
		Reduce handgrip width
		Enhance strength
Handle	C ：Long	Gain distance
		Gain grip
		Receive force
		Gather force

Forks

	Component	Function
Tip	A ：Split-tip	Extend contact length
		Reduce resistance
		Increase resistance
		Help move
		Gather force
		Escape force
		Taper tip
	B ：Thin-surface	Gain surface
		Increase handgrip area
		Reduce handgrip width
		Enhance strength
		Gain indent
Handle	C ：Long	Gain distance
		Gain grip
		Receive force
		Gather force

Hashi

	Component	Function
	A ：Two-piece	Divide force
		Gain space
		Gain independent-motion range
	B ：Thin	Taper tip
		Reduce contact area
		Reduce resistance
	C ：Long	Gain distance
		Gain grip
		Receive force
		Increase handgrip-area range
		Convey force
		Increase handgrip surface
		Increase contact surface
		Increase contact area

Figure 1: Definitions of shape (*mono*) function

2.2. Refining functions and evaluating FAST diagrams by the radar chart analysis

I refined the functions, previously defined from each of the three components. As a result, the higher order functions of spoons, forks, and *hashi* turned out the same, that being <<Hold things>>. The basic functions of the three utensils are five, which, except for the critical function logic path, are exactly the same among them. Each critical function logic path of spoons, forks, and *hashi* is <<Put things>>, <<Poke things>>, and <<Pinch things>>, respectively. Except for these differences, the three utensils have common functions: <<Reduce falls>>, <<Divide things>>, <<Reduce deformations>>, and <<Reduce stains>>. I created each FAST diagram with the five basic functions of spoons, forks, and *hashi* (Figure 2). Also, I visualized these three FAST diagrams in one radar chart via the radar chart analysis (Figure 3).

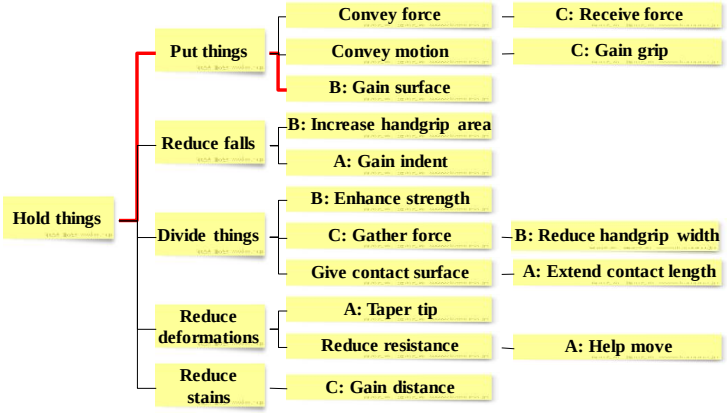

Figure 2(a): FAST diagrams Spoon by shape (*mono*)

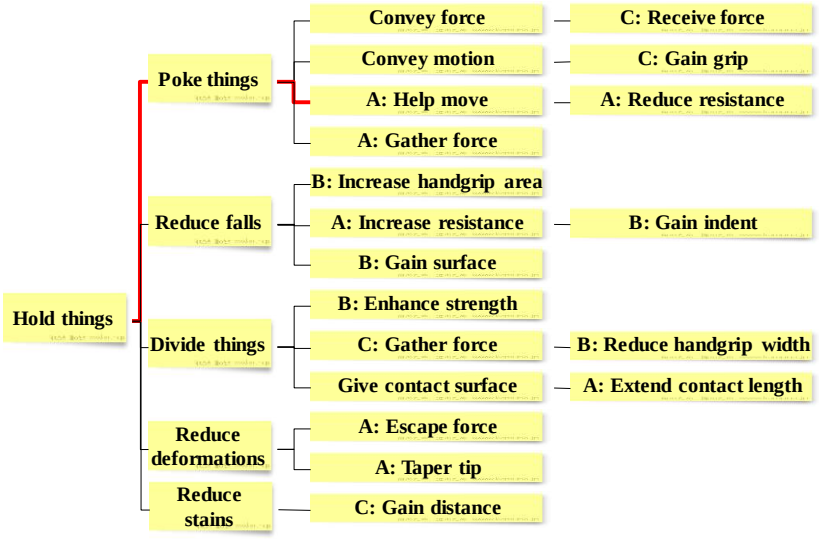

Figure 2(b): FAST diagrams Fork by shape (*mono*)

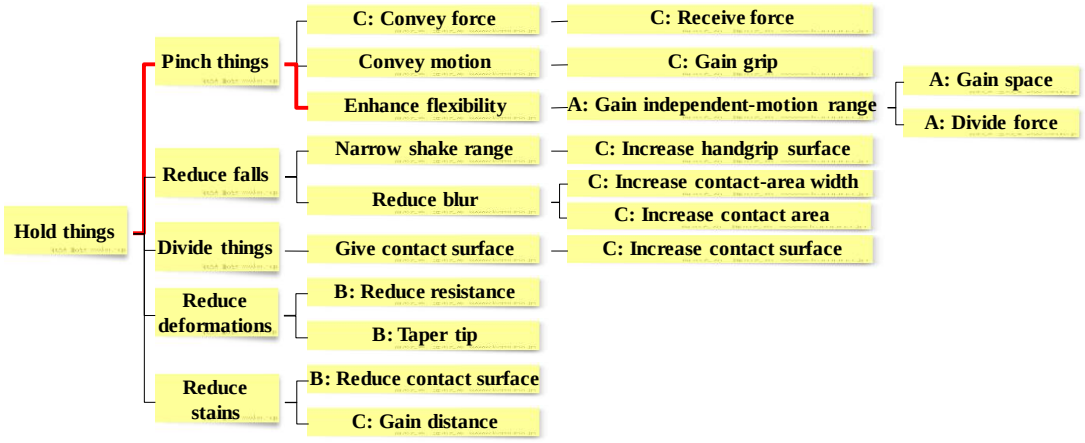

Figure 2(c): FAST diagrams *hashi* by shape (*mono*)

From these results, spoons and forks have very similar functions and achievements. By comparison, *hashi* have lower functions in <<Reduce falls>> and <<Divide things>>, and have a slightly higher function in <<Reduce deformations>>. Without much thinking, people tend to use different utensils for different cuisines. Having said that, I had not imaged how different the functions and achievements of the three utensils were before I conducted this study. People may not feel such differences when eating them. I felt that with a '*mono* or shape' function analysis alone, the true functions of the three utensils were not fully utilized in people's daily life. Therefore, I tried to extend their '*koto* or use functions'.

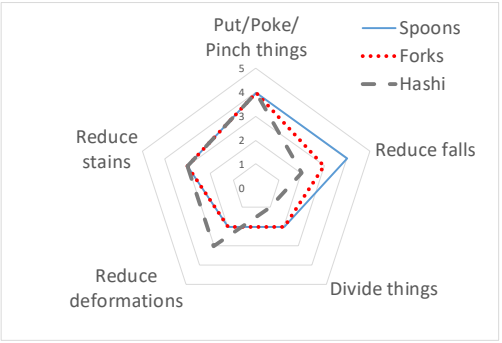

Figure 3: Radar chart analysis by shape(*mono*)

Spoons

	Component	Function
Tip	A ：Oval	Gain indent
		Extend contact length
		Taper tip
		Help move
	B ： Thin-surface	Gain surface
		Increase handgrip area
		Reduce handgrip width
		Enhance strength
Handle	C ：Long	Gain distance
		Gain grip
		Receive force
		Gather force
Koto to use	D: Hand	Fix handgrip position
		Gain grip
		Increase force
		Extend handgrip range
	E: Arm	Change position

Forks

	Component	Function
Tip	A ：Split-tip	Extend contact length
		Reduce resistance
		Increase resistance
		Help move
		Gather force
		Escape force
		Taper tip
	B ：Thin-surface	Gain surface
		Increase handgrip area
		Reduce handgrip width
		Enhance strength
		Gain indent
Handle	C ：Long	Gain distance
		Gain grip
		Receive force
		Gather force
Koto to use	D: Hand	Fix handgrip position
		Gain grip
		Increase force
		Reduce force
		Gain hold
		Reduce conveyed force
		Increase conveyed force
		Extend conveyed-force range
		Extend handgrip range
	E: Arm	Change position

Hashi

	Component	Function
	A ：Two-piece	Divide force
		Gain space
		Gain independent-motion range
	B ：Thin	Taper tip
		Reduce contact area
		Reduce resistance
	C ：Long	Gain distance
		Gain grip
		Receive force
		Increase handgrip-area range
		Convey force
		Increase handgrip surface
		Increase contact surface
		Increase contact area
Koto to use	D: Hand	Fix handgrip position
		Gain grip
		Gather force
		Extend tip distance
		Shorten tip distance
		Gain fulcrum
		Reduce handgrip area
	E: Arm	Change position

Figure 4: Definitions of *mono*/shape functions and *koto*/use functions of spoons, forks, and *hashi*

3. New technique with *mono*/shape function and *koto*/use function

3.1. Extended Function Diagram with mono/shape function and koto/use function

While I was analyzing the '*mono*/shapes' of the three utensils, I noticed that a *mono*/shape function analysis influenced the effect of functional themes differently. Therefore, I thought that it would be useful to extend the scope of functions to peoples' movements by adding the *koto*/use functions of the utensils. I named this technique the Extended Function Diagram. I divided the *koto*/use definitions of the utensils into two components – the 'hand' and the 'arm'. I then defined each *koto*/use function of the 3 utensils (Figure 4).

3.2. Refining extended functions of the 'hand' and conducting a radar chart analysis

From the functions defined in each component, I refined both *mono*/shape functions and *koto*/use functions, considering users' 'hands' as well, and created FAST diagrams of spoons, forks, and *hashi* (Figure 5).

From these results, I found that the higher order function for each of the three utensils still remained as <<Hold things>>; and each basic function of them still remained as the five functions mentioned before. However, several new functions were added to the original FAST diagrams with shape (*mono*) only. I questioned whether these changes might trigger subsequent changes in the basic functions and achievements of the utensils.

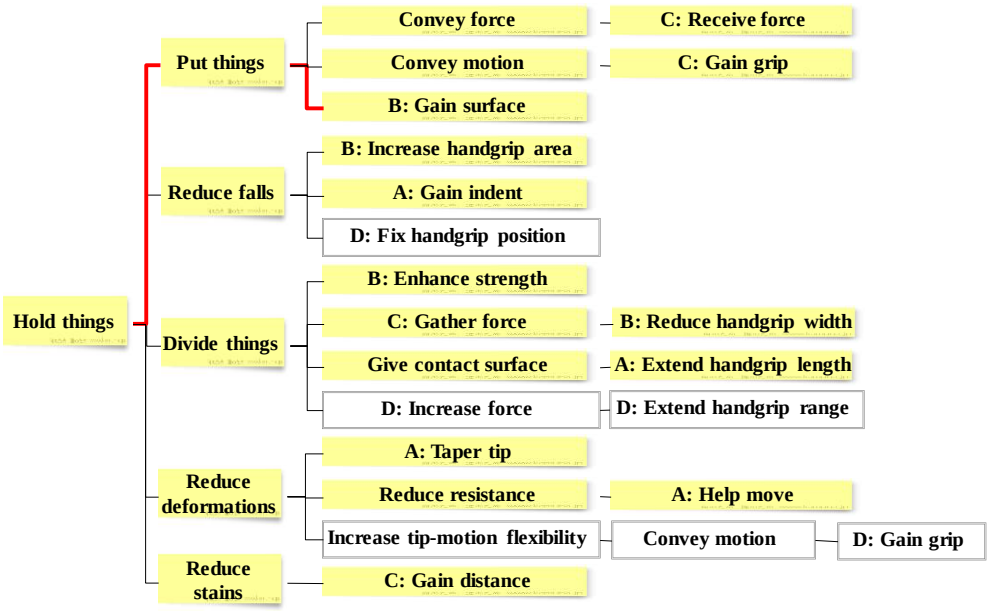

Figure 5(a): FAST diagrams Spoon by *mono*/shape and *koto*/use of the hand

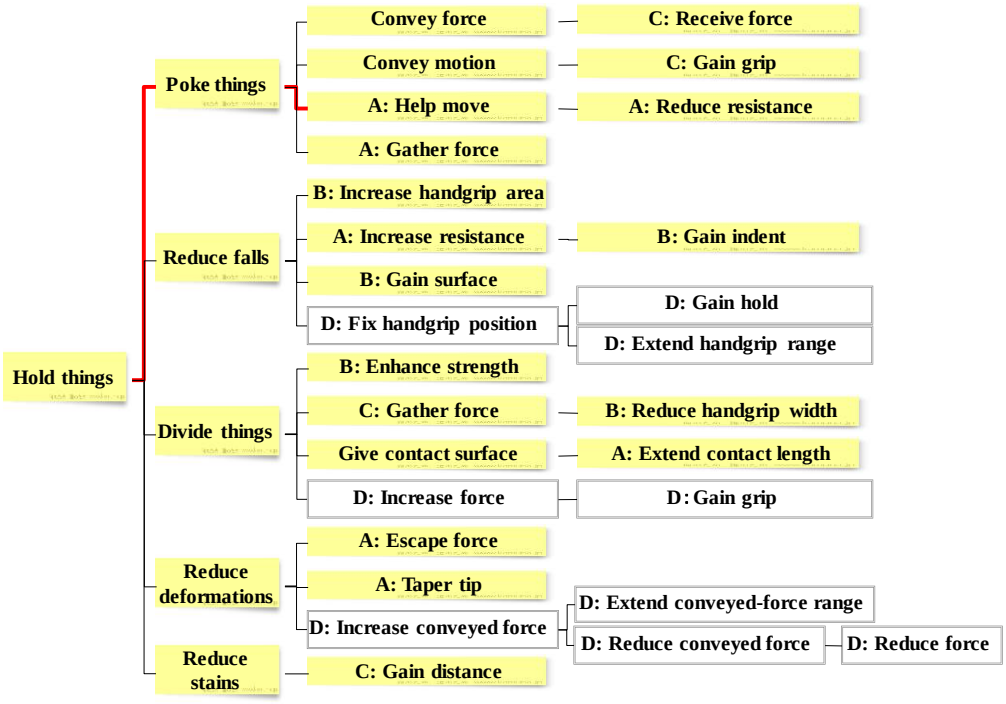

Figure 5(b): FAST diagrams Fork by *mono*/shape and *koto*/use of the hand

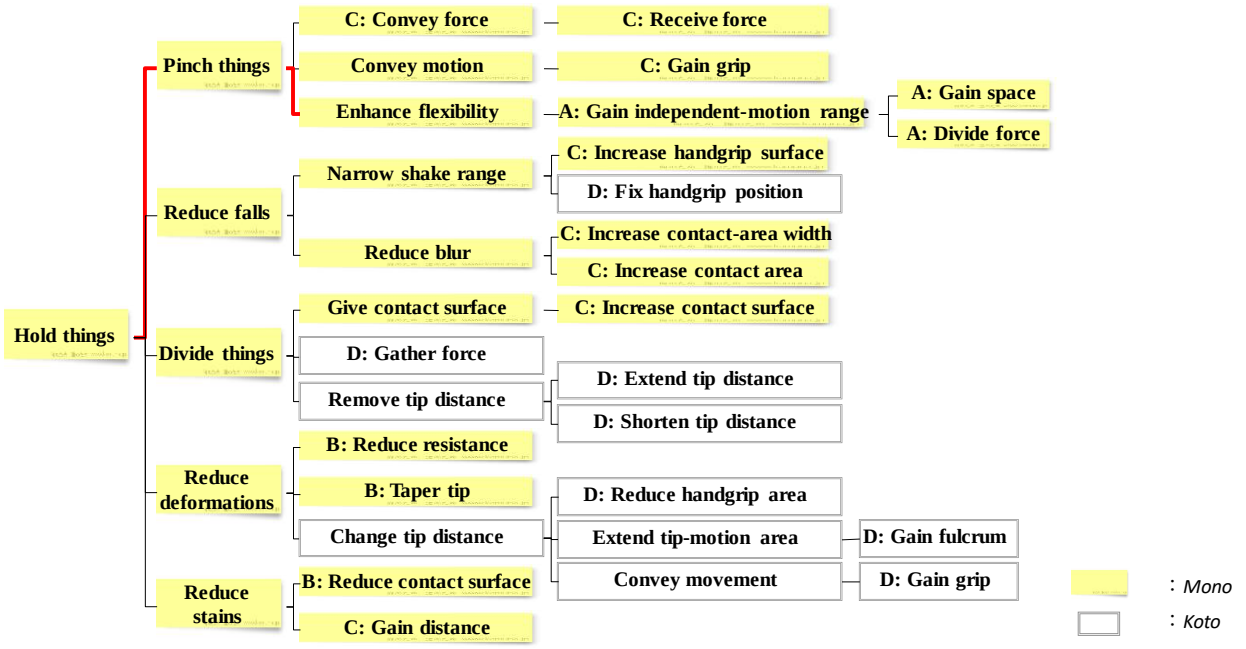

Figure 5(c): FAST diagrams *hashi* by *mono*/shape and *koto*/use of the hand

To answer my suspicion, I visualized each new FAST diagram in radar charts through use of the radar chart analysis. I made a comparison of the three utensils with each '*mono*/shape function' and each '*mono*/shape function plus *koto*/use function' (Figure 6).

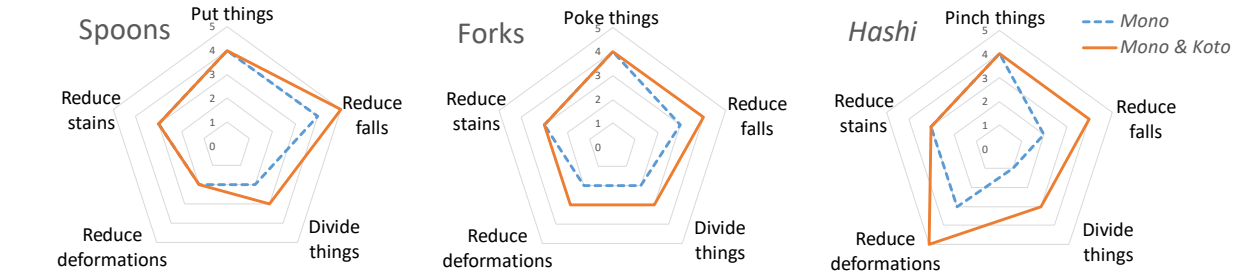

Figure 6: Radar chart analysis, comparing '*mono* functions' with '*mono* functions plus *koto* functions'

Through this new radar chart analysis, I discovered that for all the three utensils, their low functions, based on their *mono*/shape analysis, could be improved by adding their *koto*/use functions. Above all, I was able to improve *hashi*'s functions <<Reduce falls>> and <<Divide things>> to similar function levels of both spoons and forks. By adding their *koto*/use functions, I was further able to improve *hashi*'s function <<Reduce deformations>> significantly more than that of the other two.

With these analyses, I came to know that one could only learn a narrow range of a tool's functions by its *mono*/shape function analysis alone; contrarily, one could learn a wider range of its functions by its *mono*/shape and *koto*/use function analysis combined.

3.3. Refining functions through an analysis extended to the 'arm'

What if the scope of *koto*/use function analysis was extended further to the arm? To find out, I refined each function of spoons and *hashi* (Figure 7).

By extending the analysis scope to the arm, I was able to make <<Carry things>> the higher order function. This applies to forks as well. If we can achieve the functions of <<Hold things>> and <<Change position>> of spoons, forks, and *hashi* with which people carry food to the mouth, we do not have to cook within the limitations of their use.

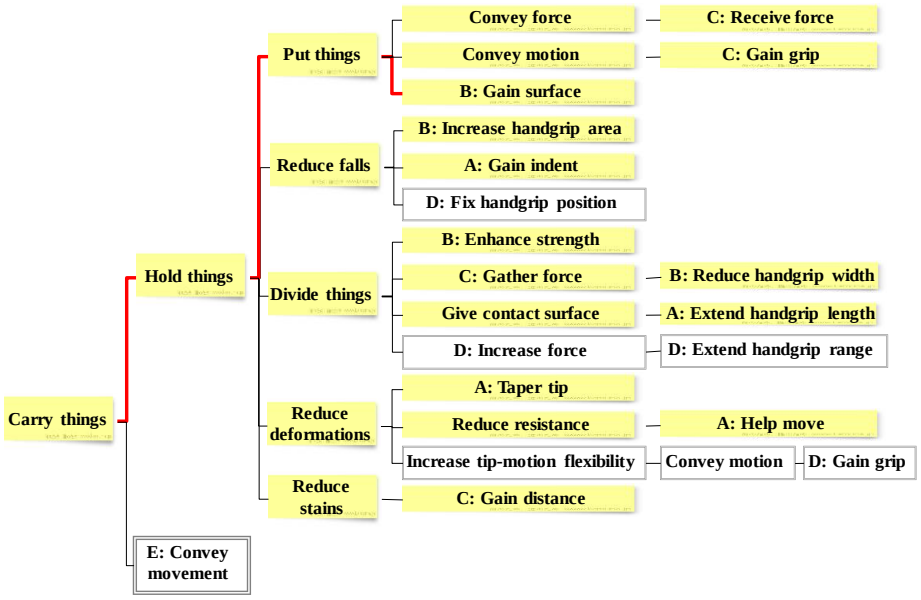

Figure 7(a): FAST diagrams Spoon by *mono*/shape and *koto*/use of the hand and arm

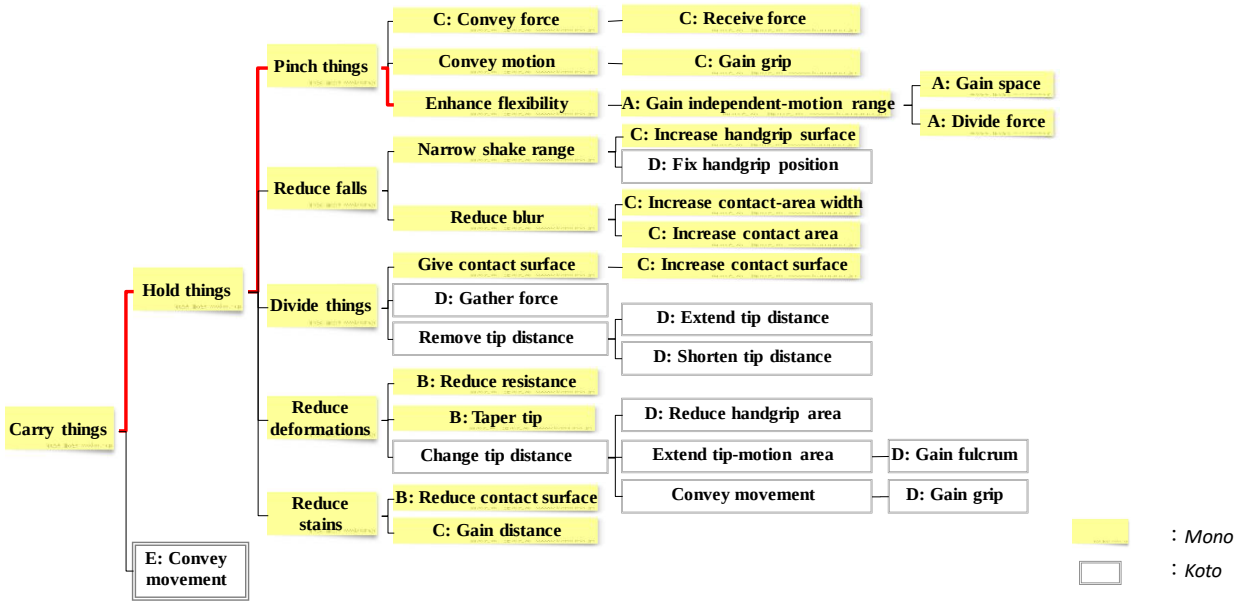

Figure 7(b): FAST diagrams *Hashi* by *mono*/shape and *koto*/use of the hand and arm

4. Study results

In this paper, I revealed the true function <<Hold things>> of 'spoons', 'forks', and '*hashi*' by their shapes. This is the common function among the three utensils. Then, I discovered five functions to achieve the above true function of each utensil. Furthermore, I found that except for the critical function logic path, the other four functions were the same among the three utensils, while the critical function logic path differed most prominently among the three. The basic functions of each were as follows: <<Put things>>, <<Poke things>>, <<Pinch things>>, <<Reduce falls>>, <<Divide things>>, <<Reduce deformations>>, and <<Reduce stains>>.

After gathering this data, I evaluated each FAST diagram with the five basic functions in order to satisfy each of the three utensils' function <<Hold things>> and to see which functions were high or which functions were underachieved. The results showed clear differences in achievement among the three utensils. Therefore, I extended my analysis scope to 'the hand's movements'. 'The hand's movements' mean the

‘*koto*/use functions’ of the utensils. I developed a technique named the Extended Function Diagram with *mono*/shape and *koto*/use functions, and was able to achieve the basic functions of the utensils. I found out that an extended use of eating utensils could widen cuisine availability, while different cuisines require different eating utensils. For cuisines to achieve functions such as <<Divide things>> and <<Reduce deformations>>, one can exploit an extended use of eating utensils such as spoons, forks, and *hashi*. By adding ‘*koto*/use functions’ to them, one can achieve higher functions of these utensils. Among them, ‘*hashi*’ showed the higher potential in ‘*koto*/use function’. *Hashi* is worth a try even if it may take time to master how to use them. To extend the analysis scope of these utensils further to the ‘arm’, I found that they possess the function <<Carry things>>, derived from their functions <<Hold things>> and <<Change position>>. The soup cup is a good example of a method in which one does not have to depend entirely on spoons to have soup. The Extended Function Diagram makes it possible to find a tool’s effectiveness by gradually extending its subject scope. I named this set of analysis the Extended Function Analysis.

5. Conclusion

In this study, I described the following:

- Success in making FAST diagrams of the functions of eating utensils and visualizing FAST diagram evaluations by the radar chart analysis
- Success in developing the Extended Function Diagram by adding eating utensils’ *koto*/use functions with the hand and arm to their *mono*/shape functions
- Success in developing the Extended Function Analysis to evaluate FAST diagrams by each subject scope by gradually extending the subject scope of the Extended Function Diagram

When we analyze a tool itself, we can only improve its *mono*/shape functions. By extending its analysis scope to the hand’s movements, we can improve the tool more. For example, it is difficult to cut food with the thin-surface of a fork’s tip by one hand’s movements alone; however, we can easily cut it with a knife, together with a fork, by both arms’ movements. In contrast, we can cut food, if it is not so hard, with *hashi* by one hand; we do not have to use arms to do so.

Unless we extend their analysis scope to the arm, we cannot generate an idea to compare forks and hashi. It is useful to consider an eating utensil’s functions with the addition of the arm’s functions. Note that I found it only by gradually extending the analysis scope from ‘a tool itself’ to ‘the hand’ and furthermore to ‘the arm’; in doing so, I clarified its hidden functions. With adding the hand’s movements, *hashi*, originally with very simple functions, were improved significantly for their function <<Reduce deformations>>. It goes without saying that *hashi*’s delicate movements developed and dispersed Japanese food. With *hashi*, Japanese people can pick up *wasabi*, put it on *sashimi*, dip *sashimi* into soy sauce, and eat it. Also, they can pinch long, thin *ramen* with the two sticks of *hashi* and eat it. These facts show that *hashi* have higher function in <<Reduce deformations>>. Through the functions <<Hold things>> and <<Change position>> only, this unique function could not be achieved. Food changes eating utensils and eating utensils change food.

Similarly, we can apply this combination of a tool’s and hand’s movements to any other tools. One example is a toothbrush, which uses a combination of its own movements and the hand’s movements. An electric toothbrush was developed by focusing only on the toothbrush’s *mono*/shape functions. Another example is pruning scissors, which enlarge their power by ‘leveraging’ human arms. I found that my VE techniques for improving eating utensils are applicable to other tools in other fields. I will continue my VE studies on functions behind food and its history and culture.

References

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