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Introduction to Group Dynamics:

Social Construction Approach to Organizational Development and Community Revitalization

Toshio Sugiman

A Taos Institute Publication

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(Kyoto University, Japan)

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Preface

Beyond Common Sense

Group dynamics is a practical discipline in which researchers enter various groups, or collectivities, such as organizations and communities and improve or transform them by collaboration with people working or living there. This book is not just for students or researchers who are interested in the discipline but also for practitioners who want to change various field sites. I would take great pleasure in knowing that, regardless of your discipline, you can benefit from this body of information that takes you beyond current assumptions regarding how groups function.

I'd like you to read this book especially if you feel interest in or resistance to the following remarks for example;

- Any group has a unique character as a whole. A person in the group is manipulated by the character. One never acts by one's own will. (Chapter 2)
- If you say, as a researcher, "I maintain a neutral position for any values," it's a lie. (Chapter 3)
- You are not eligible to be a leader if you cannot create a vision or dream. We provide you with a method so that you can create a vision. (Chapter 5)
- People in a group create something like a god and are moved by its voice. (Chapter 7)
- An emergency evacuation method in which a leader never shows bravery, a loud voice and a clear indication of the direction to the exit is sometimes effective. (Chapter 8)

Backbone of this Book

The backbone of this book is premised on the idea that we persistently go with a concept of group. However, we are usually convinced that we feel and think something in our mind individually and take action. But, the backbone of this book challenges our conviction. A premise of group dynamics is that every action is possible in a certain group. In this sense, this book is critically different from the books published so far even if the phrase, 'group dynamics,' was used in the title.

It is true, however, that we have a conviction that we feel and think in our mind. How did we get to have such a conviction? Group dynamics explains it theoretically.

Axiom and theorem are two concepts distinguished in mathematics. An axiom is a starting point we have to accept unconditionally. In contrast, any theorem should be proved from a set of axioms. The conviction above is an axiom that resides in our common sense and traditional psychology. But, in group dynamics, the conviction is a theorem that should be explained from the axiom that every action is possible in a group.

How to Read This Book

This book is an introductory work. I tried my best to make it readable even for high school students who enjoy reading a book. But, at the same time, this book is culmination of the studies I have made over a thirty year career as a professor, researcher and scholar. Group dynamics is a young discipline. Its history is a little bit more than half a century since the father of the discipline, Kurt Lewin, used the phrase, 'group dynamics,' for the first time. It has been just two or three decades since the new group dynamics I introduce in this book was born. A minimal accumulation of knowledge is always the weakness of a young discipline. But, the weakness can be changed into strength which makes it easier to take a beginner to the front-line of studies.

Please read chapters 1 and 2 in Part I. These two chapters explain the basic idea of group dynamics.

Group dynamics is a practical discipline to aim at achieving the betterment of field sites by collaborative practice of both people in the sites and researchers. Subsequently, the methodology of group dynamics is nothing other than methodology of collaborative practice. The methodology is argued in chapter 3.

The researcher's role in the collaborative practice with people in their field sites is to enrich the languages that are used in the collaborative practice. Concepts and theories should contribute to it. In Part II, theories of activity, language, norm and crowd are explained in chapters 5-8 after defining the role of theory in chapter 4. Each chapter illustrates how a theory can be harnessed for collaborative practice. You can start reading from any chapter in Part II.

Part III discusses how the discipline of group dynamics should be located in the field of science. Science actually consists of natural science and human science although traditionally, science has been equated with natural science. Group dynamics belongs to human sciences. The division of labor between natural sciences and human sciences is clarified in chapter 9.

Sadly, academic journals in group dynamics or social psychology are full of pseudo natural scientific papers. To tell the truth, I myself was committed to pseudo natural scientific study when I was a graduate student. In chapter 10, we will see the mistakes of trying to make human science look like natural scientific study concretely using my own past paper as an example.

The last chapter shows the current state of my theoretical studies. I have not yet presented these findings in an academic conference. I wish to see how it is accepted by the readers who learn about group dynamics by this book.

References of Photos, Figures and Tables

Figures 5.1 -- 5.3 in Chapter 5

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Part I

Basic Ideas of Group Dynamics

Chapter 1
What is Group Dynamics?

Objects of study in group dynamics are collectivities such as a family, a workplace, an organization, a community and so on. A concept of collectivity includes not only people, but their physical and institutional environments. A collectivity changes like a living thing. Change of a collectivity, the dynamic nature of a collectivity, is a research target of group dynamics.

A major characteristic of group dynamics is in its research stance. A researcher of group dynamics enters a real collectivity and collaborates with people there to improve or transform the field site. Collaborative practice by both people in the site and researchers is the core of a research stance.

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1. Research Objects of Group Dynamics

Collectivity ---- People and Environments

We will start to explain the discipline called group dynamics. Objects of study in group dynamics are varied. Several examples are as follows;

- A two-person group such as a husband and a wife, or a couple of lovers
- Several persons who work together or enjoy sports together
- Several hundred, several thousand, or several ten-thousand people affiliated with the same company; this is usually referred to as an organization
- More than ten thousand people watching a football game in a stadium; this is usually called an audience or a crowd
- Several thousand or several tens of-thousands of people living in the same community; they are usually referred to as citizens
- About 120 million people living on Japanese islands; they are referred to as nationals.

As you see from the above examples, the word “group” is not always adequate because it usually refers to a small set of people. Therefore, we will use the word, *collectivity*, although it is not as familiar as the word, group. Research objects of group dynamics are various collectivities, small or large. Recently, we have been faced with environmental problems on a global scale and political and economic conflicts between developed and developing countries. To resolve these problems, we should envision a huge collectivity consisting of all crew members of Spaceship Earth under consideration.

There is another difference between a group and a collectivity. A group refers to only people in the group in its everyday usage, but a collectivity includes not just people but their environments as well. Therefore, we don’t use such an expression as “a collectivity of people and their environment” in group dynamics. Environment is already included in the meaning of a collectivity.

Physical and Institutional Environments

Some explanation is necessary to define environments. Environments are classified into physical and institutional environments. A collectivity in the workplace includes not only people working there but their physical environment that includes the rooms, desks, computers, telephones, fax machines, copy machines, printers and the equipment and furniture that they use.

An institutional environment is characterized by the movement of the collectivity that

has become stylized and fixed. It is often repeated for some reason although it is possible for the movement to end up being transient. Examples of institutional environments are the sets of rules and customs that everyone in the workplace follows.

An institutional environment is not a physical thing but it bears the nature that is similar to a physical thing. A typical example is a holiday or an annual event that occurs with repeated regularity. Let's compare an actual physical event such as the expectation of an approaching train to an institutional environment. Even though the train is in the distance, people start to secure their baggage, make certain they have their tickets in proper order and begin to line up. Similarly, during the last week of December, people are aware that January 1 will harken the new-year and New Year's Day is coming. People start to prepare for the holiday by cleaning the house, composing a New Year's greeting card the same way that they prepare for boarding the train when it approaches to the station.

Included among all institutional environments is a very important concept, language, which we should not forget. People working in different workplaces use different unique linguistic expressions that reflect different contexts of work. A particular linguistic expression was brought into the workplace by some reason for the first time. It might have disappeared without being distributed but it becomes a part of the institutional environment if the movement of workplace collectivity where it is used is repeated and fixed.

All institutions resulted from the movement of the collectivity that might have been transient at the beginning even if they appear to have been static and ethereal. The movement was institutionalized simply because it was repeated by some reason including chance and luck. Even an institution that looks unchallenged can never be permanent and thus has possibilities to be changed.

More Collectivities ---- Language

All examples of collectivity in the above exist in a unity called group, organization, community, and society in everyday language. But, more diverse collectivities are targeted in group dynamics.

We have many dialects in Japan. Some dialects can be understood but others are so different from standard Japanese that they cannot be understood at all by people who don't know the dialect. In the U.S. most dialects are mutually understood although certain words might not be recognized by everyone. For example in the deep south, at one time, a phrase such as "I can carry you to the store," meant "I can take you to the store." But in standard English, the verb "carry," refers to physically picking up an item. Obviously, any dialect exists because there are people who speak and write with it. It is not possible for a dialect to exist when no one uses it. In other words, there is a dialect only when there is a collectivity in which it is used. The collectivity includes not only people living in the area where the dialect is usually used such as their home town, but people who live far from the area and use the dialect only when they call and talk with family members and friends living in that particular area or home town.

In addition to a dialect, people using certain linguistic expressions naturally constitute a collectivity. Unique terminologies are used in different geographic locations, different businesses and different academic worlds. Each lexicon exists because there is a collectivity in which it is used. This is the case for each word we use in our daily life. Babies and infants acquire new words day by day. This means they strengthen their new membership in an established collectivity each time they learn a new word.

More Collectivities ---- Custom

Beside a collectivity in which people share the use of the same linguistic expressions, people who share the same manner of action and the same customs belong to the same

collectivity. From this point of view, change in an era can be depicted by disappearance of traditional collectivities and appearance of new ones.

The Internet has spread rapidly in Japan since the mid 1990s. Now, the Internet is a necessary tool used not only for work and study but for informal human relationships. It demonstrates that an Internet collectivity was born and has expanded rapidly. The Internet collectivity includes people who use the Internet directly or indirectly, their physical environments that contain computers, Internet cables; and institutional environments such as rules and terminologies regarding the Internet. Of course, the Internet collectivity in Japan constitutes an Internet collectivity on the global scale by being connected with many Internet collectivities abroad.

In contrast, we see a collectivity that is disappearing. An example is the collectivity in which people write a manuscript on a sheet of paper by handwriting with the use of a fountain pen or a ball point pen. I was in that collectivity when I wrote my graduation thesis in the 1970s. And, I am still in the collectivity in which people enjoy sharing their reminiscences of writing with a fountain pen or a ball point pen but I am also in the collectivity of people who write using a computer.

More Collectivities ---- Conflict

Group dynamics is not limited to studies about a collectivity in which people share a goal, a rule and language. Two persons who are beating each other or two or more groups who are fighting with each other are taken as a collectivity in group dynamics. Some characteristics can be detected when two persons beating each other are observed as a whole. They might trade punches alternately like in a heated boxing game or one of them might be knocking down the other. In either case, such movement can never be detected if you focus on one of the two persons exclusively. The movement can be detected only when you have a collectivity of two persons as a whole in your scope of view.

Generally, two or more collectivities in a fight or conflict are grasped as a single collectivity in group dynamics. When a collectivity A, and a collectivity B, are in conflict, three collectivities, that is, A, B and A&B, can become objects of study. The structure of conflict is investigated as a characteristic of a collectivity consisting of both A and B.

Dynamics

Having defined what group is in group dynamics, we will explain what dynamics is. Dynamics means studies of movement or change. Basically, group dynamics regards any group as moving or changing. We are, however, likely to assume most phenomena as stable or unchanged. This is a habit of our thinking. It is true that some collectivities remain stable and unchanged. But, being unchanged is just a special case in which the speed of change is zero. You are not surprised to see a parked car when you are aware that a car can move 50 or 95 miles per hour because the parked car is just a special case at zero miles per hour. But, you would be surprised to see the converse, i.e. a car moving if you assumed that a car never moved. This is the case for a collectivity. You can deal with a collectivity that is stable if you assume a collectivity changes basically. Then, how does a group dynamic explain the change of collectivity? I will describe it in the next chapter.

2. Collaborative Practice by People in the Field and Researchers

Changing a Field Site

Objects of study in group dynamics are the elements of the dynamic nature of collectivities. But, the more important characteristic of the discipline is in the research stance,

or research attitude of researchers. Other disciplines such as sociology, educational science, management science, anthropology and so on are not different from group dynamics because they study real collectivities. For example, collectivities such as a farmers' community, schools and classes and business organizations are studies in rural sociology, educational science and management science, respectively.

But, those disciplines have an iron-bound rule that should be followed when real collectivities are studied. The rule is that a field site should not be changed by researchers who enter there. For example, it is forbidden for researchers who are interested in a traditional festival that has succeeded for hundreds of years in a certain community to enter the community and change that festival.

In contrast, researchers of group dynamics enter a field site to change it. Obviously, they try to change the site to make it better, or to improve or reform it. Researchers of group dynamics aim to improve the field site. One must understand the present situation of a site to make it better, not only the present situation but the past, i.e. how the current status has been achieved so far. Furthermore, prediction of the future is necessary. What would happen if the present situation remained? Or what if certain measures were taken to improve the future? Data collection is often required to understand the present, the past and the future. But, data collection never should be undertaken to understand the site solely for discovering a fact from an outsider's perspective. Data should be collected and analyzed for the betterment of the site.

Collaborating with People in the Site

It is almost impossible for researchers alone to understand the present, the past and the future of a field site and then attempt to make it better. Such things become possible when people in the site and researchers collaborate with each other. In the first place, it is obvious that the betterment should benefit those in the site. There is simply no justification for betterment without people in the site.

To sum up, collaborative practice by both people in the site and researchers is the basic stance in group dynamics. Then, how should the collaborative practice be developed? It will be argued in Chapter 3.

A remark on betterment should be included in this section. It is difficult to determine what should be carried out in advance or how to achieve betterment for a collectivity. It is only the way for both people in the site and researchers to answer their own questions in the process of collaborative practice. A new direction to go might appear and the original idea might be abandoned even if they started with the conviction that they should adopt a certain idea to improve their organization. The collaborative practice you were committed to for betterment in a certain period of time might have depreciated in a later period of time and is now inadequate. Collaborative practice is an endless movement toward betterment that is possible.

Chapter 2
Basic Ideas of Group Dynamics

Any collectivity has its unique characteristics which exist as a whole. This is called the nature of collectivity. The nature of collectivity can be grasped from both physical and semantic aspects. In this chapter, the nature of collectivity is likened to a canopy. We are encompassed by many canopies.

The basic assumption of group dynamics is that we are manipulated by canopies. We do not behave by thinking in our head and feeling in our mind but instead are controlled by our canopies. You cannot see anything and cannot think of anything if you are not encompassed by any canopies. In addition, you cannot grasp the entire extent of the canopies encompassing you. It is the otherness, i.e., a person who is outside of your canopy, who makes you realize even a small part of your canopies.

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1. The Nature of Collectivity ---- A Metaphor of Canopy

The Nature of Collectivity

A collectivity was defined as the whole consisting of both people and their physical and institutional environments. Any collectivity owns its unique nature. No part can be removed or no new elements can be added without the unique nature being affected. The unique characteristic of a collectivity is a whole and thus cannot be reduced to individual components such as people or their environment.

The nature of collectivity can be grasped from two aspects: its physical and semantic natures. The physical nature of collectivity is what can be observed by an outsider of the collectivity. You can observe how people and small or large goods are located when you visit a certain workplace. People and physical environments influence each other and thus produce movements that are unique to the collectivity. Such locations and movements are not the same between two workplaces even if they appear similar. When you observe a certain workplace in detail, you can detect the unique physical nature of the collectivity that will not be observed in other workplaces.

The semantic nature of collectivity is the characteristic of “meaning” that is developed in the collectivity. Both each person and each element of the physical/institutional environment in the collectivity has meaning. For example, a person working at a desk apart from the other many desks is not just a person but a *person as a section chief*. The person has a meaning of section chief. Many pieces of paper on your desk are not just papers but *papers as budget documents.* The papers have the meaning of budget documents. A ten-minute meeting before starting work each morning, in an institutional environment, is not just a meeting but *a meeting as the opportunity to share information on what work should be implemented on that day*. The meeting has a meaning of the opportunity to share such information. Furthermore, the same is true for each word that is used in a workplace, which is a part of institutional environments. For example, a word is not just a sound but has meaning. The word, *work* is not just a sound but has the meaning of work.

Don’t assume that the meaning is equivalent to a dictionary meaning. The word/percept in a dictionary is given a different meaning in different collectivities. The same work manual is *a manual of crucial information sources* in each workplace where it is frequently used. The manual has a meaning of *crucial information source.* In contrast, the same manual can be or

will be *a manual of that should be discarded in the near future* in the workplace when the manual is left unused for a long period of time. That discarded manual will have the meaning of *a wasted product.*

The physical and semantic natures of collectivity determine each other. Suppose that natural environments and buildings in a community were collapsed by a huge earthquake. This would be an enormous change of the physical nature of the collectivity. The change caused the disappearance or change of meanings that the natural environment and buildings had until the quake.

The semantic nature of collectivity also affects the physical nature of collectivity. For example, if a certain partially destroyed building is conserved as a monument to keep memories of the earthquake for the future, the building alone maintains a partially declined figure while the other buildings are newly constructed. This shows that the semantic nature of the building determines the physical nature of the community where the building is located.

Photo 2-1. A Real Canopy

Photo 2.1. Two beds called ‘futon’ in Japanese are spread in a canopy in this photo. A canopy is used to prevent being bitten by a mosquito while having the flow of air in summer.

Mutual Influence Model ---- A Tentative Explanation

Let us use canopy as a metaphor of the nature of collectivity. A physical canopy was widely used to prevent mosquitos in summertime until several decades ago (see Photo 2.1). It is now used rarely even in rural areas. But, even young people who have never seen one complain using the expression, "Only I am outside the canopy," when they are not informed of what their friends are aware of. A canopy remains in their vocabulary even for those who have never seen one.

We learned that the nature of a collectivity consists of both the physical and the semantic aspects. When we use the metaphor of a canopy, the physical nature corresponds to the nature that even people outside a canopy can observe while the semantic nature corresponds to the one that only people in the canopy can observe.

Change in the nature of a collectivity is represented as a repeat of the two steps as followed when we depend on a metaphor of canopy (Please note that the following explanation is not complete because it will be discussed later).

The first step: Any collectivities are necessarily encompassed by some canopy. If you are in a real canopy, you are affected by the canopy for example, by smelling its odor or feeling its peculiar atmosphere. You might want to say you are influenced by the canopy. In the same way, people in the canopy of the nature of collectivity are affected by it. You might want to say you are determined or bound by the canopy. Actions and recognitions of people who are components of a collectivity are bound by the canopy of the nature of collectivity. Similarly, physical and institutional environments that are also components of the collectivity are determined by the canopy.

Suppose there is a collectivity where a meeting is going on using a long table. Older people are seated in a deeper position in the room and younger people are seated closer to the door. The canopy of this collectivity might bind participants in the way in which they make remarks by taking their own age into account. A young person might worry about an older person's reaction and hesitate insisting on his/her own opinion even though he/she has an excellent idea. The canopy might define a physical environment the same way that a seating assignment is arranged such as seat of honor in a fixed position at the head of the table. The canopy probably determines institutional environments the same way that young people use honorific language for older people.

In contrast, let's suppose that people in a collectivity are holding a meeting sitting around a round table where they can be seated anywhere they like. The canopy of this collectivity affects younger people so that they can speak more freely than at the previous collectivity where seniority determines position. The canopy might make it possible to have coffee cups on the table, which is a physical environment that you could not see in the previous collectivity. The canopy might also make it possible for the youngest person to chair the meeting, which is a part of institutional environments.

In Figure 2-1, downward arrows indicate how five people in a collectivity are affected by the canopy. Their environments are affected by the canopy although those are not shown in the figure. However, people differ in the degree that they are affected by the canopy. The degree in which each person is affected by the canopy is shown by the width of arrow in Figure 2-1.

The second step: People and environments in a collectivity are determined by the canopy but a person is not bound by the canopy thoroughly. Only half of your body and half of your mind are determined by the canopy. You feel and think many things freely and act actively by half of your body and mind while the other half is bound by the canopy. Even in the example of the meeting where seating is fixed according to age, a young person might be brave enough to make a remark suddenly.

Resultant forces of free and active actions that are exerted by the half of body and mind

of each person change the canopy. Some move the canopy a great deal while others move it just a little. But the canopy is changed by expressions of freedom and actions exerted by each person more or less. Upward arrows in Figure 2-1 show how much each of five people move the canopy.

The same is true for environments. Only half of the environments are determined by the canopy while another half moves independently from the canopy. The independent movement changes the canopy. An example is that when an emergency alarm goes off, the environment changes and the meeting is abruptly finished. Some components of environment change the canopy more than others but any components can change the canopy more or less. The two steps above are repeated endlessly.

Figure 2.1 How Canopies Affect Individuals

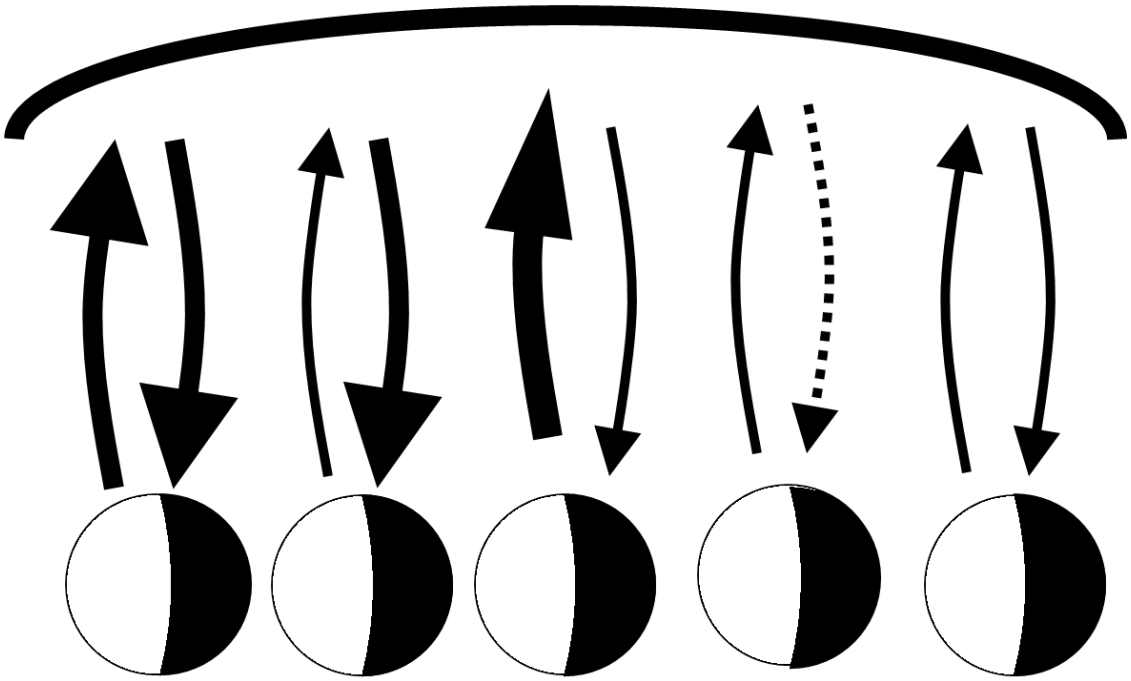

Figure 2.1. Each circle represents an individual person. Five persons are encompassed by the same canopy that is represented by a curved line at the top in this figure. A half of an individual is affected by the canopy but the other half affects the canopy. The width of the arrow represents the strength of the influence.

2. Reconsidering an Image of Human Being

A Body that has a Mind within the Skin?

The explanation of change of the nature of collectivity with the use of a metaphor of canopy in the above is not very different from our common sense. We often experience the situation in which the psychological state of each member is affected by the atmosphere of the collectivity, shown in the downward arrows in Figure 2.1. At the same time, we often experience a situation where we can take an action by our own intention while being affected by the atmosphere that is subsequently changed by such actions, like upward arrows in Figure 2.1. The explanation in the previous section integrates both into a single cycle. Therefore, the explanation is easy to understand but is not new.

Group dynamics grasps changes of the nature of collectivity from more radical viewpoints than the explanation above, the mutual influence model. In fact, the mutual influence model depends on our common sensory image of a human being. Group dynamics does not depend on the image easily and thus stands on an assumption beyond our common sense. In this section, we reconsider our common sensory image of the human being to prepare for a description of how group dynamics grasps the change of the nature of collectivity.

First of all, we will revisit the image of a human being we share in common. What is a human? When we are asked so, we are likely to imagine a single person, that is, an individual person. An individual person is a physical body before anything else. The body is separated from the outside of the body by skin. However, such a body alone is not an individual person in our image. The body is assumed to feel and think many things, and act consciously. Namely, an individual person has a mind, consciousness or mentality beyond being a mere physical body. We will use the word *mind* as a representative word in the following.

Where is the Mind?

Then, we might want to understand our common belief regarding the location of the mind: where is the mind? You might quickly give an answer like “It is in our brain or central nervous system.” The study of physiology has clarified the close relationship between brain functions and psychological processes in our mind. But, let’s remind ourselves of situation in which we talk about the mind in everyday conversation such as when we say, “How does he feel now?” Does this mean he has a feeling in the brain? Probably not. It is not that aspect of the mind in the brain as far as our everyday life concerned. Nevertheless, what do you think if someone points to the surface of a desk and says, “My mind is here?” Or, he says the same thing while pointing to his pocket. You have no way to respond other than with a laugh. It should be a joke. Such remarks are totally removed from common perception of the mind’s location.

It has become clear where the mind is assumed to be in our common sense. It is somewhere within a body separated from the outside by the skin. We cannot say either more or less than that. If you want to know more precisely beyond *somewhere*, it is impossible. At the same time, you laugh when someone states the mind is outside the skin. It is our common sense that the mind is somewhere inside the body surrounded by skin and that a human being consists of a physical body that contains a mind somewhere inside.

Half of the mind that appeared in the mutual influence model in the previous section was half of the mind-in-a-body. We see that the mutual influence model depends on our common perception, the mind-in-a-body. That is why the model was easy to understand. It is true that the mind-in-a-body has certainly become a part of our common perception. But, we have room to doubt whether the concept of mind-in-a-body is naturally developed through our daily experiences. We will show that the concept of mind-in-a-body contradicts our daily

experiences.

You Say You Have an Image in Your Mind, but ----

We will see several examples to show that the concept of the mind-in-a-body is not consistent with our experiences in everyday life. Suppose you have exercised on a hot day in summer and are now thirsty. You want to drink water as soon as possible and run to a fountain or sink. Your hand is on the handle. It is this moment when you are about to turn the handle but water has not appeared yet. However you are so thirsty that you almost see an image of water. For such a situation, you say you have an image of water in your mind or head. But, is it true? Probably not. Even when you have an image of water, it must be at the faucet, not in your mind or head. The image is not inside your mind but on the outside.

Let's look at another example. Suppose you are reminded of a beautiful scene you observed from the top of the mountain you climbed last Sunday. You saw a cloudless sky, and a lake glittering far away. You say you are reminded of the scene in your mind, but do you see the image of the beautiful scene in your mind or head? Again, the answer is no. It must be that you see the image of the scene on the outside like an image projected in a three-dimensional way by laser beams. This example is about memories of the past but also the case for imagination about the future. Images of both the past and the future are seen in the outside.

The two examples above indicate that an image is not located inside but outside the body even if we say we see it in our mind or head. Our everyday naïve experience of the image contradicts the concept of the mind-in-a-body.

Understanding the Consciousness of Others

We have a proverb in Japanese,"Onna-gokoro to aki no sora." Loosely translated to English, it reads, a woman's mind is like weather in autumn. It means that a woman's mind tends to change easily like weather in autumn, a common complaint of men. For example, she is not interested in you any more although she liked you very much until the other day. She might have fallen in love with someone else but you are not sure. The same is generally true for all people more or less. We don't see what and how other people are feeling and thinking.

However, is it totally impossible to understand what other people are feeling and thinking? Can we see nothing about consciousness of other people? Not necessarily. For example, you understand that she is thinking about someone by her behavior and facial expressions. Sadly, you also understand that the person she is thinking about is a man who is not you. But, at the same time, you can't understand whom she is thinking about and how. You understand her partly but not completely. This is how we experience another person's consciousness in our everyday life.

Sometimes, you understand a certain person certainly thinks something but you cannot see what he/she is thinking at all. Even in this case, you understand him/her partly, that is, you understand he/she is thinking something, or he/she is conscious about something. To repeat, other's consciousness can be understood partly but not completely.

Our common understanding of the mind-in-a-body concept contains a conclusion that contradicts our everyday experiences of other's consciousness. We conclude that you cannot understand other's consciousness at all because mind or consciousness is installed inside the body covered by skin. The conclusion contradicts our everyday experience in which we partly understand other's consciousness. We have not come to understand that others have a mind the same as we do if we can't understand another's mind at all,. We believe others have a mind naively even if we don't see what they think.

***Kojin* ---- A Coined Word**

An image appears outside of our body even though we linguistically express that the image appears inside our head or mind. Also, our experiences of other's consciousness contradict the conclusion from the common sensory premise of the mind-in-a-body.

Actually, we did not have a concept of human being in which the mind-in-a-body occupied an enormously important position in Japan until the country started to be modernized at the midpoint of the 19th century. A concept of the mind as an important place where judgment and decision are made did not exist in the Edo period when Samurai dominated the country and earlier. It follows that they could not translate a foreign word, *individual*, into Japanese when the word was brought about from the West where a concept of human being as having the mind-in-a-body as an important element had been already spread widely. The word "individual" meant a human who thinks and makes judgment in an important place, the mind-in-a-body. Then, Japanese people at that time had to coin a new term, Kojin.[1]

The mind-in-a-body was developed historically even if it looks obvious now. To use a more extreme example, the concept of mind-in-a-body is something similar to a traffic rule that a car should run on the right side of the road while people should walk on the left side. The rule has never been developed as a crystallization of fundamental human nature. The rule is not obvious any more when you go to most foreign countries except in some countries such as UK where people walk on the right and drive on the left.

The fact that a concept of the mind-in-a-body is a historical product means the concept is also a canopy. Then how was the canopy developed and in what historical context? Unfortunately, it is too early to explain it briefly. We need a theory of norm that will be introduced in chapter 7 in order to explain it.

A Common Understanding between Outer and Inner Worlds

A common sensory concept of the mind-in-a-body is like one side of a single coin, the other side of which will be explained. When we assume we have a mind somewhere inside the body, it can be called an inner world. It is assumed that we feel how beautiful a flower is or we wonder which key we should hit on a computer key board in the inner world.

This means there is an outer world in which the flower and computer really exist. The outer world includes not only physical things such as the flower and computer but other people. The other people are individuals who have minds in their bodies like we do and your physical body is an important part of the outer world. You sometimes think "My hands are dirty. I have to wash" while looking at your hands, a part of outer world. We grasp the outer world not only by seeing but by hearing, touching and tasting. When you feel pain in your stomach, you are grasping a part of the outer world. The stomach is certainly inside of your body but it is located in a different place from your mind.

As you see in the above examples, the common perception of the mind-in-a-body brings about another commonality regarding the dichotomy of inner and outer worlds. From this, we have the feeling that recognition is necessary to grasp the outer world in our inner world.

We believe our outer world really exists regardless of whether or not it is grasped in inner world. A blade of grass --a part of outer world-- that you happen to find at your foot now is believed to have been there a minute ago, an hour ago, or even yesterday. It is believed that you grasp it in your inner world now, i.e., you recognize it.

Obviously, the outer world is not recognized as it is. The same object in the outer world can be recognized differently depending on the state of your inner world. In an extreme case, you might recognize something horrible on a white wall such as when a person has a

[1] Yanabu, Akira (1982). *Hon'yakugo seiritsu jijyo* [How foreign concepts were translated into Japanese.] Tokyo: Iwanami-shoten.

hallucination and sees shadows or monsters where they do not exist.

The outer world is believed to really exist in its original configuration regardless of how it is grasped in your inner world. The original percept is called a fact, or an objective fact. When the fact is recognized correctly, it is called *objective recognition* but, when the fact is recognized incorrectly, it is called *subjective recognition*. A common concept that distinguishes outer and inner worlds is called the *outer-inner world dichotomy*.

3. Premises of Group Dynamics

A Concept of Appearance

Neither the common understanding of the mind-in-a-body nor the outer-inner world dichotomy is a premise of group dynamics. If that is correct, what is a premise of group dynamics? Here, we have to introduce three new terms that are required to explain the premise of group dynamics. It is because the terms we use in daily life have been connected tightly with the concepts of the mind-in-a-body and the outer-inner world dichotomy. For example, when you say you see a flower, it means that you grasp the flower in the outer world in your inner world. To avoid implying that you grasp the flower in the outer world, we have to use the terms we don't usually use.

First, the term of "appearance" is introduced. This term is used like *A beautiful flower appears for me* or *The appearance of a beautiful flower*. You have a certain world, or scene, in front of you. It is not as if you exist in a vacuum i.e. that nothing is around you. You see a window a couple of meters away and you see some trees outside the window. What you see closer to you are a ballpoint pen, a book, and your hands. The scene described above is a familiar scene. The sound of a moving bicycle on the road, the aroma of coffee and a comfortable breeze softly stroking your cheek are examples of what can be included in a scene.

You have such scenes around you. Then, we say such a scene appears in front of you. The scene, or world, includes the window, trees, the sound of the bicycle being pedaled; the aroma of coffee and a gentle breeze which we say appears in front of you. However, it is important to remember that the term, "appear" never implies that they really exist in the outer world and you grasp them in your inner world. The use of our familiar words such as 'see,' 'hear,' feel, or 'recognize' in general inevitably implies our common sensual that you see, hear , feel, or recognize something in your outer world, i.e., you grasp it in your inner world. This is why we have to introduce a new term, "appear," although it might be inconvenient for you to use it for the first time.

Physical Things and Bodies

Let's make our explanation more detailed. Suppose a person, A, is seated on one side of a table while another person, B, is seated on the other side of the same table. There are a coffee cup and a beautiful flower on the table. But, the scene that appears for A is not the same as the scene that appears for B. For example, the handle of the cup appears for A but not for B ---- A sees the handle but B doesn't, if you express it by using usual terminology. Similarly, the flower appears for A differently from the way it appears for B ---- A sees the flower differently from the way B sees it in usual expression. Generally, it is impossible that the scene that appears for A appears for others in the same way. The appearance must differ from one person to another if the positions where they are seated are different even a little bit or if they see the scene at different points of time. In other words, the appearance of a certain scene for someone is unique for his/her. The exact same appearance for you at a certain point of time is impossible for anyone else or even for you if time passes.

We are now ready to introduce the second concept, "body." A body is defined as

something material for which a unique scene appears. People, A and B above, are bodies because a unique scene appears for each. You find a cat, which is a favorite pet of A, in a corner of the room. We can assume that a certain scene appears for the cat although the scene is different from the one that appears for A and B. Therefore, the cat is a body.

Lastly, we will introduce the third concept, "physical thing." A physical thing is defined as something material for which nothing appears. We cannot assume that a unique scene appears for the coffee cup or table. Therefore, they are physical things.

Any scene appearing for us consists of bodies and physical things. The distinction between bodies and physical things might look the same as a distinction between living and non-living materials, but that is incorrect. What is a body and what is a physical thing are determined by the nature of a collectivity including both bodies and physical things. For example, suppose a collectivity consists of a small girl and a stuffed toy she loves as if it were her younger sister. She feels as if she herself is hurt if the stuffed toy were to be hurt by someone else. In this collectivity, both the girl and the stuffed toy are bodies. We will return to this explanation in more detail in section 2, chapter 7.

Meaning

Having defined three concepts, i.e., appear, body and physical thing, we can take our explanation one step further. Any bodies and physical things appearing for us are not just "something." They have necessarily meanings. We already learned about meaning when the semantic nature of collectivity was described in the beginning of section 1 in this chapter. For example, a person is not just something but it has the meaning of person A. The person is something as A. The cat in the corner of the room is not just something but something as a cat. Similarly, a physical thing in front is not just something but something as a coffee cup, or something as a table.

Any bodies and physical things that appear for us have meaning. Even a small amount of dust on a table has meaning. It is something which you don't care about at all even when it is blown away. That all bodies and physical things necessarily have meaning implies that what does not have meaning does not appear for us. It does not appear for us even if it is reflected in our eyes. Let me give you an example. Suppose you have two book shelves standing side by side in your room as shown in the left figure (A) of Figure 2.2. Please look at the left figure (A) only but carefully. Then look at the polygon painted in black in the right figure (B) of Figure 2.2. Did it appear for you when you looked at the left figure (A) alone? Probably not. In contrast, one or two stairs or an entire bookshelf certainly appeared. Why? It is because one or two stairs or a bookshelf has meaning but such a polygon does not. One or two stairs or a book shelf has acquired meaning because you had experiences in which you wondered if a certain number of books could be put on a single step or you wonder how many cartons would be required to bring all the books on a single book shelf to another place. But, you probably have no experiences in which you wondered about something about such a polygon. That's why the polygon did not have meaning and thus did not appear for you.

Meaning is definitely necessary in order for something to appear for us. Meaning is born and developed in a collectivity that includes both bodies and physical things, as we will see in more detail in chapter 7. For example, the meaning of a coffee cup has been developed because there has been a collectivity which consists of a huge number of bodies and a huge number of physical things (coffee cups) and in which a coffee cup is used as a coffee cup. Roughly, the huge collectivity includes people all over the world who enjoy drinking coffee with the use of a coffee cup. You are also a member of the huge collectivity if a coffee cup naturally appears for you.

To summarize the above, (1) A scene or a world consisting of bodies and physical things

appear only when they have meaning, and (2) Meaning is necessarily developed in a collectivity. These two concepts make us conclude that it is a collectivity that makes it possible for anything to appear for us. What appears for you and how it is totally determined depends on what collectivities you belong to. It is the work of a collectivity that makes any appearance possible. This is a basic premise of group dynamics. It is never that the outer world appears because it is grasped or recognized in one's inner world.

Figure 2.2. The Significance of Meaning

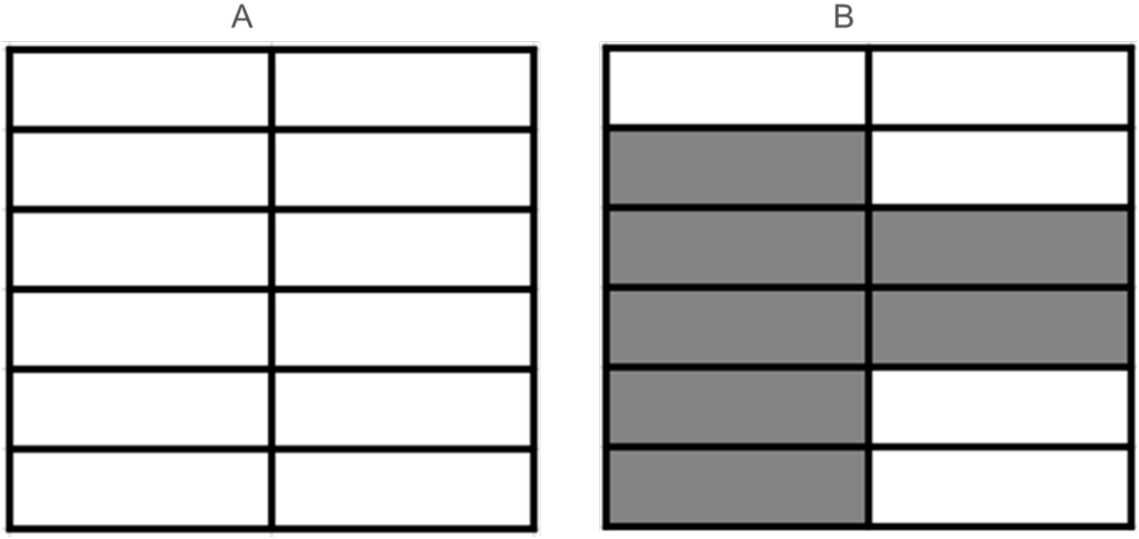

Figure 2.2. One cannot see anything without meaning. Look at only the left-hand figure (Figure A) carefully. The figure shows two bookshelves tightly arranged. Each bookshelf has six layers. Did you see a polygon in Figure A that is painted by gray in the right-hand figure (Figure B). Maybe, not. It is because such a polygon has no meaning. Anything that has no meaning never appears for you.

A Canopy as a Subject ---- Unfamiliar but a Correct Explanation

Let's go back to a metaphor of the canopy. At the end of the previous section, we reached a conclusion that it is exclusively a collectivity that makes it possible for anything to appear for us. This implies that a canopy enables any appearance for us. Any collectivity is encompassed by some canopy. A certain world appears for anyone in the collectivity because he/she is encompassed by some canopy. Anything would never appear for you if you would not have been encompassed by any canopies. Your world would be nothing, i.e., you could not see, hear or feel a touch of anything even if your physical and neural functions were normal. If a certain world appears including a ballpoint pen in front of you, you are encompassed by a canopy that encompasses a huge number of people who perceive such a thing as a ballpoint pen and use such a thing as a ballpoint pen. Such a thing appears as a ballpoint pen because you are encompassed by a canopy which you can call a ballpoint pen canopy if you want.

Here, we can clarify how the mutual influence model was incorrect. The model explained the change of a canopy by the repetition of two steps, i.e., (1) A canopy determines half of the feeling and thinking of each person and half of their environment and (2) Each person exerts freedom and subjectivity by the one half and the half of environment moves independently from the canopy, which changes the canopy. Either the half of feeling and thinking that is determined by a canopy or the half of feeling and thinking in which the freedom and subjectivity are exerted means nothing but half or another half of the mind-in-a-body. This was the fault or inadequacy of the mutual influence model.

Our premise was that what enables appearance of a certain world for us is a canopy. In other words, we can express this as following. When we recognize something, we are forced to recognize it by the canopy. When we desire something or want to do something, we are moved by the desire of the canopy. When we deliberate something, we are moved by the deliberation of canopy. When we take an action, we perform a part of action of the canopy. Like these, if you want to use a word of "subject" of recognition, desire, thought and action, an individual person who has a mind in one's body is never the subject. The subject is a canopy.

Subjectivity

That a canopy is a subject implies that people and their environments in a collectivity are puppets manipulated by a puppeteer, the canopy. Such a strange remark must elicit a strong reaction. You must want to say, "It is an extreme idea. If it is true, it means we are always influenced by the group we belong to or by people around us. We are sometimes influenced by other people but we often think and decide things independently from the people around us. Also, we sometimes meditate, deliberate or want to do something regardless of any collectivity."

Such a reaction comes from a question, "Where has our subjectivity, or our subjective judgment, gone?" As a matter of fact, we had experience in deciding something subjectively or we know from our experience that it is sometimes important to decide something subjectively. Here, we should note that subjective judgment or decision-making implies that we make a judgment in our mind-in-the-body without being influenced by the people around us. We should remember that such a notion of subjective judgment is fixated by a concept of the mind-in-a-body we denied in section 2 of this chapter.

However, it is not that group dynamics does not have any concerns with subjectivity. Subjectivity can be taken as one of many ways in which someone's action appears. One's action can appear for you in many different ways. One's action might appear as due to judgment obliged by someone else, due to judgment made by accident, due to judgment made carelessly or so on. Subjective judgment is one of such appearances of judgment. If so, a basic premise that any appearance is made possible by a canopy can be applied to appearance of subjective judgment. When a subjective action appears for you, or in a usual expression, you assumed you

had made the judgment subjectively because you are encompassed by a particular canopy.

Appearance of anything is not brought about by just a single or a couple of canopies. Since you were born, you have already belonged to countless collectivities. In other words, you have already been encompassed by a huge number of canopies. Subjectivity appears when a set of canopies encompassing you satisfies a particular condition. Then, what conditions should be satisfied for the appearance of subjectivity? Subjectivity is taken as being exerted in the mind-in-a-body. Therefore, for explaining appearance of subjectivity, it is necessary to explain how a concept of the mind-in-a-body was developed historically. We will do this in chapter 7 as was already promised.

How Should the Mutual Influence Model be Reinterpreted?

We will see how the mutual influence model should be reinterpreted to transform it into a correct model. It is because the model is useful if you use it while understanding its deficiencies. The model is almost sufficient when you find the traditional concept of group that stands on interactions among plural individual people and replace it with the concept of canopy. This model is useful when you as a researcher discuss the canopy of a real field with people living and working there. That is why it is important to know how the model should be corrected while using it as a tool.

When you reinterpret the model, you should focus on the half of the mind in which freedom and subjectivity are exerted. The half of the mind is the part of a person that is determined by the other canopies than the one shown in Figure 2.1. We all have been encompassed by many canopies. A canopy in Figure 2.1 is just one of many canopies for each of five people. Each of them is moved by many canopies that are not depicted in the figure. The half of the mind in which freedom and subjectivity are exerted should be taken as the part that is moved by many canopies that are not shown in the figure. Importantly, a canopy of the mind-in-a-body is among many canopies that are not depicted in Figure 2.1. A reason why we assume the half of mind moves a certain canopy we focus on is that we are also affected by a canopy of the mind-in-a-body.

How to Use the Mutual Influence Model

The mutual influence model can be utilized when you want to emphasize the importance of the nature of collectivity. It is because we are locked into a traditional concept of group, from which we want to become free. How, then does the concept of canopy differ from a traditional concept of group? Let’s clarify it now. What image of group did you have until you read this book? First, it must be that you had an image of two or more people. In this, the concept of canopy is the same. But, a canopy includes not only people but their environments.

And, an image of group is not complete with just plural people. For example, three people who are not aware of each other do not constitute a group. Second, it is assumed, in a traditional concept, that people in a group interact with each other. Interaction among people is assumed to be that person A influences a person B and person B influences A.

In summary, a traditional concept of group consists of two conditions; (1) there are plural individuals and (2) they interact with each other. The concept is illustrated in Figure 2-3. It is obvious that each person in a group is assumed to have a mind-in-a-body. However, the concept of canopy does not imply interactions among people in a canopy. Direct interaction between people is not implied at all. If people exert influence on each other, it is indirectly through a canopy. For example, three people, A, B and C, are affected by the canopy while each moves it, but the direct influence of A on B is never assumed. As you see in the above, the mutual influence model varies greatly from the traditional concept in that the nature of collectivity including both bodies and physical things is emphasized. Therefore, you can utilize

the mutual influence model to say, “Let’s get rid of the old concept of group and start to focus on the nature of collectivity.” In fact, the concept of mutual influence is useful enough to discuss many things with people in a real field.

Figure 2.3 Traditional Concept of Group

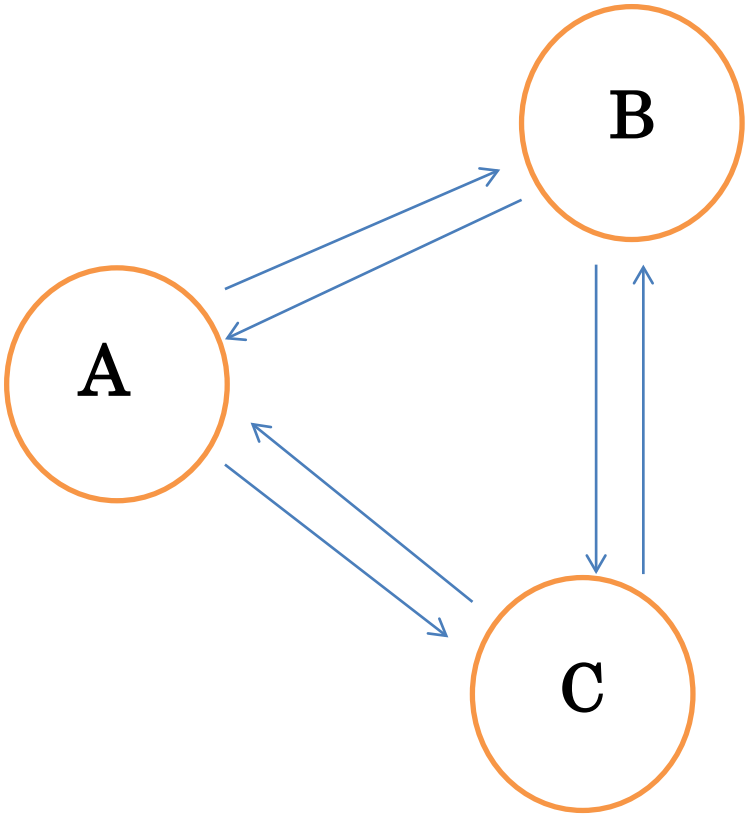

Figure 2.3. Traditionally, a group is defined as two or more persons who interact with each other as shown in this figure. In the definition, plural individual persons are assumed first and only then a group is assumed if they interact with each other. In contrast, a concept of collectivity that was explained by the metaphor of canopy does not assume direct interaction between persons.

Difference from Traditional Psychology

In group dynamics, the common perception of the mind-in-a-body as well as the common assumptions of subjectivity is an issue that should be explained. Those assumptions are never basic premises. They are not assumed from the beginning but they should be explained by beginning with our premise, namely a premise that any appearance is made possible by a collectivity, and accumulating our consideration. Actually, we will see how the problems can be resolved in Chapter 7.

In contrast, traditional psychology starts from a premise of the mind-in-a-body. Only then, we study what emotion is brought about and/or what thinking is performed and how it exists in the mind-in-a-body. Also, behavior is taken as a manifestation of such emotion and thinking. This is why traditional psychology could not produce total knowledge of the origin of the mind although the discipline professes itself to be a study of the psyche, or mind. A main stream of current psychology is cognitive psychology. Cognition means information processing. It studies how a human processes information coming from the outside or being stored in one's head. According to cognitive psychology, a human is a highly developed computer. Cognitive psychology tends to come close to brain science because the core of the human computer is a brain.

How should we understand the relation of group dynamics with cognitive psychology or brain science? Group dynamics regards a human computer as a network-based computer. The computers we now use were originally developed as independent machines. We entered a stage in which many computers were connected and constituted a computer network only after the computer had been developed considerably as an independent machine. A computer was originally created as stand-alone machines to process information without connecting to other computers even though it might be difficult to imagine a computer without internet, now. In contrast, a human computer has totally depended on a network from the beginning. It has been just a part of network. It must be that the mechanism of the human computer is like parts of the network. Obviously, what we refer to by the term network is nothing but a collectivity.

An idea that a canopy is a subject is not just a basic premise of group dynamics but has penetrated into broader disciplines such as sociology, educational science, management science, anthropology, and philosophy. The idea is called social constructionism. It is one of the fundamental thoughts, or meta-theories that underlie various specific theories introduced in Part II of this book. We will explain social constructionism in more detail by comparing it with the logical positivism that is a meta-theory for the natural sciences.

4. Multiple Overlapping Structures of Canopies

Multilayered Canopies

A collectivity is encompassed by many canopies, that is, it is characterized by many natures of collectivity. For example, if you observe the daily goings on in a workplace, you find many canopies. For example, you can find a canopy that determines what time people arrive at the workplace, a canopy that determines how a morning meeting is carried out, a canopy that determines how work is implemented, a canopy that determines how lunch time is spent, and a canopy that determines how overtime work is determined. Each canopy encompasses the same workplace. A single collectivity is encompassed by various canopies. In other words, a collectivity is encompassed by many canopies in a multilayered way as shown in Figure 2.4, which is called the multilayeredness of canopies. Obviously, each of these canopies has two aspects, physical and semantic. Two or more canopies might sometimes influence each other. In the example of the workplace above, a canopy that determines how works are implemented and a canopy that determines how overtime work is carried out might influence each other.

In a certain collectivity, relationships among people are so intimate that they can understand each other as if they shared their lives. They can communicate with each other so smoothly and deeply that they look as if they are a single unit. Traditionally, such intimacy is regarded as the one they feel in their mind. That is, intimacy has been taken as a state of mind while based on the common concept of the mind-in-a-body. However, intimacy is never a state of mind. It results from the state where the collectivity is encompassed by an enormously large number of canopies in a multilayered way. For example, a collectivity of an old husband and his wife who have spent their long life together is encompassed by so many canopies that one of them determines a trivial thing such as how he/she uses chopsticks while eating, which makes it possible for the wife to notice that the husband is eating while worrying about the same problem.

Figure 2.4. The Multi-layered Structure of Canopies

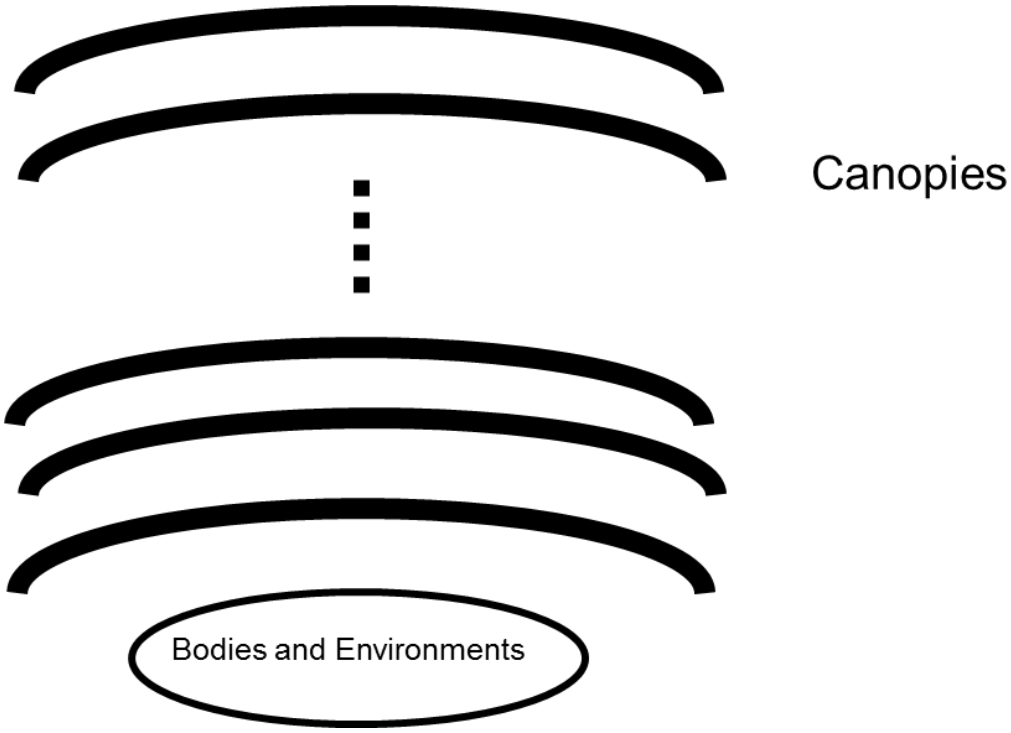

Figure 2.4. The multi-layered structure of canopies. A set of bodies and their environments is encompassed by many canopies usually, not just a single canopy like in Figure 2.1. Figure 2.4 shows many canopies, only five of which are represented by five curved lines and the others of which are substituted by four dots between the two canopies at the top and the three canopies at the bottom.

Figure 2.5 The Overlapping Structure of Canopies

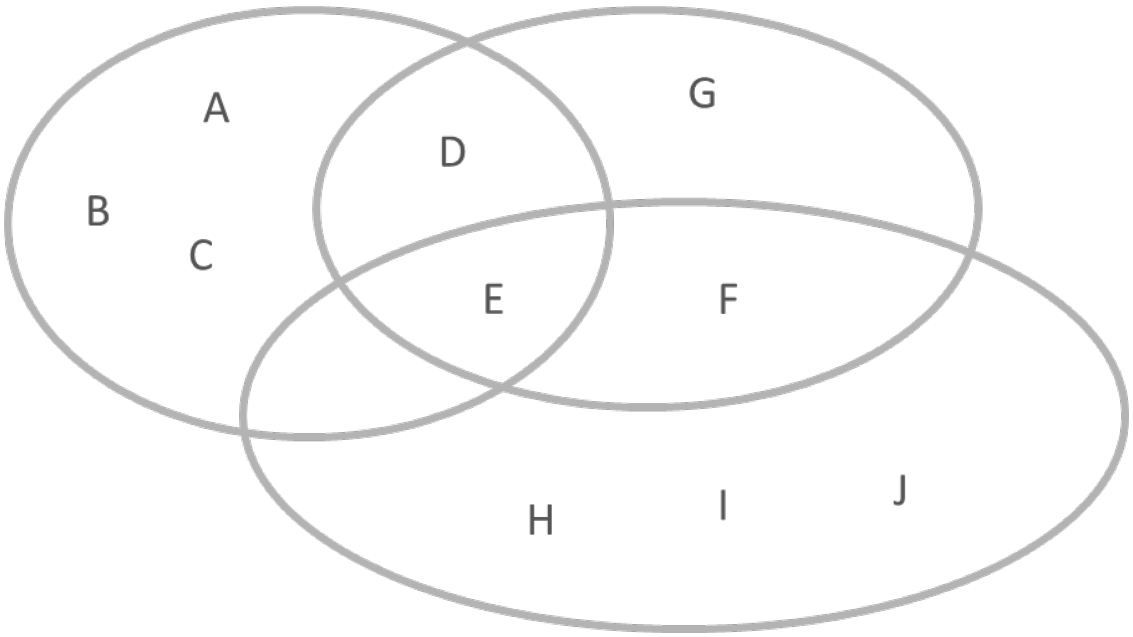

Figure 2.5. Canopies overlap to form multiple areas of influence. The ten letters, A-J, represent ten persons while the space around the letters represents their environments. This figure includes three canopies represented by three circles. For example, five persons, A-E, are encompassed by the same canopy located at the upper-left of the figure. At the same time, two persons, D and E, as well as a part of environments of A-E are also encompassed by a different canopy located at the upper-right of the figure. Moreover, person E as well as another part of environments of A-E is encompassed by a different canopy located at the lower-right of the figure. Importantly, this figure is a plain view. Each circle might be multi-layered in a side view like Figure 2.4.

Overlapping Structure of Canopies

Canopies in real situations are not just multilayered but they overlap partially. As shown in Figure 2-5, a set of canopies encompasses five people, A, B, C, D and E, another set of canopies encompasses four people, D, E, F and G, another set of canopies encompasses five people, E, F, H, I and J. Such a configuration is called an overlapping structure. The same thing is true for environments, physical and institutional. The three canopies encompassing different sets of people encompass different sets of environmental elements and then constitute overlapping structure. We already saw that intimacy results from the multilayeredness of canopies. Here, we will consider the uniqueness of person. Uniqueness is usually acknowledged to be uniqueness of what is felt in the mind or what is thought in head. But, is it true?

Suppose we can represent all the canopies that have encompassed you since you were born (such as in Figure 2.5). Of course, it is impossible, but suppose we could? Then you look up and see all canopies above you. Nobody in the world is encompassed by the same set of canopies encompassing you. Even identical twins start to be encompassed by different canopies from the very beginning of their lives. Therefore each of us has been encompassed by a unique set of canopies which we refer to as uniqueness of a person. Like intimacy, uniqueness is not uniqueness of the mind-in-a-body but uniqueness of canopies encompassing a person.

The Otherness

For people encompassed by a certain canopy, a person who is not encompassed by the same canopy exists as an extraneous individual for them. We refer to that person as *the other.* The person lives in different physical and semantic natures of collectivity. Actions that the others perform naturally might not be warranted for the first person. Their common ways and sensibilities might not be followed or understood by the first person. This is the otherness.

Canopies constitute multilayered overlapping structures. Therefore, we often see two or more people who are not encompassed by the same canopy and thus are encompassed by different canopies than each other. Among such people, each one exists as the other. This does not mean that something would take place between two people who happen to pass each other on the road but do not recognize each other. Nothing occurs for their canopy. But, something might take place between the two accidentally, or for some reason. For example, if an old man walking suddenly stumbled over a stone and fell down, the two people might collaborate to help him stand up. Or, in the workplace, you might start to work with someone whom you have not been aware of at all but who came to your workplace by a sudden decision to relocate personnel.

A new small canopy is born if something takes place between two people. A new small collectivity emerges and the two people are encompassed by the new canopy. This is the case even if a quarrel or fight takes place between two people. Suppose two people coming from opposite directions on the road take each other hard and start fighting. A new canopy is also born in this situation although it is not desirable. Two people or two groups in conflict are encompassed by a canopy when the two are regarded as a whole as was mentioned in Chapter 1. A canopy is not restricted to collaborative or comfortable one. If a new canopy encompassing two people is born, canopies that have encompassed each of them start changing. It becomes possible to change, at least. Encounter with otherness can trigger a change of canopies.

Change of Canopy by Otherness

We will see how canopies change by encounters with otherness. Suppose there are two people, x and y, who are encompassed by canopy X and canopy Y respectively. They constitute the concept of otherness for each other because they are encompassed by different canopies. Then, what happens if the two people meet and a new small canopy, Z, is born? A new canopy,

Z, becomes a blend of the two canopies, X and Y, because it is constructed by person x encompassed by X and person y encompassed by Y. If so, the nature of canopy X infiltrates into Y through canopy Z while the nature of canopy Y infiltrates into X through canopy Z. In this way, both canopies, X and Y, change by the emergence of canopy Z. As you see, two different large canopies are changed by the emergence of a new canopy encompassing several people, some of whom have been encompassed by one of the two canopies and the other of whom have been encompassed by the other canopy and thus who exist as the other for each other. A chance of change of canopies is in the encounter with the otherness, which might be an accidental encounter or might be brought about by external circumstances. Such a chance of encounter is found everywhere in the multilayered overlapping structure of canopies. Those canopies change one after another each time a few people exist as the other for each other encounter and create a new small canopy.

You don't have to take otherness as something peculiar. We already learned that uniqueness of a person is not in the inside of the person but in the characteristics of the canopies encompassing the person. We also learned that no one is encompassed by the same set of canopies encompassing you. This implies that anyone exists as the other for others because everyone is encompassed by a unique set of canopies. The uniqueness anyone has for others changes canopies through multilayered overlapping structure.

Acquiring New Knowledge

We have learned many things since we were born. We started learning how to drink milk and how to use a spoon at an early stage of our life, learned words one by one and studied many things in school. We acquired various kinds and amounts of knowledge in the workplace and community and from mass media.

A change of canopies take place when you learn something. Let us see, as an example, a situation in which you learn from your teacher at school that the sum of the interior angles of a triangle is 180 degrees. Scholars and members of society have already developed that canopy i.e. that the sum of the interior angles of a triangle is 180 degrees. This is one of the sematic natures of collectivity. The canopy encompasses a huge number of people including the teacher. But, students are not encompassed by the canopy. At this point, the teacher has the otherness for the students. The teacher and the students have formed a collectivity called a class. Classwork is performed every day from Monday to Friday. Teaching that the sum of the interior angles of a triangle is 180 degrees is among such classwork. By the teaching, a canopy of common sense that the sum of the interior angles of a triangle is 180 degrees, which has already encompassed the teacher, infiltrates to a canopy encompassing the students. It is never that the knowledge that the sum of the interior angles of a triangle is 180 degrees is injected into the mind or heads of the students. They come to be encompassed in the canopy of 'the sum of the interior angles of a triangle is 180 degrees' through the encounter with the otherness of the teacher.

This is also true in a situation in which one teaches something to another one-on-one. Suppose you were informed of an interesting website from your friend. In this case, your friend had been already encompassed by the canopy encompassing people who had already used the website. They had had the otherness for you while you had had the otherness for them. But, a new small canopy encompassing you and your friend was born. By this small canopy, you started to be encompassed by the canopy of people who had already used the website through your friend.

The Insider and Outsider

We often notice how other people are encompassed by their canopies. For example, you

might be surprised to see a unique way of meeting when you move into a new workplace. How are you related to the collectivity when you are surprised at the canopies encompassing it, or when the nature of collectivity of it appears for you? First, you must be an insider of the canopy that encompasses the collectivity to some extent at least. If you are totally outside the canopy, the world that appears for people in the collectivity and the world that appears for you are quite different. If so, what people in the collectivity are doing is literally unintelligible and you can't see what they are doing at all. Obviously, it is not as extreme to say you can't see at all because you and people in the collectivity are encompassed by your company's large canopy. It is necessary for you to be encompassed by a common canopy so that you recognize the characteristics of the meeting. But, you might not be able to recognize the commonalities if you were recruited by the company just yesterday. It is necessary for you to be an insider more vested than an incoming partner so that you can understand the unwritten rules of the meeting.

Second, what happens if, in contrast, you are encompassed by the same canopies as the ones encompassing people in the collectivity? When that occurs, you are never surprised at anything in the meeting. You can't recognize the canopy in which you are a genuine insider. You can't recognize the canopy encompassing you. We will discuss about those phenomena in more detail in the next section. It follows that you are can be an outsider of the canopy when you recognize anything about it. You consist of the other for people in the canopy when you are an outsider.

The two remarks above lead us to a conclusion that you are both an insider and an outsider of a canopy when you are surprised at the collectivity encompassed by it. It is possible for you to be surprised at the canopy when you are encompassed by it like people in the collectivity and, at the same time, you are encompassed by different canopies than they are.

You Can't Recognize Your Own Canopy?

It is extremely difficult for you to recognize the canopy encompassing you. We can understand this idea if we are reminded of the explanation of the two aspects of canopy: the physical and semantic nature of collectivity. The physical nature of collectivity is movement of a collectivity as a whole that you can observe when you put the entire picture of bodies and physical things of the collectivity in your scope of view. Therefore, you need to observe all bodies and physical things in the collectivity so that you grasp the physical nature of the canopy that encompasses you. It is impossible for you to put your own body in your view the same way you can see other people.

As for the semantic nature of collectivity, meaning is used unconsciously in a collectivity in which the meaning is shared. For example, a round thing rolling is 'something like a ball' for people in a collectivity who are enjoying football. Something has the meaning of a ball. But, the meaning is used unconsciously. Based on the meaning, each player decides which direction he kicks it. It is almost impossible for you to recognize what you use unconsciously.

Having examined both physical and semantic natures, we have to conclude that it is difficult to recognize a canopy encompassing oneself. But, it is a pity that we have learned about a canopy so far and we admit we cannot recognize our own canopy. You might get angry at the author of this book who has continued to lead you on until now. But, wait! You will be relieved to know there is a way to recognize your own canopy.

We learned in the previous section that it is required to be both an insider and an outsider of the canopy so that you can recognize it. This is true when we discuss a way to recognize one's own canopy. That is, you must be an outsider as well as an insider of your canopy in order to recognize your own canopy. The point is that you should be an outsider of your own canopy because it is obvious that you are an insider of your canopy. In other words, you can recognize

your canopy to the extent that you can become an outsider of it.

Becoming an Outsider by the Encounter with Otherness

How can you become an outsider of your our canopy? Here, the encounter with otherness plays a critical role. We already explained how two canopies, X and Y, change by the emergence of a new canopy encompassing two people, x and y. The two people had otherness for each other because they were encompassed by different canopies. If such two people create a new small canopy, Z, it triggers changes in the large canopies, X and Y. This process is also the one in which one can come to realize one's own canopy. A new canopy, Z, is blend of X and Y because it is produced by x and y who are encompassed by X and Y, respectively. Subsequently, x starts to be moved when x is encompassed by Z. Person x was moved only by X but x is now moved not only by X but Y. This means person x has become an outsider of X to the extent that x is moved by Y. Thus, person x becomes the outsider of canopy X and then person x becomes able to recognize canopy X that has encompassed x for a long time.

Now, we will see the same process from the side of canopy Y. Person x had been purely an outsider for the collectivity Y. Probably, what people in Y were doing was unintelligible for person x, or person x did not have any concern with collectivity Y. But, person x started to become an insider of Y once a new canopy Z was born by x and y. Person x becomes an insider of Y even more when person x is encompassed by Z more strongly. Then, person x is both an insider and an outsider of the collectivity Y, which makes it possible for person x to recognize the canopy Y more.

As we see in the above, the encounter with otherness is integral to recognize and change one's own canopy. But, we tend to hesitate to face and get along with otherness. It is because we can't go as smoothly with a body that has otherness as we do in our own collectivity and we can't expect others to accept our common beliefs for such a body. It is possible for our life to be declined by such a body. It is risky to have contact with, and it is safe to be far from such a body. This might be reasonable in a sense. But, we give up opportunities to recognize and change our own canopy if we keep away from otherness.

We already learned that one's uniqueness does not reflect uniqueness in the mind-in-a-body but a uniqueness of canopies in which one has been encompassed so far. Everyone is encompassed by a unique set of canopies and thus becomes the other for other people. Japanese society has been characterized so far as suppressing heterogeneity, or otherness while respecting homogeneity. It is time now to reconsider how we should go ahead with otherness.

Chapter 3
Research Methodology
---- Collaborative Practice by People in the Field Site and Researchers ----

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Collaborative practice by people in a field site and researchers change a canopy. However, it is important to remember that it is impossible for researchers to exclusively analyze the canopy objectively. How then, should researchers participate in collaborative practice? Five points will be discussed in this chapter.

(1) Collaborative practice and knowledge obtained from it are subject to the restrictions of the locality.
(2) Value neutrality is impossible.
(3) Collaborative practice is a continuous alternation of the first and second modes.
(4) It is possible for collaborative practice in a locality to expand into an interlocal one, and
(5) A researcher's role in collaborative practice is to enrich the discursive space of the practice.

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1. Standpoint of Researcher

Is a Researcher Privileged?

In group dynamics, a researcher enters various collectivities and carries out collaborative practice with people living or working in a real field site as was mentioned in Chapter 1. Of course, the collaborative practice aims at improving or reforming the site, in other words, the betterment of the site. Therefore, research methodology of group dynamics is nothing but the methodology of collaborative practice by people in the field site and researchers.

We saw the basic ideas of group dynamics with the metaphor of canopy in Chapter 2. It is critically important to note that it is impossible for a researcher alone to be outside of a canopy and observe it objectively. All that was mentioned in Chapter 2 is completely true even for the appearance for a researcher.

The relationship between a researcher and a field site closely describes what was discussed about the insider and outsider in Chapter 2. A researcher is not encompassed by canopies of the site and thus is a perfect outsider of the canopies until he/she puts his/her foot in the site for the first time. Therefore, anything unique in the site does not appear soon after the researcher enters there, even though a casual observation is possible. But, as he/she visits more places and meets more people in the site, growing phenomena and problems start to appear gradually for him/her. This process shows that he/she has become an insider of the site step by step.

Overlapping Structure of Multiple Canopies of People in the Site and Researchers

When a researcher encounters people in a site, this process forms a new canopy. If a new small canopy is created by a few people in the site and a researcher, it brings about an overlapping structure between the canopies encompassing many people in the site and the canopies encompassing the researcher. Both the people and the researcher are faced with the *otherness* through the overlapping structure of canopies. The researcher is the otherness for the people while the people are the otherness for the researcher.

Recognition of one's canopy is recognition of oneself because everyone is influenced by canopies. People in the site might recognize a part of their life which they have long been unconscious of through the encounter with a researcher. Similarly, a researcher might recognize

that a particular phenomenon going on in the site has been almost overlooked in an academic discipline he/she belongs to after making contact with the people.

Let us remember that the overlapping structure of canopies is only a mechanism of changing canopies. A certain canopy acquires the possibility to change itself toward the direction of the other canopy by creating an overlapping structure with the canopy. Canopies encompassing the site might change toward the canopy of researchers by making contact with it. Similarly, canopies encompassing researchers might change toward the canopy of people in the site. If the phenomenon that has been going on in the site has been overlooked in an academic world of researchers and is given attention in their academic convention, it illustrates that a researchers' canopy starts to change into the canopy of the people in the site.

As you can see from the above descriptions, both people in the site, and researchers change their canopies through overlapping structures while being influenced by the canopies. It is totally impossible for researchers to keep a distance from any canopies and observe them objectively. Researchers sometimes feel excited and say "I found a new fact," which is the valuable experience of discovering a new appearance. But, we should not forget that the excitement is brought about by the art of the overlapping structure of canopies.

Overlapping Structures for You and Me

The relationship between an author and a reader of the book can be taken as an overlapping structure of canopies. This book you are reading was not produced by the thought and writing skill of my mind-in-a-body. This book is a product of many canopies that have encompassed me until I completed writing it. Many canopies encompassing you and many canopies encompassing me start to develop an overlapping structure when a new small canopy is created by you, me and this book. The small canopy might change your canopies while it might change my canopies by knowing your response to the book.

You might notice from the above description that the researcher in group dynamics contrasts with the researcher in the natural sciences. The viewpoint regarding a natural scientist is that one is a god, or at least should try to reach the level of a god, who can see everything in the universe including all canopies and who is omniscient. The ultimate goal for the natural sciences is to reach such a position. We will discuss this world view more in depth in Chapter 9.

In the rest of this chapter, we will see research sites of group dynamics, or field sites of collaborative practice by people in the site and researchers while conscientiously remembering that a researcher is also in a canopy. Specifically, we will see five points that characterize collaborative practice: (1) locality, (2) value and purpose, (3) first and second modes, (4) interlocality, and (5) role of a researcher. Methodological characteristics of group dynamics will be highlighted by comparing them with the characteristics of the natural sciences.

2. Methodology of Collaborative Practice

Locality

Collaborative practice is necessarily carried out during a particular point of time, or period, in a particular place and by particular people. Of course, the length of the period, the area of the place and the number of people vary from one practice to another. But, in spite of such variety, collaborative practice is restricted by time and space and participants. Thus, knowledge in group dynamics is produced by collaborative practice with restrictions of time, space and people, or in other words, by locality, and reflects the nature of the locality in which it was produced. In contrast, natural sciences pursue knowledge that should be valid beyond differences in time, place and people, i.e. universal knowledge.

Data collection and observation are important even in group dynamics. But, they are carried out in and for collaborative practice in the discipline. It is obvious that a current state should be grasped when you start collaborative practice. You need to collect data if necessary. Also, you have to investigate the past history. Moreover, sometimes you are required to predict the future by computer simulation, for example. Although data collection and observation are necessary in group dynamics, they are carried out to grasp the present, the past and the future in the locality. Data collection in group dynamics is never for discovering universal facts that are valid beyond time and place and for all people.

In contrast, data collection and observation in the natural sciences are for finding universal facts. Data in the natural sciences are always samples of the facts that are valid beyond time and space. A sampling is sometimes useful as a method of data collection in group dynamics, but it is employed for saving time, labor and expense and for understanding the present state of the field site, *not* valid beyond time and space.

Value and Purpose

Collaborative practice is necessarily underpinned by particular values and purpose. This is true even if you try to be neutral in value or you don't pursue any specific value consciously. If a researcher says, "I am neutral about any values," he/she forgets that he/she subscribes to a dominant value that prevails among the vast majority of people. If we admit the above, knowledge of group dynamics is tightly combined with the value and purpose underlying the collaborative practice that produced the knowledge. It is significant only for people who share the value and purpose underlying the collaborative practice. Conversely speaking, using knowledge of group dynamics makes you share the value and purpose with those who dispatch the knowledge through their practice.

Both those who produce knowledge of group dynamics and those who use it are required to ask themselves what values they hold and for what purpose. At this point, group dynamics differs from the natural sciences in which knowledge should be valid beyond value and purpose and thus knowledge should be neutral.

Immanence and Externality

You are described as being immanent in a certain canopy when you are thoroughly encompassed by it. Being immanent is contrary to being external. When some bodies and physical things are not immanent in a certain canopy and thus external to the canopy, they are encompassed by other canopies. We can only say that they are encompassed by different canopies. A basic assumption of group dynamics, namely, a canopy as a subject, was explained in Chapter 2. The basic assumption stands perfectly on the concept of immanence. Of course, collaborative practice by people in the site and researchers should also be discussed while assuming the collaborative practice itself is immanent in certain canopies.

In contrast, externality implies not being immanent in any canopies. In other words, being external means being transcendent for every canopy. Natural sciences pursue external knowledge, or transcendental knowledge, in this sense. Knowledge of natural sciences can be applied to any canopy because it is transcendental beyond the difference in canopies.

You cannot decide any action if you assume that your understanding of the present state does not guarantee an external fact but is produced by the canopies in which you happen to be immanent. You can't stop someone from engaging in violence if you are not sure whether the violence is a fact or not. You can do nothing other than to stand aside from it or say to yourself nihilistically, "Our world is like this." If this is so, then, how should we solve this problem?

The First and Second Modes

A stage in which you grasp the present, the past and the future and then commit to problem solving is named the *first mode* of collaborative practice. In the first mode, data collection and observation are sometimes required. Researchers bring various concepts and theories into the first mode. A stance in which you observe an object on the opposite side of a line from your side is required like in the natural sciences. Or, a stance of naïve realism in which you accept unquestioningly what you see in front of you is required in the first mode.

Importantly, collaborative practice in the first mode necessarily stands on certain premises that you can't recognize. They are unrecognizable premises. It is impossible to carry out any collaborative practice without unrecognizable premises. It is only when you stand on unrecognizable premises that you can be involved in collaborative practice. Even if you try to reflect the premises which you stand on unconsciously and clarify a part of them, unrecognizable premises "remain" beyond what you have clarified.

Moreover, the term "remain" is incorrect as a precise expression. Reflecting one's own unrecognizable premises itself is a part of collaborative practice. If so, collaborative practice to reflect unrecognizable premises produces further unrecognizable premises while recognizing a part of them.

But, you sometimes recognize premises which you have stood on unconsciously so far. The stage in which you recognize what have been unrecognizable premises so far is named the second mode of collaborative practice. It is the moment when you realize the unrecognizable premises in the precedent first mode like "I see. We have totally overlooked such a thing," or "We have been anchored by such a value so far." You proceed to a new first mode through the second mode.

The present, the past and the future are grasped differently in the new first mode from the previous first mode. Also, collaborative practice in the previous first mode is understood differently. But, the new first mode also stands on unrecognizable premises although they are different from the ones in the previous first mode. When you can recognize them, you proceed to a further second mode.

Alternate Movement of the Two Modes

The first and second modes can be repeated and thus continuous alternate movement of the two modes can proceed in a real setting of collaborative practice. The second mode comes after deepening collaborative practice in the first mode probabilistically, but not necessarily.

The alternate movements are classified into large and small ones as shown in Figure 3.1. Small or microscopic alternate movements proceed in everyday practice. Any recognition or discovery of something small but new is taken as an alternate movement in which the first mode is followed by the second mode and then followed by the new first mode. In such a situation, you don't feel excited to discover unrecognized premises and the unrecognized premises are not drastically changed. But, they change gradually while you carefully examine the present, the past and the future and continue your collaborative practice even though you don't feel any change. By accumulation of such small alternate movements, energy toward a large or macroscopic alternate movement is accumulated.

In a large or macroscopic alternate movement, you can be convinced that unrecognized premises certainly change. You might say, "We have unconsciously assumed such premises" with excitement. The large alternate movement drastically changes collaborative practice that has proceeded in the previous first mode and also the understanding of the present, the past and the future.

Figure 3.1. Alternate Movements of the First and Second Modes

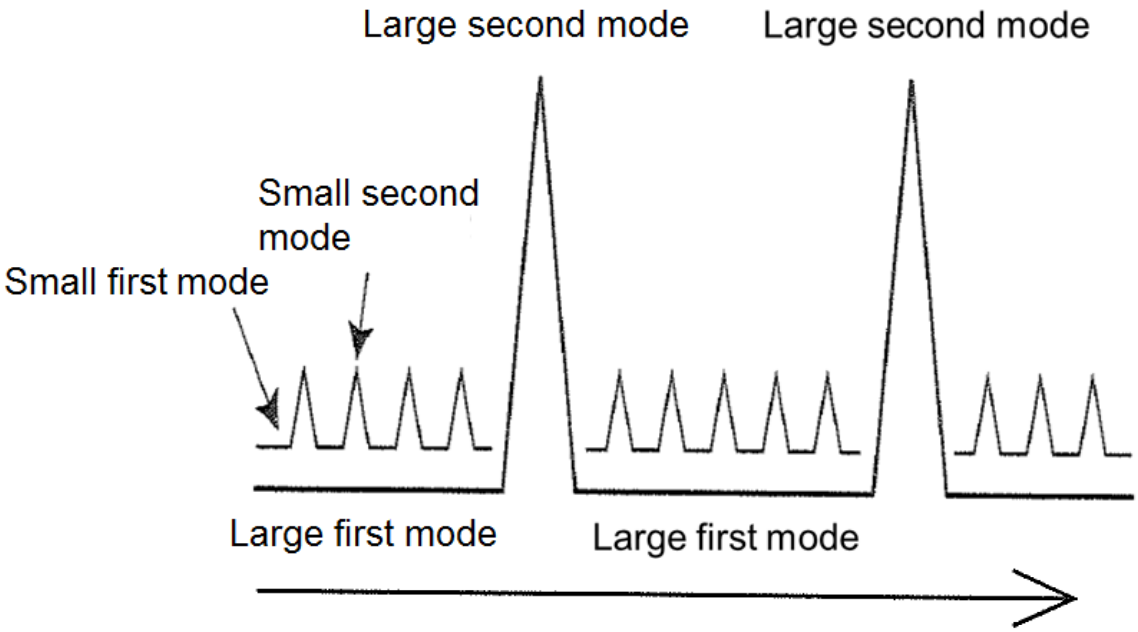

Figure 3.1 Alternation of the last first mode and last second mode. Collaborative practice by people in the field site and a researcher proceeds by alternating two modes, the large first and second modes. In the first mode, collaborative practice proceeds standing on unrecognizable premises, a part of which is recognized in the second mode.

A large first mode consists of alteration of small first and second modes in more detail. Something new is found in the small second mode even if it is just a small discovery. The more frequent the alternation of the small first and second modes take place, the more potential to attain the large second mode is cumulated, although the large second mode comes only probably, not necessarily.

Difference from the Natural Sciences

You might think that what was mentioned above about the first and second modes is also true for natural sciences. It is true that basic theories have been revised by great discoveries in the natural sciences and a great deal of knowledge has been reorganized once those theories were revised. However, although this process might appear similar to the alternate movement of the first and second modes in group dynamics, it is not. In the natural sciences, such revisions of basic theories are made only when they can approach an ultimately universal fact by continuous revision. Conversely speaking, revisions of basic theories aim at approaching a universal fact. This implies that basic theories in the past were insufficient for approaching a universal fact, or were incomplete or even wrong if they are required to be revised.

In contrast, group dynamics never aims at pursuing a universal fact: it is for a collaborative practice that is carried out in a specific locality. Therefore, even if we enter the second mode, it does not mean the precedent first mode was wrong. You might say in the second mode, "We have been locked into an assumption by such and such, but we were wrong ----." But, the meaning of "wrong" is different from an error to recognize an external fact, or error the way it is defined in the natural sciences. At the end of this chapter, I have included an example of the second mode which I experienced in a revitalization movement in a certain depopulated area (see Supplement 3.1).

Interlocality

Description of collaborative practice is a vivid record highlighted by a particular people, place and period. Such a vivid report is impressive but, at the same time, is not easily translatable to practice in other times and places and of other people. You might try to make it your reference but you might say, "It was possible because of such people and such time and place. Such conditions are not met in our community so we cannot follow them."

You should make the vivid record abstract to some extent. In other words, you make it possible even for outsiders to understand the record by using concepts that are translatable. For example, an original record documents the information that a certain person left his hometown because of a fight with his father, got married after spending an eventful youth in a large city, went back to his hometown due to a failure in his business and then happened to become a leader of a revitalization movement by applying the experiences he had in the city. It is impossible to find a person who has the same life history as he did. But, because the point in the above story is that he harnessed his experiences of life in a large city, you can describe the story in a more abstract manner with the use of a concept called of the "U-turn" person, in which a U-turn means the phenomenon of working people's returning from big cities to their hometowns. Then, people in other communities might be able to use the report as a reference by identifying the person in the record with someone else who did a U-turn in their community.

The abstraction above should be made by a collaboration of both people in the field site and a researcher. The researcher often suggests a concept that can be used for an abstraction. For this, the researcher should explain the concept as simply as possible so that the people can understand it. At the same time, the people should sincerely examine whether their practice can be adequately described by the concept. They should hold a frank discussion with the researcher and question whether they use the concept to dispatch their message about their practice.

This is the process in which knowledge is produced and dispatched by collaborative practice in group dynamics. The knowledge is somewhat an abstracted description of local practice that was carried out in a particular time and place and by particular people. By this process, knowledge that was originally produced and dispatched from a particular time and place can be transmitted to other local fields that differ temporally and spatially. The knowledge might be received by people in other local fields and be utilized for the practice. If so, an

interlocal relation is born between two localities that differ temporally and/or spatially. In other words, an interlocal practice emerges from two different local practices.

Sometimes, the knowledge is not necessarily used easily by another locality. Another locality may find the knowledge unacceptable and criticize it. Sometimes an interlocal practice includes criticism or even disputes between different localities as is the case within a single locality. However, criticism does not always result in a negative outcome. Such criticism and dispute might enhance collaboration between different localities and transform a local message into a more general message for a larger number of people who feel less negative about new information.

Expansion of local practice into an interlocal one in group dynamics might appear to have the same position as the pursuing of universal knowledge in natural sciences. But, even if interlocal practice is expanded temporally and spatially, it still remains an interlocal practice, not a universal one.

A method of ethnography will be introduced while regarding it as a way to expand local practice into interlocal one in supplement 3.2 at the end of this chapter. An example of interlocality that connects two different points in time: time immediately after the war and the present, is shown in supplement 3.3.

A Researcher's Role

What role should researchers play in collaborative practice with people in the field site? Here, researchers are not restricted to those who belong to universities and research institutes. The difference between a researcher and an ordinary person is not like the relationship between oil and water. That impermeable boundary does not exist. Rather, an ordinary person can function as a researcher without being affiliated with a university. Such people are included in what are called researchers.

A researcher's role as a researcher is to enrich the discursive space of collaborative practice. Discourse consists of a coherent group of words and sentences and enrichment of the linguistic world in the field site is a role of researchers. We consider something using language and we communicate with each other using language. Thus, consideration and communication become richer if the language we use becomes richer.

Researchers learn and even develop various concepts and theories. A theory is a discourse and a concept is an important piece of material used to construct a theory. Researchers can use various theories to enrich discursive space. They can use theories on particular phenomenon and particular practices, grand theories from the long historical and large social perspective, and metatheories on the grounding of study itself. They can also use methodological theories on data analysis, model construction and so on. Moreover, they can sometimes use concepts and theories from the natural sciences.

Discourses include not only ones expressed by ordinary language but also ones expressed by mathematical language such as a mathematical formula or by symbols such as the symbol for an element or formula in chemistry. Of course, those languages should be explained as simply as possible by researchers when they are brought into the field site.

Contribution of Researcher to Collaborative Practice

How can researchers contribute to collaborative practice by enrichment of discursive space in the field site? First, they can facilitate alternate movements of the first and second modes by theoretical discourses. Specifically, theoretical discourses might be useful to grasp the present, the past and the future and develop a plan for practice. Also, theoretical discourses might be useful to reflect unrecognized premises in the first mode and increase the possibility to proceed to the second mode. Moreover, based on clarified unrecognized premises, theoretical

discourses can contribute to relocation of practice in the previous first mode and then determination of direction to go in the new first mode.

Second, theoretical discourses might be able to expand local practice into an interlocal one. For this, an accurate record of local practice should be abstracted to some extent by theoretical discourses. One should determine carefully how much the record is abstracted because excessive abstraction makes it difficult for people in other localities to understand the message. It is a part of collaborative practice to decide how one's own collaborative practice should be dispatched as a message to the outside.

In contrast, and as a requirement, one must concretize a message for those who receive the message that has been abstracted and dispatched in other localities. That is, an abstracted message should be interpreted by making it connected with concrete events in their own locality. Here, a researcher can contribute to the concretization. But, it is not that they have a single interpretation that is correct. The same message can be interpreted differently depending on the situation of those who receive it. Concretization of a message is also a part of collaborative practice by people in the site and researchers.

We have discussed collaborative practice so far by mainly focusing on researchers who are directly involved in practice with people in the site. But, we need a diversity of researchers who differ in their distance from a real site. For example, we need a theorist who always works in his office or a researcher who develops theories exclusively from a wide historical and cultural perspective. But, importantly, such researchers should have their colleagues in mind who are working with people somewhere in a real site even though they themselves are not involved in collaborative practice directly, as a pure theorist in natural sciences should have his/her colleagues in mind who try to demonstrate the theory in a laboratory.

Action Research

If the only role of a researcher would be enrichment of discursive space, we should not forget that such a role is not always necessary. The term "action research" is often used when a researcher clearly realizes his/her own intention to change the field site. The role of a researcher is the same as mentioned above even in action research. You would be arrogant as a researcher if you assumed action research is always necessary or is always useful for people in the field site. Of course, action research is useful for people in many situations. But, it is sometimes useless and sometimes even harmful.

For example, I myself was convinced that action research would be harmful when I visited the affected area of the 1995 Hanshin-Awaji Great Earthquake just two days after the quake. All I saw were many victims who were overwhelmed by the disaster and could not stand up. Sadness, loneliness, sorrow, and a feeling of emptiness surrounded them. All the victims could do was to persuade themselves regarding what really happened. Linguistic communication to other people was not possible. The enrichment of discursive space looked quite irrelevant or would have even been harmful at the moment.

Supplement 3.1
An Example of the Second Mode:
Not excessively sparse but an adequate population

This story goes back to 25 years ago when I started traveling to a certain depopulated area named Chizu, Tottori prefecture in Japan. I visited there for the first time in 1992 when I was 41 years old. I had heard of words such as depopulation, community revitalization and so on but they had been in a different world from mine. In Chizu, residents' grass-root movement to revitalize the community had been going on since 1984, which was probably one of the most radical movements to pursue participative democracy in Japan. More than twenty years had already passed since my first visit.

I noted a remark mentioned by almost all the people I met there. It was a remark to express anxiety for *kaso*. *Ka* in *ka-so* means *excessive* and *so* means *sparse* in Japanese. *Kaso* means excessively sparse, and refers to excessive depopulation. The residents deplored *kaso* saying "We have less and less young people. Only old people remain here. How will my village be in twenty years?" *Kaso* was an undoubted fact not only for ordinary residents but for the two leaders and their colleagues who rose to action to take active measures against *kaso*. Although the villages were aware of the ongoing loss, they remained passive. But, the two leaders differed from ordinary residents in their active attitude toward *kaso* although they also accepted the fact of *kaso*. Furthermore, this was the case for us as researchers. The more I visited Chizu, the more deeply I could understand how serious the *kaso* problem was. I discussed how we could change Chizu with the two leaders and we took action together, based on my understanding of *kaso*.

One time, a researcher brought a section of the graph, shown in Figure 3.2. The researcher had been involved in the revitalization movement in Chizu and invited me to join. The graph documented the change of population in Chizu since the 1790s that was in the Edo period when *samurai*, or warriors, governed Japan. The graph showed that the population was stable at about 7,000 to 8,000 during that time. But, it increased gradually after Japan started to modernize during the Meiji period (1867-1912) and jumped up to more than 14,000 immediately after the Second World War. The sharp increase was caused by the large number of soldiers who came back from foreign battlefields and the influx of people who had lived in cities but lacked food and supplies because most cities were burned due to bombings.

The graph taught us that 7,000 was the natural capacity of Chizu as far as the population was concerned. We found that the population which had greatly increased after the war was decreasing and returning to an adequate level of sustainability. This meant that Chizu was not on the road to excessive sparseness but to an adequate population. Then, a new word, *teki-so* was created in which *teki* means *adequate* therefore the term was *tekiso*' not *kaso.* This was a moment of the second mode. The new first mode started when we could promote community revitalization actively while taking the decrease of population into consideration as documentation of data but not to fear excessive sparseness in the population.

Note: Okada et al. (2000). *Chiiki kara no chosen: Tottori-ken Chizu-cho no 'kuni'-okoshi* [Challenge from a rural area: Community revitalization in Chizu, Tottori prefecture, Japan]. Tokyo: Iwanami-shoten.

Figure 3.2. Changes in Chizu's population from 1800 -2010

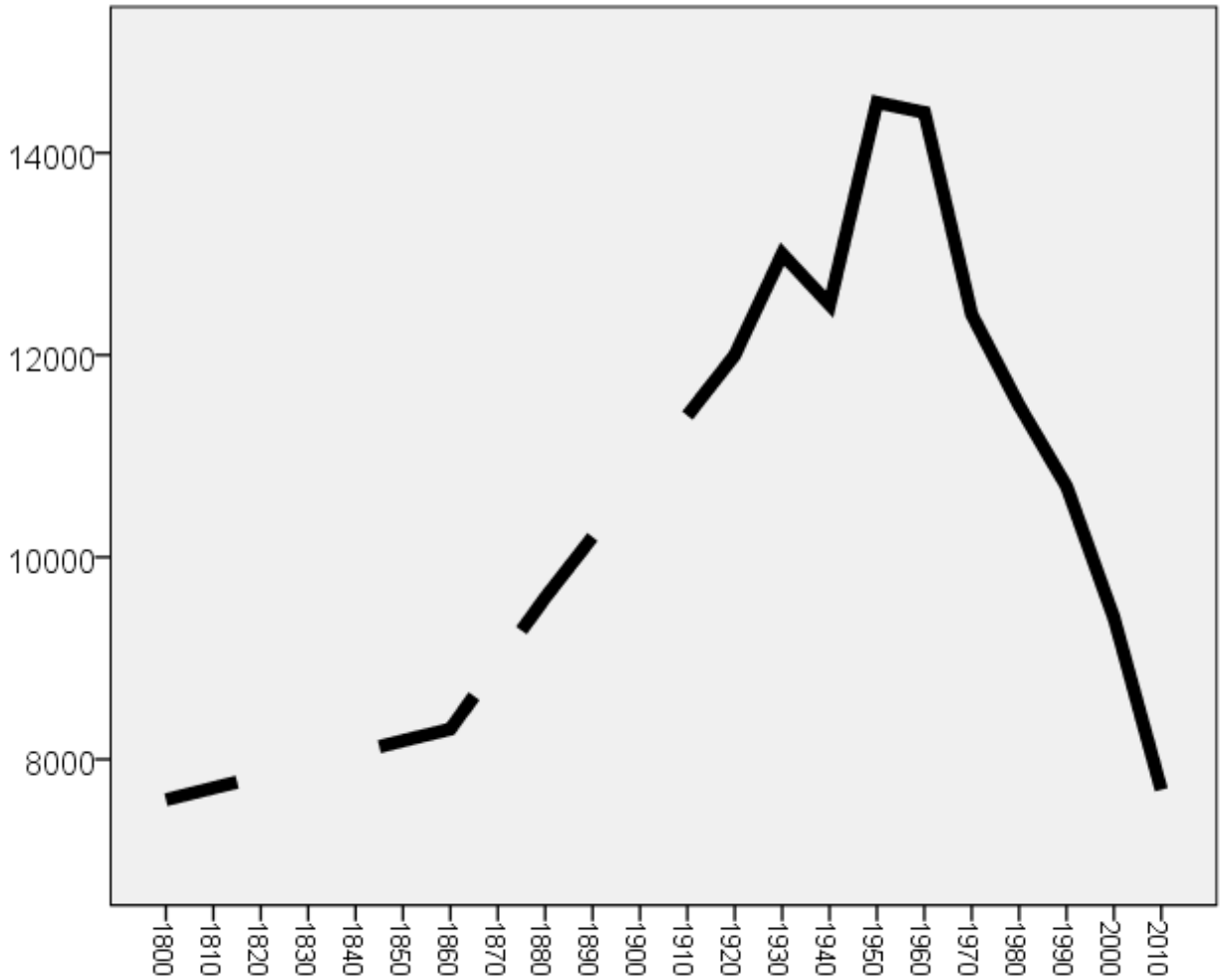

Figure 3.2 Chizu's population from 1800 to 2010. Chizu's population had been about 8,000 for a long time until modernization started in Japan in 1860s. Since then, the population steadily increased to about 13,000 when World War II started. The population sharply increased to its peak, 14,600, in 1955 because people who could not continue to live in cities that were destroyed by bombing had to move back to their homes in villages during wartime and especially immediately after the defeat. But, after economic growth in Japan started in the 1960s, Chizu has depopulated rapidly,

We were able to produce the graph in 2000 using data from the nineteenth century (9,400) although there was a lack of data that caused discontinuity of the line in the graph. The graph taught us that the decrease of population we were experiencing at that time could be interpreted as a return to the original level of population, or natural level of population.

Figure 3.3. Chizu's Geographic Location

Figure 3.3. This photograph shows how the center of Chizu is located in a valley surrounded by mountainous regions.

Supplement 3.2
Ethnography

We will explain the method called ethnography from the viewpoints of interlocality. Ethnography was originally a document that ethnologists or anthropologists wrote regarding what they experienced while investigating their research fields. Most of the original research fields were primitive communities and societies. But, recent ethnographies have been written not only by ethnologists but by researchers in various disciplines in the humanities and social sciences. The subjects written about in ethnographies have become diverse such as, for example, the new life style of the younger generation, a venture business, a sport or art group, or a workplace.

One question raised regarding an ethnography is like "Your ethnography is certainly interesting. But, does it have generalizability? Is it an objective description?" How should we respond? Here, as already pointed out, we should remember any collaborative practice is implemented in a particular locality. If so, an ethnography that is descriptive of such a practice should bear the attributes of its local nature. One initially determines what will be written and not written and how it is written in the ethnography of the locality. A question about generalizability assumes that what is written in the ethnography should be valid universally beyond localities while a question about objectivity assumes the same description should be expected regardless of who writes it. These assumptions ignore the fact that an ethnography is necessarily produced in local collaborative practice. Questions about generalizability and objectivity are misdirected and irrelevant when writing ethnographies.

Then, what should an ethnography pursue instead of generalizability and objectivity? It is the expansion of collaborative practice from a certain locality to an interlocality. Plainly speaking, it is the expansion of collectivity in which people are interested in the practice, or even more fundamentally, to increase the number of one's colleagues.

Writing an ethnography is not work you do after you complete the collaborative practice but it is a part of the collaborative practice. First of all, any collaborative practice never has an end in which you can say "Everything has been completed." It is ongoing and impossible unless time stops even if you want to finalize the practice. An ethnography is a message from a certain field site at a certain time to readers. It is aimed to dispatch a message concerning your collaborative practice and attract readers to become your colleagues or people to understand your practice. In other words, the purpose of an ethnography is to develop interlocal relationships between you and your readers. For this, readers are required to follow your experience as if it were their own; in breathless suspense or with tearful eyes. Hopefully, they will. Therefore, an ethnography is disqualified from being a collaborative project if people who are concerned with the topic of the ethnography do not become fascinated or feel that it is interesting.

Then, can you write anything to attract readers? Can you write even what did not take place? Regarding this point, ethnography is critically different from fiction. Suppose you were enthusiastic about, and found a certain ethnography interesting, visited the field site that was described in the ethnography but found the real situation was quite different from its description, or you accessed the internet to get more information but found that information full of untrue descriptions. Then, you don't become a colleague of the author. Basic "factual" documentation of real situations and history are required if one is to obtain colleagues although facts differ from one author to another.

Supplement 3.3
Interlocality between Two Different Points of Time

This story takes place in an area called Onogo at the north-western part of Kyoto city, Japan. The area was at the corner of the city until a nation-wide merger of municipalities occurred ten years ago. Kyoto is a large city that has more than a population of one million but when you see Onogo alone, it is a depopulated area. The only medical doctor who had been working for a long time in Onogo died in 2000 and thus Onogo became a doctorless area. People had to drive on a mountain road for an hour to go to a hospital in a central part of Kyoto city. Patients had to be brought to a hospital by a helicopter when they needed emergency first aid. They could receive medical care somehow or other but when they lost their doctor, they lost a valuable member of the community who was acquainted with the area, the residents' life and family members of the patient.

An article in the *Kyoto Newspaper* on February 23, 2001 drew the attention of two medical doctors and me. The article reported a study named *For Tomorrow in Onogo* carried out by seven pupils of the Onogo Elementary School. They went around their own community to investigate the current state while visiting each of 190 households and listened to many stories on Onogo's past and the present. They disclosed their observations, sympathy and enthusiasm with their community and proposed several options for the future in the presentation meeting. One of their anxieties concerned the condition of being doctorless.

The two doctors and I visited Onogo with a proposal for residents, which asked, "How about establishing your own clinic? If you do that, we would be pleased to be employed by the clinic." But, the proposal did not make sense to the residents. Their frank opinion was like "We don't want to hear such a difficult proposal. Why don't you open your clinic quickly?" It was a natural response because they had two doctors in front of them.

We three came to know a group called "Group to Discuss the Future of Onogo." The group consisted of about ten males aged 40s to 50s. They shared a sense of crisis from the depopulation and stagnation of the community and were exploring a way out. But, they were still peripheral to the community and received little attention by core members of the community council and ordinary residents. We had meetings with the Group repeatedly. Members of the Group and we three gradually reached a policy that they revitalize the community by running a clinic by themselves as a core of their movement. We came to share the policy step by step. Our meeting started after seven o'clock in the evening after coming back from work and always continued until after ten o'clock at night even though they had to go back to work in the early morning on the next day.

It was also important to discuss the proposal with a formal organization, the village council. We prepared a draft in the Group, which was then discussed in the council. Following this, we discussed the responses to the draft in the Group again. While repeating this cycle, not only the Group and the council but we three could clarify an image of *a clinic run by residents* step by step. During the meeting, one council member said "I was not sure what you three had been talking about, but I felt I understood today. You are waiting for us to stand up." Other members nodded in agreement.

Activities to establish *a clinic of residents* started in this way. The residents decided that the clinic would be established in a public hall near a large shrine. They cleaned a utility room that had been left to gather spiders so that it could be used as a consultation room. They also established the Regional Medicine Committee to learn how to manage a clinic and participate in the management. Members of the Committee made a public announcement to recruit people so that anyone who had an interest could participate.

There was a reason we three made such a proposal for a residents' clinic. We knew that

a model for it existed. It was a clinic that had been established by people living in Nishijin area, Kyoto in their extreme poverty soon after the Second World War. They did not have public medical insurance. They could not receive medical care even if they needed it. To deal with such a situation, they united and established a small clinic with a medical doctor who was sympathetic to their plight. The residents prepared a medical bag and a bicycle for a doctor. The clinic grew and became a comprehensive hospital while maintaining a policy that it should be run by residents.

The two doctors and I knew about the residents' activities to establish their clinic in Nishijin through the doctor who joined it. Now, we have a public medical insurance system and don't have to worry about medical care in that area. But, we have many areas that are seriously depopulated and have become doctorless like Onogo. Relationships among residents have been weakened and lonely old people have increased in rural areas as well as in cities. Currently, many people die alone without any family members beside them for comfort.

It is time now to regain the bonds of residents again although we are not as poor as we used to be. This is why we need to revitalize our community. A community can be revitalized with various points of emphasis. For example, emphasis can be put on specific areas such as welfare, industry, education, art, or disaster prevention. In Onogo, regional medicine run by residents is emphasized. Regional medicine by residents here is an attempt to develop an interlocal relation between Nishijin immediately after the war and Onogo more than a half century later. We see interlocality between two different periods of time. It is as if a seed of a dandelion which flew from Nishijin soon after the war is now establishing roots in Onogo after half a century.

Note: Details of community revitalization movement emphasizing regional medicine in Onogo are described in Chapter 3 of the following book;

Sugiman, T. (2000). *Yomigaeru komyunithi* [Revitalizing Comminity]. Kyoto, Japan: Mineruva-shobo.

Figure 3.4 The New Clinic in Onogo

Figure 3.4. In the new clinic in Onogo, residents wait for a diagnosis in the public hall.

Figure 3.5. Residents in the City of Nishijin

Figure 3.5. These residents in Nishijin built their own clinic soon after World War II. The district was originally known for textile production named ‘Nishijin-ori.’.

Part II

Theories and Practices of Group Dynamics

Chapter 4
Theories for Collaborative Practice

This chapter is an introduction to Part II in which theories of group dynamics are described. Theories of group dynamics are for collaborative practice by people in field sites and researchers. First, we will explain how a theory should be located. Not only researchers, but theories are immanent in collaborative practice. Second, we will explain how theories can contribute to collaborative practice. Theories can contribute to both decision-making and sense-making. Sense-making on the past is also toward the future as decision-making.

Immanence of Theories in Collaborative Practice

Theories of group dynamics are introduced in each chapter of Part II. At the same time, examples are given to illustrate how the theories can be harnessed in collaborative practice by people in field sites and researchers. In this chapter, we will explain how theories should be applied in group dynamics and how theories can contribute to collaborative practice before looking at each specific theory.

In the previous chapter, we wrote that collaborative practice is immanent in the canopy of collaborative practice. In collaborative practice, not only people in field sites and researchers but also their understandings of the past, the present and the future are immanent in the canopy of collaborative practice. This principle also applies to theories. It means that interpretation of the same theory differs from one canopy to another. In contrast, theories of natural sciences are external. You might say they are immanent in the canopy of collaborative practice when they are used. But, they maintain a definite meaning even if they are apart from the practice. They are outside the practice and are utilized by bringing them from the outside to the inside. Therefore, their meaning never differs in different collaborative practices.

In group dynamics, however, the same theory is interpreted differently due to the canopy of collaborative practice in which it is immanent although interpretation is not elastic. In a canopy, one determines how a theory is interpreted and whether it is useful. This is combined with the fact that a researcher is not in a privileged position but is immanent in the canopy of collaborative practice with people in the field site. It is not that a kind of discourse, a theory, alone is privileged.

Decision-Making and Sense-Making

There are two situations in which theories can be useful. One is a situation in which you decide on a policy and develop a plan. It is a situation of decision-making. Another situation is one in which you look back on a route you have walked so far and understand how you have reached the present. That is a situation of sense-making.

You might understand sense-making as passive and decision-making as active because the former concerns the past or is backward while the latter concerns the future or is forward. As for sense-making, you might say, “What can we do since the past has already happened? It’s a waste of time.” But, is that true? Suppose you have had a good friend for several years. He is cheerful most of the time but you notice he sometimes suddenly responds with a gloomy expression on his face. At one time, when his facial expression darkens while talking with you, you reflect on the conversation. You note that you were talking about your mother enthusiastically. You now get a sense of connection between what you were talking about and the change in his facial expression from cheerful to sad. You remember now that he told you a

story about his family background when you first met him. When he was a small child, he lost his mother due to a traffic accident. Now, recalling this fact and the connection between conversations about one's mother and his change in facial expression, you can extrapolate and make sense of his sad appearance you observed in the past.

Then, knowing this, do you continue to talk about your mother in front of your friend as you have done so far? Probably not. You hesitate to talk about your mother as easily as you did in the past because you know that it upsets him. In a situation like this, you don't have to make a decision like "I will never talk about my mother in front of him." In this way, sense-making changes your behavior without decision-making. Sense-making has the power to change the future as much as decision-making.

Needless to say, theories of group dynamics concern canopies, or the nature of collectivities that continue to change. The nature of collectivity consists of two aspects, semantic and physical, as was mentioned in Chapter 2. Sense-making has to do with theories on the semantic nature of collectivity because sense-making makes you realize the meaning you have not realized so far, just as you noticed the meaning of your friend's dark facial expression in the above example. In contrast, decision-making has to do with theories on the physical nature of collectivity because you decide how you will change people, physical things, or institutions. But, the relation of sense-making and decision-making with the two natures of collectivity mentioned above should not be taken vigorously as if they were two separate entities. First of all, sense-making and decision-making are not clearly separated like first you make sense and then you make a decision. They both proceed in an integrated manner in such a way that you can make sense of something while trying to decide something. Also, the two kinds of nature of collectivity are connected with each other closely. You never have the semantic nature that has nothing to do with the physical nature of collectivity. You never have the physical nature that has nothing to do with the semantic nature of collectivity because a meaningless physical thing never appears for you.

Structure of Part II

Theories that will be introduced in Part II can be classified as the following although they are just rough classifications. The Theory of Language in Chapter 6 and the Theory of Norm in Chapter 7 are mainly theories on the semantic nature of collectivity while the Theory of Crowds in Chapter 8 and Theory of Conflict in Chapter 9 concern the physical nature of collectivity. The Theory of Activity in Chapter 5 concerns both the semantic and the physical nature of collectivity.

You can start reading any chapter in Part II. In Part III, Chapter 10, the definition of theories will be explained from the viewpoint of discourse, and then we will argue that two kinds of science, natural sciences on the one hand and human sciences including group dynamics on the other, should be separated from each other.

Chapter 5
A Canopy of Activity

We tend to attribute either success or failure exclusively to a certain individual and feel confident using that causal attribution. But, whatever appears to be an action of an individual person is actually a part of team play. Activity theory expands our scope of understanding that extends the restriction from individual action into team play. This theory enables us to perform decision-making by taking into consideration what should be taken into consideration.

We also introduce how we can create a dream, or a vision, with the use of activity theory. A vision is integral and essential for decision-making. At the end of this chapter, we focus on the topic of leadership that has been dealt with in most textbooks of group dynamics.

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1. Structure of Activity

The Habit of Focusing on an Individual Person

We are always immanent in a changing collectivity. This means we are totally embedded in the collectivity. Therefore, it is impossible for us to hold a bird's-eye view to grasp the nature of collectivity as a whole entity. But, we don't move randomly without looking at anything. We move while grasping a part of the nature of collectivity even though we can't grasp its nature entirely.

We are, however, likely to focus on an individual person. For example, when we see a sports team win, we pay attention to the manager as an individual and attribute the success to his excellent leadership. Or, when a team is defeated, we pay attention to a particular player as an individual and attribute the defeat to his error. In this way, we tend to reach a sense of closure by attributing either the win or loss of the team, the success or failure, to a certain individual person.

When we repeatedly observe either a good or bad quality in an individual, we tend to attribute that quality to the inside of an individual person. When we see a person who always processes his work efficiently, we are likely to attribute it to his inherent abundant knowledge and skill. Conversely, when we see a person who is habitually making mistakes in his/her daily work, we fault that person with a lack of motivation inside him/her. In this way, we feel we understand a certain phenomenon when we can successfully attribute the cause of the phenomenon intrinsically to a certain individual. Here, you have to remember we started our discussion in this book by abandoning the mind-in-a-body paradigm in Chapter 2. We started with an idea of a canopy as subject. This contradicts the rationale seek of causes that are inside a person.

We need to expand our scope of view (that is likely to be restricted to an individual person) to include a larger collectivity although it is impossible to see the entire collectivity. In other words, we need to try to grasp and understand that what appears to be an individual action is actually a part of larger team play.

Activity theory, introduced in this chapter, aims at expanding our scope of understanding into a larger collectivity. Please remember a collectivity includes both people and physical and institutional environments. Activity is defined as movement of such a collectivity.

Structure of this Chapter

In this chapter, first, the structure of human activity will be described while comparing it with the activities of lower and higher level animals. Second, we will explain what it is to have a new activity that has not existed so far and how we can create a new activity. Activity theory aims at creating an activity that produces a new activity, that is, a transformational activity.

Expansion of our scope of view to include a larger collectivity is critically important for decision-making although it is also important for sense-making. For decision-making, you need to expand your scope of view and look at what you should take into account. Specifically, in Section 3 in this chapter, we will introduce a tool to create a vision, or a dream, using activity theory because drawing a vision occupies an important portion of decision-making. In the last section of this chapter, we will take up the topic of leadership, one of the most popular topics in group dynamics.

Evolution of Activity

Activity theory was originally founded and developed in the early twentieth century by Russian psychologists such as Lev Vigotsky, Aleksei Leontiev and Alexander Luria. The theory is often called 'cultural and historical activity theory,' which implies the theory tries to grasp human action persistently in the cultural-historical context of collectivity and society. Moreover, activity theory is not just for understanding the activity of collectivity and action of humans: it is a theory to reform a collectivity and an action, namely a theory for decision-making.

In this chapter, I will introduce activity theory, depending on the theory proposed by Yrjö Engeström. One of the most important concepts, which is called learning activity by Engeström and is referred to as transformational activity in this chapter, is activity that challenges the cultural and historical grounds of the premises we have uncritically accepted, and creates a new premise.[2]

Here, let's look at the change of structure of activity along the process of animal evolution to contrast the characteristics of human activity although it might look like a roundabout way. Figure 5.1 shows the structure of animal activity ranked lower in the evolutionary tree. You might note that the structure is represented by an inverse triangle. The triangle indicates that two vertices are not connected directly with each other but they are connected another vertex. This configuration is described by saying two vertices are mediated by the other vertex. For example, the relation between individual members (upper left vertex) and natural environments (upper right vertex) is mediated by the species (lower vertex). That is, individual members are always among species. An individual member can't survive if it is not with its own species. At the same time, the species always determines and is always determined by the natural environment. In this way, the relation between an individual member and the natural environment is not direct but is mediated by the species.

Figure 5.2 shows the structure of activity of higher level animals such as apes. You can see the relation between two adjacent vertices shifting from a direct relationship shown in Figure 5.1 into an indirect one. The relation between an individual member and environment, natural and artificial, has become mediated by artifacts, the relation between a member and a community has become mediated by rules and convention, and the relation between a community and environment has become mediated by a division of labor. It should be also noted that environments that were natural in Figure 5.1, have come to include both natural and artificial ones, and that biological species in Figure 5.1 have been replaced with a social community rather than a biological community.

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[2] Explanation of activity theory in this chapter depends on the following book published in 1987 by Engeström. Y, *Learning by expansion: An Activity theoretical approach to developmental research*. Helsinki: Orienta-Konsultit.

Figure 5.1. Activity of the Lower Evolutionary Level of Animals (Engeström, 1987)

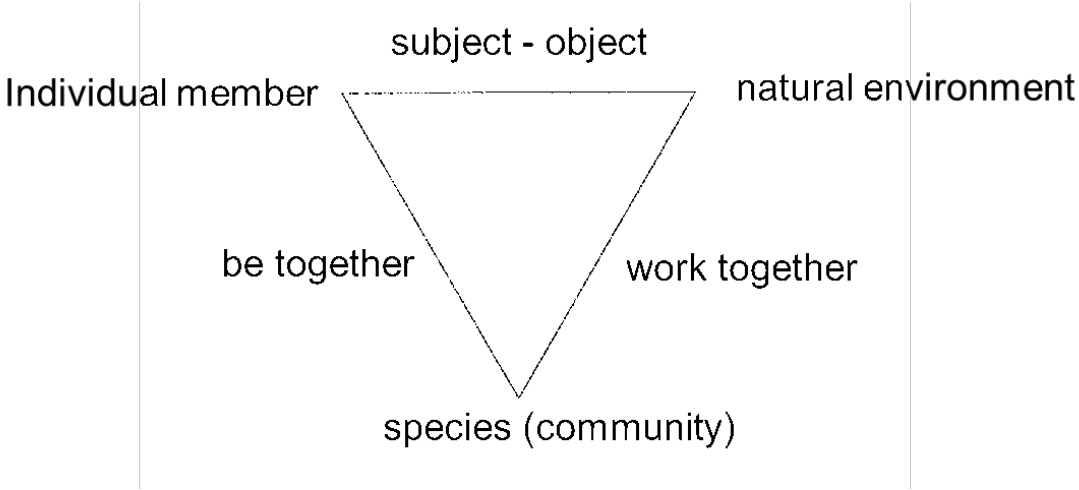

Figure 5.1. In lower animals, an individual member works in the natural environment with other members of the same species in a direct relationship. The community is biological; relationships are not mediated with artifacts.

Figure 5.2. The Activity of Higher Level Animals (Engeström, 1987)

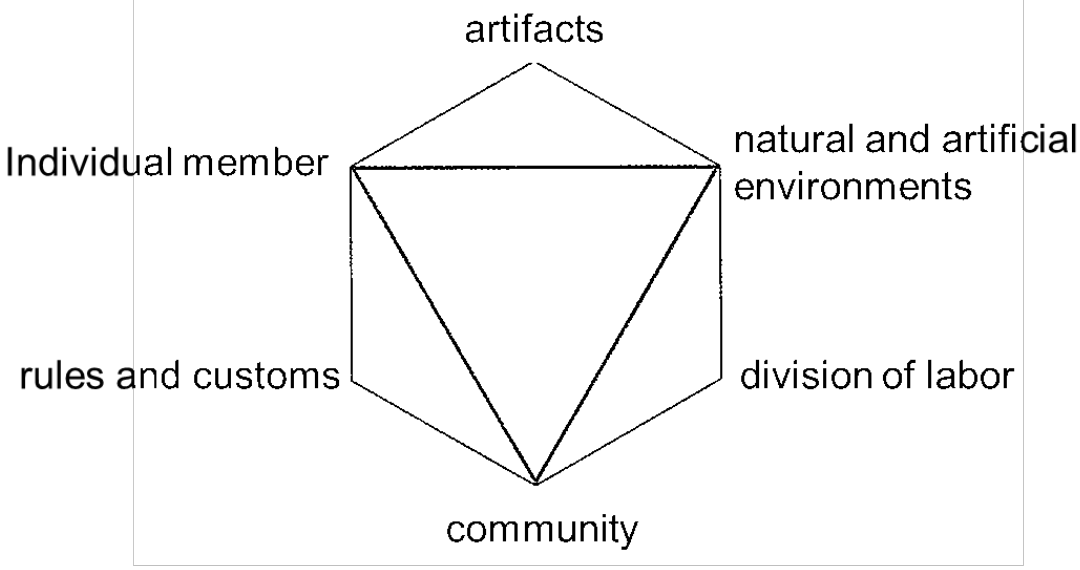

Figure 5.2. In higher animals, unlike the relationships and activities of lower animals in Figure 5.1, the relationships among individual member, community and environment are mediated by artifacts, rules/customs and division of labor.

Human Activity

We have reached the structure of activity that is peculiar to humans shown in Figure 5.3. Here, the three vertices that mediated two vertices that were adjacent in Figure 5.2 occupied the same importance as the three vertices in Figure 5.1. This configuration brings about a structure that consists of a total of six vertices that determine each other. Figure 5.1 represents an activity that is carried out in nature without mediation. Then, economic and historical mediating vertices appeared such as artificial environments and communities in Figure 5.2. Al last, Figure 5.3 shows activity peculiar to humans that is both natural and economic/historical.

As a specific example of Figure 5.3, the structure of the activity of regional medicine is depicted in Figure 5-4. This figure shows the activity of regional medicine implemented by a medical doctor living in a community. First of all, let's start with a horizontal line in the middle that connects a subject, or a central person or small group, to an object → outcomes. This line indicates the daily activity that a medical doctor as a subject performs on an ill resident as an object and transforms him/her into a healthy resident as an outcome. But, at this time, our point of view is limited to a two-person relation. From here we expand our understanding to a larger collectivity by two routes.

First, we can expand our scope of view upward in Figure 5-4 to include an artifact. The doctor cares for patients with the use of various artifacts. These artifacts include physical items such as medicines and medical equipment, and intangible artifacts, medical knowledge the doctor has learned. Importantly, every artifact is an historical and a social product. It means both doctors and patients put themselves in collectivities that have sustained the use of artifacts.

Second, we can expand our scope of view downward in Figure 5-4 to include a community and its rules and division of labor. Both the doctor and patients are members of the same regional community and thus they are under the same nature of collectivity of the community. The relation between the doctor and a patient is not direct but is mediated by a community, i.e., a regional community, even if they seem to be limited to a direct relationship with each other.

Division of Labor and Rules

Ordinary regional medicine in a community, a regional community here, assumes a division of labor in which a doctor administers medical services and a patient, or a resident, receives it. Additionally, various rules regarding regional medicine have been developed in a community. What we call a rule here indicates one in which members are aware to some extent. Ordinary medical activities that are implemented by the division of labor above follow a rule that a doctor should devote him/herself to serve a patient while the patient should follow his/her instructions. You might take the division of labor and the rule mentioned above as obvious, but it is possible to have a different division of labor in which residents participate in running a clinic, which will be introduced in Supplement 3-3 at the end of Chapter 3.

Now, we can grasp the relation of the subject with an object as a part of activity that consists of a total of six vertices. In other words, we can expand our scope of view to the extent that both the nature of collectivity that includes subject and object connected indirectly by the mediation of artifacts, and the nature of the collectivity that includes subject and object connected more directly, can be taken into account. The only thing you can do to change the subject's action was to change the subject's ability and attitude. But, now you have many more measures to change the subject's action when you have six vertices in your scope of view. For example, you might change an artifact, a subject's partner (a community), the assignment of roles (division of labor) or a rule.

However, it is not as easy to expand our scope of view like the example of regional medicine above when we are faced with a crucial problem. One must make a thorough

observation and analysis including trial-and-error in order to discover what artifacts mediate the relation between a subject and an object and what community determines it. How you can expand your scope of view by such observation and analysis, or what activity you can find as involving an action of a subject is an important part that affects your decision-making.

An area of study called ethnomethodology will be introduced from the perspective of activity theory in Supplement 5.1 at the end of this chapter.

Figure 5.3. Activity of Humans (Engeström, 1987)

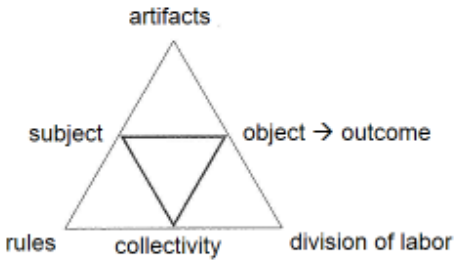

Figure 5.3 In humans, activities are more complex. A total of six vertices occupy the same importance. In this figure, the *subject* acts on the *object* to transform it to the *outcome* with the use of the *artifact* by collaborating with member(s) of the *collectivity* while following the *rule* and the *division of labor*.

Figure 5.4. An Example of Medical Activity in a Clinic

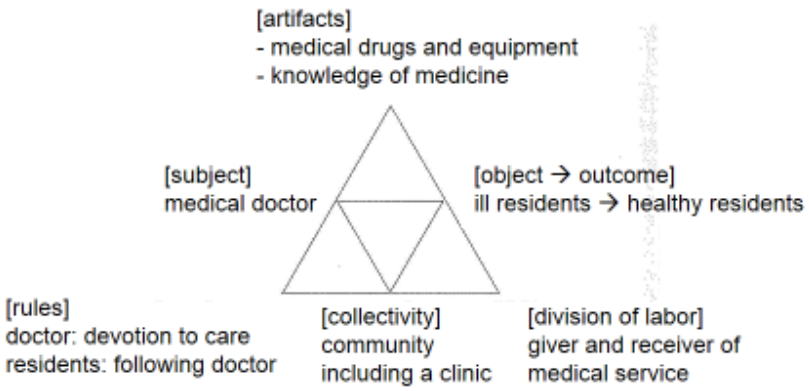

Figure 5.4. A medical doctor acts on an ill resident to transform him/her into a healthy resident with the use of drugs, equipment and medical knowledge in collaboration with community members. The doctor devotes care as a giver of medical services while the community members follow the doctor as a receiver of services.

Relation among Activities

A huge number of activities exist in our society. Some activities are almost independent from, but some are dependent on, each other. Relation of activities is classified into four types i.e. artifact production, subject production, rule production and transformational. The most important type for us is the fourth one that is described in the next section, in which three activities such as transformational, conventional and new activities are connected. But, we will see the other three types in advance in order to understand the relation between two different activities.

First, we see the relation in which an artifact of one activity is produced by another activity. For example, scientific activity in medicine produces medical knowledge that is used as an artifact of medical activities to care for patients. Scientific activity in medicine and medical activity to care for patients are related in the way in which an artifact of the latter activity is produced by the former (see Figure 5-5).

Second, we see the relation in which a subject of one activity is produced by another activity. For example, educational activity produces people who can speak a foreign language and they are involved in activities, as subjects, who aim at improving life in underdeveloped countries by using their language skills. Here, educational activity and support activity for underdeveloped countries are in the relationship where a subject of the latter activity is produced by the former (see Figure 5-6).

Third, we see the relation in which a rule of one activity is produced by another activity. For example, the administrative activity of a government or legislative activity of a parliament produces rules that should be followed in other activities (see Figure 5-7).

Having seen three types of relationships between two different activities in the above, we will proceed to a transformational activity that is one of the three related activities in the next section. A transformational activity is the one that acts on a conventional activity as an object and changes it to a new activity, as an outcome that one has never had. Here, you see the relation in which three activities, i.e., conventional activity, transformational activity and a new activity appear.

Figure 5.5. Activity to Produce an Artifact of other Activities

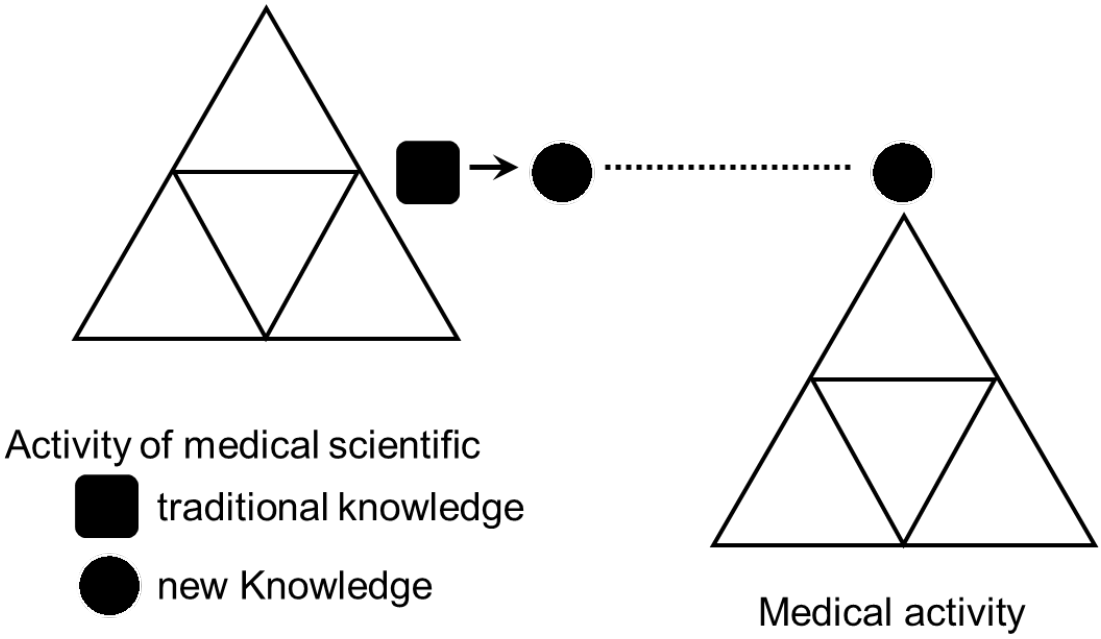

Figure 5.5. An example of how the activity of traditional knowledge is acted upon by another activity in the medical field to produce new knowledge. Two activities, the activity of medical science and a medical activity, are related in the way in which the former produces an artifact of the latter, i.e. new medical knowledge. This new medical knowledge then becomes an artifact and is used to promote subsequent new knowledge that becomes traditional. The process is ongoing.

Figure 5.6 Activity to Produce a Subject of Other Activities

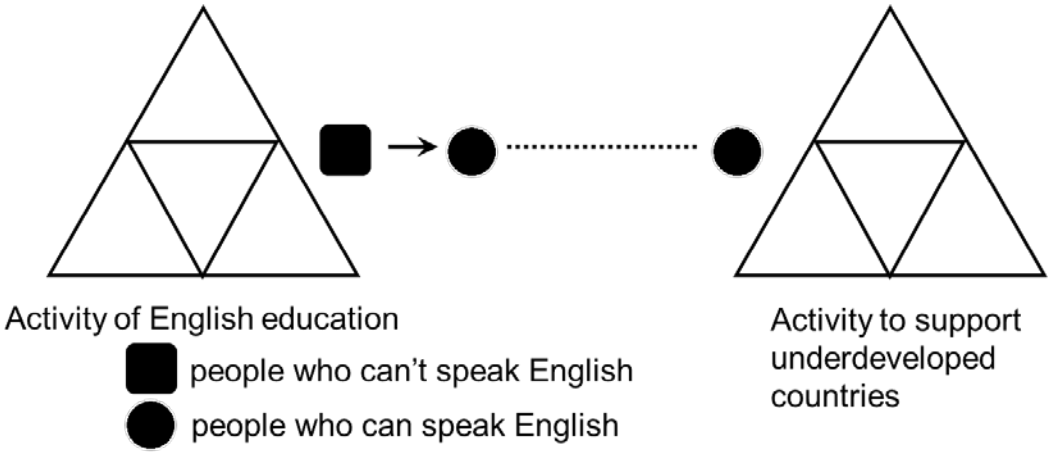

Figure 5.6. Activities of an English education produce people who can speak English.
Two activities, the activity of English education and the activity to support underdeveloped countries, are related in the way in which the former produces the subject of the latter, i.e. people who can communicate in English and contribute to supporting underdeveloped countries.

Figure 5.7. Activity to Produce a Rule for Other Activities

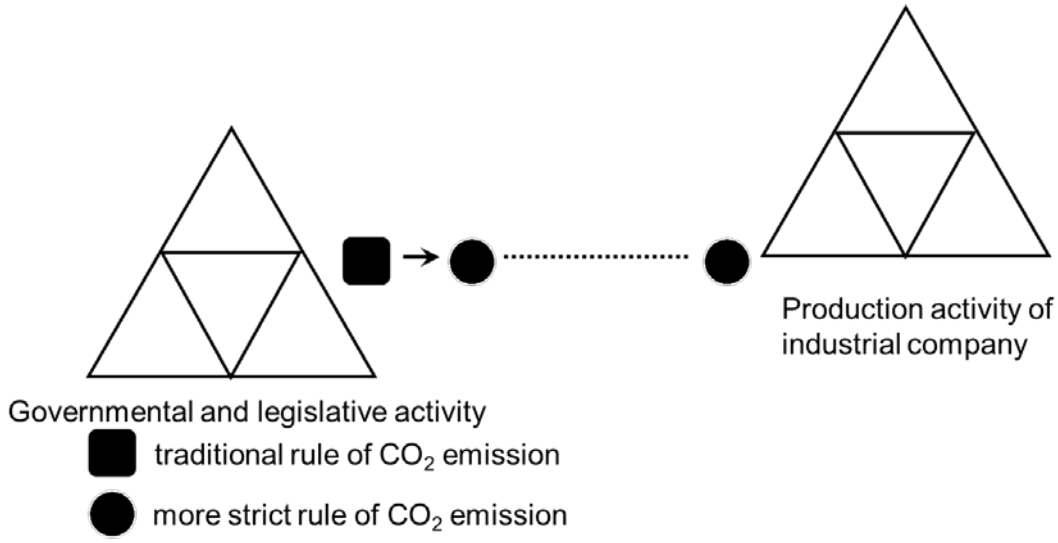

Figure 5.7 Two activities, governmental and legislative activity and the production activity of industrial company, are related in the way in which the former produces the rule of the latter, i.e. the rule that determines how much CO_2 emission is allowed.

2. Transformational Activity: Creation of a New Activity

Contradiction and Double-bind

Activity theory is not only for describing activities as mentioned above. The theory provides a way in which people who have long been immanent in a conventional activity can get rid of it and create a new activity. Such an activity was called *learning activity* originally by Engeström but is now called transformational activity in this book because a concept of learning might be confused with the one used in learning psychology and educational science.

Figure 5-8 shows a structure of transformational activity. The object of transformational activity is some activity that has been implemented for a long time so far. It is transformational activity that challenges such a conventional activity and creates a new activity as an outcome.

Then, you might ask, “What triggers a transformational activity?” It is contradiction. Contradiction is a situation in which six vertices of a single activity are incoherent or a situation in which two or more activities are incoherent. Seemingly, contradiction looks problematic, but this is not true. It can give a valuable opportunity to go forward toward a new activity. But, a new activity is not always created whenever contradiction occurs. Contradiction makes you choose going forward to a new activity or staying in a conventional activity.

“You can’t remain in your position. You have to go right or left.” Such a situation is called double-bind in activity theory. Contradiction brings about double-bind situations in which you have to go forward to a new activity or you have to go back and stick to a conventional activity. In this sense, double-bind is a kind of predicament. If you get out of the predicament in the direction of selecting a new activity, you are starting a transformational activity.

There are three kinds of contradiction, that is, (1) contradiction among two or more vertices in a single activity, (2) contradiction between conventional and dominant activity and a new activity, and (3) contradiction between a new activity born in one area of activity (the medical area, for instance) and dominant activity in another area of activity (the domestic area).

Figure 5.8. Transformational Activity

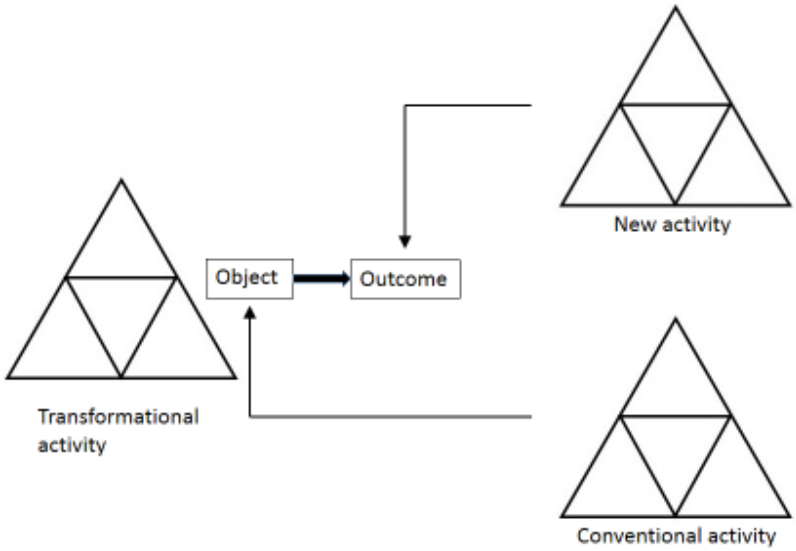

Figure 5.8. Transformational activity acts on conventional activity as an object and produces a new activity as an outcome. This figure includes the relationship among three activities, i.e. conventional activity, a new activity and a transformational activity, while the relationship between two activities is included in Figure 5.5, 5.6 and 5.7. Transformational activity acts on a conventional activity as an object and produces a new activity as an outcome. The new activity is new in the sense that it stands on quite a different premise from the conventional activity.

Values Underlying Activity

We have to know that each vertex in a single activity contains a latent contradiction within it before explaining each of the three contradictions, (1)-(3). A single activity consists of six vertices like a table sustained by six legs. Each of the legs should not be longer or shorter than the others in order to support the table well. In the same way, six vertices should be harmonious or consonant with each other without contradiction so that they sustain the activity smoothly. It is a value that makes the harmony possible[3]. Six vertices can retain their balance or harmony by standing on a value like a common flat floor on which six legs of a table stand.

A value is a system of meaning. As for meaning, we learned in Chapter 2 that anything that has no meaning does not appear for us. Also, we will learn the important nature of meaning in Chapters 6 and 7. But, meaning has one more important aspect that is not touched in these three chapters.

One of the important characteristics of meaning is that it is a system of differences. Let us explain it. *Goodness* has meaning because it differs from *non-goodness*. A word or meaning of goodness would have never existed if we had no non-goodness at all in our world. Or, the meaning of *mobile phone* would have never existed if we had phones that were not mobile phones. The meaning of mobile phone was born because we had phones that were not mobile such as desk phones, wall phones and public phones and we needed to make a distinction between them. Thus, the meaning of *A* necessarily implies the possibility of *non-A*. This is the case for a value because it is a system of meaning. A certain value is possible because other values that are contradicted with it are possible.

Any activity stands on a value. This implies that when a certain activity stands on a certain value, it should also stand inevitably on the value that is contradictory or opposite. However, the contradictory value is located offstage or latent. Or, sometimes, it appears on the stage only as far as it does not disturb the performance taking place on the stage. You might want to call it a *latent* value when the value underlying the performance on the stage is called manifest or overt.

Examples of Contradiction within a Vertex

Let's explain a value using an example of regional medicine shown in Figure 5-4. Here, we will focus on two contradictory values, a use-value and an exchange-value. Figure 5-4 depicts an activity of regional medicine that stands on a use-value. Such artifacts as medicines, medical equipment and medical knowledge have a value because they are useful to cure the illnesses of patients. In this sense, they have a use-value for a doctor. Also, people living in the community have a use-value for the doctor because they become a partner in the treatment action.

At the same time, however, medicines and medical equipment have an exchange value because they are bought and sold in a market. Medicines, equipment and knowledge have an exchange value that enables a doctor to obtain money to make a livelihood. In addition, residents in a community have an exchange value for a doctor because they sometimes become customers who purchase medical services.

In this way, there is another activity behind the scene of the activity shown in Figure 5-4 and it stands on another value in which an exchange value is pursued. If the two activities change their position, we have unethical medical activity in which excessive medical tests and medicines are provided for financial income.

Contradiction between Vertices

As was described above, there is another activity that contrasts with a manifest activity.

[3] Engeström used the term motive instead of value.

Usually, an activity underlain by a manifest value proceeds while sustained by six legs, or vertices but, contradiction is certainly latent in each vertex. Such latent contradiction might manifest in one of the six vertices by some reason. Then, the vertex becomes inconsistent with the other five vertices. It is like a table that was stable with six legs but has become unstable because it lost one. This situation is the first kind of contradiction discussed above.

From this point, what double-bind is brought about by each of the first through third types of contradiction, and what transformational activity can be triggered? Contradiction exists latently in each vertex of structure. We will use, as an example, two different values in the following. One is a value in which the physical treatment of a body is emphasized and another is a value in which the whole person is targeted as a medical object by treating not only the physical body but also mental problems. Suppose there is a situation in which the value of a physical cure is manifest while the value of the whole person-cure is latent. In this activity, a patient as an object claims a physical cure exclusively. But, what happens if the number of patients sharply increase who claim mental problems that are beyond physical problems by some reason and a doctor has only artifacts that are useful only for physical treatments? Here, a contradiction becomes manifest between two vertices, an object and an artifact.

Contradiction between vertices is manifest. It thrusts double-bind situations before the people who are concerned. You can step forward to a new action by changing the other vertices to fit them to the change of object, i.e., the rapid increase of patients who claim mental problems. Or, you can remain as you are by ignoring the change. You are located in such a double-bind situation.

It is the first stage of transformational activity that goes forward to a new action. We will describe later how we can start transformational activity and what artifacts we can use for it. Here, we suppose we could break through a double-bind situation tentatively. But, we still have the next obstacle to challenge. It is the contradiction between conventional and dominant activity and a new activity.

Contradiction between a Dominant Activity and a New Activity

A new activity is attempted by a minority that is in conflict with conventional and dominant activities. Here, we see contradiction between the two. Dominant activity tends to force new activity to return to conventional value and grasp new activity in its hand again. Also, the subject of new activity tends to be caught and drawn back by dominant activity. In the example of medical activities, even if a new activity emphasizing the whole person cure would be born, it brought about contradiction with a conventional activity concentrating on a physical cure exclusively. Then, a double-bind situation took place to force a selection between conventional medical activity just for a physical cure and new medical activity for the whole person cure.

Activity to break through the second type of contradiction and go forward to a new activity is the second stage of transformational activity. Again, suppose you could successfully break through the double-bind situation. But, still, there are more obstacles for growing a new activity. It is the third type of contradiction, that is, contradiction between a new activity born in one area of activity and dominant activity that has existed in other area of activity.

Contradiction with a Dominant Activity in Other Areas

Most medical activities can be implemented in a hospital or a clinic if we go along with a physical cure. But, family members of a patient are required to participate in medical activities if we go along with the whole person cure. It is not a dominant domestic activity, however, for family members to participate in the medical treatment of a patient. It is dominant, instead, not to be involved in a medical cure while leaving it to the role of the hospital and medical personnel.

In this way, contradiction takes place between the whole person cure that was born in the area of medical activity and the conventional dominant activities in the area of domestic activity. Here, again, we are faced with a double-bind situation in which we have to decide whether or not we proceed to a new activity. If we go forward to the whole person cure, transformation of conventional medical activity into a new activity pursuing the whole person cure is promoted considerably. An activity in this direction is the third stage of transformational activity.

As mentioned above, transformational activity is an activity to break through the three types of double-bind situations and go forward toward a new activity. If this is possible, then, how can we start a transformational activity?

Analysis of the Present and the Past

What is required first to break through a double-bind situation is thorough analysis of the status quo by excluding any preoccupation and depending on the activity structure shown in Figure 3-1. You have to ask yourself whether phenomena that looks as if it were caused by the personality and ability of an individual person is really so, whether it is caused by a problem of artifact, what community he/she belongs to, what rule of the community constrains him/her, and so on. In this way, you have to analyze the phenomena from a social and cultural perspective.

Historical analysis is also important to analyze the present. Six vertices in Figure 5.3 and relations between them have been developed in the stream of time despite the difference in the length of history. The status quo that you take as natural or long-standing might have become as it is just recently. In contrast, the status quo you take as recent might have been produced a long time ago. Such historical analysis along a temporal axis can enrich analysis of the present by activity structure in Figure 5.3. Understanding of the status quo by expanding our scope of view fully, as we see in the above, is useful for discussing artifacts of transformational activity which is described next.

Artifacts for Transformational Activity

We have three types of artifacts for transformational activity, namely, (1) springboard, (2) model, and (3) micro cosmos.

Springboard. A springboard is the encounter with image, technique, and people that emerges unexpectedly and suddenly. An example is the distress where you feel like a drowning man grasping at straws. Figure 5-8 showing transformational activity can be drawn only after a new activity becomes visible and clear to some extent. In the early stage of transformation, a new activity can be drawn only vaguely and transformational activity toward the new activity is also unclear. In such a situation, you have to start transformational activity by groping in the dark toward a new activity that should be definitely different from the present activity but is not clear yet.

But, you have already decided to depart from conventional activity in a double-bind-situation and thus the path of retreat has been intercepted. In this sense, it causes great distress or anxiety to initiate an unclear transformational activity toward a new activity that is also unclear. To repeat: the retreat has been cut off. All you can do is go ahead, but the path is not clear. You might not have enough time. This is a desperate pinch. In such a pinch, you might get a certain idea in your desperation, you might make a certain remark extemporaneously, or you might able to meet a certain person you could not meet otherwise. Such an encounter is the springboard.

Therefore, we can tell what was springboard only after the fact. All we can do in advance is to increase the possibility to achieve such an encounter. Examples would be networking with as many people as you can, or enhancing the level of your culture. But, you cannot anticipate what will become a springboard in a specific transformational activity until you are put in a

double-bind situation.

Model. A model is defined as an artifact you use when you grasp an object of transformational activity, that is, conventional activity. You can grasp a conventional activity in many ways. We already saw two different ways of grasping depopulation in a certain community in Supplement 3-1 at the end of Chapter 3, in which a different new activity was pursued depending on whether depopulation was regarded as excessively sparse or adequately sparse. Here, a *classificatory model*' is used so that the status quo is classified into excessively sparse or adequate.

The simplest form of a classificatory model is the one in which a single category is available. In this case, one can argue whether the category is used or not to represent the status quo. In the example above, it was either possible or not to use a label of excessively sparse before a classificatory model of excessively vs. adequately appeared. All residents had put the label on their community. A model that includes only one label is called a prototype model. When a prototype model is used, the status quo is grasped just from the viewpoint of whether or not it is adequate.

Beyond a classificatory model, we often take into consideration the relation between cause and effect. In this case, a causal model is used. For example, if you use a causal model that insists that the decrease in population causes the stagnation of industry in a community, you take the community characterized by the stagnation due to the decrease of population as a major object of transformational activity.

It is sometimes difficult to grasp the present situation by using a simple causal model. The situation might consist of many factors that influence each other in a complicated way and thus constitute a network of causal relations. A 'System model' is one of the models that can be used to describe such a situation. For example, you might group a cluster of factors affecting each other as a system and explore what inputs are given from the outside of the system such as investment and visitors and what is produced as an output by the system. Such a system is taken as an object of transformational activity.

One of these systems is self-organizing. A living thing is a typical self-organizing system. Only one embryo grows and becomes a mature organism by repeated divisions due to its own genetic program. When you regard a community as a self-organizing system, you pursue understanding programs that are embedded in the daily life of the community and transformational activity to change the program.

Microcosmos. A microcosmos is a miniature community that is supposed to play an important role in a new activity in the future. Let's look at the movement to establish a clinic of residents introduced in Supplement 3-3 in Chapter 3. The movement was a transformational activity to transform a conventional medical activity in which a clinic is taken for granted to be run by a medical doctor into a new medical activity in which a clinic is run by residents. In the transformational activity, the Regional Medicine Committee was established for representatives of residents to run the clinic.

In the initial stage of this transformational activity, about ten residents who formed the "Group to Discuss the Future of Onogo." Two doctors and myself joined their meetings. Looking back to this point in time, the meeting was a miniature or microcosmos of the Regional Medicine Committee that was established later. Actually, most members of the Group to Discuss the Future of Onogo became members of the Regional Medicine Committee and played leadership roles in the Committee.

Zone of Proximal Development of Activity

We described how a new activity is created beyond a conventional activity based on activity theory. The activity theory provides a practical guideline for the creation of a new

activity. Let's reaffirm the guidelines. First, we should focus on an activity that has sociocultural and historical contexts even if tempted to focus on the ability and personality of an individual person. Second, energy to create a new activity comes from contradictions within an activity or between activities and from double- bind situations that are manifestations of contradictions. Third, artifacts of transformational activity to create a new activity include a springboard, models and a microcosmos.

Transformational activity does not start without such artifacts as springboards, models and a microcosmos even if you are faced with contradictions and are put in double-bind situations. Conversely speaking, you have an area of new activities, possibility in front of you, that you might be able to create if you are afforded such artifacts and then you attempt transformational activity. This possible area of activities in front of you is called the *zone of proximal development*, which was defined by the twentieth century psychologist, Lev Vygotsky. This zone is the area of possible development that is closest to present activities. Proceeding to the zone of proximal development includes the development of *subject* that is one of six vertices of activity structure. However, it never means development of an individual who has a mind-in-a-body but it is the development of activity of a collectivity that includes the subject. Vygotsky redefined development of thought that had been taken as development of thought in one's head as development of activity of collectivity.

3. A Technique to Draw a Dream

Importance of Dreams

In this section, we will introduce a method to use activity theory for decision making. Specifically, we will learn a technique to create a dream activity, or vision of a new activity. You might say, for example, "How wonderful it would be if such and such activity were implemented in my workplace."

It is not easy to have a dream in the present day. In Japan, people shared a dream of getting rid of poverty and achieving a richer life until the period of rapid economic growth in the 1970s. And the country actually reached an economic level that was almost equal to Western countries. But by the 1980s, after overcoming poverty and having enough food and clothing consistently, our physiological needs were satisfied and fulfilled. We no longer felt the need to sustain that dream or think about the future. We lost a nation-wide dream.

At the same time, companies have tried to slim their organizations by reducing the number of employees since the 1990s. Everyone has had to work as much as possible. It might be natural for them to think that creating a dream is the work of free people and has nothing to do with them.

But, we must remember that no one is more miserable than one who has to work hard under a leader who has no visions or dreams. Such a leader plays a role that assigns a great deal of work to the employee, relentlessly. However, a person can bear busy work if he or she is convinced that the work contributes to realizing a dream. One is motivated to do the work if one is eager to make the dream come true.

Importantly, a dream or a vision is different from a daydream. The function of a dream or a vision is to present it to other people and collaborate with them to achieve it. For this, it is essential that the dream or a vision is narrated to others. Informing others regarding the dream or vision is an indispensable condition.

A Method to Create a Dream

It is not easy to create a dream even if you understand its importance. You might not be able to cultivate a dream if you deliberate hard with your arms folded. However, I had an idea

that we could develop a tool to create a dream. Any problem becomes easier if we have a tool for solving it. A picture book is an example of tool to make easier communication between parents and their small children. You can increase communication with your child by reading a picture book together and stopping every once in a while and saying “Oh, this dog looks like the dog of our neighbor’s, doesn’t it?” and then waiting for a response. In that way you can connect with your child. I wonder if we could have a similar tool to make it easier to create a vision.

I happened to remind myself of activity theory. I thought this theory could be used as a tool to create a vision like “How wonderful it would be if someone (a dream subject) would do something (dream object and dream outcome) with the use of something (dream artifact) by collaborating with someone (dream community).

A tool should be as easy and simple as possible to use. Since the structure of Figure 5.3 is not user-friendly for most people, instead, I decided to use a diamond shaped figure shown in Figure 5-9 while maintaining the important elements in Figure 5.3. We will see how activity theory is explained using the diamond figure in the following. The explanation overlaps with the contents of section 1 of this chapter but you will notice that it is much easier to understand. It is an example that shows how a theory is shared with people working in a field site.

The diamond figure is not just a tool to create a vision but a tool to narrate it. Phrases written in Figure 5-9 indicate key expressions that should be used to narrate a dream.

I will introduce the case in which the method using the diamond figure was applied to leadership training for nurses working in a large hospital although the method has been widely used to revitalize various workplaces in industrial organizations, residents’ organizations in a community and so on. The nurses in this case had several years of experience working in a hospital. They were expected to play a leadership role in their workplace beyond just concentrating to improving their skill to become full-fledged nurses. It meant they were expected to understand the importance of creating a vision as a leader and to learn the method to do so.

Figure 5.9. Representation of Activity by a Diamond Figure

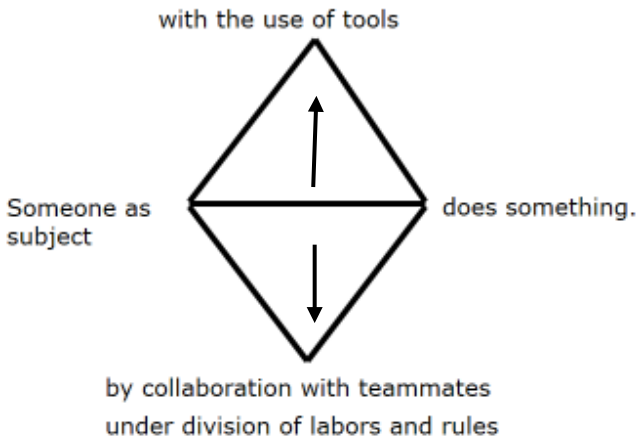

Figure 5.9. The diamond figure reads as 'Someone as a subject does something with the use of tools by collaboration with teammates under division of labor and rules.' Compare this figure with Figure 5.3. This figure is more user-friendly although all elements in Figure 5.3 are maintained.

Introduction of Activity Theory by the Diamond Figure

You will see how we introduce the activity theory as a method to create a vision in the following. The major purpose to introduce activity theory is to see a seemingly individual person's action as a part of activity of a collectivity including that person. Please note that an individual person takes an **action** while a collectivity takes an **activity**. (We don't have a term of an individual person's activity.)

Look at the horizontal line located in the center of Figure 5-9. This line indicates that a subject (someone) works on an object and produces an outcome. Plainly, it says someone usually does something. For example, a nurse named A (subject) usually cares for a lonely patient named B (object) and produces a situation in which B can converse with her even if for a short time.

We often stop the analysis here. Then, we have no way other than attributing a cause of the outcome to the internal qualities of subject such as knowledge in one's head, skill in one's body, or motivation in one's mind, regardless of whether the outcome is good or bad. For example, we might assume that the good outcome was brought about by the subject's excellent ability, or conversely, the poor outcome was brought about by the subject's lack of enthusiasm.

It is true that we can't help attributing intrinsic causes to the subject, but, in many cases, the subject works on the object as a member of a certain collectivity and thus his/her action can be changed if activity of the collectivity is changed. In other words, we can find a clue to change the outcome in many cases if we expand our scope of view to the extent that a collectivity, including the subject, is grasped.

Two Routes: Tools and Teamwork

We have two routes to expand our scope of view toward a collectivity. The first one is taking the tools the subject uses into account (an up-pointing arrow in Figure 5-9). For example, nurse A might converse with B while reading a sports newspaper (a tool) together with him because she knows B is crazy about football. A newspaper is an example of a physical tool but we can also use institutional tools such as organizations, customs, languages, and knowledge.

Here, we might wonder why taking tools into account means expanding our scope of view toward a collectivity. The reason is simple. It is because tools never fall from the sky. Tools can be used by the subject only when other people make them available for the subject. Any tools must have a group of people behind them who sustain the tools. Therefore, taking a tool into account leads you to include the collectivity that you collaborate with indirectly via the tool in your scope of understanding.

The second route to expand your scope of understanding is taking into account people with whom you directly collaborate (a down-pointing arrow in Figure 2). For example, nurse C, working in the same section as nurse A might often give nurse A advice concerning how A should act with patient B. Also, a chief nurse, D, might often encourage A to continue her efforts to help B escape his loneliness. In this example, C and D are invaluable teammates for nurse A.

Now, you can see the subject's action as a part of the way team players cooperate, not just by an individual action. You expand your scope of understanding through the second route. The team has a division of labor, or division of roles among team players. It also has rules that each player should keep in mind. The division of labor and the rules should be taken into account in the second route.

Having expanded your scope of understanding, you have many more measures to change the outcome than you had when you focused on the action of subject alone, i.e., the horizontal line alone in Figure 2. You don't have to concentrate on the subject alone. You can explore what happens if the tool is changed, if someone else can join the team, if the division of labor is modified, or if a new rule is developed.

The First Step: Drawing a Vision

After introducing activity theory as outlined above, we proceed to the explanation of how you can draw a vision with the use of the diamond figure. Obviously, it is not sufficient to only draw a vision. We want to realize or accomplish the vision we drew. In the following text, the first step, where you draw a vision, and the second step, where you draw an activity to realize the vision, will be explained.

In the first step, you draw the activity that you don't have but that you would like to achieve in your workplace. The activity reads "a subject is doing something dream-like with the use of dream tools by collaboration with dream teammates."

Let us look at an example. Figure 5.10 is a vision, or a dream activity, drawn by a nurse named E who works in an intensive care unit (ICU). Emergency patients are brought into the unit one right after another. The department functions like a battlefield for the medical staff. The employees tend to be noisy and have loud voices. But, patients recovering from surgery are also sent to recover and wake up in the ICU. That room should be as quiet and calming as possible for such patients. Nurse E had a vision that the room that tends to be noisy would be as quiet and as calm as possible.

Figure 5.10. Dream Activity: The First Step

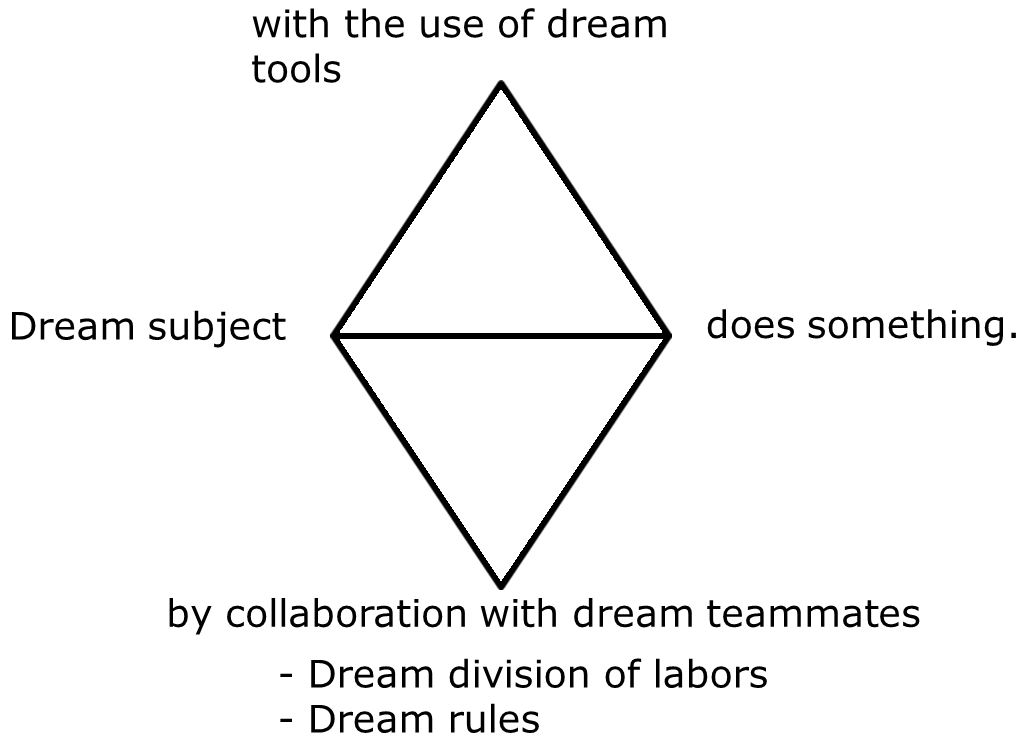

Figure 5.10. This diamond figure reads as a dream subject does something with the use of dream tools by collaboration with dream teammates under a dream division of labor and dream rules.

Figure 5.11. An Example of a Dream Activity: The First Step

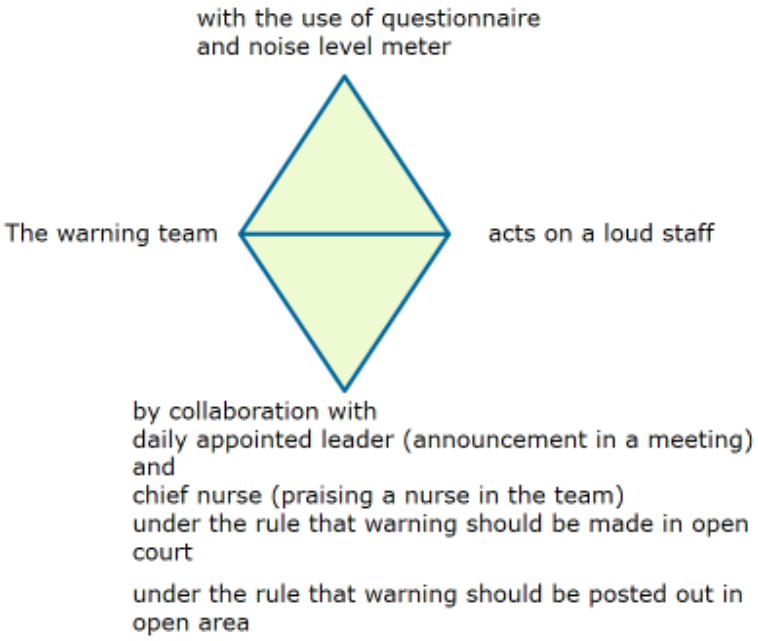

Figure 5.11. This diamond represents is a dream that was drawn by a nurse working in an intensive care unit (ICU) in a large hospital. Medical staffs of ICU tend to communicate with each other loudly because emergency patients are brought in one after another. But, the excessively loud voices of staff personnel might make patients uncomfortable and even tense. She had a dream that her workplace would become quieter. Her dream reads that the warning team acts (a dream subject who did not exist) acts on the loud staff with the use of a questionnaire to ask patient's evaluation and noise level meter (dream tools) by collaboration with a daily appointed leader and a chief nurse (dream teammates) under the rule that warning should be posted out in open area (dream rule) and the division of labor indicated in parentheses after dream teammates in the figure (dream rule).

Figure 5.11 reads “The warning team quiets anyone who is speaking in a loud voice with the use of the questionnaire administered to patients to evaluate their comfort level. The noise level in the room is measured using a meter. Both are performed by collaboration with a daily appointed leader and a chief nurse of the unit.” She expects the division of labor in which the daily appointed leader emphasizes the importance of keeping the room as quiet as possible in daily meetings. The head nurse praises a member of the warning team when he/she actually acts to quiet a noisy staff member. She wants to have a rule among such team players, the warning team, the daily appointed leader and the chief nurse. That rule is that the warning should be carried out with confidence because sometimes a team member is younger or occupies a lower status than a noisy person. This is the dream or vision. They did not have the warning team when she drew and created the vision. Neither the tools nor the teammates existed because the subject who used the tools and collaborated with the teammates did not exist.

In this leadership training, “I”, or a group including the trainee, were not allowed to be in the position of subject. It was because the purpose of the training was to depart from the stage in which improvement of nursing skill as an individual nurse was emphasized most and enter the stage in which leadership in the workplace would be expected. In other words, in this activity, improving nursing skill was less important than leadership. The researchers predicted that a trainee might not pay full attention to his/her entire workplace if he/she was allowed to make him/herself a subject.

The Second Step: Drawing an Activity to Realize a Vision

The next step is to draw an activity to realize the vision by taking the initiative as a subject. In this step, the subject is already definite; it is I. The diamond figures that are drawn in the second step can be divided into three types, that is, for drawing activities to produce (1) the dream subject, (2) the dream tools and (3) the dream teammates like Figure 5.12 (1) - (3). But, you might already have the subject or the tools that appeared in the vision. Or, you might already have established that the relationship between the subject and the teammates is good enough to realize the vision. In these cases, you need to draw only the necessary activities among the three types.

In contrast, you might have to draw two or more activities for a single type of activity. For example, if two important tools were included in the vision, you have to draw two activities to produce them. Or, if many teammates were included in the vision and it would be difficult to develop a collaborative relationship among them all, you might need to have plural activities, each of which is to develop collaboration in a subgroup. Furthermore, it might be possible for a single activity to accomplish two different elements in the vision. For example, both a dream tool and collaboration might be achieved by an activity in which you work with the dream subject and his/her dream teammates to produce the dream tool in the vision.

Figure 5.12 (1) The Second Step: Activity to Produce a Dream Subject

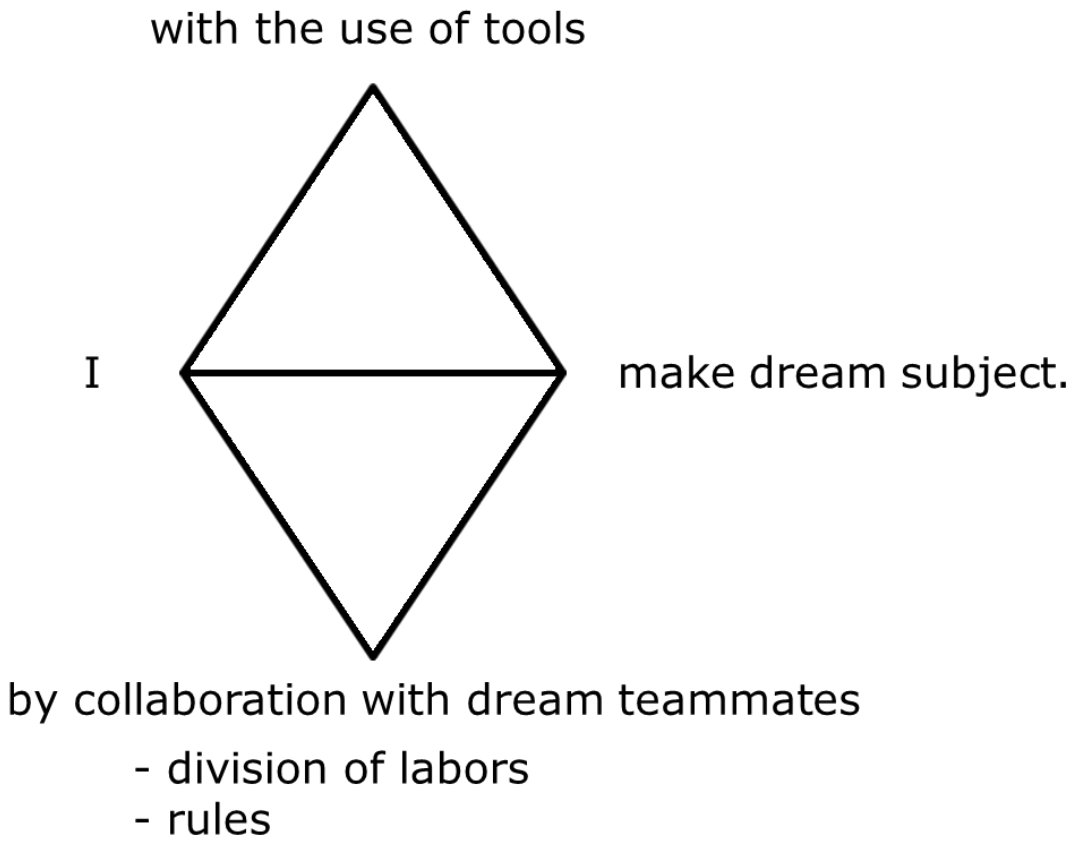

Figure 5.12 (1). The second step is the activity to realize a vision by becoming a dream subject. This is why a term, subject, should be always 'I.' This figure shows an activity to produce a dream subject. The figure reads "I will make a dream subject with the use of tools by collaboration with teammates under a certain division of labor and rules."

Figure 5.12 (2) The Second Step: Activity to Produce a Dream Tool

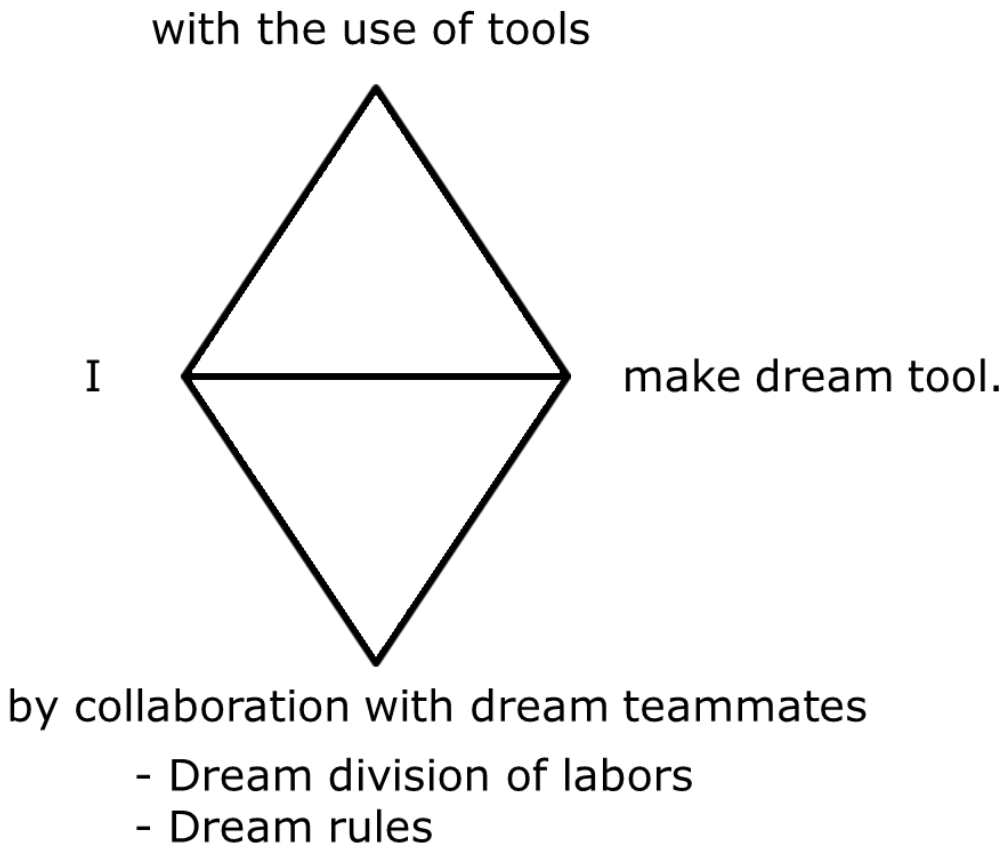

Figure 5.12 (2). The figure diamond figure represents how a dream tool and collaboration are related. The figure reads “I will make a dream tool with the use of tools by collaboration with teammates under certain division of labor and rules.”

Figure 5.12 (3) The Second Step: Activity to Produce a Dream Teamwork

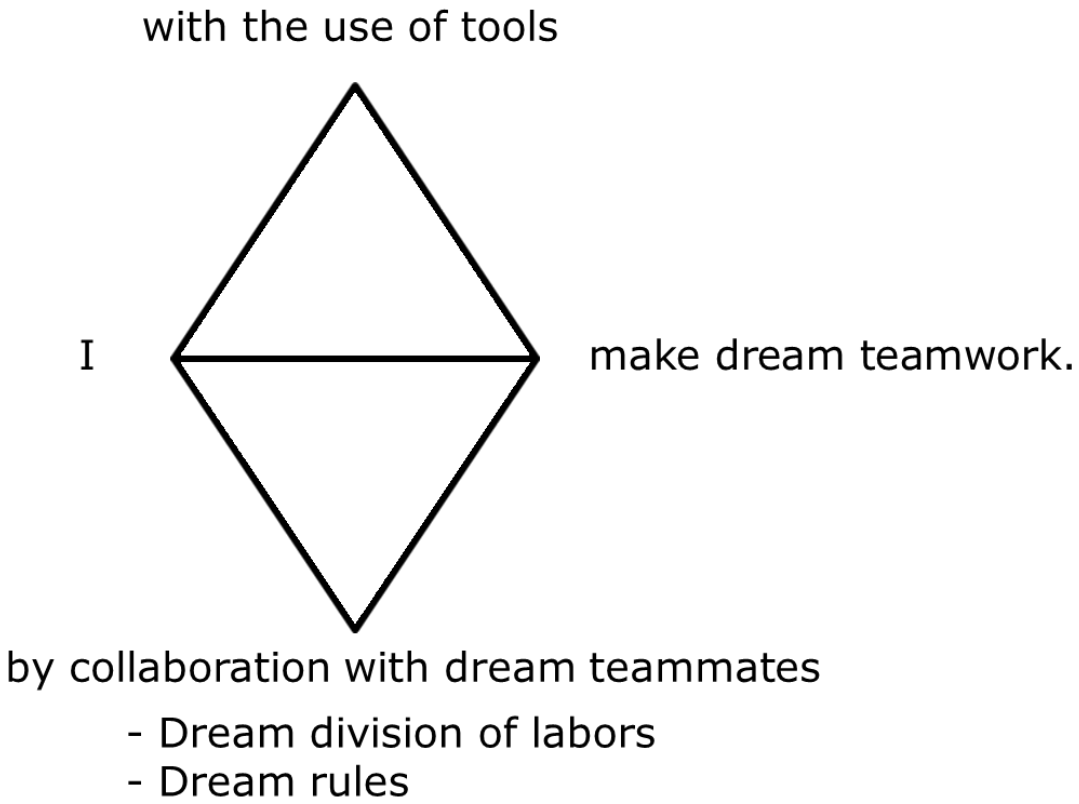

Figure 5.12 (3). This diamond figure represents reads “I will make a dream teamwork with the use of tools by collaboration with teammates under certain division of labor and rules.”

Let us see what activity was drawn in the second step by nurse E, whose vision was described above. A dream subject, i.e., the warning team, had to be established and supported before anything else to realize the vision. Figure 5.13 shows the activity in which nurse E, herself, takes initiative to establish and support the warning team. The subject is I. The figure reads “I (nurse E) establish and support the warning team with the use of a poster and e-mail by collaboration with the daily appointed leader and the chief nurse.” In the activity, the daily appointed leader as a teammate is expected to be a lynch pin between the warning team and nurse E, while chief nurse D is expected to support nurse E, by encouraging other staff members to collaborate with nurse E. A rule of the activity is that all staff become members of the warning team alternately without sticking to a fixed membership. In addition to Figure 5.13, nurse E drew another activity to produce a dream tool, a questionnaire for patients although it is not included here. The activity reads like “I develop a questionnaire using the results of interviews with patients and collaboration with the warning team.”

Figure 5.13. An Example of Activity to Realize a Vision

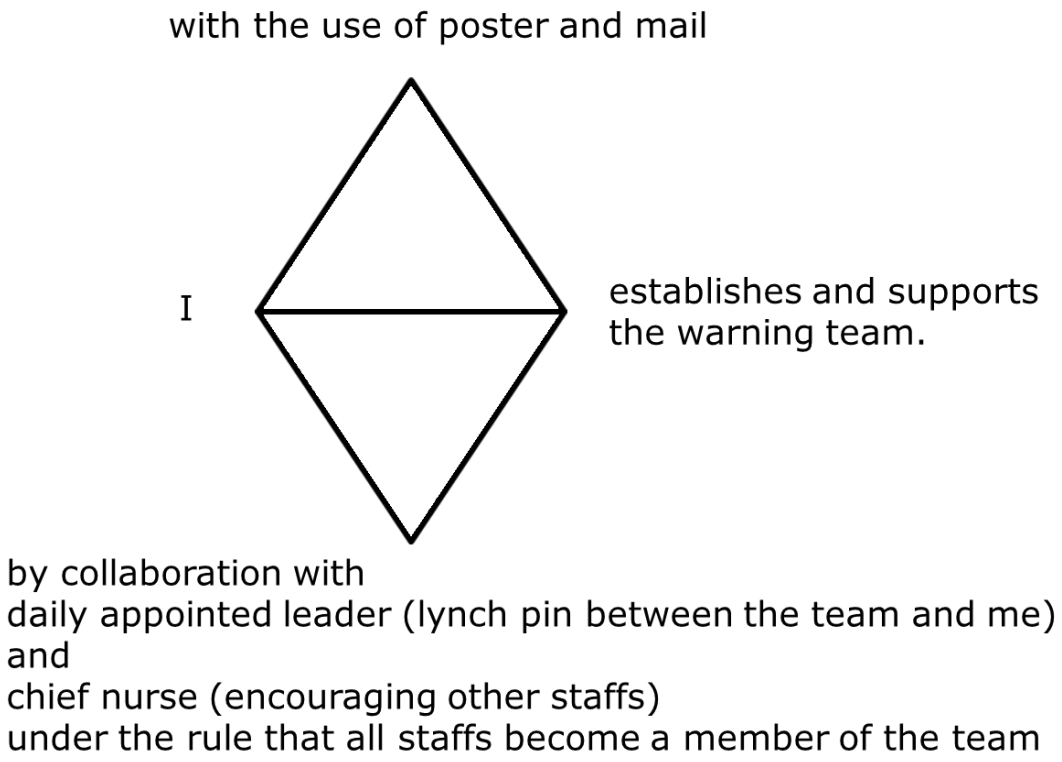

Figure 5.13. This figure shows an activity that the nurse who drew a dream shown in Figure 5.11 developed to realize her dream. For this purpose, it was most important to establish the dream subject, i.e. the warning team that had not existed when she drew her dream. The figure reads "I will establish and support the warning team with the use of a poster and e-mail by collaboration with the daily appointed leader, who is expected to work as a lynch pin between the team and me, and a chief nurse, who is expected to encourage other staff, under the rule that all staff become members of the team." Beside this figure, she also drew activities in which she would play a central role as a subject to produce dream tools, i.e. questionnaire and noise level meter

Going Back and Forth

The first and second steps were described above in that order but, in many cases, you cannot advance straightforward from the first step to the second step and then implement the activity drawn in the second step. You might not be able to draw the activity to achieve the vision as a central person in the second step even if you managed to draw the vision in the first step. In such a case, you should not hesitate to go back to the first step and redraw your vision.

Alternately, even if you completed the second step, you might find it difficult to implement the activity for accomplishing the vision in just a few days. If so, you should not hesitate to go back to the second step or even to the first step. Going back and forth might seem like a waste of time or that it is unsuccessful but that is not true. Generally, it is not easy to draw a vision. You have to practice it because it is a skill. In this sense, going back and forth is never in vain but a positive process that develops a vision. In fact, one way to improve your skill to draw a vision is by practicing it by going back and forth.

Narrating a Vision

As stated in the beginning of this section, a vision differs from a fancy. It is critically important that a vision can be narrated to someone else. Phrases in Figure 5.9 articulate a format to narrate a vision like "Someone does something with the use of ---- by collaboration with ----." In our training, we repeatedly emphasized that it was important to use this format. You might want to ask if the vision you drew is adequate. But, since it is impossible to show an absolute criterion to determine the adequacy of a vision, how can you judge its adequacy? The only way to know the adequacy of your vision is to talk about it to other people. Let us explain. Suppose you are starting the activity you drew in the second step to realize your vision. The activity includes the teammates you wanted to collaborate with. It means that you have to ask them to play the role you indicated in the division of labor in the second step. Then, they ask you why you have requested such an activity.

Here, the vision you drew in the first step should be disclosed. You say, "I drew this vision. I want to realize it while playing a central role. For this, please collaborate with me." Then, how do they react to the disclosure of your vision? There are three different possibilities. First, they might react by saying "I am impressed and in agreement with you. I also want to realize such an activity. Let's work for it together." This reaction confirms that your vision is adequate. Second, they might say, "I understand it would be wonderful if such a vision would be realized. But, I can't see how I could assist in such a huge vision." This reaction indicates that your vision is too large and thus unrealistic. Third, they might say, "I understand what you said is important, but it should be a part of daily work." This shows your vision is too small. Excitement and enthusiasm are integral in order for a vision to interest another person. An idea is not a vision if it does not elicit any excitement on the part of the person who learned about it.

As you can see in the above examples, the adequacy of your vision can be judged only by knowing the possible responses of the teammates with whom you wanted to work to achieve the vision. Thus, it is critical for you to narrate your vision to fit your workplace. Logically, it follows that the adequacy of the same vision will differ from one workplace to another because each workplace is unique. The same vision might be perfect for one workplace, but it might be too large or too small for others.

A New Type of a Problem-solving Method

Many training sessions for problem-solving are held in public and private sector organizations. The training aims at teaching various methods or techniques to discover a problem in a workplace and resolve it. Such training using a problem-solving method is also implemented using a meeting designated as Off the Job Training or Off-J-T. Various methods

have already been developed and utilized that share the common idea that a problem, or weakness or deficit, should be analyzed and identified, then followed by identification of, and removal of the cause.

It is important to focus on problems or weaknesses but we might become depressed if we are always forced to be convinced of our weakness alone. We need another kind of problem-solving technique to respond to a different idea.

Our method to draw a dream is a kind of technique for problem-solving but responds to such a new idea. It is true that if you have a problem to solve, the solution has to do with the dream you create. But, our method differs from traditional techniques for problem-solving where the causes of problems, or weakness or deficit, should be analyzed, identified and dealt with. In contrast, in our method, we present an ideal situation where problems have been already resolved. This is drawn as a dream activity in the first step and then the process to achieve the situation is drawn in the second step. Our method is directed to an ideal situation in the future and thus future-oriented. We can say our method makes a problematic situation substantially non-problematic by drawing a dream in the future-oriented way and trying to attain it. Regarding this point, our method shares the same orientation with narrative therapy that is introduced in section 4 in Chapter 6.

4. Leadership

Leadership Studies

Leadership is one of the most popular topics included in textbooks of group dynamics. We will read about the topic based on activity theory in the last section of this chapter.

Results of leadership studies so far are summarized as following;

(1) There are two kinds of leadership. One is for contributing to the attainment of goals of a group. Another is for contributing to the improvement of human relations in a group.

(2) When the two kinds of leadership are measured by a questionnaire in which followers evaluate their leader, as well as goal achievement, follower's satisfaction and collaboration in a group, those factors are likely to be superior in the group where the leader is appreciated for demonstrating skills in both.

Let's see the specific contents of the two kinds of leadership by looking at the questionnaire items. Leadership for goal attainment is measured by such criteria as "Does your manager clearly show goals and plans of work?" and "Does your manager give directions and orders based on sufficient knowledge and skill?" and "Does your manager demand that you to work as hard as possible?" and so on. In contrast, leadership for human relations is measured by such items as "Does your manager listen to your opinion?" and "When there is a conflict in your workplace, does your manager try to resolve it?"

Past studies found that when a leader is evaluated by his/her subordinates with the use of such items, goal attainment, satisfaction and collaboration tend to be highest in a workplace where he/she is appreciated for both kinds of leadership. Goal attainment can be evaluated in raising the degree of achievement of sales or production goals, and lowering the number of compensation claims, occupational accidents and injuries. Followers' satisfaction and collaboration are measured in the same questionnaire in which leadership is measured. For example, satisfaction is measured by the item, "Are you satisfied with your workplace?" while collaboration is measured by the item, "Do your colleagues help each other?"

Cultural Values and Leadership

I had the opportunity to participate in the studies to develop a questionnaire mentioned above because my mentor was promoting leadership studies when I was a graduate student in

the 1970s. Different concrete behaviors constitute in each of the two kinds of leadership in different kinds of groups and organizations. Therefore, specific questionnaires are required for different organizations such as companies, hospitals, public administrative offices, and schools. Also, specific questionnaires are needed for different hierarchical levels in a single organization such as top management, middle management and supervisors.

At the time, I participated in cross-national comparative studies and worked with foreign researchers in the West and China. I will share some of these interesting memories with you. One example is from the time when I worked with a researcher from the US to translate a Japanese version of a questionnaire into English. He claimed that the Japanese version included problematic items. Specifically, he told me that one of the items measuring leadership for goal attainment, "Does your manager demand that you work as hard as possible?" did not reflect positive efforts to achieve a goal but it had negative effects on goal attainment. He explained to me: "It is most important in the US to follow the contract you and the company agreed to when you were enrolled. It is not good for a manager to make you work hard beyond the contract." He also criticized an item measuring leadership for human relations. It was an item like "Does your supervisor take care of your personal problems?" He said, "You should not intervene in the personal life of your subordinates as a manager." Two claims from this U.S. researcher concerned the contents of leadership behavior while accepting a theory of two kinds of leadership. Then, the theory itself was criticized by a Chinese researcher. He said, "You are not a good leader even if you exert both kinds of leadership. You need to be a man of virtue to become a good leader." I remember his remark on the virtue of leadership because at that time it was beyond my concept of leadership and I was unable to respond to it.

From the Perspective of Activity Theory

The stories of my experience above were in the 1970s. Current Japanese workers might now be similar to American workers at that time. Also, I am not sure whether current Chinese managers are expected to exert the value of virtue as important to leadership as much as they were when the market economy did not prevail.

However, it is important that the issue of leadership is not restricted to the relationship between a leader and followers. When you are reminded of activity theory, you notice that the concept of leadership describes just a part of activity, that is, a relation between a subject and on an object/outcome that is shown by a central horizontal line in Figure 5.3, like "a leader as a subject acts on followers as an object to produce some results as an outcome." This means description of the concept tends to make it insufficient for you to pay attention to the other parts of the activity such as artifacts, community, division of labor and rules. The American researcher's criticism on the manager's behavior to demand subordinates to work as hard as possible suggested that a contract should be paid attention to as an important artifact when a manager as a subject acts on his/her subordinates as an object.

Value underlies an activity as was mentioned in section 2 in this chapter. Six vertices of an activity are like six legs of a table standing on a floor of common value. The disgust that was shown by the American researcher for the intervention of a manager to a subordinate's private life represented a difference of values between the US and Japan. Similarly, a theory of leadership in which virtue was emphasized by the Chinese researcher showed the difference of values between China and Japan at that time.

The Word "Leadership."

Lastly, a new perspective of leadership will be introduced. It is a perspective in which the word "leadership" is focused on. The phrase of "He/she exerts leadership" is an expression to appreciate a leader in a group or an organization in which people share the same goals. Even

if the word leadership is not used, such expressions as “He guided us,” or “She held us together,” communicates the same meaning as “He/she exerted leadership.” The new perspective takes an expression of “He/she exerted leadership” as the expression of appreciation, admiration and gratitude.

Looking at daily life in the workplace and organizations, we notice that any result is brought about by a complicated process regardless of whether it is a good or bad result. Just a result is produced by many activities that proceeded one after another or side by side. The activities are so complicated that even a person who played a central role cannot explain them fully. The word leadership is one of the expressions that summarize such a complex process. You might feel it is extremely incorrect to refer to a complicated process using just the word leadership. We can’t deny this feeling of discomfort that occurs when a complex idea is reduced to one word. However, a remark such as “Mr. X exerted leadership” has various impacts. For, example, a new activity in which Mr. X plays a central role might start to be expanded even if he had been visible for others. Or, it might become possible for Mr. X to increase his attractiveness so much that he can challenge a difficult task by involving more people even if he had been already evaluated as a good leader. In this way, a word or language has the power to open up a new horizon for the future. This does not include wordiness but rather the capacity of language in general to change the world. We will see the impact of language on the creation of a new reality in next chapter.

Supplement 5.1
Ethnomethodology

We will look at an area of study called ethnomethodology while relating it to activity theory. It belongs to sociology. Although *ethno* originally meant *race*, it means a group of people here. Therefore, ethnomethodology is a study of the method used by a group of people.

The term, however, is still ambiguous. What does a group of people use the method for? It is for creating and maintaining order. We, humans, are animals who cannot live without order. We already learned, in section 3 in Chapter 2, that the appearance of a world is not possible without meaning. Meaning is a kind of order. You see many people who regard various creatures swimming in the sea and river with the use of the meaning, *fish*, even though they have different shapes, sizes and colors.

What order a group of people maintains by what method ---- this is studied in ethnomethodology. Let us give an example. Suppose you are asked to respond to a sheet with a list of questions. You don't have to fill in your name but have to indicate your sex and age in many cases. And, "male or female" is already printed in a place where you indicate your sex and you have to check either of them in most questionnaires. It is not unusual to see that no request to check is written. But, it is a little bit strange. In each item in the main body of questionnaire, such alternatives as "can't say which" or "don't know" is prepared in addition to such alternatives as "agree," "agree to some extent," "disagree to some extent," and "disagree," for example. But, such alternatives "can't say which" or "don't know" are not prepared in the item for sex. You have just male and female. You might be surprised if you saw an item for sex that has three alternatives such as male, female and neither.

It is true that most people are either male or female. But, some people are androgynous and have physiological characteristics of both male and female although there are very few who are like that. How do they feel when they respond to the item without a third choice for sex?

We can understand that the item for sex in a questionnaire contributes to maintain an order that a human is either male or female. Of course, we have many other ways to maintain the order but we can't deny that the item contributes to the order. We can say the majority of people, ethno, use the item for sex in a questionnaire as a method to maintain the order above.

When you remember activity theory, you realize a method in ethnomethodology is one of artifacts in Figure 5.3. In the above example, those who administer a questionnaire (subject) promote activity to maintain the order above with the use of the item for sex (artifact) and by collaborating with many respondents (community). I don't mean an item for sex should be changed at once but the above example suggests that a group of people have been committed to the maintenance of an order designating a binary (two) for sex unintentionally and unconsciously.

A group of people might be small or might be large like the example in the questionnaire. For example, a small group of people who promote drug dependence with each other might maintain an order that makes it difficult to quit from using drugs. If so, one would be required to discover the ethno-method they use to maintain such an order and remove it. Or, the minority might suffer from discrimination due to a certain order sustained by the majority. If so, one would be required to clarify the discrimination caused by the majority's ethno-method without intentional harm and to inform the majority to modify the method.

Chapter 6
A Canopy of Language

A human is an animal who uses language. When we use language, a canopy encompassing us is formed. A single word can sometimes drastically change collaborative practice by people in the field site and a researcher.

We will start this chapter with a basic explanation on what language is. We will explain the formation of meaning in the stage (prelanguage) where language is not yet used, and then proceed to the stage where language is used.

After defining language and its formation, we will introduce a theory of the act of speech to explain how language impacts other people and how this impact is possible. Finally, we will use an example of how the impact of language can be harnessed to cure a person who suffers from a mental problem in a unique way. A new method of psychological counseling called narrative therapy will be introduced.

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1. Four-limb Structure

Structure of this Chapter

As mentioned in Chapter 2, the nature of collectivity has two aspects, physical and semantic. Language plays an important role to produce the semantic nature of collectivity. Of course, language is a part of the physical nature of collectivity because it is a kind of sound when it is spoken and leaves traces of ink or patterns of dots and lines when it is written on paper or presented on a computer display. But, still, language occupies much more importance in the semantic nature of collectivity than in the physical nature of collectivity.

Needless to say, all of the semantic nature of collectivity is not constituted by language. We should not overlook the semantic nature of collectivity that is not produced by language. For example, bodily movements indicate a meaning that is non-verbal. This is referred to as paralanguage. Arts and music are also examples that show the importance of the semantic nature of collectivity that is not constituted by language.

Still, language has a special importance for us since we are known as animals who use language. Then, what is language in the first place? What characterizes the semantic nature of collectivity that depends on language? These questions will be answered in this chapter. The fundamental nature of language is described in section 2 after introducing Theory of Four-limb Relational Structure plainly in section 1 that was developed by the Japanese philosopher, Wataru Hiromatsu (1982).[4]

To state our conclusion first, the fundamental nature of language is that language indicates only a part of our world. In other words, you can't grasp the whole world in front of you when you use language. But, language gives you a powerful device to transmit some information instead of giving up because you cannot grasp the entire world. Transmission by language will be plainly explained as included in the theory of the speech act in section 3. Last, in this chapter, narrative will be discussed. Narrative is discourse, namely, a group of linguistic expressions that classify and focus on one category of discourse. A counseling technique that emphasizes narrative called narrative therapy is introduced.

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[4] Hiromatsu, Wataru (1982). *Sonzai to imi: Kototeki sekaikan no teiso* [Existence and meaning: Foundation of relational viewpoints of world.] Tokyo: Iwanami-shoten.

Combination of Two Relations

The concept of meaning is one of the most important concepts in group dynamics. We learned in Chapter 2 that anything without meaning does not appear for us. We also learned in Chapter 5 that meaning is a system of difference. Moreover, we will explain that meaning and norm are two sides of a single coin in the next chapter. Then we will explain how meaning is formed.

In this section, we will introduce Hiromatsu's theory of four-limb relational structure. The relationalism theory will help explain what language is. Although the unusual terms "four-limb structure" and "relationalism" appeared suddenly, without an introduction, readers do not need to worry because the terms are not difficult to understand. A four-limb relationship is a combination of two relations. One relation is between a hand and a foot, or a relation between the above and the below. Another is a relation between the right and the left. The combination of the two makes a four-limb relation. Think about your body as you stand. You have two arms and two legs. The four-limb relationship is the same as the relationship between your limbs. To demonstrate, separate your feet a small distance from each other and

Figure 6.1 The Four-Limb Structure

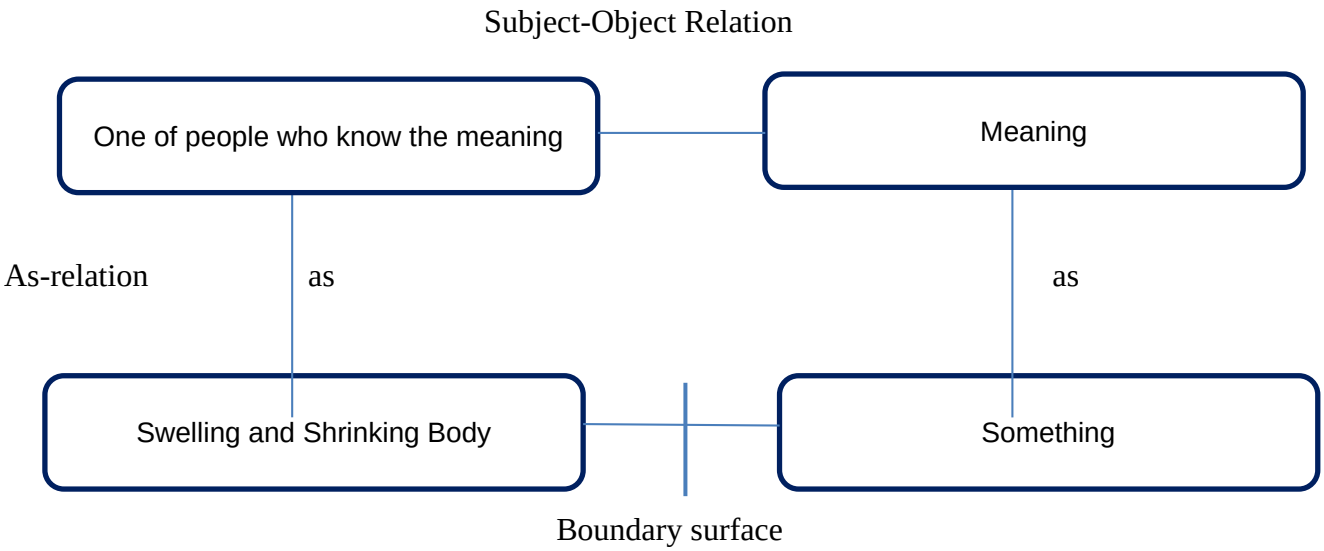

Figure 6.1 The Four-Limb Structure adopted from Hiromatsu (1982). 'Something as meaningful' in the right-hand side appears for 'a swelling/shrinking body as one of people who know the meaning' in the left-hand side. The four-limb structure consists of a combination of two relations. One relation is called 'as-relation' in which the lower item is always 'the lower item as the upper item' in both right and left sides. Another relation is 'subject-object relation' in which the right item (object) appears for the left item (subject) in both upper and lower halves.

The two items in the upper half and the two items in the lower half differ in their nature. The former is beyond space and time while the latter is spatially and temporally specific. Something appears for a swelling/shrinking body by having a boundary surface between the two that is spatially and temporally specific, but such boundary surface does not exist between the two items in the upper half because their relation is not restricted spatially and temporally.

stretch your arms upward and slightly outward. Now, you have moved your body to demonstrate the relationship among a total of four elements: two hands and two feet is a four-limb relational structure.

Here, let us look at Figure 6.1. We will see roughly what it means, although it will be explained in greater detail later. First, the relation between the right and the left shows a relation in which the right appears for the left. The right is an object and the left is a subject. It is relation in which an object (the right) appears for a subject (the left). You can replace the object with a term of world or scene that you read about in Chapter 2.

Second, the relation between hand and foot, or the above and the below, is called the "as-relation" that indicates "the foot as the hand," or "the below as the above." We already learned in Chapter 2 that anything that has no meaning does not appear for us. That is, all that appears for us always has meaning. Meaning is XXX when you say 'something as XXX.' In this sense, the relation between the hand and the foot, or the above and the below is a relation of meaning, or a relation that makes meaning possible.

There is a relation between an object and a body, or the right side and the left side while there is the *as-relation* on each of the two sides. Appearance is possible when such a relation consists of a total of four items. This is the theory of the four-limb relational structure. Here, a body is never a body that has a mind inside. Also, an object in the theory is not assumed to exist in the outer world in the dichotomy of inner/outer worlds. The theory was proposed as a challenge to a traditional idea that assumes recognition is grasping an object in the outer world in the mind-in-a-body.

As-relation on the Side of Object

We will start using a genuine explanation of the four-limb relational structure. The theory was proposed to explain the foundation of appearance from the perspective of relationalism alone. Relationalism is in contrast to substantialism. In substantialism, relations among different substances are also taken into consideration after their existence is admitted. But, in relationalism, all we have is relation and therefore we never assume that any substances existed prior to their relations.

What is most important is the as-relation in the theory of four-limb relational structure. Something you have in your hands now is not just something. It is something specific e.g. a book. Here, *a book* is the meaning of something. The "something" in something as a book is something at a particular point of time and in a particular place. Its appearance differs at different points in time and in different places. Brightness and the visible sides differ even slightly if the something exists in a different point in time and in a different position. Thus, the appearance of something is not repeated in exactly the same form and thus is singular. To sum up, something that is combined with meaning is spatially/ temporally/ singularly specific.

In contrast, the meaning of "book," in something as a book is not conditioned by place and time. It implies what you have in your hands right now, what is put on a shelf in a bookstore where you have never been, and so on. In this way, the meaning of book is used beyond place and time. Moreover, the meaning is not used exclusively to refer to books that we have presently. Books that were read in the past but were already burnt are also referred to as books. Also, books that will be published in the future are also referred to as books. In this way, the meaning is used beyond time. To sum up, meaning is characterized by being beyond place, beyond time and universal whereas something is singular.

As mentioned above, the as-relation is one between something characterized by being singular, spatially and temporally specific, and meaning characterized by being universal, beyond space and time. Something that is spatially and temporally specific and singular appears for you as the meaning that is beyond space and time and universal. All that appears for you is

something that is spatially and temporally specific and singular as the meaning that is beyond space and time and universal. Therefore, appearance is not possible without the as-relation. Something without meaning does not appear.

Something as book represents a relationship. It is not that 'book' is located at the upper left position all the time even for the same 'something.' This is the case in positional relation of three persons. Even if person X is seated to the left of another person, Y, in a certain situation, it is not that X is always to the right and Y is always the left. X becomes left if someone, Z, is seated to the left side of X.

This is also true for the as-relation. The location of a certain term, i.e. whether a certain term is located before or after "as," is not predetermined. For example, a book you have in your hands is a textbook for a certain class. In this case, you have 'something as a book' *as* a textbook, in which something as a book as a whole is located before "as." It is not that both something that is spatially and temporally specific and singular and the meaning that is beyond space and time and universal has existed in advance and that the two are connected by "as." What happens first is the formation of the as-relation, which then enables the appearance of something that has already identified with a certain meaning.

Swelling and Shrinking Body

The as-relation is not only in the side of an object but in the side of a body in the four-limb relational structure. Note that a body is never a physical body that has a mind inside. A body was defined in Chapter 2 as material for which something appears but the material does not include the mind inside.

What material is a body for which something as a book appears? First, the body is in touch with something. In the following, we will begin our explanation with appearance by the sense of touch and then expand it toward appearance by the sense of sight. When you have something in your hands, you touch something. If so, a boundary emerges between your hands and something. The boundary sometimes belongs to your hands and sometimes belongs to something. To understand it, it might be good for you to put your palm on the surface of table while closing your eyes. You might feel you are touching the table but you also feel you are touched by the table, or the table is touching your hands. The border belongs to your hands in the former while it belongs to the table in the latter.

This is the case regarding the sense of sight. When a tree appears in front of you, your body swells enough for you to touch the tree with your eyes. Actually, in point-of-regard or tracking eye movement measurements in physiology, the point moves around the surface of the object as if you stroke the surface with your eyes. Contrarily, the point remains at the same place when you don't gaze at the object, that is, when you just stare abstractly at something else.

A border is produced between a swelled body and an object in the sense of sight, too. The border is the surface of the object that appears for you. The border sometimes belongs to your swelled body but sometimes belongs to the object. You feel touched or effected by the object when the border surface belongs to the object.

A body not only swells but shrinks. Let's assume you have a pain in your stomach. Here, your body shrinks enough for you to touch your stomach and feel the pain. The border is inner surface of your stomach. With regard to this explanation and this way, a body can swell and shrink. When such a body touches an object at the boundary, the object becomes "something" in something as meaning. A swelling and shrinking body is spatially and temporarily specific and singular as something is. Moreover, the border surface is also spatially and temporarily specific and peculiar. The border surface is nothing but the relation between something and a swelling and shrinking body. To sum up, not only something and a swelling and shrinking body are spatially and temporarily specific and singular but also the relation between them is spatially

and temporarily specific and singular.

The As-relation on the Side of Body

Now we will expand our understanding. A body is not just a swelling and shrinking body. A body is also one of people who know meaning. Here, we have as-relation, again. A body is a swelling and shrinking body as one of people who know meaning. If something as a book appears for you now, your body is a swelling and shrinking body as one of people who know the meaning of book.

"People" in "people who know meaning" is not a countable group of people. For example, people who know the meaning of book include not only people living now but also people who used a book in the past and will use a book in the future. That is, it is beyond time. It is also beyond place. People who know the meaning of books are not actual individuals; they are people in the sense of a universal or abstract nature, not countable. To sum up, people who know meaning have the nature of super-spatiality, super-temporality and universality as meaning in something as meaning.

Such a nature is not only owned by meaning and people who know meaning but also is owned by the relation between the two. The relation does not have a border surface that is produced between something and a swelling and shrinking body. The relation between meaning and people who know the meaning is super-spatial, super-temporary and universal.

A four-limb relation in Figure 6.1 summarizes what was mentioned above. The relation is called the four limb structure because we can take the upper half of the figure as a left hand (one of people who know meaning) and a right hand (meaning) while we can take the lower half as a left foot (swelling and shrinking body) and a right foot (something). The four-limb structure is the combination of two relations. One of them is a relation between the right and the left that is the relation between body and object. The other is the relation between the above and the below that is the as-relation. The former relation enables existence and the latter relation enables meaning. The two relations make appearance possible. Hiromatsu's book was titled *Existence and Meaning.* Other titles might be impossible as far as the book concerns the four-limb structure.

Misperception of Priority of Substance

The theory of four-limb structure stands on relationalism. Relationalism insists that there was the relation in the beginning. In substantialism, substances are assumed to exist in the beginning and only then they are assumed to have relationships with each other. In relationalism, we argue the reason that we came to be convinced that the substance exists in the beginning by starting with there was the relation in the beginning.

Meaning and something can be terms only after the as-relation is established. It is not that there were meaning and something in the beginning and then they became related to each other. Were the *why* and *how* a recognition that there were meaning and something produced in the beginning?

Here, let us remember our common assumption that distinguishes the outer and inner worlds that was mentioned in Chapter 2. The common understanding is one side of a single coin, another side of which is the common understanding that assumes the mind-in-a-body. In section 3 in the next chapter, we will describe how such a common sense was developed historically.

When the dichotomy of the outer and inner worlds is established, meaning that was originally a term of the as-relation came to be perceived as what existed in the outer world from the beginning. Furthermore, meaning was perceived as a physical entity that existed in the outer world. This perception is called *materialization* because it is perceived as a material in the outer

world.

In contrast, something that was a term of the as-relation came to be perceived as an image in the inner world of a material in the outer world. This perception is called *imaginarization*. Both materialization and imaginarization make the as-relation, something as a desk for example, substantial so that we are convinced that a desk that objectively exits in the outer world is subjectively received as an image like something. Therefore, substantialism that consists of both materialization and imaginarization is a misperception, theoretically. But, we need to be cautious about this.

People behind Materialization

We will now turn to the left-hand side of the four limb structure. You see "people who know meaning." A certain meaning is possible only when it has relation to "people who know it." It depends on people who know meaning what material is assumed to exist in the outer world because meaning is materialized. Thus, substantialization should not be treated just as misperception but should be taken as social processes by people.

Let us use the example of a plastic grocery bag. Recently, we have been encouraged to bring our own bags to a store in order to conserve resources and cut down on waste. In some stores, we have to pay for a plastic grocery bag that is provided. But, the following example is a story that took place before that. A grocery bag is necessary for me even now. For me, something in clerk's hand is definitely a necessary thing for me to bring goods home that I bought. No doubt, there exists "a necessary thing to bring goods I bought" in the clerk's hand, that is, in the outer world.

But, why is it a necessary thing? Here, we should remember the four-limb structure. First, something as a plastic bag appears for me. It is because I am not just a body but a body as one of people who know the meaning of grocery bag. Moreover, not just "something as a grocery bag" but "something as a grocery bag as a necessary thing" appears for me." This implies that I am not just a body as one of people who know the meaning of grocery bag but a body as one of people who know the meaning of a grocery bag as a necessary thing which should be provided by a clerk. Plainly, I am one member of a body of people who are totally convinced that a clerk should provide a grocery bag when we buy something.

Recently, the number of people who bring their own shopping bags to reduce the use of plastic bags has increased among those who are keen about environmental problems and saving natural resources. For such people, plastic bag as a thing that should not be used appears instead of plastic bag as a necessary thing. Each of them is a body as one of people who know the meaning of plastic bag that should not be used. In contrast, unfortunately, I am not one of such people.

In this way, our concern is expanded from the reality in front of us into people who sustain such a reality when we stand on a relational perspective such as the four limb structure. Contrarily, substantialism tends to trivialize a social problem into an individual psychological problem in the mind-in-a-body by tempting you to assume that he /she perceives a plastic bag in the outer world as a necessary thing in the inner world, although it is not impossible for substantialism to take people into consideration.

2. The Four Limb Structure of Language

Indication and Description

It is time now to enter the main topic of this chapter, namely, what language is, based on the theory of four-limb structure. All explanations of the four-limb structure in the above concerned the relation that enables appearance prior to the use of language. In the following,

we will explain the appearance with the use of language by expanding the four-limb structure without language.

A *holophrase*, a one-word utterance, is the simplest linguistic expression. It takes a form of a noun like Earthquake!, an adjective like Fast!, or a verb like Fly! A holophrase looks like a *description* as far as what is explicitly expressed concerned, that is, it just describes what something is, how something is, or what something is doing. However, it is important to note that a holophrase has already indicated something when it describes something. *Indication* is implemented at the same time when description is made. For example, a seismic shock in the ground is indicated when you say Earthquake! A sprinter running rapidly is indicated when you say, Fast! In this way, even a holophrase has two functions, indication and description. The two functions are indispensable for linguistic expression.

Importantly, the two functions, indication and description, constitute the as-relation. In the above examples, the as-relations such as a shock as earthquake and a sprinter as being fast are constituted. A shock and sprinter correspond to something in the four-limb structure prior to language while earthquake and being fast correspond to the meaning of something. Therefore, if you say, Earthquake! or Fast!, you are a swelling and shrinking body that maintains the border surface with shock or sprinter and, at the same time, you are one of a group of people who know earthquake and being fast.

Two Selections in Language

Two selections are implemented implicitly in the indication/description. The first selection is to select what aspect of an object is focused on. In the remark Earthquake, a shock of ground is indicated but all aspects of shocks in the ground are not indicated. It is likely that non-scientists and people who are not specialized in seismology to only be concerned with the amplitude of the shock, not rhythm and cycle. Likewise, all aspects of the sprinter are not included in the remark, Fast! Only the speed of running is focused on and the sprinter's facial expression and clothing is not within our scope of attention.

The second selection, description, is really an offspring of the other possible descriptions. That is, there are many descriptions that are possible but are not actually made behind the description that is really made. In the example of earthquake!, such modifiers such as slight quake!, big quake!, or huge quake are possible even when the amplitude of shock is the focus. Thus, when the description of earthquake! is implemented, it means that the description is selected while the other possible descriptions are rejected. Similarly, the description of fast! is selected by comparison with the other possible descriptions such as Slow!, So-so, or Incredibly fast!

The as-relation that is constituted by language is characterized by the fact that the two selections are implemented concerning one aspect of the object focused on and selection of a particular description from all possible descriptors. Some context is constructed behind any linguistic expressions. The context is constructed by a series of the two selections that are implemented in a multi-layered way.

The above explanation was about a holophrase, but it is fundamentally true for a sentence including the subject and the predicate. The only difference that is important is that indication and description are already implemented by the subject alone. For example, in the sentence, "Cherry trees bloom," something is indicated by cherry trees and is described as cherry trees. Then, something as cherry trees is doubly described as bloom. Needless to say, the two selections above are implemented for each of the two descriptions. Here, only the indicated object is described along with the two selections in linguistic expressions. Consequently, it is impossible to express a world or scene as a whole as far as language is used. In Japanese, the origin of the word that means language *kotoba* is *koto-no-ha* which means just an aspect (*ha*)

of an event (*koto*).

3. Impact of Language

Expression and Evocation

Language has an important function because it impacts other people although it can express just an aspect of the world that appears for you. We will see the impact of language on others in this section.

When the indication and description were explained in the previous section, we used an example of a holophrase such as "Earthquake!" that might mean or expand to warn, "Earthquake! Protect yourself!" or "Fast!" that might mean "Fast! Don't you think so?" that have impacts on other people. But, the function of indication and description in its pure form is neutral in the sense that it has no impact on others. A scream, Earthquake! is no different from the mundane and expressionless remark, "earthquake," as far as the indication and description is concerned. However, both of the words indicate something as earthquake. How does the neutral indication and description obtain power to give impact on others? For this, it is required for the neutral indication and description itself to be given meaning, that is, be put in the as-relation.

First, it is necessary for the indication and description to be taken as the expression of what appears for the speaker. For example, the neutral indication and description such as "earthquake" has to be what appeared for the speaker so that it has impact on the listener.

Second, it is necessary for the indication and description to be taken as the evocation of some actions of the hearer. For example, the neutral indication and description, "earthquake," might be taken as what evokes the action of stopping work and escaping or as what evokes action to wait and see how situation goes. At any rate, such a meaning that is given to the indication and description makes it possible for the speaker to effect the hearer.

To sum up, language has four functions: indication, description, expression and evocation. All of these functions are needed in order for the speaker to have an impact on the listener.

Theory of the Speech Act

It is natural to assume language was born for expression and evocation. The neutral indication and description is a fundamental concept to explain expression and evocation logically, but the use of language in real settings can't be discussed without the functions of expression and evocation. The functions of expression and evocation are phenomena that include two or more bodies. It is the phenomena in which an utterance of a certain body impacts the actions of the other bodies. Impacting actions of the other person imposes some constraints on a set of the alternatives of action of the other person.

The theory of the speech act[5] regards using language as an action and focuses on its effects. Three major traditional structures of linguistic studies are phonetics, syntax and semantics. Phonetics treats language as sound, syntax analyzes the grammar of language and semantics deals with the meaning of words. But, there is one more quality of language that was overlooked and that is that using language is a kind of action that has an impact on others. The theory of the speech act provided a breath of fresh air into the commonly accepted traditional theory of language.

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[5] For the theory of speech act, see
Austin, John Langshaw (1962). How to Do Things With Words. Cambridge (Mass.) - Paperback: Harvard University Press, 2nd edition, (2005).

The theory of the speech act focuses on the fact that the use of language is an action to impact others, namely, an action to initiate or drive a set of actions that can be taken by others. For example, the speech act of asking a question restricts a set of alternatives of the hearer into a set of actions of answering the question regardless of how the hearer answers it. Of course, the hearer can answer in various different ways but his/her set of alternatives of action is directed toward answering the question in some way or another.

Three Components of the Speech Act

Then, how can we grasp the structure of the speech act? It is a complex phenomenon that consists of the following three components. First, obviously, an act of speaking something is required for speech to have an impact on other people. The act is called a *locutionary* act. Second, a certain act must be implemented in making a speech so that the speech can trigger an impact on others. The act, an act in saying something, is called an *illocutionary* act. For example, in the request, "Pass me the book," an act of asking a favor is carried out if it is expressed politely, but an act of ordering is implemented if it is expressed forcibly. An illocutionary act is gives meaning as expression to neutral indication and description when we remember the concepts in the previous section. Third, an act must occur on the side of hearer. The act, an act by saying something, is called a *perlocutionary* act. A perlocutionary act of responding to a request is carried out if the hearer says, "OK. Here you are," and passes the book to the person who said, "Pass me the book." But, a perlocutionary act of getting angry is carried out if the hearer feels insulted by the same remark because he or she interpreted it as a command rather than a request. The perlocutionary act gives meaning of evocation to neutral indication and description.

Locutionary, illocutionary and perlocutionary acts are not the ones to classify the speech act but they are components that constitute whatever the speech act is. A speech act, "Pass me the book," is a locutionary act in the sense that it is sound that follows grammatical rules and has meaning; it is an illocutionary act in the sense that it implements asking a favor or giving an order, and is a perlocutionary act in the sense that it causes a response to a request (or getting angry).

Here, let me raise a question. Who is the subject of speech act? You might answer, "Of course, it is the speaker." But, if you answer in that way, you assume a speaker who has a mind-in-a-body as a subject. You should remember that such an assumption was rejected as our starting point of discussion in Chapter 2. Our starting point was that the canopy is a subject. It is the canopy that is the subject of speech act. Then, what is the canopy that is the subject of the speech act? We will answer this question in supplement 7-4 in chapter 7.

4. Narrative Therapy

Analytical Discourse and Conjunctive Discourse

We have discussed basic issues so far such regarding what language is and how language impacts other people. We will proceed to the use of language in our daily life in this section, based on the discussion above.

When a series of words is used with some consistency, it is called discourse. Discourse is sometimes made vocally and sometimes by written characters. We dispatch and receive many discourses every day. We live in a world of discourse, a discursive world. In this book, we use three axes to classify discourse. We will use all three to clarify what discursive space is targeted by group dynamics. We will explain two of them that are required. The first axis is *analytical – conjunctive*. It concerns how two sentences are connected. An analytical discourse is one in which two sentences are connected by if ----, then ----. An example is "If this disease is

tuberculosis, then it might be infectious." In the example, two sentences, "This disease is tuberculosis" and "It might be infectious" are connected by if ----, then -----. For this connection, it is necessary that tuberculosis in the first sentence is one of the diseases that might be infectious in the second sentence. In other words, it should be that when the diseases that might be infectious have been classified into many categories, one of them is tuberculosis. In this way, classification of diseases that might be infectious, or analysis of the diseases, is required. This is why we call a discourse including if ----, then -----, analytical discourse.

In contrast, a conjunctive discourse is one in which two sentences are connected by and. An example is "He had tuberculosis **and** he was hospitalized to prevent his family members from getting infected." In this case, the first sentence, "He had tuberculosis" and the second sentence, "He was hospitalized" show a temporal sequence of events. Conjunctive discourse has more freedom than analytic discourse when the second sentence follows the first sentence. The second sentence might be "He dislikes hospitals and remained at home to get cured," for example. It is not necessary for the event referred to in the second sentence to be one of categories that constitute the event referred to in the first sentence. Instead, much more continuation is possible in conjunctive discourse and thus it is interesting to see how the continuation is made in a real discourse.

Personal Discourse and Depersonalized Discourse

The second axis for classification of discourses is *personal – depersonalized.* This axis concerns how much the meaning and the truth or falsehood of a discourse depends on who verbalizes the discourse. Personal discourse is defined as one whose meaning and truth or falsehood depends on who says the discourse. For example, your fiancée's discourse has romantic meaning that makes you happy because it is she who verbalized it. The same discourse would have a totally different meaning if it were said by a person who happened to be seated beside you in the bus. In that case, you would be repelled because the discourse was so inappropriate.

In contrast, *depersonalized discourse* is defined as one where meaning and truth or falsehood is totally disconnected from the person who says it. A typical example of depersonalized discourse is theoretical or empirical discourse in the natural sciences. Famous scientists are often introduced in textbooks in natural sciences, but the meaning of the theories they discovered would never change even if such an introduction were not included.

Discourses located somewhere between personal and depersonalized discourses, that is, *quasi-depersonalized* discourses, are important in group dynamics. Quasi-depersonalized discourse is defined as one whose meaning and truth or falsehood is substantially depersonalized among people in a field site and the researcher engaged in the same collaborative practice and among the larger population who live in the same period and culture as they do but whose meaning and truth or falsehood are constrained historically and culturally. You might find your depersonalized discourse is constrained by your culture and thus is not really depersonalized if you have dialog with people living in different cultures. Or, you might find the discourse that was written a century ago was constrained historically and thus is not really depersonalized. Still, many quasi-depersonalized discourses play the same role as depersonalized discourses in the same period and in the same culture.

Narrative

When discourses are classified by the two axes above, a conjunctive discourse that is personal or quasi-personal is named *narrative* in a narrow sense while an analytical discourse that is personal or quasi-depersonalized is named *theory* in this book, A term of narrative is sometimes used to refer to a long story such as an old folk tale or folklore but it includes a short

and familiar one like “I met him after a while and talked for a long time after cutting a class.” As for theory: it does not only include an academic theory but also a familiar one like “He never gets angry (If you talk about him, then he never gets angry).” Narratives and theories are used complementarily in our daily life. The two influence each other in the way that narrative changes theory and theory is referred to in narrative.

Narrative Therapy

Let’s include both narrative and theory in the term narrative in a broad sense. It is because the concept of narrative includes not just narrative in a narrow sense but theory in what is called the narrative approach (that includes narrative theory as a part that is introduced in this section). For the remainder of this section, narrative in the broad sense will be indicated just by narrative.

Most of our discursive space is occupied by narratives. Narratives greatly influence our semantic nature of collectivity. This means our action, including recognition, is determined by narratives. The stream of psychological counseling called narrative therapy has emphasized a change of action by narratives. You might have a question like “Is dialogue between a counselor and a client, or narratives of both, integral for any counseling. If so, what is narrative therapy?”

The major difference between narrative therapy and other therapies is that it is not aimed at clarifying the cause of psychological problems and dealing with them. Then, you may ask, “How does narrative therapy deal with problem without taking measures of discovery and resolution of the problem?”

The point is that the client is encouraged to get rid of *dominant narrative* and explore a new *alternative narrative*. Not only a client but everyone is bound or locked into a certain dominant narrative. For example, in the depopulated area that was introduced in Supplement 3-1 in Chapter 3, all residents called the decrease of population *kaso* or excessively sparse and exchanged many narratives to express their anxiety of *kaso*. They were bound by a dominant narrative that presented *kaso*. But then, a new word, *tekiso* or adequately sparse, appeared and it was used in such a situation. By this change, people who had been involved in a revitalization movement of the community could get rid of the dominant narrative and start to explore a new direction toward the *tekiso*.

A client who comes to counseling might have a problem caused by being obsessed or controlled by some dominant narrative. They tend to be bound by the narrative that the cause of problem is in their inner world and thus they should identify and cure it. Their dominant narrative can be expressed like “the cause of problem is in their mind-in-a-body,” if you depend on the terminology that is often used in this book. Narrative therapy aims at getting rid of this dominant narrative and explores an alternative narrative that replaces it.

How does narrative therapy achieve this goal? It can do so by following two characteristics.

Externalization of Problem

A dominant narrative which narrative therapy encourages a client to get rid of is “The cause of my problem is in my inner world and thus I should identify it in order to cure it.” Briefly, it is a narrative to internalize the problem, in which the cause of problem is investigated somewhere inside. To oppose to this narrative of internalization, one needs to have a narrative of externalization to transform an internal problem to an external problem.

But, here is an important distinction. Externalization does not mean externalization of the **cause**. To externalize the cause is to attribute the cause to other people or society rather than the client him/herself. You cannot resolve a problem even if you externalize the cause by saying “My parents are bad,” or “Our society is terrible.” Instead, it is necessary to externalize the

problem itself, not the cause.

Then, how can we externalize the problem, not the cause of it? Let us see an example. It is the famous case of Snooky Poo that was introduced by Michael White and David Epston[6].

Nick, aged six, and his parents visited the clinic of Dr. White, a narrative therapist. Nick suffered from a problem called encopresis. He was six years old but could not appropriately control his bowel movements. He defecated in his pants. Moreover, he painted his excrement on the wall, on the underside of a table or placed his feces in a drawer. His parents had taken him to several counselors but in vain, to no avail. The counselors were tied to a dominant narrative that the cause of encopresis should be in his mind-in-a-body. This was the case for his parents as well.

White externalized the problem itself by the following way. Dr. White proposed an idea like "Let's pretend that the problem is an act of Snooky Poo." By this, he attempted to get rid of the dominant narrative by replacing it with the narrative that the problem should be attributed to Snooky Poo, not the inside of Nick. Next, White asked Nick and his parents what terrible influences had been given by Snooky Poo. They answered with responses like "Snooky Poo isolated Nick from his friends, made it difficult for his to study and diminished his style of life totally;"and "Snooky Poo deprived his mother of confidence and tired her out her completely," or "Snooky Poo forced Nick's father to live with a secret that kept him far apart from his friends and relatives." In this way, encopresis that had been an internal problem of Nick was transformed into an external problem caused by an enemy, i.e. Snooky Poo.

Then, how did they deal with the problem that had been externalized? Here, White focused on the times in which Snooky Poo was not successful in disturbing Nick and his parents. White asked them to relate a time when each of them was **not** controlled and disturbed by Snooky Poo. This question reminded Nick of the fact that he did have several experiences in which he was not controlled by Snooky Poo. The mother remembered her experience in which she could prevent herself from feeling miserable by listening to her favorite music. The father did not remember any experiences in which he was not controlled by Snooky Poo but he came to think it might be good to disclose the acts of Snooky Poo to his friends so that he could defeat Snooky Poo. Furthermore, the parents assured Nick that the many terrible acts of Snooky Poo would not collapse their family relationship.

At the end of the counseling, White asked them how they will deal with Snooky Poo in the future by taking into consideration what they discussed in the session. Nick answered, "I won't be deceived by Snooky Poo, again. I definitely won't be his friend." The mother said, "I will not be defeated however much he tries to make me miserable." The father said, "I will share my troubles of Snooky Poo with my friends." In this way, all three changed how they dealt with the problem after it was externalized. After this helpful session, Nick was controlled by Snooky Poo only once in two weeks. He and his parents visited Dr. White again and their narratives had changed from the one about their desperate bewilderment to the one about their fight against the problem.

Attitude of a Counselor's Ignorance

In the last section, we demonstrated how narrative therapy emancipates a client from a dominant narrative, i.e., narrative of internalization. Narrative therapy pursues emancipation from not only narratives of internalization but narratives to identify the cause and resolve it. A client usually visits a counselor, believing that the cause of his/her problem is in the inner world and wishes the counselor to identify the cause and cure it. Likewise, the counselor meets the

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[6] White, Michael and Epston, David (1990). *Narrative Means to Therapeutic Ends*. NY: W W Norton & Company.

client with a sense of mission to clarify the cause in the inner world of the client and cure it. In this way, both counselor and client are bound by the narrative of identifying the cause to resolve it.

Here, we have to pay attention to two things. First, a counselor is immanent in the collectivity in which a therapy is going on. The collectivity includes not only a client in front of the counselor but family members and colleagues at the workplace of the counselor. It is never that a counselor alone is in a privileged position where the collectivity as a whole can be grasped. A counselor is also an insider of the collectivity. A counselor is never in a privileged position that makes it possible to identify the cause of problem of a client and indicate how it can be resolved.

Second, it is a client him/herself who is aware of the problem most. It is a client who is living with the problem while suffering from it regardless of how the problem is labeled by a professional expert. If a counselor believes that he/she understands the problem more than the client with the use of professional labeling, he/she is trying to cling to a privileged position. Then, what attitude is required for a counselor? It should be a modest attitude that assumes the counselor is ignorant of the client's problem. It is an "attitude of ignorance." If a counselor maintains an attitude of ignorance, he/she is in a position to ask a client to articulate and teach the counselor about the problem. In the example of Snooky Poo, the counselor asked Nick and his parents to teach him about their experiences regarding the unsuccessful control of Snooky Poo.

An attitude of ignorance also creates an equal relationship between a counselor and a client. If a counselor is assumed to be "an expert to discover a cause in the inner world," an unequal relationship is developed between a counselor, a person who observes, and a client, a person who is observed. But, in actuality, the two are equal like brothers in arms who fight against the same enemy, an externalized problem, if the problem is externalized and the counselor retains the attitude of ignorance.

Method to Draw a Dream and Narrative Therapy

Do you notice similarities between narrative therapy and the method to draw a dream or vision that was introduced in section 3, Chapter 5? The method was not only for drawing a dream but also for narrating the dream. You use a narrative to express your dream like "----- is always doing ---- with the use of ---- by collaborating with ----." Both the method to draw a dream and the narrative therapy are the ways to change a collectivity by creating a canopy of narrative. The method to draw a dream was for improving and revolutionizing a collectivity in a future-oriented way rather than clarifying and resolving problems or deficits. Drawing a Dream Method shares the same features as Narrative Therapy.

Chapter 7
A Canopy of Norm

A norm is a set of actions that a group of people assume might take place. The feeling one has about a norm is like "It is customary, not strange for such an action to occur." Alternately, when you are faced with an action taken by someone who follows a different norm, you might say, "Incredible!" and that person will feel the same way about yours.

In this chapter, we will introduce a theory on how a norm is formed. Initially, it might look occult because of the language used to explain the process. Two key terms are *melding of bodies* and *a god*. We can *become* others. The melding of bodies is a situation in which plural bodies become others' each other. A god is formed through the melding of bodies and those bodies come to hear the voice of the god and follow it. The voice indicates a norm.

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1. Norm and Meaning

Theory of Norm

In this chapter, we will introduce a theory of norm that is one of the most representative theories of the semantic nature of collectivity. You might imagine a rule such as "We must do something" or "We must not do something," when you hear the word *norm*. It is true that such a rule is included in a norm. But, the concept of norm we will introduce here also contains what you might want to call objective recognition such as "The three angles of a triangle add up to 180 degrees," or "There is a blackboard in this classroom."

Norm and meaning are two sides of a single coin as we will explain later. Therefore, the theory of norm is also the theory of meaning. We already learned, in Chapter 2, that in order for something to appear for you, something must have meaning. It is norm theory that explains how such meaning is formed.

The theory of norm stands on fundamental ideas of group dynamics that were addressed in Chapter 1. Thus, the theory of norm never accepts the common assumption of the mind-in-a-body and the dichotomy of inner and outer worlds. In this sense, the theory must be contrary to your common understanding (Osawa, 1988; Osawa 1990).[7]

Norm as a Set of Assumable Actions

A norm is defined as a set of actions that can be assumed to occur, or, more precisely, an infinite set of such actions. Assumable actions are those actions that are not incredible if they actually occur. The concept has nothing to do whether an action is liked or disliked. Also, it has nothing to do with whether an action is morally good or bad. You follow a certain norm if you perform an action that is taken as assumable regardless of likes and dislikes or moral judgment.

In contrast, a non-assumable action is one in which you cannot believe what you are seeing with your own eyes. Again, it has nothing to do with likes and dislikes or moral good and bad. There is an action that is extremely good morally but for which you have no way other than doubting your eyes. Such an action does not follow the norm.

Let's use an example. Suppose two students are chatting about their personal interests

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[7] Osawa, Masachi (1990). *Shintai no hikaku shakaigaku (Dai 1 kan)* [Comparative sociology of body (Volume 1)]. Tokyo: Keiso shobo. For mathematical basis of his theory, see Osawa, Masachi (1988). *Koui no daisugaku: Spencer-Brown kara shakai-sisutemu-ron he* [Algebra of action: From Spencer-Brown to a social system theory]. Tokyo: Seidosha.

in the class. Clearly, other students around them are troubled because of the distraction. Then, the teacher scolds loudly, “Stop chatting!” The teacher’s response is so sudden that all the students are surprised. The action of the teacher makes not only the students who were scolded uncomfortable but the other students as well. The teacher is uncomfortable, too. However, such a teacher’s action is not so shocking if it occurs in a classroom. Both teacher and students are fully aware that it is possible for such an action to occur during a classroom by some reason. Their awareness is because they had the experience of being scolded or of seeing a classmate scolded in the past. Therefore, such an action is assumable and thus an action that follows a norm.

But, what about the following instance? Suppose a teacher suddenly takes out a bottle of wine and a piece of cheese and starts to enjoy the food and drink after saying, “Let’s have a rest for thirty minutes.” Probably, the students cannot believe their eyes and say, “Shocking. Is this a joke?” The teacher’s unnatural behavior of drinking wine and eating in the classroom is not assumed and is beyond good or bad. Such a non-assumable action is the one that does not follow a norm.

Drawing a Circle of Norm

Norm was defined as a set of assumable actions in the above. It follows that indicating a norm is to draw a circle on a paper while saying, “Points inside the circle indicate assumable actions while positions outside the circle indicate non-assumable actions.” In other words, the purpose of drawing such a circle is to distinguish assumable actions from non-assumable actions.

There are limitless points in the circle. You can put a new point between two points that are closely located to each other if you enlarge the distance of the two by using a microscope. In this way, a set of assumable actions is an infinite set. When going back to the example of the classroom, the teacher’s actions such as explaining something orally, writing something on the blackboard, asking a question to a student, and students’ actions such as listening to a lecture, taking naps, and taking notes, are all assumable actions. Moreover, when you focus on a teacher’s action such as writing something on the blackboard, it has limitless variations if you see the details of the contents of writing, the way of writing and so on.

Importantly, the circle is drawn in a collectivity. You can see its primitive processes clearly in children’s play. Suppose four children get together to play baseball. They make two teams, each composed of two persons. At this point, they can play baseball with a triangular arrangement of bases, home, first and second bases. They have a pitcher and a fielder for both the infield and outfield because there are just two players for the defense. Inside at bat, one is a batter and another is a catcher. When a batter goes to first, another is both a batter and a catcher. They need a rule that a batter is out when a runner cannot go back to home plate by a hit of another. Obviously, base stealing is forbidden.

Then, another child appears. The team including the new child has to designate a catcher formally. If the catcher can’t hold a ball, a runner of the other team can steal a base. Then, one more child joins. Both teams designate formal catchers. Two more children come. The triangular arrangement of the bases is changed into a normal square arrangement, which is accompanied by changes in other rules.

In this way, a set of assumable actions change from one moment to the next. They develop a norm while playing baseball, which in turn changes the norm. This process is repeated. We develop a norm while performing an action. We live with more established norms although we sometimes have rules that change from one moment to the next like the norm of children in the above example. Then, what does the establishment of norm mean? How does a norm that changes from one moment to the next change into the established one? This will be explained

later in the section on the formation process of norm.

Two Kinds of Norms

Norms are classified into two kinds, *valuational* and *cognitive* norms. The two kinds of norm are different from each other in how deviation from the norm is dealt with. In a valuational norm, a person who deviates from the norm is pressed to follow the norm. In the norm in the example of class above, it is a valuational norm because students who chatted and deviated from the norm were pressed to stop chatting, namely, they were pressed to follow the norm. In contrast, a cognitive norm is one that does not require a deviator to follow it but the norm itself changes to admit or include the deviant action. For example, a teacher who always wears conservative clothes appears at school dressed in showy clothing like a red jacket and a white tie one day. The students do not say, "Stop from wearing such showy clothes!" although they are surprised at the teacher's appearance at the beginning. Then, they change their point of view of the teacher to include "The teacher sometimes wears showy clothing." In this example, the norm they followed until yesterday is changed by the deviant action of teacher and thus the norm is cognitive.

A term of norm is used to refer to valuational norm rather than cognitive norm in daily conversation, but please note that recognition of a fact is made by following a norm, a cognitive norm. As we showed in our example in section 2, Chapter 2, the recognition of a fact never means the grasping of the fact in the outer world in the inner world.

Meaning

Let's explain how norm is related with meaning before describing the formation of norm. A concept of meaning has special importance as was mentioned in section 3, Chapter 2. It is because anything that has no meaning never appears and thus never becomes an object of action. An action that has no objects is not an action any more. Meaning is defined as *the identity of an object for an assumable action*. The identity of object is what it, an object, is. Suppose a teacher tries to attract students' attention by hitting the blackboard loudly with an eraser. This action is assumable. Then, you ask yourself about the identity of the eraser as an object, namely, "What is it (the object)?" the answer is that it is "a thing with which we hit a blackboard and make a big sound." The answer is the meaning of the eraser as an object.

Norm and meaning are two sides of a single coin because norm is a set of assumable actions. Meaning is formed in a collectivity because norm is formed in a collectivity. Different norms produce different meanings. You should not mistake meaning for "meaning" in a dictionary. It is true that the meaning of a word in a dictionary is the identity of an object that is referred to by the word in many collectivities that include the object. But, characteristics of a collectivity are always reflected in meaning that is sustained in the collectivity. For example, a television set in one family might have a certain meaning, i.e. what is watched by all family members in the living room, but it might not have such a meaning for another family where members watch programs independently.

Atmosphere

Atmosphere is a kind of norm. Norm and meaning are two different sides of a single coin as we saw in the previous section. Meaning was defined as the identity of object, or what an object is like, for an assumable action. "What it is" is sometimes easy to express by language but is sometimes difficult to express verbally. The meaning of a chalk eraser is a thing with which we hit a blackboard and make a big sound, is easy to express verbally.

In contrast, we have objects whose meaning cannot be expressed verbally. They are objects that evoke emotions such as being attracted, averting one's eyes and so on. They evoke

emotions that are difficult to express verbally. Here, we should remember we denied the mind-in-a-body paradigm at the beginning as you saw in Chapter 2. Emotion is not in the mind-in-a-body. It is the meaning of an object. It is not something in your mind even if you say, "I have some emotion in my mind." It is the appearance of meaning as if it were the facial expression of an object. Atmosphere is defined as a kind of norm that gives an object meaning that cannot be expressed verbally. A chair shows an inviting expression as if it says, "Sit down on me." The keyboard of your computer shows you a beckoning expression as if it says, "Tap me with your fingers." A physical thing is usually taken as having a passive existence that is worked on by an active person, or body. But, a physical thing is not passive (but active) in the sense that it works on a person by its opportunities for action.

In summary, the examples of the inviting chair and keyboard are examples of opportunities for action, almost as if the inanimate objects had facial expressions. The quality of an object that allows a person to perform an action was referred to as *affordance* by a psychologist named James J. Gibson.[8] In most cases, an object that appears for us has both the meaning that can be expressed verbally and the meaning that cannot. A canopy of norm that encompasses us includes this atmosphere in most cases.

2. The Formation Process of Norm

2-1. Formation of a Primitive Norm

Body

Let's start with the explanation of formation and change of norm. A concept of *body* plays a critical role in the following theory of norm. A body was defined as a physical entity for which a proper world appears in section 3, Chapter 2. Obviously, a body is different than an individual person. A body does not have a mind. An individual person is usually assumed to have an inner world somewhere inside the skin and feel and think something there. But, a body never has such an inner world. All that happens for a body is that a proper world appears for it.

There are two kinds of bodies: melding bodies and a third body. The difference between the two is in what appears for the body. To state our conclusion first, a world or scene at a particular space and time appears for a melding body while meaning appears for a third body. You might predict which direction we are going by remembering that something that has no meaning never appears for us as was mentioned in section 3, Chapter 2. A world does not appear if you are just a melding body. It is required for appearance to be both a melding body and a third body, more precisely, a melding body that is affected by a third body. What process makes it possible? We will start explaining it now.

Becoming Others.

We have to start to explain *becoming others* prior to the explanation of a melding body because the melding of bodies is a situation where two or more bodies become each other intensively and frequently. We experience becoming others in our everyday life although the phrase, becoming others, might sound like something occult. Suppose you are seeing a play. A hero is pushed by the enemy to the extreme edge of a cliff. The convincing performance makes you feel as if you were on the edge of a cliff. This is really breathtaking. But, you return to yourself inadvertently. You are relieved to be assured that you are not on the edge of a cliff and you are merely seeing the play as a member of the audience. Now reflect on the change: who

[8] Gibson, James J. (1979). *The ecological approach to visual perception*. Boston: Houghton Mifflin.

were you until returning to yourself? You were the hero on the stage. You returned to your body on the seat.

A hero on the stage is an actual human being but similarly, you sometimes become that person on a screen in a movie theater or on a TV display. Such an image is a body as far as you identify with it. You become the other when another person you are seeing evokes a strong emotion in you. For example, suppose a person in front of you is using a large kitchen knife in an awkward manner. You are watching it in great fear and anxiety. Then, the person cuts his finger and a great deal of blood appears. “Oh, no!” you say and close your eyes as if you had cut your finger. It is because you become the person who was using the knife.

We will see another example in which you become a physical thing. You see many works that cannot be replaced with machine-produced items and thus should be made by a craftsman with skill in manufacturing factory. A craftsman manipulates his favorite tools to process something in a way that is impossible for automated machinery to create. His favorite machine is a body for him. When the machine’s condition is bad, he feels his condition is bad. He becomes the machine.

We previously learned that whether something is a body or a physical thing is determined in a collectivity when concepts of appearance, body and physical things were introduced in Chapter 2. If a body becomes X, then X is a body. In the example in Chapter 2, we used the example of a girl who loves her stuffed toy as if it were her younger sister. The toy is a body in the collectivity including the girl and the toy. But, it is a physical thing in the collectivity including the toy and her parents who bought it as a Christmas present. The parents never become the toy.

Melding of Bodies

We can define the melding of bodies, now. The melding of bodies is a situation in which two or more bodies become each other intensively and frequently. For example, when you and your friend are talking with each other and you cry or laugh in sympathy, your body and your friend’s body are melding. That is, you become your friend; you’re your friend becomes you intensely and frequently and then you talk and hear each other.

In a sport such as football that includes a quick team play, plural players demonstrate a series of performances that constitute streaming motion. Such a performance is possible with the melding of bodies in which one player predicts where the ball goes by becoming a body of another player and running in the direction of the ball by returning to his own body. In the melding of bodies, plural bodies become each other intensely and frequently. Suppose three bodies, A, B and C, are involved in the melding of bodies. A body, A, becomes B and C many times. This is true for B and C. In such a situation, A, B and C might better be called three different positions rather than three different bodies. It is because it is possible for two bodies to be in position A while one body is in position B. Each of the tree bodies puts itself on each of the three positions repeatedly.

Communal experiences beyond a difference of positions have more importance than different experiences in each position when each body experiences each position many times. The communal experiences are crystallized into a norm. Suppose three persons, A, B and C are melded with each other while surrounding beautiful roses that have a sweet smell. The ability to see certain petals and how bright they are depends on the position of the viewer. The temporal change of appearance in flowers is different from one position to another. But, the roses are beautifully pink and smell sweet regardless of the difference of the viewers’ positions. The communal experiences that are produced by the melding of bodies distinguish a set of assumable actions from a set of non-assumable actions. A set of assumable actions includes actions such as saying “How sweet!, or “What a beautiful pink color!”, smelling the roses and

so on while a set of non-assumable actions include saying “What a bad odor!” or “Black!” crushing the flowers in one’s fist and so on. In this way, a norm is developed from the melding of three bodies.

The concepts of norm and meaning are two sides of a single coin as was already described. Something in front of them is not just something when a set of assumable actions become definite. It is something like “what smells sweet,” or something like “what they want to smell.” In other words, something acquires the meaning of what smells sweet or what they want to smell.

A Third Body

One of the most eminent characteristics of the norm theory in this chapter is that a concept of a *master* of norm is introduced, or a master that indicates a set of assumable actions to play an important role in the theory. Let’s explain. A set of assumable actions is made by crystallization of communal experiences of plural bodies melding with each other. Importantly, it is exclusively communal experiences that are crystallized into a norm. Let’s go back to our examples of three bodies: A, B and C. Communal experiences are a part of the experiences of A, which also include unique experiences in A. This is why person A cannot be a master of the norm that is produced exclusively by the communal experiences. This is the case for B and C. A master of norm should be different from any of the three bodies.

A master of norm is a body who represents communal experiences but is different from the three. Therefore, a master cannot be a third body, like a third person, the master must be someone who is not any one of the three. In the introduction to this chapter, a master of norm was described “a god.” It is not the same God that people describe in monotheism. In Japan, we have gods everywhere as we often say multitudinous gods. A person who made a great contribution to our society becomes a god sometimes; and strange as it seems, even a huge rock or tree can become a god. You can take a third body as a prototype of such Japanese gods.

Let’s sum up the above information. Norm was defined as a set of assumable actions. The set is indicated by a third body. Therefore, formation of a norm is paralleled with the formation of a third body. A third body is born from the melding of bodies.

Example of a Third Body: A Fear of Strangers

We will see a couple of examples of a third body. In the examples, we will examine how a third body is characterized in the primitive stage soon after it is born from the melding of bodies. We bear and grow third bodies one after another as we become members of our society and experience the melding with various bodies. Some third bodies develop further while some third bodies decline (as we will describe later), but generally, the more you grow, the more third bodies you develop. Therefore, it is difficult to observe the effects of a third body in a primitive stage in an adult that indicates a single norm because an adult has already incorporated many third bodies. Conversely, it is easy to observe the effect of primitive third bodies clearly in children.

The first example of a third body is a phenomenon called a fear of strangers. It is also called the eighth-month fear because it is observed when a child becomes around eight months old. A baby will cry loudly when she is hold by strangers although she has always smiled at whoever holds her until now. This demonstrates that a baby has become able to distinguish those bodies with whom she melds with in daily life from those with whom she doesn’t.

A baby melds with particular adults such as parents and other family members in various situations every day. She melds with these people while eating something together, taking a bath together, having her diaper changed and so on. In such melding, third bodies are born one after another. Importantly, a primitive third body that is born from the melding of bodies and

thus has not been developed very much overlaps with a particular body that appears for you. But, by definition, a third body never appears for you because it is a body like a god. However it overlaps with particular bodies such as father or mother. In other words, a third body is something like an aura or a halo of the person with whom a third body overlaps. In this sense, we can say a primitive third body is visible.

A fear of strangers is evidence that shows third bodies have been born by the frequent melding of bodies between parents and their child. A small child melds with her parents every day and bears many third bodies, most of which overlap with her parents. That is why bodies of father and mother become a special body for their children. Space, in which the effects of a third body can cover, space in which a third body can indicate a set of assumable actions, is called *the sphere of influence of a third body*, or *sphere of influence of a norm*. Overlapping of a third body with a particular person implies that the sphere of influence of the third body is the same as the space in which the particular person appears for the child. Plainly, the sphere of influence of a third body is the place in which a child can see the particular person and can hear his/her voice.

A third body cannot extend its influence outside the sphere. Here, you should remember that norm and meaning are two sides of the same coin and something will not appear for you if it has no meaning. If so, the outside of the sphere of influence of a norm is the space where you have no meaning that is combined with the norm. You go backward to nothingness as much as you lose meaning by going beyond the sphere.

For a child, the space in which her father or mother does not appear for her is outside the sphere of influence of norms that are indicated by the third bodies who overlap with her parents. She cries loudly because she is afraid to lose meaning and return to nothingness by being brought to the outside of the sphere of influence.

Example of a Third Body: "Tell me to say 'I'm done, thank you'."

The next example is introduced in a specialized book in developmental psychology but is also a case that I myself experienced when my older son was three years old. When a child reaches the third or fourth year, he/she can eat something by using a spoon, but he/she does not concentrate on eating. My son looked as if he was playing with rice and soup by stirring them with a spoon while eating. My wife and I told him several times to eat neatly but he did not follow our instructions. After a while, I left the table and started reading a newspaper on the sofa. My wife also gave up being with my son and started washing dishes.

It was at about that time he said, "Mom, tell me to say 'I'm done, thank you.'" How strange that such a statement was coming from him at so young an age! He understood what he should do. I was so mystified that I looked at my wife. She also looked puzzled. But, then she addressed him and said, "Say 'I'm done,'" because he had asked her to do so. Then, surprisingly, he was able to finish his dinner quickly.

It seems that norm regarding a meal in my family was formed by the melding of my son and his mother because I (his father) was absent in the daytime and often returned home late at night. Third bodies that indicate those norms overlap his mother's body. Therefore, her voice was not merely a voice but the voice of a third body as far as eating was concerned. My son could perform an assumable action, namely, saying "I'm done," when he heard a voice of the third body and he was influenced by it.

We saw two examples of small children in the above, but this is the case even for adults. An adult exists in many more spheres of influence of norm than children. Also, the norms are much more generalized with a great deal less overlap with a particular body. We will explain this later. Nevertheless, when you say to yourself, "I have to do it in this way," or "I have to be careful with this," while doing your work, you might be reminded of the face of the person who

taught you in the past (e.g. your past supervisor, your senior, your mentor.) or you might feel as if you were hearing the voice of that person. If so, the person is a body with whom a third body overlaps.

Norm and meaning have two important natures called *infiniteness* and *logical priority*. The two natures are referred to as *ideality* of norm and meaning. For an explanation of this, see supplement 7.1 at the end of this chapter.

Self-reference

We explained the process in which a primitive norm is generated through the melding of bodies. Then, what route does a primitive norm or a primitive third body follow thereafter?

The process in which a set of assumable actions is generated from common experiences in the melding of bodies constitutes a structure of *self-reference*. A term of self-reference might sound difficult but it is not. Let's explain it plainly.

Suppose there is a set of remarks that I can express in a certain situation. The set includes limitless remarks such as 'Good morning," "It's beautiful weather," and so on. "But, some remarks such as "All I say is true (I never tell a lie)," or "All I say is untrue (I am a liar)" need special attention. The remarks are characterized by referring to a set of remarks as a whole which they themselves belong to.

The Liar's Paradox

Referring to the set as a whole which one belongs to is known as referring to oneself. That is why such a structure is called self- reference. To sum up, self-reference is the structure in which one remark refers to the set of remarks as a whole to which the remark itself belongs.

Let's start with an example of the remark, "Everything I say is a lie," as one of the easiest ones. This is the famous *paradox of the liar*. Let us believe his remark because he actually says "He is a liar." This means all remarks in the set of his remarks are a lie. Then, it follows that his remark, "I am a liar," should be a lie. He might be saying, "I am not a liar." We become puzzled as to whether or not he is a liar. This is also true for the remark, "All I say is true." You might have a doubt and ask yourself, "Why did he say such a thing? He may possibly not tell the truth all the time." Again, it becomes ambiguous whether he is honest or not. In other words, it becomes possible to have both the possibility of his honesty and the possibility of his dishonesty.

As mentioned above, a self-referential remark is ambivalent. A remark, "All I say is untrue," looks like one is either saying "I am a liar," or "I am not a liar." In this way, a self-referential remark, "This is A," has ambivalence in which this is A and, at the same time, this not A.

Ambivalence

Here, let's go back to an issue of the relation of the melding of bodies and the norm. Experiences in the melding of bodies are not merely experiences but generate a norm. The experiences and the formation of a norm are made simultaneously. This implies that experiences in the melding bodies generate a set of assumable actions that includes the expressions themselves. Thus, the process in which norm is generated by the melding bodies takes a form of self-reference.

Therefore, any experiences in the melding of bodies should be dualistic and ambivalent. Roses in front of you smell good and, at the same time, they don't smell good. They are beautiful and pink and, at the same time, they are not. Please note that we are not talking about someone who has mental problems in recognition and judgment. We are talking about the general process of formation of norm. Ambivalence is inevitable when a norm is generated by the melding of

bodies.

But, fortunately, we live in a world that is not ambivalent although sometimes it is difficult to make a decision. We live in an almost non-ambivalent world. We seldom are faced with the kind of ambivalence such as something is a book and, at the same time, it is not a book. This implies ambivalence is suppressed. How, then, is ambivalence suppressed? How does an almost non-ambivalent world become possible? We will answer this question while explaining what route a norm talks after being born as a primitive norm in the following.

2-2. Development of Norm

Collapse or Develop

The sphere of influence of a primitive norm is small so that it includes bodies that have melded with each other and generate it. The sphere of influence often encounters a body that is not included in it. For the body, a set of assumable actions in the sphere is not applicable and the body is an alien. No contact might happen even when two bodies unfamiliar to each other are located closely. But, what happens if the two bodies come in contact? There are two possibilities. One is that the sphere of influence collapses by its contact with an alien body that has no hesitation to show a non-assumable action. The other is that an alien body becomes included in the sphere of influence because the strange body is melded with a body in the sphere. The sphere is expanded if it includes the alien body. This is referred to as development of the sphere of influence. The encounter with an alien body puts the sphere of influence at the crossroads, collapsing or developing.

Contact of two different spheres of influence is more drastic. It is possible for the two to experience nothing even though they are located closely. But, they both stand at the crossroads if they have contact with each other. Regarding collapse: one of the two might collapse or both might collapse. Then, what happens in development of a norm?

Transmission of Norm

A norm is sometimes transmitted from one sphere to another. Suppose a norm is transmitted from sphere A to sphere B. There are three kinds of media that transmit a norm. The first one is a body. This is a situation in which a body reflects the norm of the sphere A is transmitted to B. You can see an example in a company that revives under a foreign president or in a public organization that changes due to recruitment of a president from those who had the experience of working in a private company. The foreign president and the president from a private sector have been in the sphere of influence of a foreign company and private sector, respectively. Superficially, you might interpret the changes as the influence of an individual person but this is not true. The changes result from the transmission of norm by the person as a form of media. Generally, a norm changes more or less when you have a new member in your group. The change is likely to be taken as the influence of the new member but a new action the new member takes should have been an assumable action in the group which the member belonged to before. Thus, such a change of a group by having a new member should also be regarded as transmission of norm by a body as a type of media.

The second kind of media for transmission of norm is a physical thing that plays an important role to sustain the norm. Suppose a computer is introduced in a workplace where it has never been used. A physical thing, a computer, transmits a norm that has not existed in the workplace. Many actions there such as communication, data management, or ways to spend a rest period, might be changed. Those actions are quite new for the workplace but they have belonged to a set of assumable actions among people who have already used a computer.

The third kind of media for transmission of norm is language. Please listen carefully to

how you as a patient are called by doctors, nurses and clerical workers when you go to a hospital. In the Japanese language, people are addressed with suffixes, a word in addition to their first name. These suffixes include -*san*, and -*sama*, which are added to the family name. Sama is a respectable form of expression, for example used for the elderly people. San is given as a gesture of being polite to the other person. We sometimes use san to younger people. In many hospitals, you are called *kanjya-sama* (*Kanjya* means a patient in Japanese). Probably, such naming started to be used and then was transmitted from one hospital to another. A linguistic expression of kanjya-sama makes actions assumable that respect patients to the extent that the naming of *kanjya* or even *kanjya-san* cannot attain.

Difference from Exchange

Importantly, transmission of norm by the three kinds of media is different from exchange including an unequal exchange. Exchange is not possible unless the norm is already shared on the both sides, or unless the two sides are already in the same sphere of influence of the norm concerned. For example, when you buy a book at the book shop, a book and money are exchanged. In this, it is assumed that a book is an article of commerce at the beginning. Moreover, a scale of the amount of money is shared among a seller and buyer. The book and the money you pay for the book are plotted on the same point on the scale. When you are deceived by a master of a secondhand bookseller and buy an extremely expensive book, the old book you bought and the money you paid are plotted on two different points on the scale. But, even in this case, the scale of money is shared on the both sides.

We experience exchanges without money. Suppose an elderly person walking in front of you suddenly stumbles over a stone. You run up to the person and help him up. He appreciates you for your kindness, saying “Thank you very much.” This is an equal exchange. A scale of favorableness of action is already shared on both sides although it is not easy to express numerically like the gradations of value when dealing with money. Your action to help him and his words of appreciation are plotted on almost the same point on the scale. But, he might depart as if he were saying, “Leave me alone.” This is an unequal exchange. Your action and his response are plotted on two different points on the scale. But, again, it is important that the same scale, or the same norm, is shared between the two.

Transmission of norm is quite different from exchange, equal or unequal. A form of media reflects a norm of the transmitter but is irrelevant for the transmitted regardless of which media is used. The side of possible transmission might show no interest in the media. The two sides do not share the common scale on which a point of media is plotted. You might have difficulty in understanding the transmission of norm because it is different from the types of exchanges you are familiar with in daily life.

Transmission of norm is unilateral in contrast with exchange that is bilateral. If the giver of media wonders if someone receives it, or if someone is pleased to get it, this becomes an exchange, not transmission of norm. Also, if the receiver appreciates it and says “Thanks!,” this becomes an exchange. In transmission of norm, the giver leaves a media as if he says, “I will leave it because I want to do so. I am not interested in what happens,” without any concern about whether someone is interested in it and whether someone receives it. The receiver takes the media as if he says, “I like it. It’s mine,” without expressing any appreciation for the giver. This is a unilateral transmission of media. In this way, the giver leaves something without any concern about a receiver while the receiver makes it his/her own without any appreciation for the giver. Transmission of norm is a combination of selfish leaving something with selfish obtaining something. Thus, one is not always sure that such a combination always occurs. It is like a gamble in the sense that success or failure is determined by chance and also it is like a fight in the sense that a harmonious and stable relation between the two sides is not assumed in

advance and the both sides behave as if they are selfish.

Effects of Norm Transmission

When media is successfully transmitted from the sphere of influence, A, to another sphere, B, a norm that is represented by the media is transmitted from A to B. If this happens, the sphere, B, becomes included in the sphere, A, as shown in Figure 7.1. The sphere, A, has become larger so that it contains B. In contrast, bodies in the sphere, B, have started to follow the norm of A even if they continue the same actions as they did. Here, remember norm and meaning are two different sides of a single coin. Starting to follow the norm A in addition to an original norm B, actions of bodies in sphere B obtain new meanings that are combined with norm A. In this way, unilateral transmission of norm inscribes its impact on the sphere that received a new norm. We cannot see such impact inscribed in an exchange.

Figure 7.1 Transmission of Norm

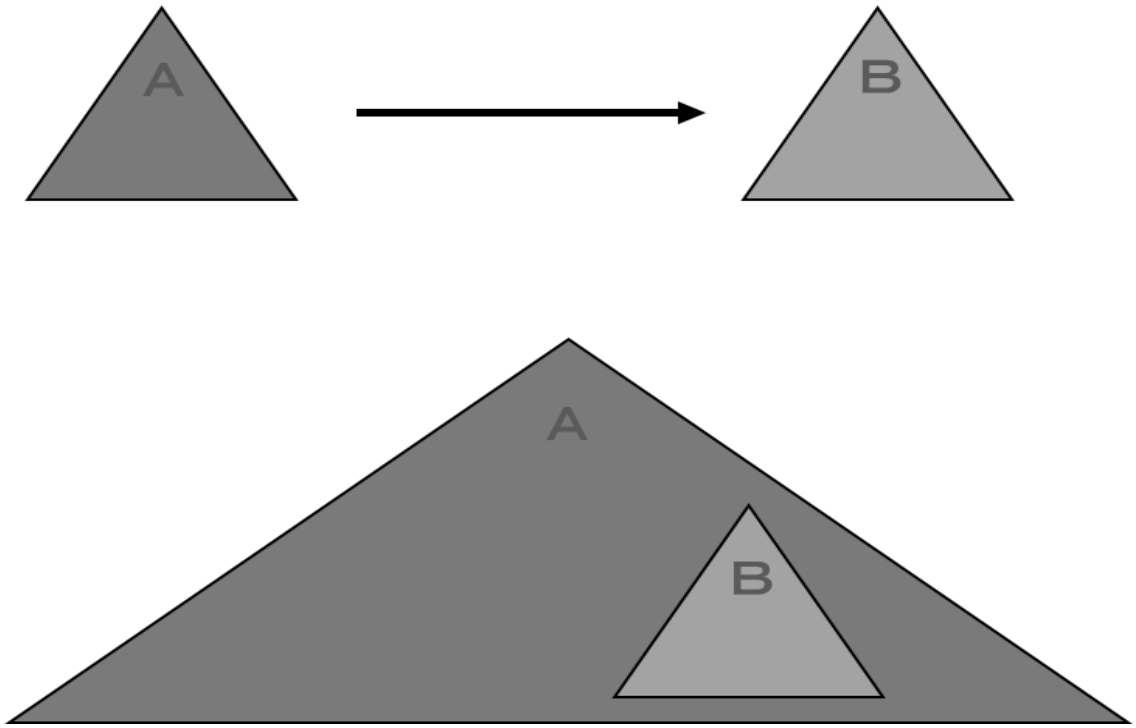

Figure 7.1. The sphere of influence (A) becomes large enough to include the sphere of influence (B) as a sub-system when the norm A is transmitted to B.
In other words, norm B becomes a specific type of norm A that is more general than norm B

Norm transmission also inscribes impact on the giver. Norm A indicated a set of assumable actions only for bodies in sphere A before the norm was transmitted to B. But, sphere B became included in A when transmission took place. This implies that norm A had come to indicate a set of assumable actions for bodies not only in sphere A but bodies in sphere B. To make this possible, norm A should have been more generalized than before. It should have been generalized to the extent that it can be applied to bodies in sphere B, at least.

It might be difficult for you to understand norm transmission in the above without concrete examples. In supplement 7.2, an example of norm transmission will be introduced that I myself experienced in a revitalization movement in a certain depopulated community. I suggest that you read it before going ahead.

The Chain of Norm Transmission

Norm transmission in its pure form is a combination of a giver discarding something and the receiver taking it without any acknowledgement or appreciation for the giver. Such a combination does not occur easily although it is not impossible. It rarely occurs without a face-to-face situation in which the two meet and assure possibility of giving/receiving something. But, it is inevitable for a face-to-face situation to have an element of exchange, which makes it impossible for norm transmission to occur. In a face-to-face situation, an exchange of remarks or eye contact is likely to occur. An example would be “I will leave it here, so that you can get it,” “OK.” Or, a verbal or non-verbal exchange of a remark might be included like “I’ve got it,” “I see.” When this occurs, it is not a pure form of combination of giving and receiving any more.

How is it possible to have a pure form of unilateral transmission? It becomes possible when a chain of transmission is prolonged. That is, media is transmitted from one sphere to another like from sphere A to B, from B to C, from C to D……. The prolongation forms a nested structure of spheres as shown in Figure 7.2. Bodies in a certain sphere follow norms of the spheres that have already been included in the chain of transmission prior to that sphere, although they maintain the same actions. And, the sphere changes the nature of norms of those spheres that are included after the sphere.

When a chain of transmission is prolonged, an element of exchange that is brought about by face-to-face interaction with a body in a sphere immediately anterior or posterior to a

Figure 7.2. A Chain of Unilateral Transmission of Norm

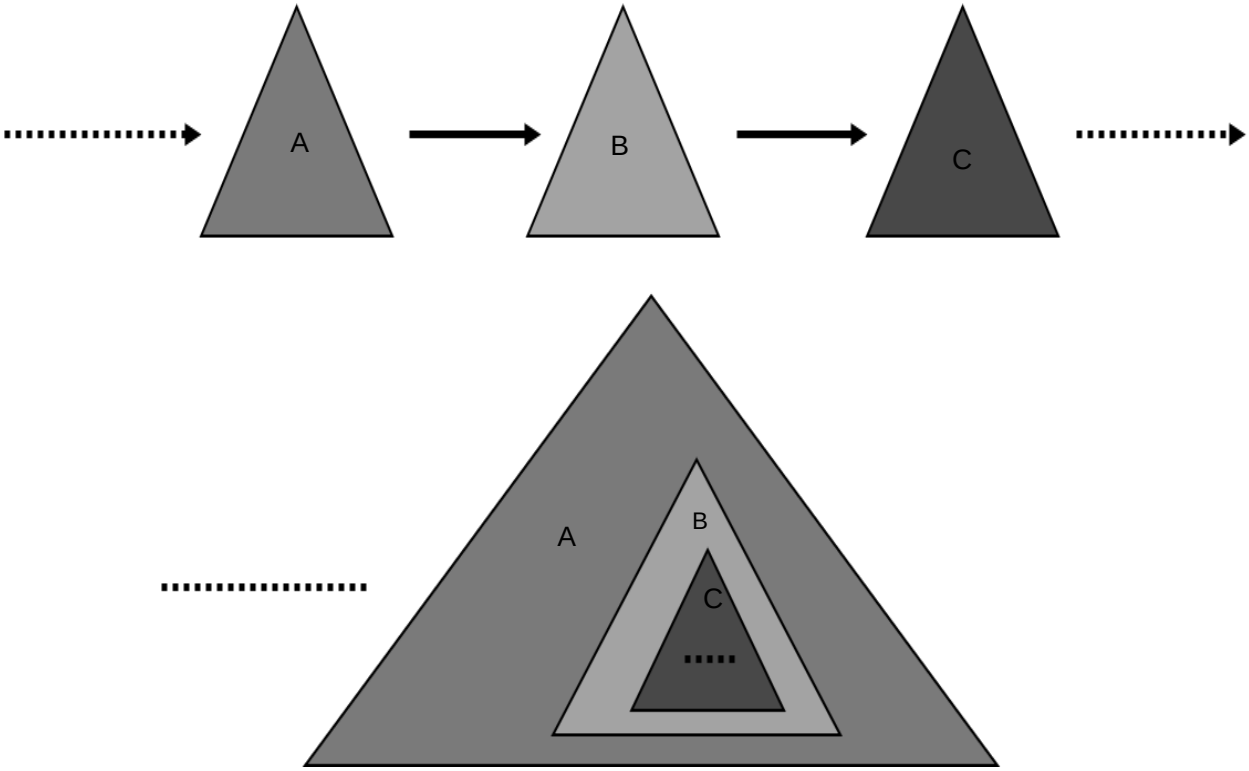

Figure 7.2. When norm is transmitted from the sphere of influence, A, to B and then from B to C, norm B becomes a specific type of norm A and then norm C becomes a specific type of norm B. But, this figure also shows that some norm is transmitted to A after many transmissions of norm have already occurred, which is shown by an arrow of broken line that is directed to A in the upper half of the figure. A broken line at the left of the largest triangle in the lower half of the figure shows norm A has been already become a specific type of many other norms. Furthermore, norm C is supposed to be transmitted to other spheres one after another, which is shown an arrow of broken line starting from C in the upper half of the figure. A broken line inside the smallest triangle shows many norms are supposed to become specific types of norm C in the lower half of the figure.

certain sphere becomes irrelevant. It is because a norm transmitted to a sphere including you came from far away and thus a body in the sphere immediately anterior to your sphere just hands you the norm that has come from far away. Even if you make some exchange with such a body, it is not important. Similarly, transmission to the next sphere is just a step toward far away and thus a body to whom you hand a norm just happens to be next to you. The exchange you might have had with such a body is not important, either. In this way, prolongation of chain of norm transmission makes an element of exchange with a body in a sphere immediately anterior and posterior to your sphere irrelevant. In other words, an element of exchange no longer becomes a problem.

A Third Body in the Second Level

A third body is generated again when a chain of norm transmission is prolonged. We have already described a process in which a third body is generated by the melding of bodies. When we call it *a third body in the first level*, the third body we see here is in the second level. A third body in the first level represented communal experiences of melded bodies but differed from any of them. The same logic was used, again. A third body in the second level represents all spheres in a chain but differs from any third bodies in the first level located in the chain. The third body is like a master of the entire chain because it represents the entire chain. It is like a place from which a long chain starts and also like a place to which the chain is directed. A third body in the second level is generated as a body that is both a starting point and an ending point of a chain of transmission.

A two-layer structure is constructed when a third body in the second level is generated as is shown in Figure 7.3. It is like an organization that has two layers of management. Melding bodies are in the sphere of influence of a third body in the first level (like, under supervision of department manager). But, at the same time, they are in the sphere of influence of a third body in the second level (like, under supervision of a president) because third bodies in the first level are in the sphere of influence of a third body in the second level.

We saw the process of development of norm; (1) the melding of bodies, (2) a third body in the first level, (3) prolongation of a chain of norm transmission, and (4) a third body in the second level. Importantly, it is not that you finish (1) and proceed to (2). The stage (2) means that you hear the voice of a third body, (2), while melding with other bodies, (2). Similarly, when you get to the stage (4), you hear the voice of a third body in the second level in addition to a third body in the first level while melding with other bodies.

Figure 7.3. Two-layer Structure of Third Bodies

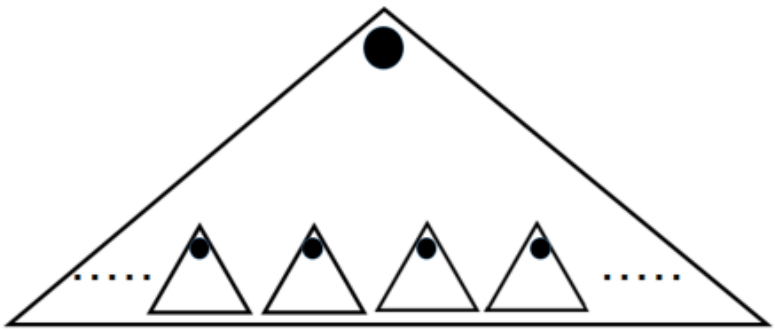

Figure 7.3. How the chain of unilateral transmission of norm is prolonged. The chain of unilateral transmission of norm is prolonged among many spheres of influence, represented by small triangles in this figure. A third body of the second level is constructed as if it would be a point from which the chain would have started and to which the chain would reach finally. When the third body of the second level is constituted, two-layer hierarchical structure is formed in which original spheres of influence of third bodies of the first level (a small black circle in each small triangle at the bottom) are under control of the third body of the second level (a large black circle at the top of large triangle).

In a real society, various spheres of influence, large or small, are complicatedly connected with each other by norm transmission beyond simply proceeding from (1) to (4). The connection becomes complicated by two different processes of norm transmission.

Complication of Norm Transmission (1)

First, norm transmission becomes complicated by the process in which transmission is made from one sphere that appears in a later stage in Figure 7.2 to another sphere that appears in an earlier stage. Sphere A comes to include B that then comes to include C by norm transmission from A to B and B to C. Then, what happens if norm is transmitted from C to A? A norm of C stands on norms of A and B because the sphere C has already been included in the spheres of A and B. Then norm C is transmitted to A which come to stand on norm C. This process cannot be drawn by simple linear figures such as Figure 7.1 and 7.2.

Let's consider an example. We will refer to supplement 7.2 at the end of this chapter which I already suggested you to read. The supplement described a case in which, in a certain depopulated community, two leaders who rose to action for revitalization of the community built several log-cabins in the deepest part of a village in the mountains and then gave the cabins to the villagers by free. The villagers started to manage the log-cabins in their traditional way of village management called *so-goto* which means obligatory work in which all villagers should participate. But, the so-goto for running the log-cabins was open for outsiders in contrast with a traditional so-goto that is only for the indigenous villagers themselves. In other words, they began to run the log-cabins as a new so-goto.

Now, we can continue the story. A concept of new so-goto gave an important suggestion to the two leaders who built the log-cabins. They had one suggestion like "Oh! We don't have to stick to a new business by a new method. It is enough to instill a new mentality into a traditional activity such as so-goto. The case can be summarized from the viewpoint of norm transmission. First, a new norm for revitalization of the community is transmitted from the two leaders to the head of the village through the medium of log-cabins. Second, a norm that was developed by the villagers concerning how to run the log-cabins was transmitted from the villagers to the two leaders by a medium of concept or a ward of 'new so-goto.'

Complication of Norm Transmission (2)

A chain of norm transmission also becomes complicated by transmission from a sphere in the first level into the second level. The resultant structure cannot be shown in a simple linear figure because a sphere in the first level that has already been included in a sphere in the second level comes to include the sphere that has included itself.

We will learn about another example in a large industrial organization. In such a large organization, different norms are formed in each department while norms are transmitted from one department to another. Also, spheres of influence of norm in a department are included in a larger sphere of influence in which a third body in the second level, corresponding to top management, is developed.

The term, a *horizontal expansion*, is sometimes used in an industrial organization in Japan. It means that a desirable activity in one department is introduced to other departments and thus is expanded to other departments. Certainly the term looks adequate because it indicates expansion from one department to another in the same hierarchical level. But it is not if you observe it carefully. In fact, they have a goal that an entire company tries to achieve. Then, when top management finds out a department that realizes the goal effectively, top management encourages other departments to follow it. Therefore, in order for the horizontal expansion to work, a norm developed in the department needs to be transmitted to top management. In other words, a norm must be transmitted from the sphere of influence in the

first level, i.e., the department where an effective activity was developed, to the sphere in the second level, i.e., top management.

Norm is sometimes transmitted from a sphere in the first level to another sphere in the second level in which the sphere is not included. An example is that a unique activity in a certain small village (sphere in the first level) in some region attracts a leader from a different region (sphere in the second level). Also, it is even possible that norm is transmitted from a sphere in the first level to a sphere in the first level but in a different sphere in the second level.

Concealment of Ambivalence

We saw processes that make a chain of transmission complicated. In a real society, a norm is transmitted in the opposite direction to an original linear route. A third body in the second level determines the voice of a third body in the first level but, at the same time, the former is determined by the latter. Inclusive relations among spheres become complicated as routes of norm transmission become complicated. Complication of inclusive relations among spheres implies complication of dependence relations among norms. Plainly, many norms become dependent on each other and thus a certain norm cannot move as freely as it wants. By this, ambivalence of norm, that is, oscillation between X and non-X, is suppressed. In this way, ambivalence that is apparent in a norm in the first level is concealed or becomes latent gradually. Here, please remember about the overlapping structure of multilayered canopies that we discussed in section 4, Chapter 2. The above explanation is on nothing other than processes in which there is an overlapping structure of multilayered canopies of norm.

Communication

If the concept of a society is taken as a system of communication, communication is not transmission of information from one individual to another or from one group to another. Such information transmission is the work of a machine such as a computer, not the work of a human or a human group.

First of all, communication means making something communal, literally. It is developing a communal sphere of influence of a communal third body and putting oneself in it (when you use the concepts of norm theory). Communication of humans or human groups is characterized by one of the following three or a combination of them. (1) The melding of bodies: This is a situation in which bodies become each other intensely and frequently, a more direct form than any other forms of communication. (2) The generation of a third body: Bodies follow communal recognition of fact (cognitive norm) and communal recognition of value (valuational norm) when they generate a third body and become in its sphere of influence. Such a communal recognition is not attained by transmission from one person to another but it is attained by putting oneself in the same sphere as other persons. (3) Norm transmission from one sphere to another: Change that occurs in a group looks as if it is due to the effect of a new member but that is misleading. The new member came from a certain sphere of influence and transmits that sphere's norm in the new sphere.

3. Formation Process of the Mind-in-a-Body

Effects of Expansion of Sphere of Influence

What happens if a sphere of influence can be expanded successfully? First, the expansion develops a situation in which you feel you are in the sphere wherever you are and whenever it is. Second, the contents of assumable actions indicated by a norm change from a concrete to a more general one so that the norm is applicable to more different bodies that have been included in the expanded sphere. Third, the overlap of a third body with a specific body,

such as an example of the relationship between a mother and her child in the above, is reduced more and, in this sense, a third body becomes more invisible. To sum up, the expansion of a sphere of influence brings about a situation in which an invisible third body keeps looking at you and giving a voice of norm wherever you are and whenever it is. Based on this, we are prepared to explain how the concept of mind, a mind-in-a-body, is constructed.

However, we need to distinguish two different levels of mind-in-a-body. One is a concept of mind that is constructed in the process of life history. This corresponds to a mind that is referred to when you say you have a mind in your body. Probably, such a concept of mind has been long held since humans appeared in this world. In contrast, another concept of mind is constructed in the process of social history. It was developed in the modern period in which individualism grew. It is referred to as an important place where judgment and thinking is made. We already saw (in Chapter 2) that we, Japanese, did not have such a concept of mind until the beginning of modernization in the late 19th century.

A Shirt Pocket Effect of a Third Body: Life Historical Level

We will start with a concept of mind that is constructed in the process of life history. More and more norms are generated by both parents and their children who meld with each other in various situations. The third bodies that contain those norms are still in the primitive stage and thus overlap with a specific body: father or mother, for example.

However, norms concerning actions that are integral for children's survival develop much more rapidly than other norms and the spheres of influence of these norms expand at a high rate. Typical examples are such actions as learning to eat foods, drink liquids, appropriate behaviors dealing with bodily functions related to excretion, avoiding danger and so on. Such actions are so important that parents tend to respond to them much more sensitively and thus meld with children much more intensely and frequently than other actions. These more intensive and frequent melding actions expand the sphere of influence and bring about a situation in which the children are always in the scope of third bodies that gives a voice of those norms.

A concept of mind in the level of life history is an effect that is caused by the situation above. Hearing a voice of the third bodies anywhere and anytime is substantially the same as moving with the third bodies in your shirt pocket. You hear the voice from your shirt pocket as if you are walking with a small music recorder in your shirt. How do you feel in such a situation? You feel as if you were hearing a voice indicating an assumable set of actions from your shirt pocket which is very close to the place where your mind is believed to be located. This is a situation in which you follow a voice of your mind.

But, the voices are still restricted to the actions that are required for a child's survival. The voice can be heard anywhere and anytime but it does not concern anything other than survival, yet. When the restrictions above are eliminated to a large extent, a concept of mind in the historical level is born as an effect of a situation in which you hear the voice of norm that indicates assumable actions anywhere, anytime and for any things.

A Shirt Pocket Effect of a Third Body: Social Historical Level

In the modern period, norms were developed that had a broader sphere of influence, i.e. in a nation, beyond small villages and towns in various social domains such as politics, economy, religion, education and so on. It follows that a shirt pocket effect of third bodies became eminent in diverse judgments made in those political, economic, religious and educational sectors. This social historical level resulted from a situation in which a third body gave a voice of norm for whatever larger actions took place beyond small social groups.

In this way, a shirt pocket effect of a third body became highly influential. A mind

occupied a special position where important judgment and thinking were carried out. The position is a concept of mind in the historical level. Individualism that was developed in the modern era is an image of a human who moves by such judgment and thinking in one's mind or, moreover, a moral value that insists that a human should move by one's own judgment and thinking without being influenced by other people passively.

We are encompassed by many canopies. They include a canopy in which a mind-in-a-body at the level of a life history is taken for granted and a canopy in which a mind-in-a-body at the level of social history is taken for granted. This is why any actions that are manipulated by canopies appear for us as actions that we performed because we wanted to, or as actions that we did because we thought we should.

We learned about the origin of a mind-in-a-body in the above. This is the task that I promised to resolve in Chapter 2. Then, does a norm continue to develop limitlessly? Before answering this question, we will revisit two concepts with which we are already familiar. One is a concept of collectivism/individualism and the other is the concept of the individual.

Collectivism and Individualism

In traditional social psychology, both collectivism and individualism are defined in terms of thought and judgment made in a mind-in-a-body. Namely, collectivism is defined as the tendency to behave by taking other people into consideration in a mind-in-a-body, while individualism is defined as the tendency to behave by putting oneself as a priority whose thought and judgment is a mind-in-a-body over other people. It must be clear that the definition is bound by a fixed idea of the mind-in-a-body.

We will redefine collectivism and individualism depending on the norm theory in this chapter. Individualism is established when a third body at a societal level is developed to the point where it is almost at its limit and a shirt pocket effect of a third body is enhanced so enormously that an idea of mind-in-a-body is respected to the maximum level. Individualism is a concept of a human, i.e., a way of appearance of a human that is prevalent in such a society.

In contrast, collectivism is established when the sphere of influence of a third body is restricted to a small societal space such as an industrial organization, a community, or even a country and a third body remains overlapped with a specific body and thus remains visible to some extent. A shirt pocket effect of a third body remains moderate and thus a concept of a mind-in-a-body is only mildly emphasized. Conversely, the shirt pocket effect of a third body is an important criterion of one's decision regarding how to behave when a specific person who is overlapped with a third body such as a president moves or how people under him/her move.

You might think that collectivism is on the way to individualism, or is not as highly developed as individualism. But, this is not true. Development of norm is similar to development of a human. It is simplistic to assume that more development, getting older, is better. Children have goodness as children and this is the case in middle aged and elderly people. Furthermore, collectivism is faced with a turning point as we will see in the next section. That is, individualism is directed to the phase in which a primitive third body should be generated through the melding of bodies.

A Concept of Individual

Here, we will put a concept of the individual in order. A concept of an individual body at the biological level should not be overlooked (although it has not been discussed so far in this book). Needless to say, disease or death of person A is different from disease or death of person B. An individual at the biological level is one of most important elements of the physical nature of collectivity. However, if you take an individual at the biological level alone, you attribute any recognition and action to the inner processes of an individual. In other words, you

try to find the causes of recognition and action in information processing of a human computer as was mentioned in Chapter 2. Especially, a concept of an individual at the biological level is desperately insufficient when you are interested in the social actions of humans.

We can assume a concept of an individual who has a mind-in-a-body in the level of life history beyond a concept of an individual at the biological level. It is a product by a small collectivity of parents and their children but it is social. Development of norm in such a small collectivity grows a concept of mind-in-a-body. Beyond this, a concept of mind-in-a-body in the social historical level was born. This is a product of history. It is the concept of the individual that arose and prevails in the modern era.

In order to understand a human as an individual person, all three levels discussed above are required. It is impossible to reduce all human phenomena to merely a biological or a physiological level. An individual at the biological level does not guarantee a mind-in-a-body. A concept of a mind-in-a-body should be understood in life, in addition to the and social historical levels.

A concept of mind-in-a-body at the level of life history does not change unless a fundamental way of child rearing changes. But, the concept of mind-in-a-body at the social historical level has already weakened. As indicated by the term, post-modern, the concept of individual in individualism that is developed and established in the modern era looks as if it is changing its definition and understanding. This change is a necessary consequence of the fact that individualism is an historical product and expected that the concept of an individual will change in this new era called the post-modern. Let's discuss this problem next as the last topic in this chapter.

Where Norm Development Goes

How far does norm development proceed? To what extent does a norm become generalized? Or to what extent is a sphere of influence expanded? And does a third body become invisible? The concept of threshold is significant here and will help to explain these limits. For example, 80 degrees Fahrenheit is too cold for one to shower in. You would shiver and possibly catch a cold if the outside temperature is cold as well. Moving up the scale, 90 degrees is still too cold. Then, going upward, 100 degrees might make you more comfortable if you can tolerate a temperature close to body temperature. The average temperature for shower water is 104 degrees. But, what happens if the water reaches 110, 115 or even 120 degrees? At that temperature, the water is capable of scalding you. If you increase the temperature of water in your shower too drastically, it changes its nature from what makes you more comfortable into what is more dangerous for you (when the temperature gets warmer beyond threshold).

The threshold principle is valid for norm development. For example, a norm indicating an assumable action such as "Live in a good way" is so general that it can be applied to almost any action. However, what should you do when someone is about to hurt you with a knife and you hear that same voice saying, Live in a good way? Should you run away, attack the person, or allow yourself to be hurt? In this way, a norm that is excessively generalized beyond a threshold does not indicate actions you should take even though its sphere of influence might be huge. Such a norm loses the original function of norm, i.e., indicating a set of assumable actions.

What happens, then, when a norm is generalized beyond the threshold and loses its original function? It has no way but to return to a starting point, a stage in which a primitive norm is generated through the melding of bodies. Norm transmission by media such as a body, a physical thing and language have been accelerated temporarily and expanded spatially more and more due to the development of transportation and telecommunication. This process makes

various spheres of influence include other spheres and continue to expand. Also, norms that were independent from each other, like norms in the economy and norms in religion, come to be influenced by each other and be transmitted to each other due to the complexity of society. In such a society, we face many phenomena that show the generalization of norm and expansion of sphere beyond the threshold and the loss of original function of norm.

Toward New Melding

Returning to a starting point does not mean returning to a perfectly original situation. A history in which we experienced individualism cannot be erased and development of transportation and communication technology cannot be discarded. Now we must create a new society in which we can be melded with each other and generate a primitive third body by harnessing the outcomes of our past history. For this, first of all, we need to eliminate factors that disturb the melding. For example, a fixed role differentiation and a large hierarchical gap tend to make the melding difficult. We should introduce more flexible role divisions and flatten organizational structure. We can see such a new structure in volunteer activities that have rapidly become familiar for Japanese people since the Hanshin-Awaji Huge earthquake in 1995. Likewise in the United States, volunteer activities permeate every sphere of economic, educational and social life. Support groups, internet websites, retired individuals who assist others to prepare their tax forms, environmental activists who clean beaches and highways, and classroom aides who assist teachers are a few examples of those volunteer activities.

The melding of bodies is not just melding but is the process in which a primitive third body is generated. This has to do with the issue of leadership of a person with whom a third body overlaps. Leadership grown from the melding of bodies is different from leadership that stands on beliefs or ideologies that are sustained by a huge number of people who follow the same norms. To meld with other persons, a sense of running together side by side without looking down on others is required. It is leadership in which a leader leads followers while sharing the rhythm of breaths the same way that a coach shares breathing with his or her runner.

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You see two supplements at the end of this chapter that connect the four-limb structure and the speech act theory with the norm theory that you read about in the previous chapter. Specifically, supplement 7.3 explains how the four-limb structure is developed from the viewpoint of norm theory while supplement 7.4 answers a question we raised in the previous chapter, i.e., who is the subject of a speech act?

Supplement 7.1
An Ideological Nature of Norm

We will discuss two fundamental natures of norm in this column. They are also the fundamental nature of meaning. The first nature is called infiniteness. Norm was defined as an infinite set of assumable actions in section 1 in this chapter. The function of norm is illustrated by drawing a circle while saying "Points in the circle are assumable actions." There are limitless points. This is the nature of infiniteness. However, as was also discussed, norm is born by crystallization of communal experiences of melding bodies. Does this make you feel strange? Experiences you have in the melding should be finite. If these finite experiences are crystalized and they generate an infinite set of assumable actions, it implies that an infinite set is produced from a finite set. How does this happen? The nature of infiniteness is a puzzling problem we should solve.

The second nature is called logical priority. If you follow a certain norm, it is required for the norm to have been formed already. Otherwise, you cannot follow the norm. Namely, *logically*, a norm should be formed prior to an action that follows the norm. This is the case for meaning. When you say, "This is an apple," or when something as an apple appears for you, the meaning of *apple* should have been formed prior to its appearance. Again, logically, meaning should be formed prior to its appearance.

Here, let's remember our example of the boys playing baseball in this chapter. The rules or norms of baseball change from one moment to another in parallel with the increase in the number of boys. The team develops norms while, at the same time, they play baseball, or experience baseball. In this way, experiences and norm formation proceed simultaneously.

A norm is easily changed. In the example we used in this chapter, the action of enjoying wine during class becomes assumable at the moment when you face a teacher who drinks wine. The norm is changed at the moment your experience of facing a teacher drinking wine in the class takes place. Therefore, experiences and norm formation proceed simultaneously as far as a temporal sequence is concerned. But, logically, norm formation, or formation of meaning is required to precede experiences. We must admit that the nature of logical priority is strange.

Both the nature of infiniteness and logical priority stem from that fact the norm, meaning, and a third body are not substances but fictions. Using the word "fiction" might make you underrate the importance of these concepts. But, you should not. Humans produce fictions collaboratively. It is not an exaggeration to say the critical difference in humans from all other animals is that humans can produce fiction. All of norm, meaning and a third body are nothing but communal fictions generated by melding bodies. Humans are often referred to as animals that can use language. The meaning of language is also a communal fiction.

Producing something such as fiction is called *fictionalization*. Using this term, we can say norm, meaning, and a third body are fictionalized through the melding of bodies. The natures of infiniteness and logical priority are constructed by fictionalization. An infinite set of assumable actions, or a norm, is fictionalized by the melding of bodies. At the same time, a third body that designates the norm is also fictionalized. Both a norm and a third body are fictionalized as if they had already existed before experiences in the melding of bodies.

Supplement 7.2
An Example of Norm Transmission

This is a narrative of my own experiences in Chizu, Tottori prefecture, a certain depopulated community in Japan. (That community was introduced in Supplement 3.1 in Chapter 3). The community is characterized by strong conservativeness, exclusiveness and control by a few wealthy individuals. But, two leaders and their thirty colleagues had started a movement to challenge the traditional nature of community ten years before I visited there for the first time in 1992. They developed a plan to construct a recreational area in the most remote village in a mountain by building several log cabins, structures that were rare at that time.

The two leaders visited a leader of the village and explained their plan. They also disclosed their hope that they would donate the log-cabins to the villagers at no cost. But, the leader of the village said, "You are not living in our village. It is absurd and rude for outsiders to enter our village and build something we can't understand. Get out!" Instead of leaving, the group spent the entire summer there and built several log cabins located little distant from the village. After completion of the buildings, the two outside leaders visited the leader of the village again and announced, "We have built log cabins although you opposed the idea. We are pleased to give them to you at no cost as we originally promised." The leader of the village answered, "We will accept them if visitors come." The leader felt it was an incredible and preposterous idea that visitors would come. Giving log cabins to the villagers was literally a unilateral transmission of the log cabins.

Contrary to the assumptions of the village leaders, many people started to visit the log cabins. Most of them came from out of their towns and even as far as the prefecture to enjoy recreation. The villagers began to take care of visitors and built an additional log-cabin in order to have a restaurant. But, there were no words of appreciation for the two leaders, which demonstrated that unilateral transmission of norm was achieved.

I assumed the villagers' activity was something like a small scale of tourism business when I started to visit the village. But, I learned I was wrong when I happened to find out the amount of income the villagers earned by working there. The amount was too little to be called a salary. However, I encountered a word after exploring many aspects of the enterprise with a question about what they were doing. The word is *so-goto*, which everyone in the community knew. So-goto means work that should be carried out by all villagers. Keeping a village forest, cleaning an irrigation channel, implementing the ceremonies of coming of age, marriage, funeral, and ancestral worship, are all referred to as so-goto. It is an obligation for villagers to participate in so-goto. In fact, they have to compensate for the absence of working with working at other times or by paying a monetary penalty.

We visited the village leader and presented our hypothesis that running log-cabins might be so-goto. He started to say, with sadness, "Yes, we performed many works as so-goto. But, it became difficult to maintain because so many young people left here and only old people remain. However, running the log-cabins is only one so-goto we can do." We found that their running of the log cabins was a so-goto. However, it is important to understand that the so-goto of the log-cabins is different from a traditional so-goto. A traditional so-goto is for maintenance of an infrastructure inside the village such as a communal forest and irrigation channel or for mutual support inside the village such as implementing the ceremonies of coming of age, marriages, funerals, and ancestral worship. In the so-goto that is carried out with the use of log-cabins, the purpose is for many visitors from the outside to enjoy and not exclusively for the villagers. Here, you see one of norms that were developed by the two leaders, a norm to break down exclusivity.

Photo 7.1. Log Cabins Given as Gifts by the Two Leaders

Photo 7.1 Log cabins built and given to the community by the two leaders. Unilateral gifting of the log cabins changed the norms of the villagers who initially maintained a conservative and exclusive community. The villagers received these cabins and by doing so incorporated the direction of the two leaders' norm that challenged conservativeness and exclusiveness of the community.

Supplement 7.3
Relation between Norm Theory and the Four-limb Structure

We will see how the norm theory in this chapter is related with the four-limb structure that was introduced in Chapter 6. To present the conclusion first, norm theory explains the process that starts from the only lower half of Figure 6.1 and continues to the figure that shows a completed form of a four-limb structure.

We learned norm and meaning are two sides of a single coin. Meaning of an object of action is the identity of the object for an assumable action. Thus, meaning in the four-limb structure can be replaced with norm while people who know meaning in the four-limb structure can be replaced with bodies in the sphere of influence of norm.

According to norm theory, formation of norm is initiated by the melding of bodies. When *something* in the four-limb structure is a body of other person, two bodies that can swell and shrink have experiences of the other at the place where the other experiences it by swelling or shrinking. That is, they become the other to each other. A situation in which plural bodies become other's each other intensively and frequently was called the melding of bodies. This situation corresponds to a situation shown in the extreme left figure in which there is only a relation between something and a swelling and shrinking body.

A primitive third body is generated through the melding of bodies. Importantly, it is not that a phase of the melding of bodies is simply followed by next phase in which a third body indicates norm as was mentioned in this chapter. But, bodies come to hear a voice of a third body while continuing to meld with each other. This situation corresponds to the middle figure in which a relation between meaning and people who know meaning is just added to the extreme left figure. The sphere of influence of a primitive third body is small. Thus, people who know meaning are restricted in this stage of the four-limb structure. The nature of super-spatiality, super-temporality and universality is still at the low level. But, it is more super-spatial, super-temporal and universal than swelling and shrinking bodies that are purely spatial, temporal and specific.

A primitive norm faces a crossroad toward collapse or development when it encounters a body outside the sphere or another sphere. Norm can develop if it comes to include the body without or it is transmitted to another sphere. The sphere of influence is expanded and the content of norm is generalized while a third body reduces overlap with a specific body and thus becomes invisible. Norm that is fully developed corresponds to the extreme right four-limb structure in Figure 7.4.

Figure 7.4. Relation Between the Four-limb Structure and the Theory of Norm

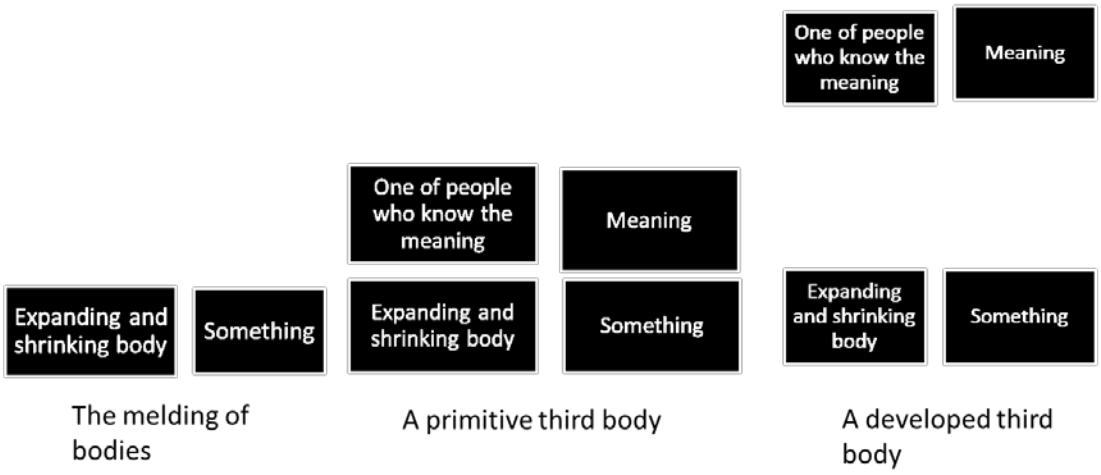

Figure 7.4. This figure indicates how each stage of norm development explained in Chapter 7 is depicted by the four-limb structure explained in Chapter 6. The stage in which bodies are melding but have not produced a primitive third body yet corresponds to the extreme left figure in which the upper half of the four-limb structure that is characterized by universal nature has not formed. The next stage in which just a primitive third body is produced corresponds to the middle figure in which the upper half has been formed but has not been established sufficiently. This is shown by a short distance between the lower and upper halves in the figure. Finally, the stage in which a third body of the second level is constructed and norm is established corresponds to the extreme right figure in which a complete form of the four-limb structure is established.

Supplement 7.4
A Subject of the Speech Act

In section 3, Chapter 6, we insisted that the subject of the speech act is not a speaker who has a mind-in-a-body but a canopy at the end of explanation of the theory of the speech act. We will see how the canopy as a subject of the speech act is dependent on the norm theory in this chapter.

A subject of the speech act is a third body whose sphere of influence includes a speaker. A remark, "Pass me the book," is not an expression of need in the mind of the speaker, but it is a voice of request of a third body. The voice transmits a norm or meaning to a hearer, who is outside of the sphere, by using the mouth of the speaker. It is not sure whether the hearer passes the book or not because the hearer is not in the sphere of influence that includes the speaker. The hearer passes the book if the transmission is successful and the hearer becomes included in the same sphere as the speaker. But, the hearer does not pass the book if the transmission is unsuccessful.

Then, let's suppose that the hearer passes the book unwillingly while making a wry face. The hearer's wry face is a perlocutionary act that was not expected by the illocutionary act. What happens here? Norm transmission is made as far as the hearer passes the book. But, subsequently, another norm is being transmitted from the hearer to the speaker: the norm is expressed by a remark, "Don't disturb me by such a trivial request." Again, this norm transmission is not guaranteed to be successful. If successful, the original speaker replies like "Sorry to disturb you," but if unsuccessful, the original speaker might get angry and leave there without words.

In this way, it is not necessary that the speech act be exchanged between two or more persons and thus continue with conversation. Conversation can be taken as a thrilling game that proceeds with the possibility that it can be declined anytime. Generally, success of unilateral transmission of norm is not always guaranteed (as we saw in this chapter). The encounter of two different spheres of influence might lead to the expansion of the sphere by norm transmission but might lead to collapse of the sphere. In this sense, even a short conversation is a process in which norm are continuously transmitted unilaterally.

An experiment carried out by the sociologist, Harold Garfinkel, a pioneer of ethnomethodology (see Supplement 5.1), demonstrates the nature of conversation in the above. [9]In the experiment, you are told to act as if you are colleague of an experimenter, Garfinkel. One of your university friends approaches you on your way to class in the morning. He says, "How are you doing?" Then, you respond to the question (as prompted by Garfinkel), "Are you asking my condition? Do you want to know whether my brain is working well today? Are you interested in whether my cold is getting better? Are you interested in the results of my examination?" Puzzled, your friend leaves. It is really a rude experiment but it clearly illustrates that a conversation is a game of continuous unilateral transmission of norm which might be declined at any point in time. The innocuous remark from your friend, i.e. "How are you doing?" is a light greeting that is widely used. The norm indicating such a greeting as an assumable action was about to be transmitted from the third body indicating the norm to you through your friend's mouth. But, the transmission became unsuccessful in enrolling you in the sphere because you responded with a number of other questions.

In contrast, suppose you had responded to the same greeting by saying, "So, so." Here, the transmission was successful. You were enrolled by the sphere where your friend was included. Then, suppose you said, "How about you? By this, you were about to enroll your

[9] Garfinkel, Harold (1967). *Studies in ethnomethodology*, New Jersey: Prentice-Hall

friend in your sphere that had been enrolled in your friend's original sphere. If it was successful, your friend would respond by saying "Everything is going very well." But, it is possible for your friend to say, "It's none of your business" as well or "I don't feel like talking about it right now."

The above experiment shows that continuation of conversation is a process of mutual expansion of sphere and the process always has possibilities of failure. However, a voice of the third body has the power of coercion to some extent regardless of whether it is attained successfully or not. In the following, we will see another one of Garfinkel's experiments that illustrates the power of coercion of a third body.

In the experiment, the subject was instructed to ask one question. Each question concerned a predetermined issue and the subject was told to estimate what opinions a person behind a curtain held. The person answered each question with only a "yes" or "no." However, unknown to the subject, the person was not a real person but a computer that generated "yes" or "no" randomly. Therefore, the person's answers were not consistent. In spite of that, many experimental subjects continued to ask questions for a long time in order to try to figure out what were the real opinions of that individual behind the curtain. The experiment illustrates that answers of the individual behind the curtain had the power of coercion which was strong enough to continue to enroll experimental subjects as a voice of the third body.

Chapter 8
A Canopy of Crowd

We will focus on the physical nature of collectivity in this chapter. Specifically, we will talk about computer simulation using a model called the micro-macro linkage model. The model assumes that many microscopic behaviors such as individual person's behaviors produce a macroscopic state such as a state of a large crowd and then the macroscopic state affects microscopic behaviors. In detail, we will see (1) a band structure represented by a large pedestrian crowd in a large crosswalk, (2) a change of a large group of people, each of whose behavior is influenced by a few persons around, and (3) the influence of conformity of each person on the change of opinion distribution of a group.

Lastly, we will see a novel method to evacuate people in emergency situations. This is an example of a method to intentionally produce a particular crowd behavior.

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1. The Physical Nature of Collectivity

Physical Behavior

Two aspects of the nature of collectivity, namely the physical and semantic natures of collectivity, are two sides of a single coin. The use of meaning is impossible without some physical grounding and it determines the physical aspects. The major interest of group dynamics tends to be in the semantic nature of collectivity. Thus, in real practice, researchers in group dynamics require interdisciplinary collaboration with people who are specialized in the physical nature of collectivity such as engineers, for example. You might need to collaborate with specialists of mechanical engineering and information technology when you enter into a collaborative practice with people working in a field site of manufacturing. Or, you might need to work with specialists in architecture and civil engineering when you are involved in a collaborative practice with people living in a certain community.

However, there are studies of the physical nature of collectivity in group dynamics although there are not as many as studies of the semantic nature of collectivity. In this chapter, we will see such studies that might be different in kind from the other chapters in Part II. The studies we focus on in this chapter concern physical behaviors shown by people in a collectivity.

For a certain type of collectivity, it is more effective to focus on the physical nature rather than the semantic nature. A typical example is a collectivity called a crowd. You might grasp the semantic nature even in a disorderly crowd, and you might find the semantic nature in the past has to do with the historical background of the emergence of a certain crowd. But, it is still possible and even interesting to analyze some phenomena regarding crowds as physical while ignoring their historical contexts such as analyses of how people fall down one upon another in a crowd in a restricted area, or how a loud voice of a single person affects a lot of people and results in a great commotion.

Micro-Macro Link

Analyses introduced in this chapter use a model called the micro-macro link model. Here, *micro* means an individual person while *macro* means collectivity. The micro-macro link implies that (1) micro states of individuals all together produce a macro state, (2) the macro state then determines the micro state of each individual, which is followed by (1), (2), and so on. A micro-macro link is a circle in which the micro determines the macro and the macro

determines the micro. Here, we should note that the micro-macro link model stands on the mutual influence model that we rejected in principle (See section 1 in Chapter 2). It is because information processing within an individual, or within the mind-in-a-body, is assumed when we say the micro states all together produce the macro state. The micro state is assumed to be produced by such information processing inside an individual person. Therefore, the model of micro-macro link is never a principle of group dynamics.

However, the mutual influence model is sufficient when you focus on a certain canopy that concerns a particular issue as was mentioned in section 3 in Chapter 2. In principle, you are manipulated by many canopies encompassing you. But, when you focus on certain canopies, it is substantially no problem for you to incorporate the influences of the other canopies as the influence of the mind-in-a-body that is not determined by the canopies.

Structure of this Chapter

In this chapter, first, we analyze a collectivity called a crowd and show how its physical nature of collectivity is analyzed. Specifically, we see the macroscopic state where you can observe, with a bird's-eye view, many pedestrians walking on a large crosswalk that is, a banded structure consisting of several streams of walking people. We will introduce computer simulation in which the banded structure is reproduced with the use of the micro-macro link model (section 2).

Then, we will see other simulations that depend on the micro-macro link model. Simulation by cellular automaton and by differential equations is introduced in sections 3 and 4 respectively. The former does not depend on numerical formulae while the latter does. Lastly, in this chapter, we will see a study that aims at crowd control behavior. It concerns how many people can be evacuated in emergencies from congested places such as buildings and underground shopping malls (section 5).

There are some parts in this chapter for which mathematics is required to be exact, but mathematical expressions are not used because this book is introductory. However, it is true that mathematics is an important language for group dynamics. You have something which you can't consider without mathematical language. But, it is vain to use it in collaborative practice with people in a field site if they do not understand it. However, the extent that a researcher can use mathematical language affects the breadth of discourses a researcher can provide for a field site

In this regard, I teach simulation by cellular automaton and derivation equations without using any mathematical expressions in a class for undergraduate students. But, I suggest that graduate students who came from humanities and social sciences should study basic mathematics such as linear algebra and calculus at least in their first year of graduate courses. It is because I have the expectation that they will never lose the ability to use mathematical language if they experience such training.

2. Banded Structure of Pedestrian Crowds in a Crosswalk

Banded Structure[10]

Look at Photo 8.1. It is a photo of a large crosswalk in downtown Osaka city that was taken from the sky. Many people were walking on the crosswalk. Figure 8.1 shows the movement of each people for two seconds. Each of the many rectangles shows the area where

[10] A study in this chapter was published in the following journal article;
Yamori, Katsuya (1998). Going with the flow: Micro-macro dynamics in the microbehavioral patterns of pedestrian crowds. *Psychological Review*, 105 (3), pp. 530-557.

a single pedestrian moves for two seconds. A white rectangle shows a pedestrian walking from left to right while a black one shows a pedestrian walking from right to left. You see bands of white and black rectangles alternately, more precisely, a total of five bands consisting of three white bands and two black bands. It is difficult to notice when you are walking in such a banded structure while you are on the crossroad. And, such a banded structure is not always produced.

Photo 8.1 Photograph of a Pedestrian Crowd (Yamori, 1998)

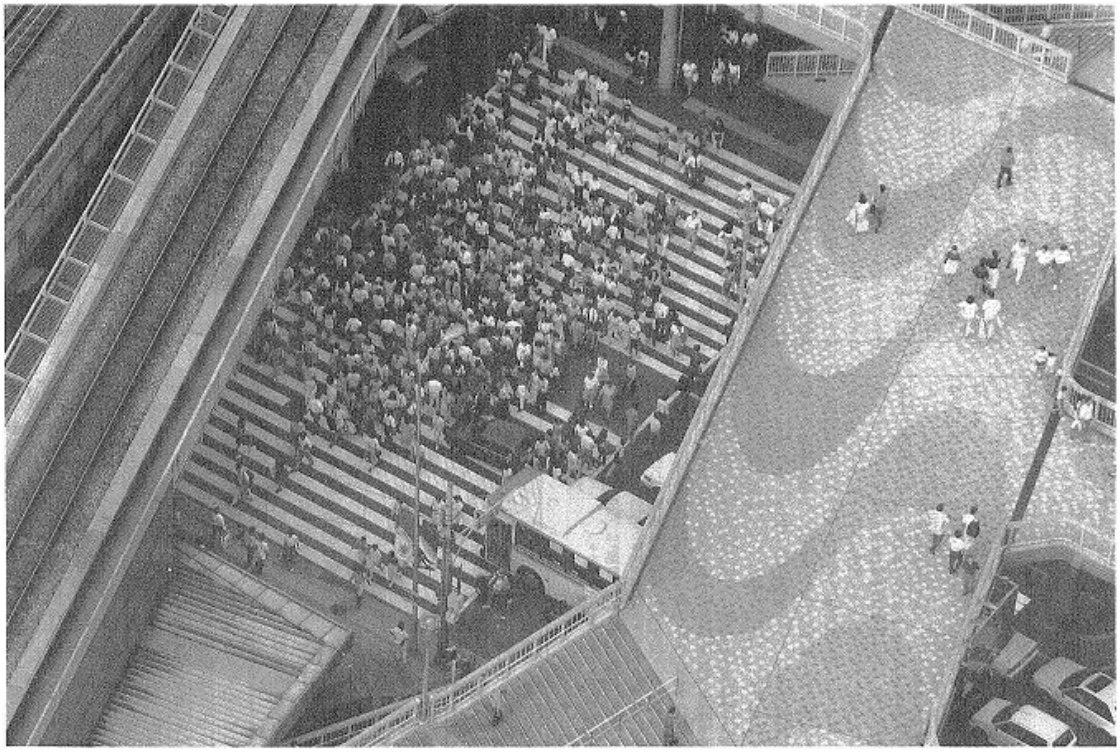


Photo 8.1. Pedestrian crowd as viewed from above on a crowded walkway (source).This group of people was recorded by a camera at two second intervals from the highest floor of a building to demonstrate how the macroscopic behavioral pattern of the entire group is produced.

Figure 8.1. Banded structure of Pedestrian Crowd (Yamori, 1998)

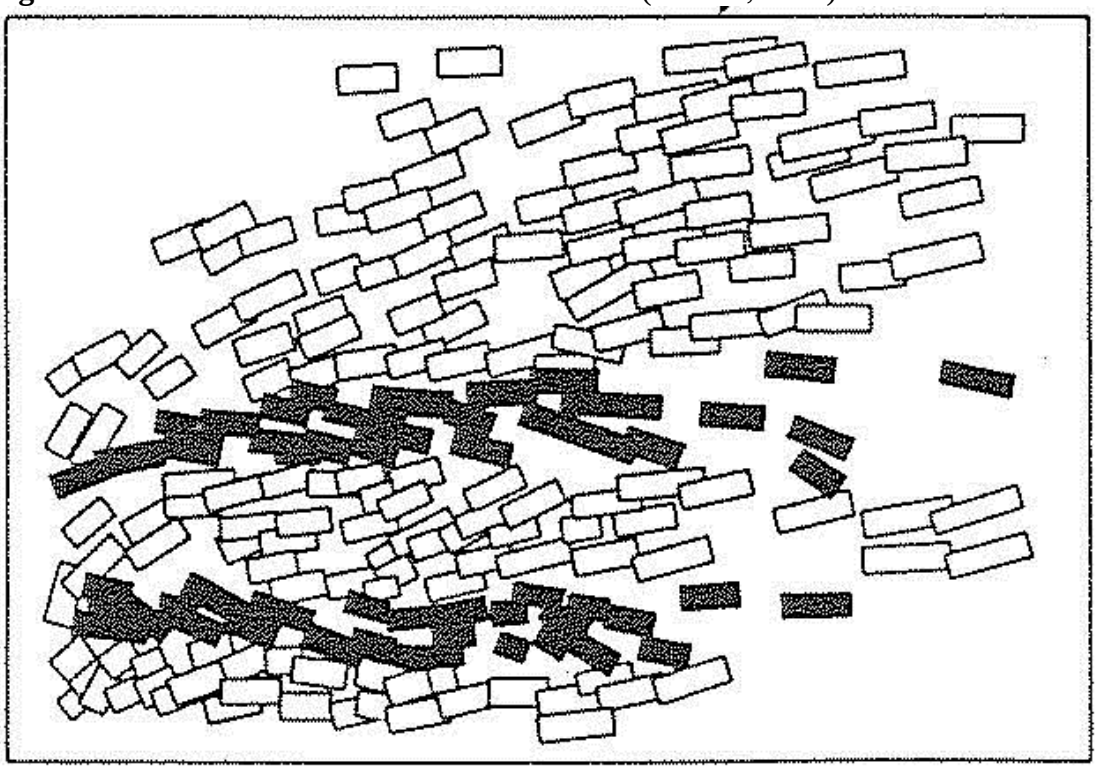


Figure 8.1. Movement in a pedestrian crowd (from Yamori, 1998). The figure shows an example of real movement of pedestrian crowd. Each rectangle represents the area where a single pedestrian walks for two seconds. Black and white rectangles indicate a person walking toward the left or the right, respectively. You can see band structure that consists of five bands, i.e. white, black, white, black and white bands from the above of the figure.

Then, how is a banded structure produced and under what conditions?

One must develop an index that indicates how much a banded structure is formed so that the emergence of a banded structure can be analyzed. We call the index a *band index*. Here, we will avoid a detailed explanation of how the band index is computed and just rely on the intuitional explanation that is provided. The band index takes a value ranging from 0 to 1. Figure 8.2 shows an example of the flow of a crowd that corresponds to each of five values of the band index. You can clearly see the banded structure in the two examples in the right-hand side in which the band index is more than 0.3.

Figure 8.3 shows the process in which two crowds of pedestrians started to walk from two opposite sides after a traffic signal turned green, mixed at the center of the crosswalk and finally formed a banded structure. A point of the lowest left of the line graph corresponds to the time when the traffic signal turned green. The third point corresponds to the time when four seconds passed after the traffic signal turned green while No. 3 indicates the movement of pedestrians for two seconds at this point time. Similarly, No. 10 corresponds to the time after 18 seconds passed. In this Figure, several wedges are formed before people walking from the opposite side mixture, and the wedges from the opposite sides intermingle alternately. A banded structure is not developed if such a wedge is not formed, or wedges from the opposite sides crash head on. In this way, a banded structure became visible after 24 seconds (as shown in No. 13) and became most clear after 30 seconds passed (as shown in No. 16).

Figure 8.2. Band Indices and Crowd Sizes (Yamori, 1998)

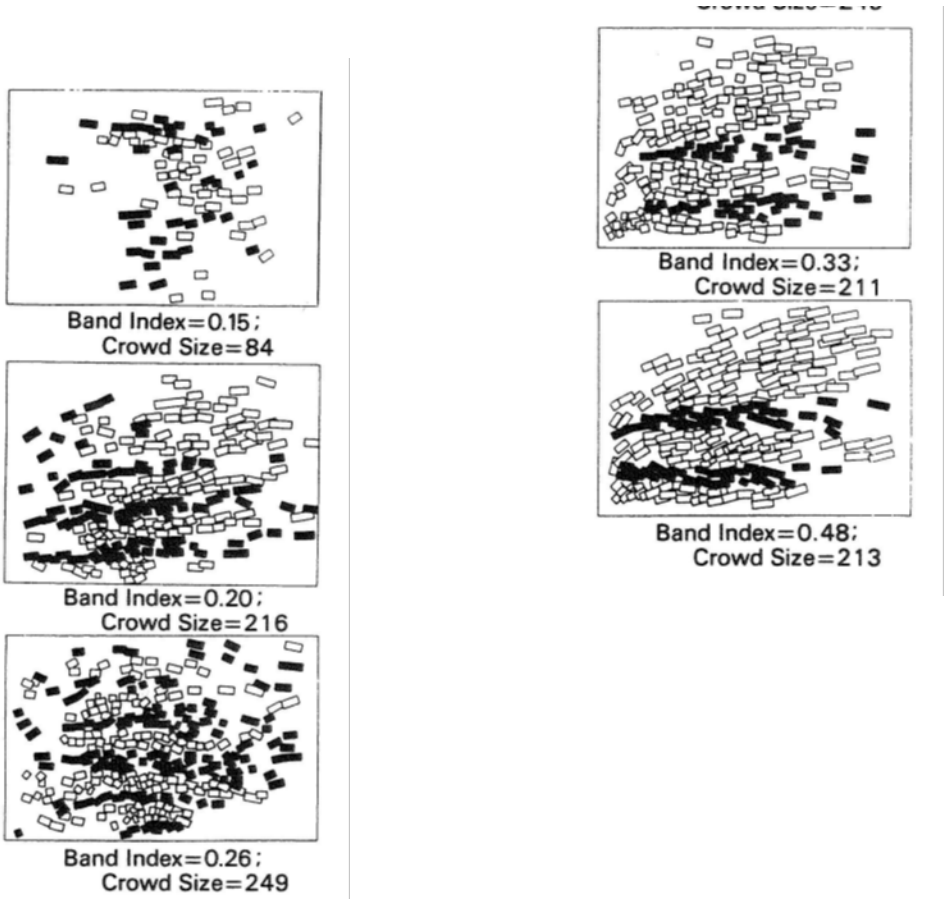


Figure 8.2. Movement of pedestrian crowd and band indices (from Yamori, 1998). The figure shows five examples of real movement of pedestrian crowd for two seconds that correspond to five values of band index, i.e. 0.15, 0.20, 0.26, 0.33 and 0.48 from the above on the left-hand side. You can see clear banded structure in the two figures on the right-hand side but you can't see it in the three figures on the left-hand side. By looking at more examples, we concluded it is safe to use the value of 0.3 as a border line to distinguish the situation in which banded structure is formed and the situation in which banded structure is not formed.

Figure 8.3 Change of a Banded Structure (Yamori, 1998)

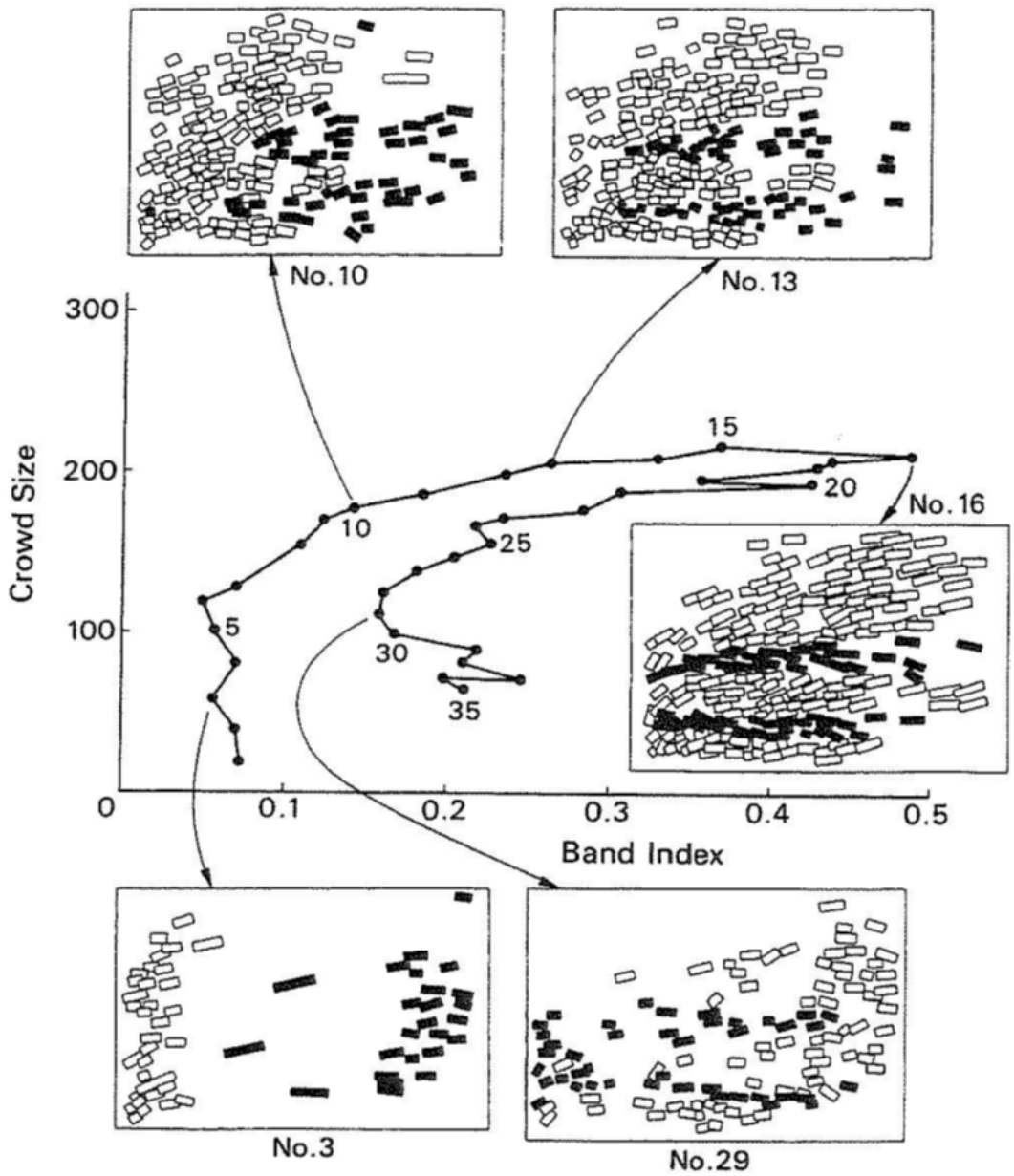


Figure 8.3. A point at the lowest left of the line graph corresponds to the time when the traffic signal turned green. The third point corresponds to the time when four seconds passed after the traffic signal turned green. No. 3 indicates the movement of pedestrians for two seconds at this point time. Similarly, No. 10 corresponds to the time after 18 seconds passed. A banded structure became visible after 24 seconds (as shown in No. 13) and became most clear after 30 seconds (No. 16) passed.

It was discovered that formation of a band structure depended on the number of pedestrians. The relation of the formation of a banded structure with the number of pedestrians was analyzed by distinguishing the cases in which a clear banded structure was formed (namely, a band index was 0.3 or more) from the cases in which the banded structure was not formed (namely a band index less than 0.3). As a result, researchers found that a banded structure was not formed when the number of pedestrians was less than 100 whereas a banded structure was formed with a probability of about 50% when the number of pedestrians was 200 or more.

Computer Simulation

Next, we will see a computer simulation that reproduces the flow of a pedestrian crowd on the crosswalk. The micro-macro link model is used in this simulation. The band index is used to represent a macro-state, that is, the state of the crowd of pedestrians as a whole. The band structure is determined by many micro-behaviors, that is, walking behaviors of many individual pedestrians. These micro-behaviors bring about the macro-state. In this simulation, it was assumed that the band structure as macro-state determines the walking behavior of each pedestrian as micro-behavior. Specifically, the walking behavior of a single pedestrian for two seconds was computed as the following.

Each pedestrian was assumed to have a fan-shaped scope of view to decide the direction of walking, like the one that is often used when the direction of movement of a typhoon is predicted in the weather forecast. If you are a pedestrian, you have people who are walking in the same direction as you and people who are walking in the opposite direction in your fan shape. Of course, it is possible for you to have no one in your fan shape. The direction of walking was computed by composing three kinds of arrow vectors:

(1) For a person who is walking in the same direction, a vector to follow the person,
(2) For a person who is walking toward you, a vector to avoid the person, and
(3) For a vector to proceed straightforward as a natural tendency

For (1), when plural persons are walking in the same direction, a vector to follow each person is computed independently and then plural vectors are composed. The same is true for (2).

After computing the direction of walking, it is required to compute a distance of walking for two seconds. The density of pedestrians around you determines how fast you can proceed. Obviously, the more people you have around you, the less you can proceed and vice versa. In the simulation, a rectangle that is the same area for each pedestrian is assumed and the density of pedestrians around you determines the distance of your walking.

The influence of macro-state on micro-behaviors was introduced by the way in which the center angle is determined by band index. Namely, it was assumed that the less the band index is (when people are walking more disorderly), the wider the center angle is (when people have a wider scope of view). In contrast, the larger band index allows the smaller center angle of the fan shape.

The simulation above was found to reproduce the results of an observation that was mentioned already. That is, a clear band structure was formed with about 50% of the people in a crowd of 200 or more pedestrians while a band structure was never formed in a crowd of less than 100 pedestrians. Moreover, it was found that improbable events such as walking toward the outside of the crosswalk, or walking on other people occur if the micro-macro link is cut so that the center angle of the fan shape is not determined by the band index. This makes us recognize the importance of the micro-macro link.

3. Cellular Automaton

What is Cellular Automaton?

Cellular automaton is one of the simulation models that use the micro-macro link model. Envision the *Go* board with its grid of 19 x 19 lines and black and white stones. Go is a game which was originated in Asia probably 2,500 years ago. It is played by two players. Here, let's focus on the small squares although a black or white round stone is put on an intersecting point in a real game of the Go. The small square is called a cell. Suppose each cell takes the state of either white or black, for example. And, you make a rule to decide what conditions change the color of the cell. First of all, each cell is painted in either black or while. This is the initial state. Then, if each cell changes its color according to the rule, a configuration of black and white on the entire board changes like an automatic machine, namely, an automaton.

An interesting point of cellular automaton is that the change of a cell color is determined only by the other surrounding cells. Regarding this point, cellular automaton is different from the banded structure that was mentioned in the previous section because the band structure is the state of all pedestrians on an entire crosswalk. In contrast, a rule of cellular automaton is applied to a few surrounding cells. In this sense, a cell is micro while the surrounding cells are macro. However, surrounding cells overlap partially for two different adjacent cells.

Let's use an example. We have a cellular automaton that consists of 100 x 100 cells, namely, a total of 10,000 cells. Here, we should pay attention to how cells on the edge are dealt with. One way is that cells on the edge are treated as they are. Then, you have to decide another rule for those cells because, even if you decide a rule that a cell is affected by eight surrounding cells, cells on the edge do not have eight surrounding cells.

Another way to look at the situation is that the cells on the edge are taken as being adjacent to the cells that are located at the opposite of lattice. For example, a cell on the upper right edge (or upper left edge) is next to a cell on the lower left edge (or lower right edge). In this way, the edge is not an edge, that is, the automaton has no edges.

Example

Let's return to the 100 x 100 automaton. Here, we continue with the assumption that the edge is an edge. Each cell takes the state of either black and white. But, we simulate how a new fashion is spread because mere black and white is not interesting. We imagine a situation in which a few people start to wear a new fashion among the vast majority who don't wear it. Each cell is taken as a person. A black cell represents a person who wears a new fashion while a white cell represents a person who does not.

We have to make a rule concerning how a cell changes. First, we assume 10,000 people are likely to be attracted by a new fashion. Specifically, we will use the following model: A person who has never worn a new fashion starts wearing it with the probability of 50% that one of eight surrounding people will start to wear it. The person starts wearing it with probability of 80% when two surrounding people start wearing it. The person starts wearing it with probability of 100% when three or more surrounding people start wearing. Once the person starts wearing it, he/she continues wearing it regardless of the number of surrounding persons. For people on the edge, the same ratio of surrounding people who start wearing it as those who are not on the edge is used. An initial state is one in which only 25 persons who are in the upper right corner have already worn it.

Figure 8.4. An Example of Cellular Automaton

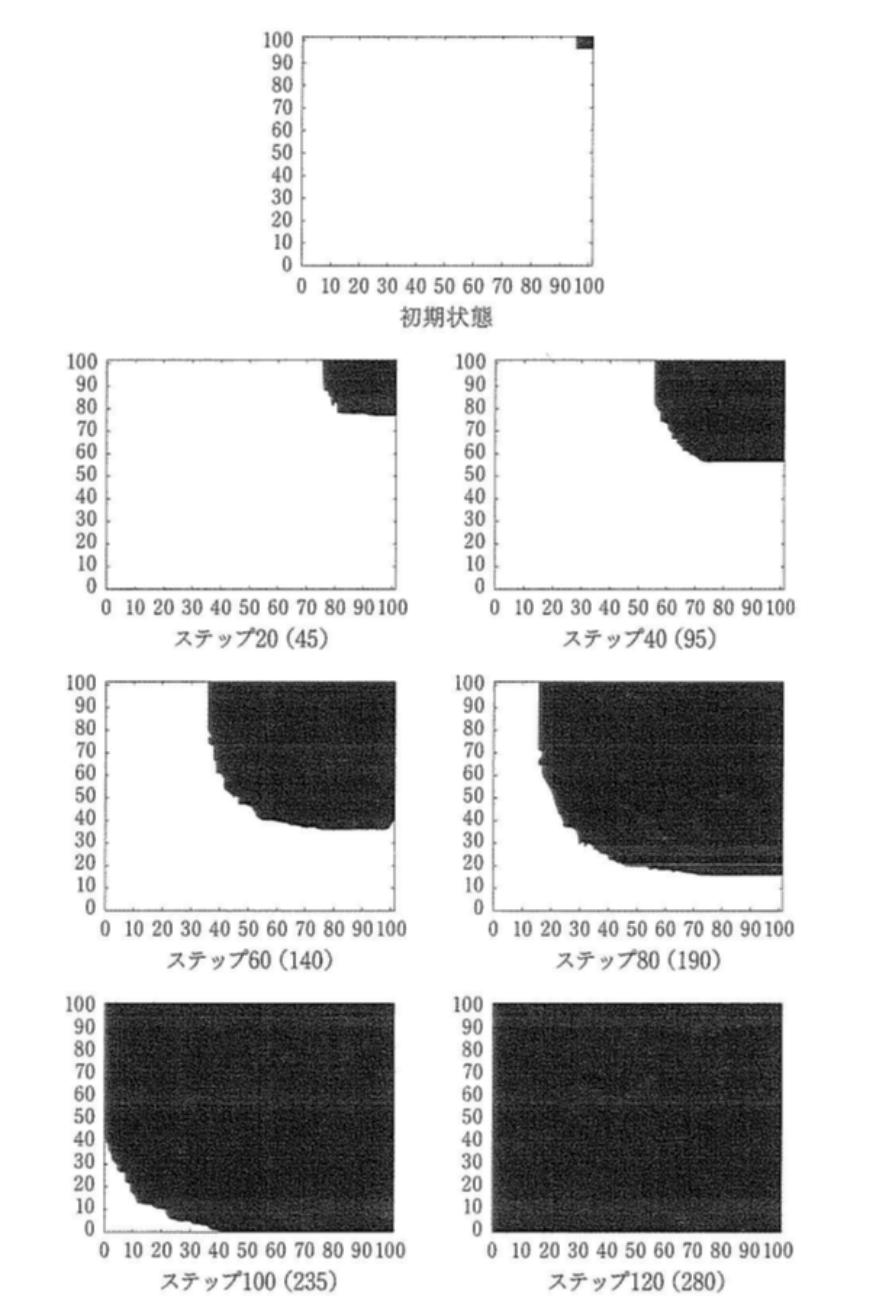


Figure 8.4. Conformity and surrounding people (adopted from Yamori). Numbers in parentheses under each figure show the number of steps for people who are not likely to conform to surrounding people. Black and white cells represent a person who started wearing a new fashion and a person who did not, respectively. Each person was affected by only eight adjacent people. A new fashion was worn by a small number of persons at the upper right corner and spread gradually.

Figure 8.4 shows how cellular automaton changes when you move it following the rule above. A new fashion is spread and finally all people start wearing it.

Next, we assume 10,000 people who are not as likely to be attracted by a new fashion as the previous example. A rule is as follows: A person who has never worn a new fashion starts wearing it with probability of just 10% when one of eight surrounding persons starts wearing it. He/she starts wearing it with probability of 20%, 30% and so on when two, three and so on surrounding persons start wearing it. He/she starts wearing it with probability of 80% even when all surrounding persons start wearing it. An initial state is the same as the previous example.

Under this condition, more people start wearing a new fashion as time passes and all people wear it finally as the previous example. But, speed of spread is much slower. In Figure 8.4, the number of steps required to reach the same state as the previous example is indicated in parentheses. You see 2.5 times as steps as the previous example is required to reach the same state.

The cellular automaton above is so simple that you could easily imagine the results without operating a computer. But, you can enjoy beautiful movements like a kaleidoscope if you use more complicated rules and set an initial stage more deliberately. You can find many web-sites where you can see such automatons. Please enjoy them.

4. Change of Opinion Distribution

Review of Probability

We could not use a numerical formula to solve a crowd of pedestrians on a crosswalk and cellular automaton in the above. We had no ways other than operating a computer to see what would happen. But, some simulations using the micro-macro link model can be expressed by numerical formulas such as differential equations and be solved numerically. This section introduces one such simulation. But, we will explain it without using any mathematical expressions.[11]

Let's review the calculation of probability briefly. We can describe the present without depending on probability if we investigate thoroughly. You can say whether it is raining or not without any doubt if you go outside and look at the sky. It is either raining or not at present. If we dare to use probability, the probability of rain is 1.0. But, what about weather thirty minutes later or one hour later? You might have a shower thirty minutes later even if you have beautiful weather now. For example, it is possible to have a shower with the possibility of 0.1 even if it is fine now. This remains true for one hour later, one day later, or even one week later. You cannot say anything about the future without using probability although you can describe the present clearly without probability.

Let's focus on weather, rainy or not, at noon on each day. Suppose when it is rainy at noon on a certain day, it is also rainy with a probability of 0.5 the next day. When it is not rainy on a certain day, it is rainy with a probability of 0.3 and it is not rainy with probability of 0.7. We assumed it is rainy with a probability of 0.3 and it is not rainy with a probability of 0.7 tomorrow when it is not rainy today. Then, what is the weather going to be the day after tomorrow? It is rainy with a probability of 0.5 the day after tomorrow if it is rainy tomorrow. But, because the probability of rain tomorrow is 0.3, you need to multiply 0.3 (the probability of rain tomorrow) x 0.5 (the probability of rain the day after tomorrow) = 0.15. But, it might not be rainy tomorrow with a probability of 0.7. In this case, because the probability of rain of

[11] A differential equation introduced in this section is called Master equation. You can see details in Weidlich, W. & Haag, G. (1982) *Concepts and models of a quantitative sociology: The dynamics of interacting populations*, Springer-Verlag.

next day is 0.3, you need to do multiplication again, 0.7 x 0.3 = 0.21. From the above calculations, the probability of rain of the day after tomorrow is 0.15 + 0.21 = 0.36. If you continue to calculate the probability of rain of three days later based on the probability of rain the day after tomorrow (two days later), and so on, you can express the weather of any day later with probability.

Macro: Opinion distribution

Having reviewed probability, we will proceed to the main issue. Suppose there are ten people, each of whom supports one of two opinions, opinion A and B. Then, there are 11 possible states such as (1) all ten persons support B, (2) 1 and 9 support A and B, respectively, (3) 2 and 8 support A and B, respectively, ----------, (11) all ten persons support A.

Opinion distribution among ten persons is a macro state. There are 11 macro states as mentioned above. In contrast, how an individual person changes his/her opinion is a micro behavior. It is obvious that opinion distribution (macro state), is determined by each person's opinion (micro state). In the following, we will see the micro-macro link model in which opinion distribution, (macro state), determines opinion change of each person, (micro behavior).

Let's start with the macro state. Opinion distribution at present becomes clear if a thorough investigation is made. Probability is not necessary. But, when time passes, even a little bit, opinion distribution cannot be expressed without probability, namely the probability of each of the 11 states, because someone might change his/her opinion for some reason. In the example of the weather above, it is sufficient to take into account only the probability of rain because the probability of not being rainy is easily obtained by subtracting the probability of rain from 1.0. But, now, we have to take into account the probability of each of the 11 states of opinion distribution.

Probability Indicator

We will use a piece of fanciful equipment called a *probability indicator*. The probability indicator is made up of eleven glass tubes as shown in Figure 8.5. Eleven glass tubes from the left correspond to eleven states of opinion distribution (1), (2), -----, and (11). There are pieces of sand in each glass tube, the height of which indicates probability. A point is that eleven tubes are

Figure 8.5. Probability Indicator

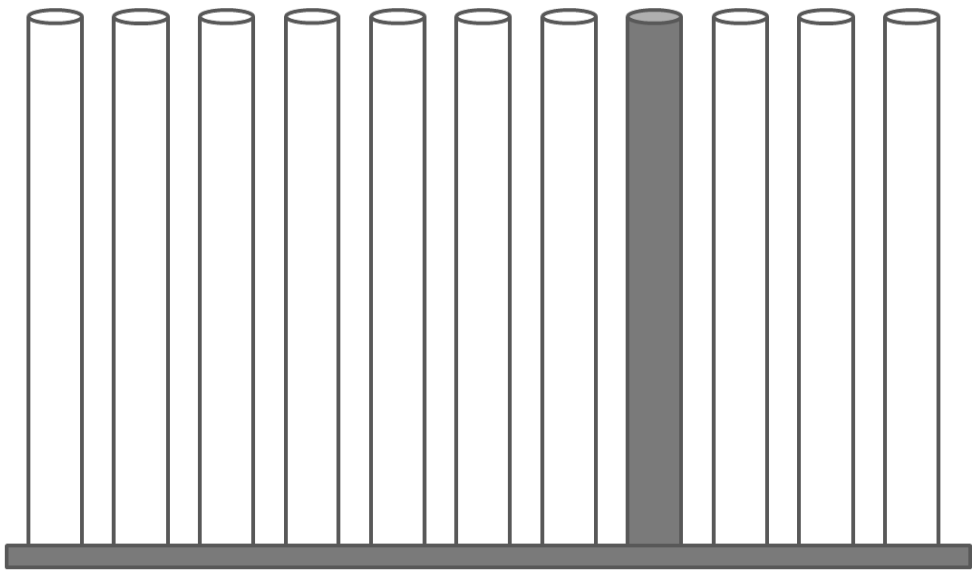


Figure 8.5. One grain of sand represents the probability of 0.001. One tube becomes full when it accumulates 1,000 pieces of sand. When the sand decreases in a certain tube, it goes to the other tubes.

connected with each other at the bottom. It implies that when sand in a certain tube decreases, the same amount goes to the other tubes. The total amount of sand never changes.

Suppose the total amount of pieces of sand is 1,000. And, each tube includes 1,000 pieces when it is filled to the top. Here, one piece of sand corresponds to probability of 0.001. One thousand pieces of sand move among eleven tubes but their sum is always 1,000, that is, the probability of 1.0. A total of 1,000 pieces of sand is in a certain tube at the beginning. But, a few pieces move to other tubes after a short period of time. The destination of the sand is ten tubes. Therefore, exactly, it should be taken into account how many pieces of sand moves to each of the ten tubes, but, it is mathematically proven that it is sufficient to take into account the movement to two adjacent two tubes, approximately. For example, when the fourth tube from the extreme left that corresponds to the state in which 3 and 4 persons support A and B respectively is perfectly full, it is sufficient to take into account the number of pieces of sand that move to the third tube and the fifth tube for a short time. For the shift from the fourth state to the third state, one of three persons who support opinion A must change his or her opinion. Also, for the shift from the forth state to the fifth state, one of seven persons who support opinion B must change his/her opinion. Such a change of opinion of an individual person brings about a change of probability of each of the eleven states. Namely, a change of the probability indicator, macro state, is determined by a change of opinion of an individual person, micro state.

We started the above explanation by assuming a total of 1,000 pieces of sand in a certain tube at the beginning. Obviously, this was true at the beginning but sand start to spread to other tubes. For example, now a certain tube has 500 pieces and another has 20 pieces. No tube has 1,000 pieces any more. Then, how many pieces of sand in a certain tube move to the adjacent two tubes when it has 500 pieces? It is easy. The answer is that 500/1,000 or 1/2 of the amount of pieces move when the tube has 1,000 pieces. Similarly, the number of pieces that move to the adjacent two tubes from a certain tube having 100 pieces is 100/1,000 or 1/10 of the amount of pieces that move when the tube has 1,000 pieces.

Micro: Individual's Opinion

Let's turn to the micro. An individual is in one of two states, supporting A or B. There are only two states but you can understand them in the same way that we used the probability indicator. This time, we have just two tubes, one of which corresponds to opinion A and another of which corresponds to opinion B. The total amount of sand is 1,000 pieces, again.

How many pieces move to tube B for a short time when tube A is filled with 1,000 pieces? Conversely, how many pieces move to tube A for a short time when tube B is filled with 1,000 pieces? By defining these, the opinion change of an individual is formulated. The micro-macro link is completed if the macro state, opinion distribution among ten persons, is reflected in the formulation of micro behavior.

Simulation of Conformity Tendency

In the following simulation, we will focus on the tendency of an individual to conform to the majority, i.e., conformity tendency, as influenced by macro on micro. A person who has a strong conformity tendency is likely to change his/her opinion when others have an opinion that is different from his/hers. In contrast, person who has a weak conformity tendency is not likely to be affected by what opinion others support. We will see conformity tendency in the case of eleven states of opinion distribution shown in Figure 8.5. A person who supports opinion A is likely to change his/her opinion under the state that is closer to the extreme left, the state in which more persons support B, if he/she has a strong conformity tendency. In contrast, a person who has a weak conformity tendency is likely to continue to support A under the same state.

Having formulated the model of the micro-macro link, we can compute the change of probabilities of each macro state, opinion distribution. This is the numerical solution of differential equations, which is different from the banded structure of pedestrians and cellular automaton. An initial state is one in which the same number of persons, five persons, support A and B. Namely, the initial state is one in which all pieces of sand are in the middle tube in Figure 8.5 while the other tubes have no pieces.

In the following, we will see results of computation in which two variables change. The first variable is conformity tendency as described above. With this variable, three cases are compared such as the case in which all ten persons have a strong conformity tendency, the case in which all ten have a medium conformity tendency and the case in which all ten have a weak conformity tendency. In each case, individual differences of conformity tendency are not assumed in the model.

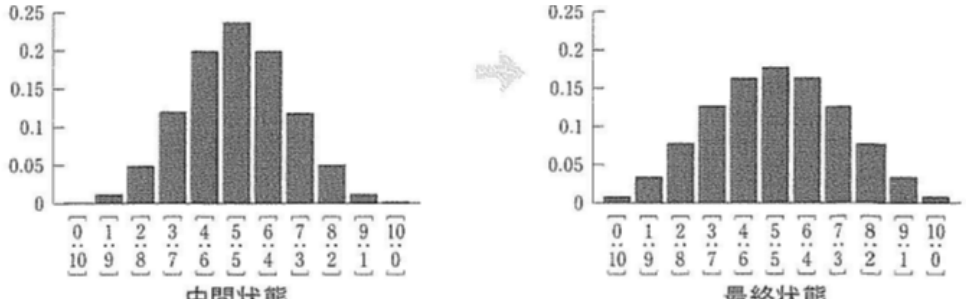
The second variable concerns how much A's or B's opinion is preferred by all people. We will take this variable as indicating the degree to which everyone prefers A to B because we don't assume asymmetry for the two. Again, individual differences are not assumed for this variable. With this variable, two cases are introduced such as the case in which all have the same preference to both A and B and the case in which all prefer A to B. In each combination of the two variables, we will see how the probability of each of the eleven states of opinion distribution is changed and what it ends up with.

The case in which all have weak conformity tendency. The (1)-a of Figure 8.6 shows a result for a group in which all persons have the same preference regarding A and B. Probability distribution changes while maintaining a mountain-shape and finally gets to a mountain-shape that is flatter than before. The most probable state is one in which A and B are supported by the same number of persons. The (1)-b diagram shows a result for a group in which all prefer A to B. You might not recognize any difference from the previous (1)-a at first glance but probabilities on the right-hand side of the mountain are larger than the left-hand-side. For example, please

Figure 8.6 Change of Probabilities of Opinion Distribution

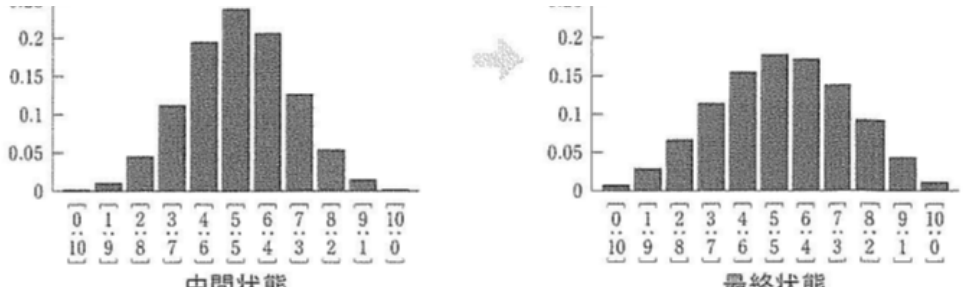
(1) 10 persons whose conformity tendency is weak

(1)-a. Each person has the same preference for opinions A and B.



Intermediate state Final state

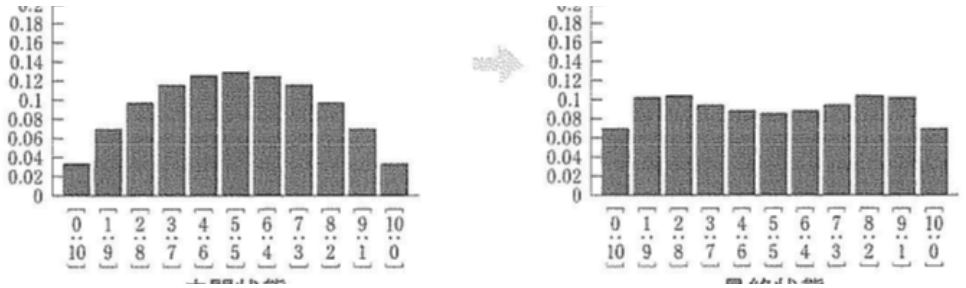
(1)-b. Each person prefers opinion A to B.



Intermediate state Final state

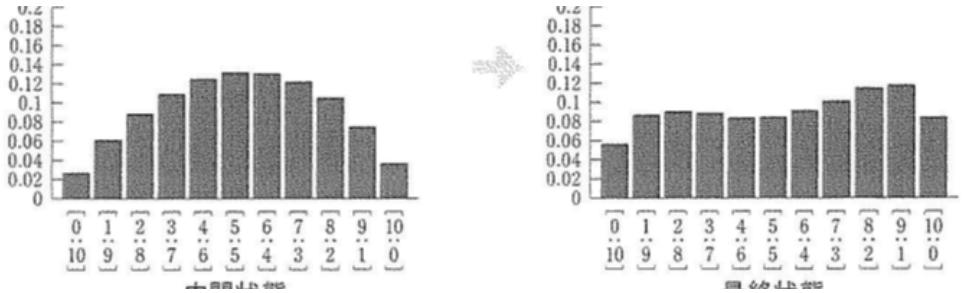
(2) 10 persons whose conformity tendency is moderate

(2)-a. Each person has the same preference for opinions A and B.



Intermediate state Final state

(2)-b. Each person prefers opinion A to B.



Intermediate state Final state

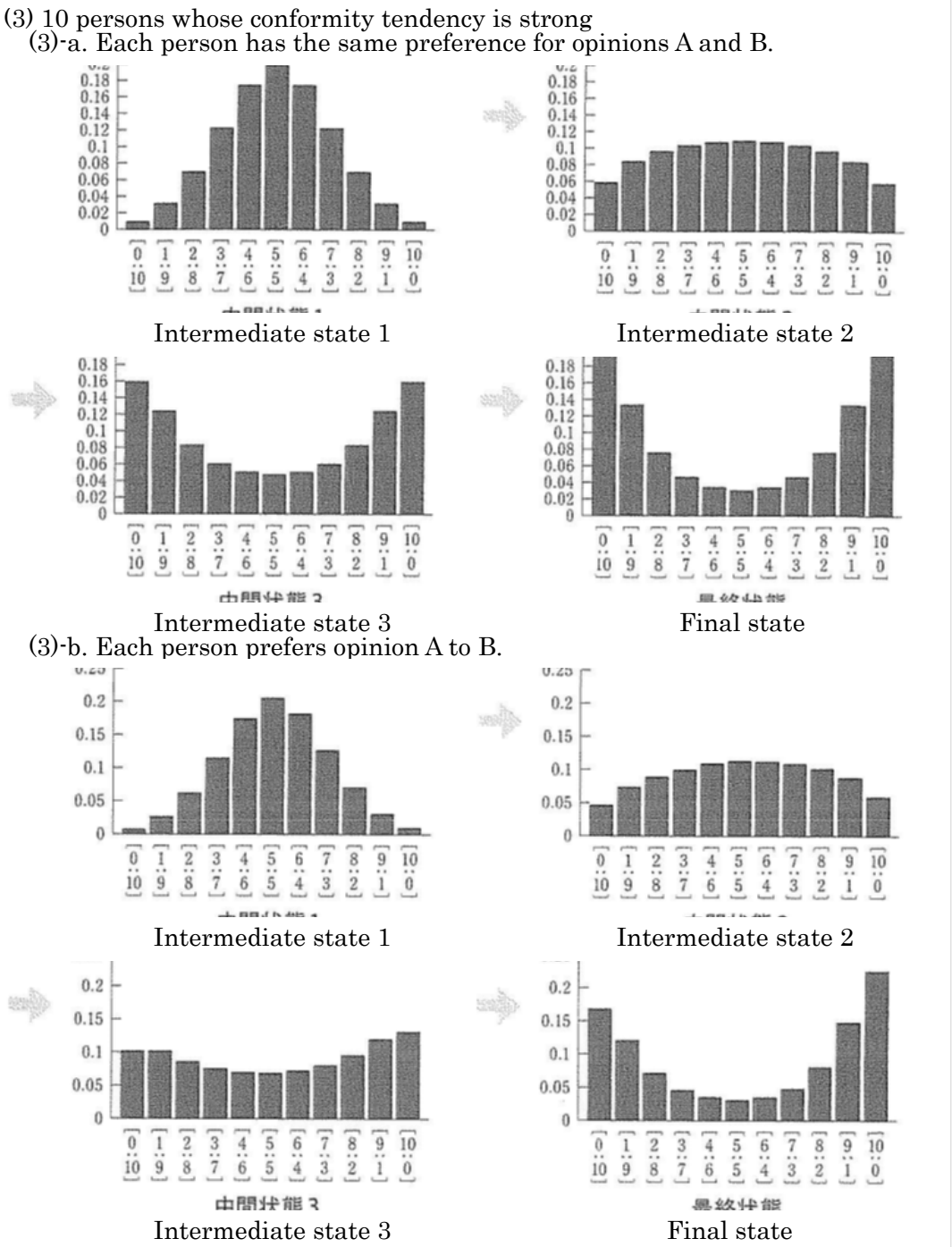


Figure 8.6. Probabilities of eleven states of opinion distribution change in ten persons depending on their degree of tendency to conform and their preference to opinion A. One of the most interesting is the last case, (3)-b, in which we assume ten persons whose tendency to conform is strong and who prefers opinion A to B. It is easy to predict most people come to prefer A due to their preference to A combined with their strong tendency to conform, which is represented by high probabilities of the two states in the extreme right and next in the final state. But, it is also probable with more than 25% to come to the two states in the extreme left and next in which ten or nine people support opinion B in spite of their preference. We could not find such a result without depending on a mathematical simulation.

compare the state in which 4 and 6 persons support A and B respectively with the state in which 6 and 4 support A and B respectively. Needless to say, the result reflects the assumption that all persons prefer A to B.

The case in which all have a medium conformity tendency. The (2)-a diagram shows a result for a group in which all persons have the same preference to A and B. A shape of probability distribution changes from a mountain-shape into a trapezoid whose central part is a little bit lower than the other part. In the final probability distribution, nine states except the extreme right and left states have almost same probability although a central state is a little bit lower. The (2)-b shows a result for a group in which all prefer A to B. The probability distribution changes from a mountain-shape whose right-hand side is higher into the shape that is obtained by making higher the right-hand side of the final distribution of (2)-a.

The case in which all have a strong conformity tendency. The (3)-a diagram shows a result for a group in which all persons have the same preference to A and B. The shape of the probability distribution changes from a mountain-shape to a trapezoid and reaches the shape in which the extreme right and left states are highest in parallel with depression of the central part. In contrast with (1) in which all persons have weak conformity tendency, the most probable states are the one in which all support A or B. A great difference is found in the final probability distribution depending on the degree of conformity tendency in a group in which all persons have the same preference to A and B. That is, the final distribution is a mountain-shape, a trapezoid and a shape with high edges for weak, medium and strong conformity tendency, respectively.

Then, what happens in a group in which all prefer A to B? The shape of probability distribution changes from a mountain-shape to a trapezoid and to a shape with high edges as in (3)-a but the right-hand side is consistently higher than the left-hand side. You might think it is obvious because it is assumed that all persons prefer A to B. However, it should be noted that the state in which all persons support B is the highest except the state in which all support A. The sum of probabilities of the extreme left and the next division is about 30%. From this, it is probable to some extent for ten persons who prefer A to become supporters of B if they have a strong conformity tendency. This is difficult to predict without mathematics.

The Markoff Nature

The result mentioned just above i.e, that people come to support B by a probability of almost one third even if they prefer A when their conformity tendency is strong looks interesting. If we replace opinions A and B with peace and war, the result brings about shocking implications that people who prefer peace come to start war with a probability of about one third when their conformity tendency is strong. But, although it might look logical, it is not realistic to apply simulation in this section to a problem such as peace and war. In the simulation in this section, we start with the initial state and obtain probability after a few times by computing the change of pieces of sand for a few times. We obtain probabilities further by repeating the computation of probabilities after a few times. Probabilities, after a few times, are computed only with the use of probabilities before a few times.

Importantly, only probabilities immediately before a few times are used to compute probabilities at a particular point of time. Thus, the simulation in this section stood on the assumption that stated a certain point of time is determined exclusively by the state of time immediately before. In other words, it is assumed that any states other than the state of immediately before, or a state a long time before (for example), never influence a current state. This phenomenon is called the Markoff nature. Under the premises of the Markoff nature, you can cut a series of processes into many stages and repeat computing the next state from the current state by establishing a certain condition. The Markoff nature is also assumed in the

simulation of banded structures of pedestrians in section 2 and the simulation by automaton in section 3 in this chapter.

Limitation of the Markoff nature

As far as the Markoff nature is hypothesized, states other than the step of immediately before have no influence on the current state although a step is a second, a day, a decade or whatever. How do you think? We have phenomena in which what happened once gives a long-term influence. For example, if your country once experienced a cruel defeat during a war, you might maintain an anti-military attitude for a long time. This is the reason why I said it was problematic to use A and B as metaphors for peace and war in the above. Also, there are many phenomena in which a history that led to the state of immediately before affects the current state. For example, if we are in an extremely poor situation at one point in time, the next state is determined differently by whether we became poor suddenly due to a huge disaster, whether we were rich but have declined gradually, or we have been poor for a long time. In this way, the Markoff nature cannot be applied to phenomena for which historical process or accumulation of experiences cannot be ignored. On the other hand, we see many phenomena that are often repeated around us. Fashion and rumor are typical. A phenomenon of high fashion is repeated for clothes, food and drink, cars, and various rumors appear and disappear regarding a variety of issues. The Markoff nature can be applied to phenomena that are repeated without a specific historical context.

5. Evacuation Method for Emergencies

Follow-direction Method and Follow-me Method

In this section, we will see an attempt to produce a particular physical collective stream intentionally. Specifically, we will focus on a method to evacuate many people from a building or an underground shopping mall in an emergency. It is aimed at how quickly a few leaders produce a stream of a crowd toward an exit, that is, a way to produce a particular physical nature of collectivity intentionally.

In this study, a new evacuation method was designed and was compared with a traditional method.[12] A certain clerk of a department store jumped up on a showcase and loudly shouted directions toward an exit for many people. His brave behavior saved the lives of many people. ---- This is an example of a leader's behavior that has been often introduced as successful so far. From this, we see the emphasis that a leader should (1) make himself/herself visible and, (2) use larges gestures and a loud voice, and (3) indicate the exit clearly. In fact, these qualities have been emphasized when evacuation drills are conducted. This method is referred to as the *Follow direction method.* However, I wonder if it is possible to have a method that does not use the three steps above. That is, I explore a method in which a leader (1) is not highly visible, (2) does not use large gestures and a loud voice, and (3) does not indicate the exit explicitly. What would that be like?

The new method is as follows: Each leader chooses one or two evacuees who are closest to him and individually asks them to follow. Subsequently, the leader actually takes them to the appropriate exit. In this method, the leader does not verbally indicate the direction of the exit, nor does he/she raise his/her voice or make any vigorous gestures. This method is characterized by concentrating the leader's action on one or two persons to work with the leader. The method was named the *Follow-me method*.

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[12] The study introduced in this section was published by Toshio Sugiman and Jyuji Misumi (1988). Development of a new evacuation method for emergencies: Control of collective behavior by emerging small groups. *Journal of Applied Psychology,* 73 (1), 3-10.

Effectiveness of the Follow-me Method

A large-scale evacuation drill was conducted at a large underground shopping district connected to the then Japan Railway's Hakata station in Fukuoka, Japan in October 1980. The drill was planned by creating a mock gas explosion accident at the underground. We carried out an experiment (the first experiment) in a part of the shopping district to compare the two evacuation methods. At the start of the experiment, 42 subjects, or evacuees, were randomly arranged in five clusters as shown in Figure 8.7. They were male employees of Fukuoka City Hall, and were in their 20s or 30s. At the beginning of the experiment, they were instructed to stay in their clusters until the evacuation started, and then, when an emergency alarm began to ring, to follow the orders made by the employees of the stores that lined the mall. The leaders were eight employees of the stores in the underground shopping district. Four of them, initially located at the north half of the mall, used the Follow Me method to evacuate subjects through the north exit. The other four, at the south half, used the Follow Directions method to evacuate subjects through the south exit. The four leaders in each condition consisted of two men and two women in their 20s.

Leaders were given instruction on their respective evacuation methods the day before the

Figure 8.7. The site of Experiment 1 and arrangement of leaders and evacuees at the beginning of evacuation (Sugiman & Misumi, 1988)

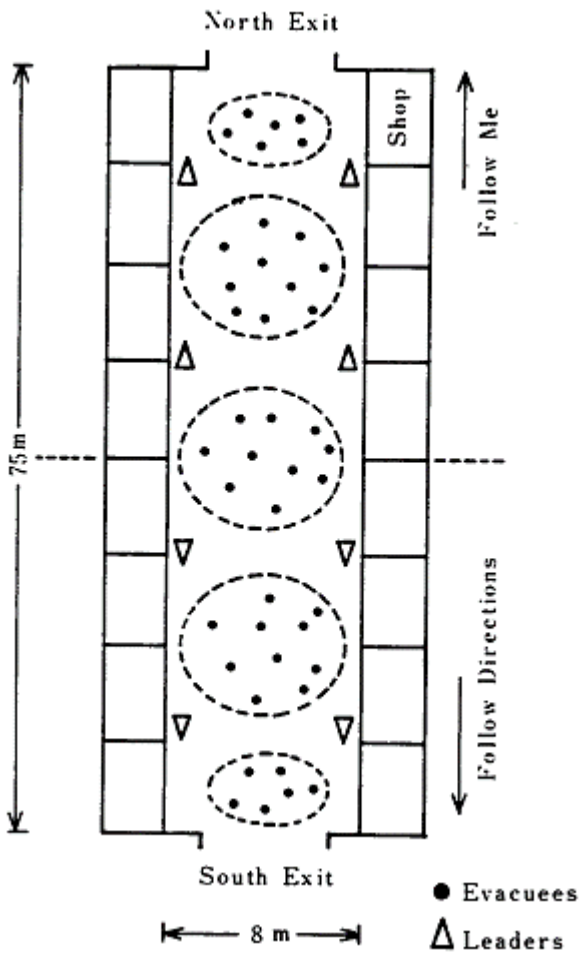

Figure 8.7. Four leaders at the north half of the mall used the Follow-me method toward the north exit while four leaders at the south half used the Follow-direction method toward the south exit.

Figure 8.8. Change of cumulative number of escaped evacuees over time after the emergency alarm began ringing (Experiment 1) (Sugiman & Misumi, 1988)

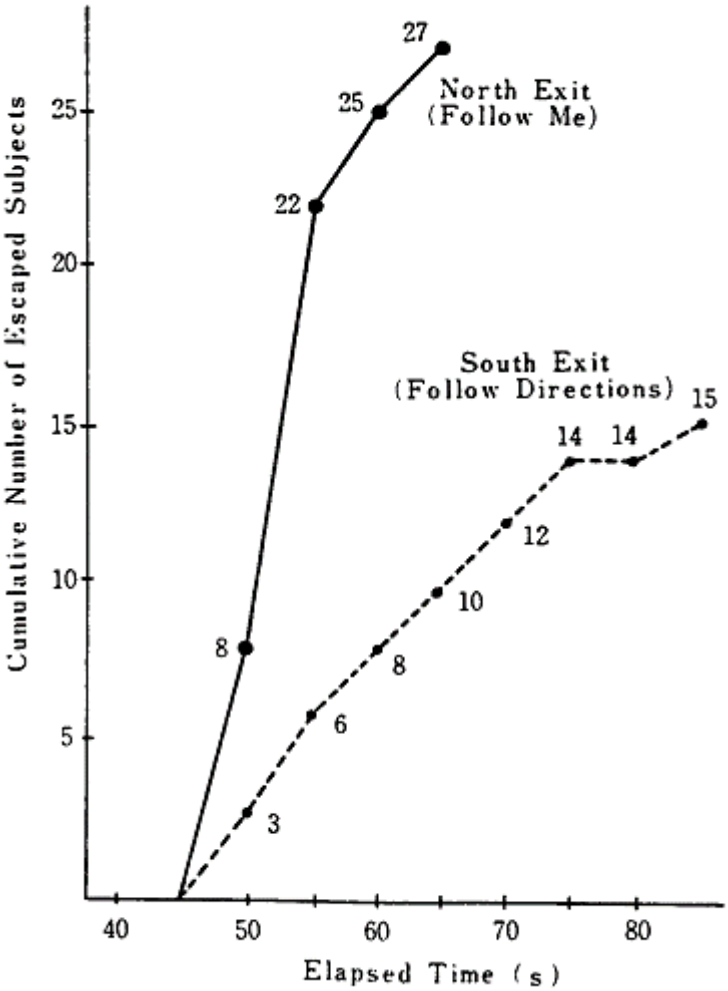

Figure 8.8. 27 subjects were evacuated in 65 seconds through the north (Follow Me) exit, and 15 subjects were evacuated in 85 seconds through the south (Follow Directions) exit. All 10 subjects who had been assigned to the middle cluster escaped through the north (Follow Me) exit.

experiment was carried out. The leaders in the Follow Directions condition were instructed to indicate the way to the south exit with a loud voice and forceful gestures while proceeding to the exit. The leaders in the Follow Me condition were instructed to locate one or two subjects to escape with, and to take them to the north exit.

Evacuation in the experiment was recorded on videotape by cameras located at the north and south exits. Figure 8.8 shows the cumulative number of evacuees over time for both exits. The horizontal axis represents the amount of time that elapsed after the emergency alarm began to ring. As you see in Figure 8.8, 27 subjects were evacuated in 65 seconds through the north (Follow Me) exit, and 15 subjects were evacuated in 85 seconds through the south (Follow Directions) exit. All 10 subjects who had been assigned to the middle cluster escaped through the north (Follow Me) exit.

The experiment demonstrated that not only did the Follow Me group evacuate more people, but it did so in a shorter amount of time. Then, how did evacuees in the Follow Me condition move? The researchers found on the basis of the results of an analysis of the evacuation process recorded on videotape the Follow Me method involved the following three steps:

- Each leader found one subject who happened to be close by to follow him/her to the appropriate exit. The leaders reported in the post-experimental interview that they had involved only one subject, although they had been instructed by the experimenter to signal one or two subjects.
- The subject who was directed by the leader, and a small number of subjects who saw what the leader was doing, began to follow the leader toward the exit. Thus, a small group formed around the leader and proceeded toward the exit.
- Nearby subjects gradually joined one of the small groups that were moving toward the exit. Those who began to follow the group at this stage had little or no direct influence from the leader's behavior.

In this way, four small snowballs were formed around each of the leaders as a core and then they rolled toward the exit while becoming larger. A snowball is an instant small group. Four instant small groups were formed around the leader as a core and then more people could be evacuated more promptly by their snowball effects.

The Leader-to-evacuee Ratio

The experimental result above was surprising not only for people who are responsible to enact emergency measures but also for myself. We decided to do another experiment to investigate effects of the Follow Me method in more detail. The two differences in experimental situations were introduced in Experiment 2. First, the escape route of choice, designated by the leaders, was more complicated than in Experiment 1. In Experiment 1, evacuees simply walked to the closest and most obvious exit. In Experiment 2, two exits were available, but the one closest and most obvious to most of the evacuees was avoided by the leaders. They led subjects toward the further exit, which was on the opposite end of the room and invisible to nearly all of the evacuees. This situation would be analogous to leading evacuees away from an obvious, but dangerous escape route, such as an elevator, and toward a safer but less obvious one, such as a stairway or a fire escape.

Second, explicit attempts were made to induce anxiety and restlessness, and thus to enhance experimental realism. All lights were turned off 20 seconds before the evacuation began, and an emergency alarm began to ring loudly in the totally dark room. Subjects were not warned beforehand about which exit they would be directed to, nor were they informed about the darkness and the emergency alarm.

In Experiment 2, the leader-to-evacuee ratio was manipulated by assigning either two

or four leaders to a group of 16 evacuees. Thus, a condition in which the leader-to-evacuee ratio was 1:8 was compared to a condition in which the ratio was 1:4 for both the Follow Directions and the Follow Me methods. In Experiment 1, analysis of the videotapes and the post-experimental interview suggested that the effectiveness of the Follow Me method was based on the rapid formation of a collective stream of evacuees. This stream was built on the emergent small groups that formed around the leaders, and then snowballed by collecting nearby evacuees. However, it is most likely that for this snowballing to be successful, there must be a sufficient number of small groups within the total population. An insufficient number of small groups, that is, an insufficient number of leaders to create these groups, would be detrimental to the creation of this stream.

Outline of Experiment 2. Experiment 2 was carried out in the basement of the training building of the Osaka Fire Defense School in 1982. The experimental site is shown in Figure 8.10.

The following five conditions were compared in Experiment 2:

(a) a condition in which four leaders used the Follow Directions method

(b) a condition in which four leaders used the Follow Me method

(c) a condition in which two leaders used the Follow Directions method

(d) a condition in which two leaders used the Follow Me method and

(e) a condition in which one of two leaders used the Follow Directions method, and the other used the Follow Me method-the Mixed method.

Evacuees were 80 volunteer university students who responded to posters at several universities requesting participants for an evacuation drill. They were run in five sessions of 16 students each, 14 men and 2 women per trial. Leaders were male university students who had been trained in their assigned evacuation method.

Figure 8.9. The site of Experiment 2 and arrangement of leaders and evacuees at the beginning of evacuation (Sugiman & Misumi, 1988)

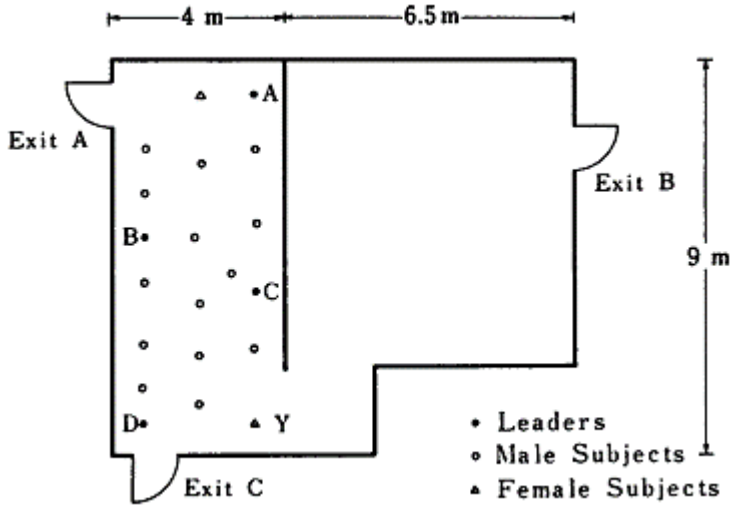

Figure 8.9. Situation of Experiment 2 was more complicated than Experiment 1. Leaders led subjects to Exit B that was not invisible from original positions of the subjects while Exit A was opened when the alarm began ringing. Exit A is assumed to be an exit that is not safe but is likely to be used by many people.

As shown in Figure 8.9, the basement was divided in two parts by a wall. The only way to pass from the starting point of the experiment to the opposite side of the wall was through the narrow pathway marked by a Y. The spots on the floor on which evacuees and leaders stood were numbered, and subjects were told to go to an assigned spot and stand there from the beginning of the experiment until the actual evacuation began. Because the room was in the basement of a concrete building and was without windows, it was completely dark when all exits were closed and the lights turned out. The lights in the room and an emergency alarm were controlled by the experimenter from outside of the room.

Procedure of Experiment. Subjects and leaders gathered outside the training building. At this stage, the leaders behaved as if they were subjects, and were not identified by the experimenter. Each subject was handed a number that corresponded to a location in the experimental room, and was asked to wear the number across his or her chest in the manner of a track and field runner or competitive skier. The numbers were assigned randomly except that the leaders received the numbers that corresponded to the letters in Figure 8.10, and female students received numbers that put them at either end of the room. This was done for the safety of the women in the event of stampeding toward the exits. Subjects and leaders entered the experimental room through Exit C. After they found their designated marks, the experimenter told them: “Now the evacuation drill is starting. Soon I will get out of this room. After a while, when the doors to this room are opened, escape from the room. At that time, some of the people among you will have a white cap on. They will try and lead you. Follow their directions.”

The experimenter gave the instructions twice and answered questions from the subjects. After the experimenter left by Exit C, it was not used again during the experiment. Exits A and B were kept closed from the beginning of the experiment until the evacuation began. All lights in the basement suddenly turned off, 15 seconds after the experimenter left the room, and a loud emergency alarm sounded for 20 seconds. The subjects had had no warning about the darkness or the alarm. During the darkness, leaders put on their white caps, which had been hidden in their pockets.

After the alarm had finished ringing, Exits A and B were opened from the outside. Taking this as their cue, leaders began to evacuate the subjects via their designated methods. At this stage of the experiment, it was bright enough from the light shining through Exits A and B to observe each other’s behavior (as well as to ascertain who was wearing the white caps), although the room lights remained off. The leaders tried to take the evacuees past point Y, through Exit B, although most subjects were closer to Exit A, and thus were more likely to use it in the absence of leaders. Subjects escaping through either exit were recorded on videotape cameras set up outside the two exits.

At this point, the leaders' behavior, in further detail, across the five experimental conditions was as follows:

1. In the four-leader Follow Directions condition, the four leaders were assigned to stand on the Points A, B, C, and D, as represented in Figure 8.9. As the evacuation began, the leader at Point A called out “Don’t go through this exit,” while standing in the way of some of the subjects who were trying to leave through Exit A, which was, to them, the nearest escape. Subsequently, the leader at Point B called out “Go in that direction,” while pointing at the Y point with a waving arm. Leaders at Points C and D then began to call out the same phrase, while pointing toward Exit B. Thereafter, all of the leaders proceeded toward Exit B while calling out directions.

2. In the four-leader Follow Me condition, the four leaders were assigned to the same points as in the previous condition. When the evacuation started, each of the leaders said to a person close to him “Come with me,” while patting him or her on the shoulder, and subsequently moved with the subject to Exit B.

3. In the two-leader Follow Directions condition, the two leaders were assigned to Points A and D. At the start of the evacuation, Leader A stood in the way of the subjects trying to escape through Exit A, and called out “Don’t go through this exit.” Leader D subsequently called out “Go in that direction,” while gesticulating toward Exit B. Both leaders then proceeded toward Exit B while calling out directions.

4. In the two-leader Follow Me condition, the two leaders were assigned to Points A and D. They acted in the same manner as the leaders in the four-leader Follow Me condition.

5. In the two-leader Mixed condition, the two leaders were assigned to Points A and D. In this case, Leader A used the Follow Directions method and Leader D used the Follow Me method. At the start of the evacuation, Leader A blocked the way out through Exit A while calling out, “Don’t go through this exit,” and pointed toward the Y point while calling out “Go in that direction." Thereafter, he proceeded toward Exit B while calling out directions. On the other hand, Leader D began to behave in the same manner as the leaders in the previous Follow Me conditions, and, at the same time, Leader A started the evacuation.

Results. Figure 8.10 provides the cumulative record of escaped subjects over time for the five conditions, measured every 2 seconds after the doors were opened and the evacuation began. Subjects were considered to have escaped when they got out of either Exits A or B. When four leaders were present, all 16 subjects escaped through Exit B. There were, however, large differences between the Follow Directions condition and the Follow Me condition in the amount of time necessary for getting the first, last, and “average” evacuee to safety; in all cases this difference was more than 10 seconds.

In conditions in which two leaders were present, a critical difference was found between the two methods; 11 out of 16 subjects escaped through Exit A in the Follow Me condition,

Figure 8.10. Change of cumulative number of escaped evacuees over time after the emergency alarm began ringing (Experiment 2) (Sugiman & Misumi, 1988)

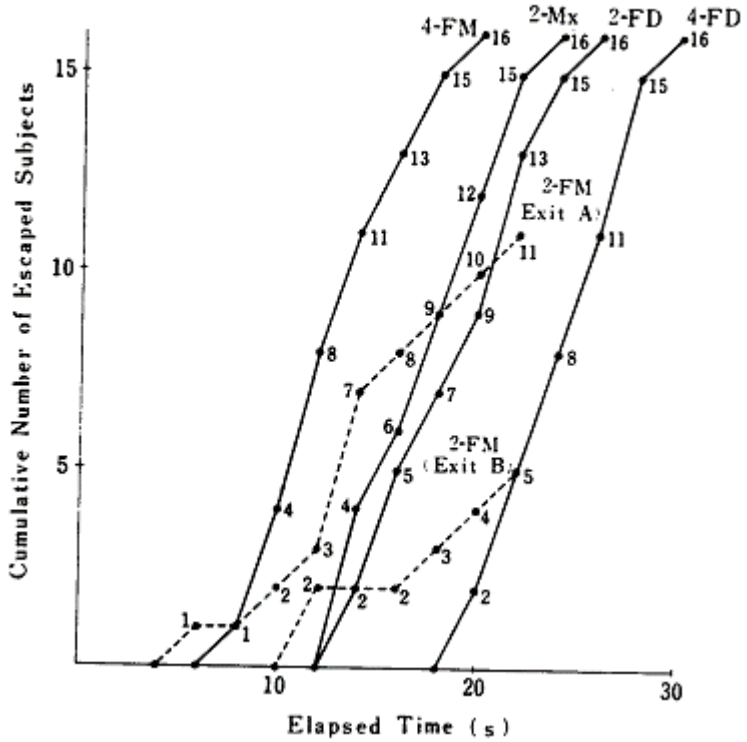

Figure 8.10. FD, FM, and Mix indicate Follow-directions, Follow-me, and mixed conditions, respectively. Numbers preceding these abbreviations show the number of leaders.

whereas none did so in the Follow Directions condition. Of all five conditions in this experiment, only in the two-leader Follow Me condition did any subjects escape through the prohibited exit. We also found that the two-leader Follow Directions condition was faster than the four-leader Follow Directions condition in evacuation time, but not as fast as the four-leader Follow Me condition. Finally, in the two-leader Mixed condition, the 16 subjects escaped through Exit B in slightly less time than in the two- leader Follow Directions condition.

Differences by the number of leaders. We found that effectiveness of the Follow Directions and the Follow Me methods were reversed by the leader-evacuee ratio. Namely, the Follow Me method was superior to the Follow Directions method as in Experiment 1 when 4 leaders were assigned to 16 evacuees, or the leader-evacuee ratio was 1:4.

In contrast, a quite opposite result was obtained when only two leaders were assigned, or the leader-evacuee ratio was 1:8. That is, about two-thirds of the evacuees escaped through the exit that was not headed by the leaders in two-leader Follow Me conditions while rapid evacuations were achieved in the two-leader Follow Directions condition although it was slower than the four-leader Follow Me condition. About two-thirds of the subjects answered that they could not identify a leader and that they did not see what evacuation was attempted in the post-experimental questionnaire. This shows that leadership was immensely weak in the two-leader Follow Me condition. From the above results, it became clear that the effectiveness of the Follow Me method was remarkably affected by the leader-evacuee ratio.

The Follow Me method can harness the absorbing power of instant small groups that are formed around leaders as a core. But, instant small groups do not always produce a stream of a crowd toward an exit as shown in the deteriorated results of the two-leader Follow Me condition. Therefore instant groups should be formed with sufficient speed. It was natural for evacuees to form a stream of a crowd toward the exit that was close to them if leadership would not be provided. Until this happens, instant small groups have to be formed and start to absorb evacuees around them. Regarding whether it is possible, a critical line can be drawn between a two leader condition and a four leader condition in our experiment. But, a general borderline of the leader-evacuee ratio depends on other factors such as the physical structure of the evacuation site, the quality of leaders and evacuees, the amount of light and the number of exits.

Evacuation in Reality

Let us see what happens in a real evacuation. The Follow Me method might be effective in a site where many leaders can be secured for the number of clients such as in a department store or an underground shopping mall. But, the Follow Me method might not be effective for the site where sufficient number of leaders cannot be secured for large audiences such as in a movie theater or a ball park. The functions of the Follow Directions method can be replaced with loud speaker announcements and hardware such as running lights on the floor. It might be effective to use a joint Follow Me method with a hardware system that is substituted for the Follow Directions method. For this, it is obvious that possible leaders can be trained in ordinary situations.

Chapter 9
A Canopy of Conflict

Conflict or fight sometimes takes place in a collectivity. Two collectivities in conflict can be taken all together as a single collectivity in which we can grasp how the two oppose each other, namely, the structure of conflict. We will use game theory to depict various structures of conflict. Starting with the basic introduction of game theory, we will discuss several typical games.

We will also learn about a game theory that is not included in a standard textbook of game theory. With this theory, you can predict a deadlock in which each participant is prevented from changing the way to easily go when counter actions by the others are taken into account.

Group dynamics sometimes deals with a collectivity including two persons who are fighting. Likewise, two collectivities that have a clash of interests are sometimes taken as a single collectivity. We can observe the nature of collectivity in a collectivity including two persons who are fighting and in a collectivity including two collectivities that are in conflict.

In this chapter, we will focus on the nature of collectivity in which two or more persons and collectivities in conflict are included. The nature of collectivity might be called the structure of conflict. Game theory is a useful device to use to illustrate this phenomenon.

Game theory was born in an applied mathematics technique called operations research, abbreviated by OR. Operations research was originally military strategy research and developed prior to World War II to use mathematical modeling as a technique to win a war or to maximize one's own profits. Thus, it was natural that game theory developed in operations research in the 1950s was then applied to economics, political science, and psychology because these fields addressed competition. In the 1980s, game theory started to be used in biology because biologists were interested in how two or more species compete to survive in the biotic world. Currently, game theory applies to a wide range of studies in decision science that include both human and computer research.

This chapter will first explain the most basic game called the standard game. We will look at several representative games that have been studied frequently so far and the type of conflict structure depicted by each of those games. Next, we will see a little bit of unfamiliar game theory called conflict analysis.

1. The Standard Game

Let's explore the standard game, the most basic game in game theory. Persons or groups in conflict are called players in game theory. We will treat a player as a person just for our convenience in the following explanation although a player is a group in many cases.

Pay-off Matrix

First, you define who the players are to formulate a standard game. Sometimes, there might be two players, other times three or more. Generally, the number of players is *n*. But, in a real setting, it is not easy to identify who the players are. Sometimes, a person whom you assume irrelevant could be an important player while a person whom you assume is a strong player might not have very much power as a player. Having defined players, you explain what options and alternatives, each player has. Again, it is not easy to understand the options of each

player. Perhaps a player has an option that you are not aware of or, for some reason, you assume a player has a strategy or an option that you assume is possible and the player is not able to execute that option.

Having defined both players and options, you define the gains each player obtains for each combination of options. Gains can be either positive or negative. A negative gain means a loss. Let's explain using an example of a game called Janken. In Italian it is called Mora; in the U.S. it is called Rock-Paper-Scissors. In Janken, we have three options: *scissors* shown by the forefinger and the middle finger, *paper* shown by opening a palm and *rock* shown by a fist. Scissors defeats paper because scissors can cut paper; paper defeats rock because paper can wrap rock; and rock defeats scissors because rock is hard enough not to be cut by scissors. Here, let's define the gains of a win, a draw and a loss as +1, 0 and -1, respectively. You can summarize the gains of each combination of the three options in the table shown in Figure 9-1. Such a table is called a pay-off matrix.

Figure 9.1 Pay-off Matrix of the Janken Game

		Player B		
		Stone	Scissors	Paper
Player A	Stone	0 / 0	-1 / +1	+1 / -1
	Scissors	+1 / -1	0 / 0	-1 / +1
	Paper	-1 / +1	+1 / -1	0 / 0

Figure 9.1. Numbers in the lower left and upper right in each cell represent the gains of player A and B, respectively. Negative values represent loss.

The pay-off matrix in Figure 9-1 is divided into nine small rectangles, three by three. Each rectangle is called a cell. Each cell is divided into two, upper right and lower left, by a slant line. The lower left indicates a gain of player A while the upper right indicates a gain of player B. In this way, a two-person standard game is defined by formulating a pay-off matrix.

Zero-sum Game

A two player standard game is classified into a zero-sum game or a non-zero-sum game. The zero-sum game is defined as one in which the sum of gains of both players is zero in all cells. Namely, one player loses the same amount as the other player enjoys regardless of whatever cell is chosen. Janken is a zero-sum game. A pay-off matrix in Figure 9-2 is also one of the zero-sum games. In game theory, a strategy named the mini-max strategy was mathematically found to bring maximum gains to both players in the zero-sum game. This strategy is an extremely cautious one like the Japanese proverb that advises a person to tap a stone bridge with a stick many times before crossing a river. In other words, even if the bridge looks sturdy, one should test it before setting foot on it. We will explain the concept in the following.

First, let's become player A. Player A has three options and says to him/herself, "What happens if I take A1? I don't see whether player B takes B1, B2 or B3 but I can gain -2, or can confine my loss to 2 in the worst case in which Player B takes B3. The worst case is -2 if I take A1. I make a note, 'A1: -2.' Then, what happens if I go with A2. I can get -3 in the

Figure 9.2. An Example of a Zero-sum Game

		Player B		
		A1	A2	A3
Player A	A1	-3 / +3	0 / 0	+2 / -2
	A2	-2 / +2	+3 / -3	0 / 0
	A3	-1 / +1	-2 / +2	-1 / +1

Figure 9.2. In a zero sum-game, one player enjoys the same gain as another's loss in all cells.

worst case in which Player B takes B2. I make a note, ‘A2: -3.’ Last, what happens if I go with A3? I can get +1 in the worst case in which player B takes B1 or B3. I make a note ‘A3: +1.’ Then, looking at the note and comparing the three worst cases possible, the player chooses an option that guarantees the best gain among the three worst gains, that is, A3. This is the logic of the mini-max strategy. In Figure 9-2, player A chooses A3 to reach a cell of A3 and B1 or a cell of A3 and B3. As you see, the strategy is enormously guarded because one has to choose an option that achieves the best gain by comparing the worst possible gains.

Next, choose an option when you become player B and depend on the mini-max. Then, you choose B3 to obtain a cell of A3 and B3. Here, note that the cells of A3 and B3 are also wanted to be obtained by player B. The same cells are wanted to be achieved by both players. A cell that is desired by both players who depend on the mini-max strategy is called a saddle point. A saddle point is like a central point of horse saddle, illustrated in Figure 9-3. Assume the height of each point on the surface of the saddle from the ground indicates the gain of player A. Player A looks at the saddle from the point of the tail of a horse while player B looks at it from a 90 degree angle at the side of the horse. Player A has to focus on the worst cases, i.e., the lowest points, on each line running from the neck to the tail of the horse, and comparing them to the best point, i.e., the highest point. The best point is a saddle point. Next, let’s become player B and look at the saddle from the side of a horse. Here, the height of the surface of the saddle means his/her loss because the height indicates gains of player A.

Figure 9.3. A Saddle Point

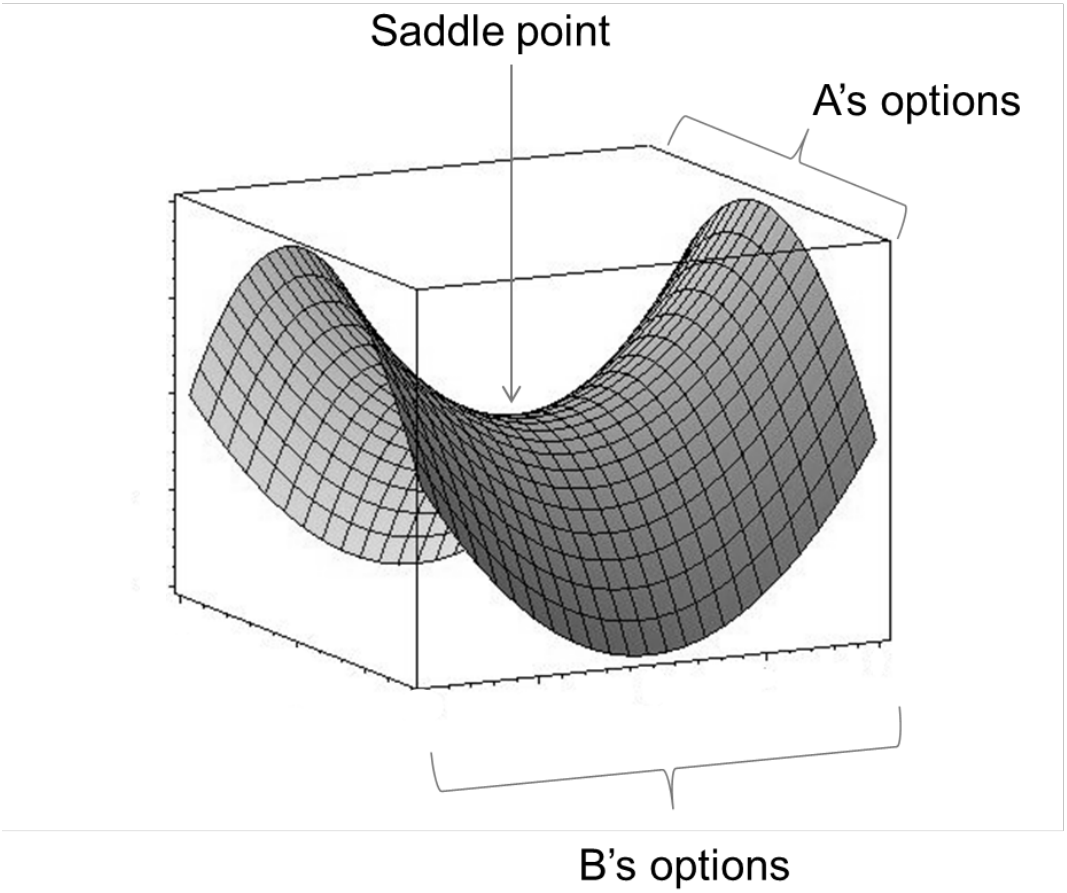

Figure 9.3. A saddle point is a cell that both players aim at when each player takes a mini-max strategy but, a saddle point does not necessarily exist.

Therefore, player B has to focus on the highest points on each line running from his/her side to the opposite side of horse and comparing them to find the lowest one. Then, player B comes to aim at the saddle point, too. In this way, the saddle point is aimed at by both players. A saddle point is at the center of saddle but a saddle point is not necessarily at the center of pay-off matrix as in Figure 9-2. It should be noted that all zero-sum games do not have a saddle point. Rather, zero-sum games that have a saddle point are just a part of zero-sum games. You can see that Figure 9-1, a pay-off matrix of the Janken, does not have a saddle point.

Mathematical game theory proved that gains of both players can be maximized when each player chooses an option by aiming at a saddle point if a saddle point exists. But, it is only a mathematical or rational solution. Humans do not necessarily behave in that way. But, game theory is useful because you can apply the solution as a point of reference with which you compare options actually chosen by people.

A zero-sum game depicts a type of conflict in which the fixed amount of gains is scrambled. An example is where two stores struggle with each other to obtain more clients in a community where there are a fixed number of inhabitants. One store acquires ten more clients but the other loses ten. In a company, a zero-sum game is played between the employer who wants to invest more money from the benefits and the employees who want to have a higher salary when the economy of a country does not develop and remains stable. Large differences occur depending on the nature of conflict depending on whether the conflict is a zero-sum type or not.

Non-zero-sum Game

A game that does not satisfy a condition that the sum of gains of both players is zero in each cell is called a non-zero-sum game. We can say most two-player standard games are non-zero-sum games while an exceptional few of them are zero-sum games. In the following, we will see representative non-zero-sum games such as in the prisoner's dilemma game, a chicken game and a difference maximization game.

Prisoner's Dilemma Game

Probably, a game that has attracted researchers the most is the one that is given an interesting name, the Prisoner's Dilemma game. But, more accurately, the name should be A Suspect's Dilemma Game as will be explained in the following.

Here, we have two persons, A and B, who were arrested on suspicion of jointly committing a crime. A prosecutor examines each suspect separately and independently. Each suspect has two options. One option is to keep silent while trusting that one's partner also keeps silent. Another is to confess everything because the suspect is being harshly interrogated by the law enforcement officer.

Figure 9-4 shows the gains for each combination of options of the two suspects. First, every detail of the crime is brought to light if both A and B confess. In this case, both are

Figure 9.4 Prisoner's Dilemma Game

		Suspect B	
		Keep silent	Confess
Suspect A	Keep silent	-2 / -2	-1 / -10
	Confess	-10 / -1	-8 / -8

Figure 9.4. Suspects are expected to be put in a jail for eight years when the crime they committed becomes apparent but only for two years if both keep silent and do not make sufficient evidence available. An interesting situation is one in which one of them confesses while another keeps silent, which reduces punishment of the former (one year) and increases punishment of the latter (ten years) by plea bargaining between a prosecutor and a suspect .

condemned to eight years' servitude. Conversely, if both keep silent, they are condemned to only two years' servitude because the prosecutor does not have enough evidence to put them in jail for eight years. But, an interesting case is one in which one of the two suspects confesses and the other keeps silent. Here, we assume a plea bargaining, i.e. a negotiation between a prosecutor and the suspect that reduces the punishment of a suspect who contributes to the investigation and increases the punishment of the suspect who does not. We assume that a cooperative suspect will be condemned to be in jail for less time (for example, one year) while a non-cooperative suspect will be condemned for a longer time (to be in jail for ten years).

Facing a pay-off matrix in Figure 9-4, a suspect experiences a dilemma of whether to aim at two years in jail by trusting the partner and keeping silent or aiming at one year in jail by confessing all and depending on a plea bargaining. The worst result, ten years in prison, is possible when the suspect tries hard to keep silent, if his partner confesses. The advantage a suspect could enjoy by a plea bargaining is destroyed if one's partner also confesses.

Figure 9-5 shows a pay-off matrix in which 7 is added uniformly to each gain in Figure 9-4. The characteristics of Figure 9-4 are maintained in Figure 9-5 because Figure 9-5 is produced by uniform increase of gains in Figure 9-4. Two players who face a pay-off matrix in Figure 9-5 also face a dilemma of which option they take. In the following, we will continue our explanation with the use of Figure 9-5.

Figure 9.5. Prisoner's Dilemma Game when Seven Points are Added to Each Gain in Figure 9.4

		Player B	
		B1	B2
Player A	A1	+5 / +5	+6 / -3
	A2	-3 / +6	-1 / -1

Figure 9.5. Because seven points are added equally to each value in Figure 9.4, the basic structure of the conflict remains the same.

We are often faced with a dilemma situation of whether we aim to choose a result that is best for both players (5 points in Figure 9-5) by giving up a larger gain we could enjoy (6 points in Figure 9-5) or we aim to enjoy the largest gain by sacrificing the other. It is not unusual to see the structure of conflict that puts people in such a dilemma. For example, suppose there are two shops that compete with each other to sell the same goods. Each of the two has two options, to reduce the price or not. Their amount of sales is $200,000 at the current rate. Sales of both are reduced to $100,000 if both decrease the price. But, when only one shop decreases the price, it can increase sales to $250,000 by attracting more clients, while sales of the other shop is reduced to $100,000. Each shop is forced to be in a dilemma of whether to aim at $250,000 by reducing the price by one's lone or aiming at co-existence and co-prosperity by satisfying oneself with $200,000.

Where does the Dilemma come from?

Here, let's examine theoretically where the dilemma in the prisoner's dilemma game comes from. As a matter of fact, the dilemma stems from two obvious assumptions included the game. Each of them looks obvious when you hear it alone. But, the two actually contradict each other.

The first obvious assumption is on the level of individual. Let's become player A in Figure 9-5. You don't see whether player B takes B1 or B2. Then, you suppose player B takes B1. You obtain 5 if you take A1 and 6 if you take A2, which makes you choose A2. Next, you suppose player B takes B2. You obtain -3 with A1 and -1 with A2. Consequently, A2 brings more gain regardless of whichever player B takes B1 or B2. You decide to take A2. How do you think? Isn't it obvious you should take a particular option if it brings more benefit regardless of which option player B takes. Player A takes A2 and player B takes B2 if the both players follow the above obvious assumption.

However, we have another obvious assumption which is on the group level. The group level means we take two persons together as a group. Here, we will indicate the gains of two players i.e. gain of player A, gain of player B. Suppose there were included cells such as [5,7]and [6, 8] although they are not included In Figure 9-5. Which cell is better for the both players as a group? Of course, [6, 8] is better because the both can gain more in [6, 8] than [5, 7], Then, how do you think about the two cells, [5, 7] and [6, 7]? Gains of player B are not different between the two cells but player A obtains more gain in [6, 7] than [5, 7]. For this, we can say [6, 7] is better than [5, 7] because more gain is obtained by player B while player A maintains the same gain. But, when we compare [7, 4] with [5, 7], we can't say the former is better than the latter because, in the former, player B obtains less gain although player A obtains more. Needless to say, when we compare [3, 4] with [5, 7], we can't say the former is better than the latter. In summary, we can say a certain cell is better than another cell when both obtain more gains or when one of the two gains more while another gains the same. Having understood the meaning of better, we focus on each cell one by one and check if other cells are better than the cell focused on. If no other cells are better than a certain cell, it is reasonable to obtain the cell. But, it is not clever to achieve a certain cell even when other cells are better than a certain cell. Therefore, the second obvious assumption is that we should not stick to a cell when other cells are better than the cell we have.

Then, we will check each cell one by one in Figure 9-5. For the upper left cell, [5, 5], no other cells are better than it. It is because the both decrease gains in lower right cell and player A (or B) decreases a gain in the upper right cell (or lower left cell). For the lower left cell (or the upper right cell), other cells are not better than it because player A (or B) decreases a gain in each of the other cells. However, only in the lower right there is a cell that is better than it. That is, both increase gains in the upper left cell. Therefore, we conclude from the obvious

assumption on the group level that it is foolish to obtain the lower right cell while it is not unreasonable to obtain the other cells. This conclusion that led by the obvious assumption on the group level is that one should avoid the lower right cell.

As we see above, a cell that is reached by following the obvious assumption on the individual level should not be obtained when following the obvious assumption on the group level. A dilemma is produced in Figure 9-5 because contradictory results are brought about by obvious assumptions on the individual level and the group level.

Here, it might be good to insert a note on *obvious* in the obvious assumption. Whenever we take something as obvious, a pitfall might be there because it is hard to say something is absolutely obvious. First, let's focus examine the obvious assumption on the individual level. It was the assumption that you should take an option that brings you more gains than the other options regardless of which option your opponent takes. But, this obvious assumption is underpinned by the premise that one tries to pursue one's own benefits without any concern with other's benefit or loss. Certainly, we are sometimes committed to selfish behavior in which we exclusively focus on our own interests, but, in many cases, we are likely to take our opponent's interest to some extent even if we are in conflict with him/her.

An example in Japanese history is a sixteenth century story about the Japanese Samurai military commander, Kenshin Uesugi and his enemy Shingen Takeda. At that time, Japan was divided into many territories, each controlled by a different ruler. Uesugi's territory faced the Japan Sea where salt, a precious commodity, was ubiquitous. Takeda's territory was in a mountainous area where salt was not present. Yet all humans need salt in order to survive so Uesugi sent salt to Takeda even though they competed fiercely. This story demonstrates that exclusive self-interest is exceptional because we are a cooperative species.

Next, let's examine the obvious assumption on the group level. It certainly looks obvious that [6, 9] is better than [5, 7] for the both players. Then, how do you think about [6, 7] and [6, 70]? More precisely, how about [6, 7] and [6, 7000000]? We can no longer easily say the latter is better than the former. It is because we have to question if it is too unequal. We end with a brief discussion on obviousness with the epigram, "Be careful when you see something obvious."

We have introduced a prisoner's dilemma game as an example of a two-person standard game. But, you can generalize it to include many players. The point of the prisoner's dilemma game is that each player has two options, pursuing one's own benefit or co-prosperity. A typical example is the problem of common ownership. For example, suppose a pasture is managed by ten people. Taking into account the amount of grass a single cow eats and the amount of grass in the field, they decide that each person could put three cows in the field. But, each of them could earn more by putting an additional cow in the field. They have two options: one which is to pursue one's own benefit by adding one more cow and the other which is to maintain coexistence by keeping the rule.

The Chicken Game

There are other interesting games than the prisoner's dilemma. One of them is referred to as *chicken game*. Here, chicken is a slang word that means coward. It is a fearful story but let's suppose two men fiercely quarrel with each other and decide to have a duel by motorbike. In the duel, each man drives his motorbike straight forward from the opposite side in a narrow path with the result of a head-on collision. They have two options to take after starting to drive: a brave one in which they go ahead and a cowardly one in which they manipulate the handlebars to avoid a crash. The structure of conflict is depicted by a pay-off matrix shown in Figure 9-6. A serious injury by a head-on collision is expressed by -20. In

Figure 9.6. The Chicken Game

		Player B	
		B1	B2
Player A	A1	0 / 0	+1 / -1
	A2	-1 / +1	-20 / -20

Figure 9.6. In the Chickens game, a tragedy awaits both players if they expect the opponent to not be a chicken and the players crash into each other for the “entertainment” of the onlookers.

contrast, when both of them avoid a crash, nothing happens, which is expressed as no gains. The problem is what happens when one continues to go ahead but the other avoids a crash. The former is applauded by the audience, which is expressed by +1, but the latter evokes ridicule, which is expressed by -1 in Figure 9-6.

Negotiation by two persons, or two parties, who represent an organization or a country, is likely to fall into the structure of a chicken game. Such leaders sometimes do not give up a strong desire to maintain the people's pride, although a miserable result can be predicted if both continue to go ahead with such a violent choice. An example is what happens during a scramble for a small island by two countries. Politicians in each country should try to find a solution that can be acceptable for both while trying to prevent from falling into a chicken game.

A Different Maximization Game

We will analyze one more famous non-zero-sum game. Please look at the pay-off matrix shown in Figure 9-7. If you are interested in getting as many gains as possible, your options are clear. Player A achieves more gains by choosing option 1 than option 2 regardless of which option Player B takes. This is the case for player B. Both can enjoy maximum gains by taking option 1 together. Then, what makes a player take option 2? It is the motivation to obtain more gains than the other, or to win over the other. Figure 9-7 depicts the structure of conflict in which motivation to maximize the difference of one's gain from the other's tends

Figure 9.7 Difference Maximization Game

		Player B	
		B1	B2
Player A	A1	+6 / +6	+5 / 0
	A2	0 / +5	0 / 0

Figure 9.7. In a difference maximization game, although it is obvious that one should choose A1 or B1 to increase one's own gains, motivation to gain more than the other player leads one to choose A2 or B2.

to be activated in spite of the fact that it is clear how they both can maximize their own gains.

2. Conflict Analysis

We explained standard games in the previous section. Now, we will examine a game theory that is different considerably from standard games. The game theory is called *conflict analysis*.[13] Conflict analysis is characterized in two ways. First, it takes reading the future into consideration. An excellent chess player can predict many moves in the future. A player cannot make a certain move if it might bring about a disastrous situation depending on the other's moves in the future. Second, a player's gains are not represented by figures but each option is just ordered in the conflict analysis. It is not easy to express gains by figures that have rational grounds except when gains can be expressed by monetary units or amounts of physical acquisitions. But, it is much easier to order options in terms of preference. The rules allow one to give the same order to two or more options. In an extreme case, all options and gains might be given the same order.

Let's explain conflict analysis using an example. Suppose there are two large countries, A and B, that compete for dominance. Suddenly, country B starts building a missile site on a small island , C, that is located close to country A. Tension between A and B increases rapidly. The two countries, A and B, have options in the following ways. Country A has a strong option to destroy the missile site on country C by bombing. Or, it has another option in which it damages the economy in country C by a naval blockade and makes B give up continuing the construction. On the other hand, country B has an option to withdraw the missile from country C. In contrast, country B has a strong option to escalate the fight against country A. In summary, country A has two options, bombing and a naval blockade while country B has two options, withdrawal and escalation. But, a player does not have to choose one of the two options. This option is different than the ones in the standard games we already described. It is possible for each of the two countries to take neither of the two options. For example, it is possible for country A either to not bomb or create a naval blockade and instead to try to depend on diplomatic negotiation. Country B might try to prolong diplomatic negotiation to finish constructing the missile site, in which either withdrawal or escalation is not implemented.

Table 9-1 shows all possible combinations of options for the two countries. The number 1 indicates the option is implemented while 0 indicates the option is not implemented. Each column in Table 9-1 corresponds to an outcome that results from options implemented by each country. Decimal numbers are put at the bottom of each column. For example, in the third column from the right end, 1,1,0 and 1 from the bottom of the column are regarded as a binary number and are transformed into a decimal by $1x2^3 + 1x2^2 + 0x2^1 + 1x2^0 = 1x8 + 1x4 + 0x2 + 1x1 = 13$. The decimal will be used to refer to the outcome.

When you take a look at Table 9-1 carefully, you notice that outcomes that never

[13] Frazer, N.F. and Hipel, K.W. (1984). *Conflict analysis: Models and resolutions*. New York: North-Holland.

Table 9.1. Combinations of options of both countries (Frazer & Hipel, 1984)

Options																
Country A																
Bombing	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
Blockade	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
Country B																
Withdrawal	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
Escalate	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Decimal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Table 9.1. The choice of 1 indicates an option that is implemented by a player. Logically, there are 16 possible combinations of options.

Table 9.2. Feasible outcomes (Frazer & Hipel, 1984)

Options												
Country A												
Bombing	0	1	0	1	0	1	0	1	0	1	0	1
Blockade	0	0	1	1	0	0	1	1	0	0	1	1
Country B												
Withdrawal	0	0	0	0	1	1	1	1	0	0	0	0
Escalate	0	0	0	0	0	0	0	0	1	1	1	1
Decimal	0	1	2	3	4	5	6	7	8	9	10	11

Table 9.2. Twelve outcomes remain after removing four impossible outcomes in Table 9.1.

occur theoretically are included. Specifically, outcomes 12 through 15 never occur. Outcomes 12 through 15 indicate that country B withdraws a missile while escalating, which is not theoretically realistic. Table 9-2 includes only feasible outcomes by eliminating impossible ones.

Both A and B can order 12 outcomes in Table 9-2 from the most preferred one to the least preferred one. This order is called preference order. For country A, withdrawal of a missile by country B is preferred. Moreover, withdrawal of a missile without any military measures taken by country A is preferred the most. Even if military measures are inevitable, country A wishes to restrict its measures to mild ones such as a naval blockade if possible. The worst outcome for country A is unilateral escalation by country B while country A can't take any military measures or can take just mild measures. The upper half of Table 9-3 shows outcomes that are ordered according to the preferences of country A. The left end is the most preferable occurring choice for country A.

Next, let's take a look at country B that brought a missile to country C. Of course, the most preferred outcome for country B is one in which a missile site is completed and becomes an established fact without any military invention by country A. But, it is too optimistic to assume that in such a story, country A will do nothing. Even if country B has to withdraw a missile, the effect of showing its own power can remain. But, if it has to withdraw the missile, less damage caused by a fight against country A is preferred. Escalation is least

Table 9.3. Preference orders of both countries (Frazer & Hipel, 1984)

Preference order of country A												
Options												
Country A												
Bombing	0	0	1	1	0	1	1	0	1	1	0	0
Blockade	0	1	0	1	1	0	1	0	1	0	1	0
Country B												
Withdrawal	1	1	1	1	0	0	0	0	0	0	0	0
Escalate	0	0	0	0	0	0	0	0	1	1	1	1
Decimal	4	6	5	7	2	1	3	0	11	9	10	8

Preference order of country B												
Options												
Country A												
Bombing	0	0	0	0	1	1	1	1	1	1	0	0
Blockade	0	0	1	1	0	0	1	1	1	0	1	0
Country B												
Withdrawal	0	1	1	0	1	0	1	0	0	0	0	0
Escalate	0	0	0	0	0	0	0	0	1	1	1	1
Decimal	0	4	6	2	5	1	7	3	11	9	10	8

Table 9.3. An above (or below) table shows how country A (or B) ranked 12 outcomes. A more preferable option is located on the left.

preferred by country B. The lower half of Table 9-3 shows the order of outcomes for country B.

As some readers might have already surmised, the example we are using is the Cuban missile crisis that really took place in 1962. Country A was the United States, Country B was the (then) Soviet Union and Country C was Cuba, a socialist country located geographically near the US but was allied to the Soviet Union. The options and preference order we saw in the above are based on many historical materials. Generally, it is hard to identify players and the options of each player and preference order of each player when you apply the conflict analysis to real phenomena. Compared with it, the stability analysis that we will see in the following is completed by a computer.

We proceed to the stability analysis after identifying the preference order of each player. The stability analysis is to find an outcome, a solution of the game that is stable for each player. But, a stable outcome does not imply that each player feels stable with or is satisfied with the outcome. Rather, stability implies that each player can't take other options even if they want to. Moreover, each player can't change his/her option because the situations might become worse than they are by a possible change of options by the other players.

Now, let's explain the stability analysis step by step.

Unilateral improvement

Let's focus on a certain outcome. You can change your own option although you can't

Table 9.4. Stability analysis (Frazer & Hipel, 1984)

Country A												
Decimal	4	6	5	7	2	1	3	0	11	9	10	8
Unilateral		4	4	4		2	2	2		11	11	11
improvement			6	6			1	1			9	9
								3				10
	×	△			×				×			
Country B												
Decimal	0	4	6	2	5	1	7	3	11	9	10	8
Unilateral		0		6		5		7	7	5	6	0
improvement									3	1	2	4
	×	△	×		×		×					

Table 9.4. More preferable outcomes to which one can shift without expecting any change of the other (unilateral improvement) are indicated for each outcome. An outcome for which the both players don't have possibilities of unilateral improvement is regarded as stable, which is shown by X. Furthermore, if one implements unilateral improvement to a certain outcome but is forced to have a less favorable outcome by unilateral improvement of the other, one cannot implement unilateral improvement, which is shown a triangle. Outcomes that are marked by X or a triangle for both players are stable.

change other players' option freely. When you can shift from a current outcome to another outcome that is preferable for you by changing your own options alone, the current outcome is called having room for unilateral improvement. It is because you can shift to a preferable outcome only by your own choice of options. Let's focus on outcome 6. Country A can shift to the outcome ranked the best from the second best by changing its own choice from option 0 and 1 to 0 and 0, namely from a naval blockade to bombing, even if choice of Country B, 1 and 0, namely withdrawal, remains as it is. Therefore, we can say outcome 6 has room for unilateral improvement for country A. The upper half of Table 9-4 summarizes what unilateral improvement is possible from each outcome for country A. For each outcome, there is a list which outcome country A can shift to. Similarly, in the lower half of Table 9-4, a summary of outcomes Country B can shift for each outcome by unilateral improvement. For example, Country B can shift from outcome 4 to 0 by unilateral improvement. You have no way other than to remain at a current outcome when you have no room for unilateral improvement. Needless to say, you have no room for unilateral improvement from the best outcome. Country A has no room for unilateral improvement from outcomes 4, 2 and 11 while country B has no room for unilateral improvement from outcomes 0, 6, 5 and 7. We put a mark, X, for such outcomes that have no room for unilateral improvement. An outcome from which the both players have no room for unilateral improvement is called stable, or a stable solution. It is because both can't change their choice due to lack of room for unilateral improvement. However, there are no outcomes for which X is marked for both players in Table 9-4.

Next, we should check an outcome that has room for unilateral improvement but from which you can't improve unilaterally because the situation might become worse for you when the other player would carry out unilateral improvement from the outcome which you would shift to. An outcome 6 that ranks second for Country A is an example. Country A can shift from 6 to 4 by changing its own choice alone. But, once outcome 4 is realized, it is possible for country B to shift from 4 to 0 by its own unilateral improvement. Outcome 0 is much worse than 6 that is original situation of country A. That is why country A can't shift from 6 to 4 even if it wants to. You substantially have no room for unilateral improvement from a certain outcome when you have one or more outcomes which you can shift to but your situation might become worse by following unilateral improvement by the other player. In Table 9-4, a triangular mark is shown for such outcomes.

Outcomes for which a triangular mark is shown for both players are stable because the both can't change their choices. You find two outcomes, 4 and 6, are stable. They are an outcome in which country B withdraws a missile while country A does not take military measures and an outcome in which country A does a naval blockade and country B withdraws a missile. Actual the Cuban Missile Crisis went on the road of the latter.

We cite the example from the famous Chinese thinker, Sun Tzu who wrote the book, *The Art of War*. Wu and Yueh were bitter enemies for rival states in ancient China. By fate they happened to be traveling in the same boat. All of a sudden, they were attacked by a big storm and the boat rolled and pitched heavily like a leaf on a rapid river. Since everyone in the boat was in peril, they were forced to cooperate in order to survive for a common good. Sun Tzu wrote that even if we are enemies, we should help each other in such emergencies.

Country A and B are placed in the same boat. They must employ diplomacy in the boat because the boat is now headed toward large dangerous whirlpools. The boat might be sucked down by one of the two whirlpools and then get to outcome 4 on the one hand, but it might be pulled into the other whirlpool and then get to outcome 6. The boat is going to exist in such a situation. In this way, conflict analysis can be used to depict the structure of conflict as one of the game theories.

Part III

Social Constructionism

Chapter 10
Two Meta-theories: Natural Sciences and Human Sciences

Traditionally, when people hear the word *science*, they assume the subject under discussion will be the natural sciences. However, the sciences should be recognized as consisting of two kinds of science: natural and human sciences. They differ from each other in an underlying philosophy, or meta-theory. In this chapter, both logical positivism, the meta-theory of natural sciences and social constructionism, the meta-theory of human sciences will be explained. Group dynamics is one of the human sciences.

First we will clarify the division of labor for collaboration of the two sciences. We will classify a discursive space and then clarify what discursive areas should be dealt with by each of the two kinds of science.

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1. Logical Positivism

Meta-theory

You have already been introduced to the basic ideas and methodology of group dynamics in Part I and various theories and their utilization in collaborative practice in Part II. Having learned them, you might have noticed that group dynamics takes a different research stance from the natural sciences such as physics, chemistry, biology, and so on. This chapter describes the difference of the research stance that stems from the difference of meta-theory between group dynamics and natural sciences. Meta-theory is the philosophy that underlies specific theories.

It might be useful to show an outline of this chapter by stating our conclusion first. Natural sciences stand on a meta-theory that is called logical positivism, which will be explained soon. In contrast, there is a cluster of sciences that stand on another meta-theory called social constructionism. These sciences based on social constructionism are referred to as human sciences in this book. Group dynamics is one of human sciences.[14]

Don't regard human sciences simply or easily as sciences that target human phenomena. Natural and human sciences are distinctive in terms of meta-theory, not research subjects. Physiological studies of the human body are included in the field of natural science even though the research subject is human. Paradoxically, if you study the chemical nature of ancient stoneware and earthenware in archaeology, it is a study in human science to help you understand the life of people who formerly used them.

Logical Positivism: the Meta-theory of the Natural Sciences

Let's explain logical positivism, the meta-theory of natural sciences. The *logical* in logical positivism means logical language. The meta-theory stands on the dichotomy of inner-outer worlds that was mentioned in Chapter 2 and then tries to describe facts in the outer world that exist regardless of inner world by language. Language includes not just ordinary language but also mathematical and symbolic language. Logical positivism is based on the premise that facts of the outer world can be copied or reproduced by language.

Knowledge of the natural sciences is the result of efforts to copy the outer world. The

[14] The term human science is often used as a name of a faculty or department of a university in Japan. But in most cases, it means studies of humans by both the humanities and social sciences and the natural sciences.

knowledge is external, or transcendental, as was already mentioned in Chapter 3. External knowledge is knowledge of facts that exist regardless of whether humans know them. For example, the double helix structure of DNA is a fact that long existed before humans discovered it. Also, obviously, that fact never changes even after people become aware of it.

Positivism is a philosophical standpoint to emphasize an empirical approach and thus can be phrased empiricism. It implies that linguistic expression or representation should be verified by strictly comparing with the fact and the expression should be revised if some deficiency is found in the expression. Generally, it is not easy to translate an external fact into language. A translation by one researcher might be different than that of another. A new version of translation might arise that is different than the traditional translation. You can decide which translation should be adopted by comparing each of the possible translations with the fact in the world which is called empirical work.

An iron bound rule is inevitable when you hold onto such a research stance. It is a methodological iron bound rule. In logical positivism, copying of the outer world should not be affected and distorted by an inner world of the person who copies the outer world. Such distortion is criticized as subjective.

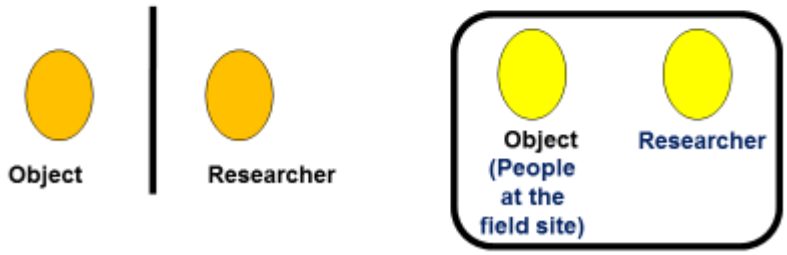
Separation of Observer from Observed Object

To prevent any criticism of the above, it is necessary to separate an observer from an observed object so that the object is never influenced by the observer. For this, an iron bound rule is required in which an observer is separated from an object with a line as shown in the left half of Figure 10-1 and the object beyond the line should be observed by the observer at the opposite side of the line. An example would be a biological researcher who enters a jungle and observes a small beautiful bird by recording with a telephoto lens attached to his camera. The bird behaves as usual without knowing she is observed. A line is drawn between the bird and the biologist and each is located at a different site.

It is best not to influence the object you intend to study but you sometimes need to have an effect on the object to observe its nature. For example, you need to attach a sphygmomanometer to measure or observe blood pressure. Or, you sometimes need to give experimental manipulation to an object as you do in a chemical experiment where you add a reagent or radioactive tag to trace an element. However, you should try to minimize your influence on the object whether it is an attachment of measurement equipment or experimental manipulation.

Figure 10.1. Two kinds of science

- **Natural sciences**
- **Human sciences**



2. Social Constructionism

Economic Prediction

It could be that the natural sciences were sufficient to know if they explained everything. But, we have many phenomena that we cannot understand by the methods and premises of the natural sciences. In such situations, it is nothing but a shackle depending on an iron bound rule in logical positivism in which a researcher and an object are separated by a fixed line. Let's consider three examples.

The first example, on a large scale, is economic prediction. Experts of economics predict economic phenomena in the near future such as the ups and downs of gross domestic products, stock market fluctuations, and commodity prices depending on theories and data. Based on these estimates, they present their prediction to the mass media. You might assume economists predict their objects, economic trends that are put on one side of a line from the other side. But, it is not such a simple story.

For example, let's suppose a certain famous economist predicts the American economy is worsened based on certain theories and data. His prediction is reported in the mass media. Then, some companies start trying to reduce production costs and decrease the price of products while saying to themselves, "Oh, the economy is getting worse. Consumers are hesitating to buy as much as they did previously. We will need to decrease our prices as much as possible." If the number of such companies that are lowering their production costs increases, the price of various goods becomes lower and, as a result, more goods are bought. As a result, companies earn more profit and the economy does not become worse. That is, the prediction of the famous economist has failed (fortunately). However, it is because an object, people's economic activities, changed by learning of the prediction.

An opposite scenario is also possible. Suppose a famous economist predicts the American economy is getting worse. Some manufacturing companies start to reduce the amount of production because they are afraid of the possibility that their goods will not be sold due to the decreased income of consumers. At the same time, some consumers start saving their money because they assume their incomes might be decreased. If such companies and consumers increase these behaviors, buying and selling will really decrease and the economy will get worse. The prediction is right in this case. But, is it because theories used by the economist are right? No. It is because people who heard the prediction changed their economic behaviors. A prediction can be successful due to the change in people who believe the prediction even if the theories used by an economist are not valid. Such a phenomenon is called self-fulfilling prophesy of prediction. This means the prediction has come true regardless of whether the theoretical grounds are valid. Again, even when a prediction looks as if it was true, it is not because theories of the economist were valid but it is because an object to be predicted changes by learning about the prediction.

In this way, it is not possible for an economist to draw a line: to put the object on one side of the line and predict objectively what happens in the object from the opposite side of the line. The objects change their behaviors once they know the prediction. Facts of the object change at the moment when an economist grasps them. You find it impossible to separate an economist and economic phenomena by drawing a line between the two.

Behavioral Sciences

The next example is more familiar in our daily lives. You can find many books available that are written about how you can develop good human relationships, how you should get along with your colleagues in the workplace, or how you can become an excellent leader. You might easily find some of them unreliable due to their lack of academic grounds, but you might

find others more trustworthy because they are written by psychologists or behavioral scientists. Let's suppose a theory indicating the effectiveness of leader's behavior XYZ, for example, is proposed in a certain book written by a behavioral scientist based on much data.

Suppose a certain manager reads a book and learns the effectiveness of a leader's behavior XYZ. He makes up his mind to go with the XYZ behavior pattern beginning the following day and he actually does. His subordinates, impressed with his actions and attitude are immensely motivated to work harder by observing his behavior. They tell each other, "I find him much more capable than I ever thought," or "He is a nice person although I never noticed it before."

One day, however, one of them happens to enter a book store and peruses at a certain book in the business section. The book describes what behaviors a leader should take in an organization or workplace and concludes that the XYZ behavior is most effective to motivate members to work. The book shows the conclusion is not the personal opinion of the author but is derived from much empirical data collected in various organizations with the use of graphs. The subordinate who reads the book immediately reflects on the message and says to himself, "Yah, this! He has changed recently. He is doing this." Having discovered the XYZ theory, the subordinate is not the same as he had been. Now the XYZ behavior by the manager will affect his subordinate in a different way. In some cases, the subordinate says to himself, "I understand his intention!" and the power of the XYZ behavior disappears. But, in other cases, he says to himself, "My boss must be very busy but he tries to read such a book and apply it to his own leadership. I have to follow his attitude," and his trust of the manager increases.

Effects of Knowing

In either case above, it is important that the effects of the XYZ theory are changed once people come to know about the theory. Let's sum up. First, there is a researcher who discovers the XYZ theory. His research object is a manager and subordinates who are working together in various locations. The researcher reached the theory by drawing a line between the objects and himself and collected data from the object located on an opposite side of the line from his side. But, if one of the objects, namely a person who happens to read the book, comes to be aware of the theory, it becomes inapplicable for the object.

The two examples above suggests that we cannot depend on the way of natural sciences, drawing a line and separation between a researcher and a research object. In the first example, it is impossible to draw a line between an economist who predicts the future economy and economic phenomena predicted by the researcher. This is also the case for a psychologist or a behavioral scientist who studies leadership or human relations in workplaces and their research object, leaders and subordinates in various workplaces. Moreover, the same is true for a person who learns and applies the theory and those to whom the person applies the theory. The theory becomes inapplicable once those to whom it was applied come to know it. It is also impossible to draw a line between the applier and the applied.

Counseling

We will see one more example in which the methodology of natural sciences is not applicable. Brain science and life science are said to have made great strides in this century. We are convinced of it when we see the results of genetic engineering such as in a cloned animal. Let's take a look at a psychological counselor in the mid twenty-first century who has studied brain and life sciences. Someone visits the counselor and says, "I have felt neurotic, recently. I can't concentrate on work in the day time and can't go to sleep at night. I wake up suddenly at midnight after sleeping for a short time and then many things come to my mind so that I can't go back to sleep. I sometimes feel suicidal." The counselor responds to the client by employing

his knowledge of brain and life sciences. He says, “Probably, dopamine is being secreted excessively in your brain. Or, a particular part of the DNA structure of your genes might be such and such.” What happens? The client might decide there is no way to escape his fate because there is a physical reason and he commits suicide that night.

Why is this example strange? In this example, a problem that should be addressed by drawing a line between an observer, a counselor, and an observed object, a client, is wrongly associated with a problem for which a line cannot be drawn. More clearly, the client complains about a problem for which a line cannot be drawn but the counselor mistakes it for a problem in which a line should be drawn.

What is Social Constructionism?

Here a meta-theory that is different from logical positivism is needed because we have phenomena for which logical positivism cannot deal with. The most likely candidate is social constructionism. “Every action including recognition is possible only when you are immanent in a certain collective stream. Every action is possible as a piece in a collective stream.” This is the basic argument of social constructionism. A collective stream is a change in the nature of collectivity. The change is called a collective stream by likening it to a stream of water or air. Being immanent in a collective stream implies that you are totally immersed in the collective stream and you can’t observe the stream from the outside as if with a bird’s eye view.

Social constructionism denies a concept of mind-in-a-body and also denies the dichotomy of inner/outer worlds. If the concept of mind-in-a-body and the dichotomy of inner/outer worlds are assumed, recognition is grasping of the outer world in the inner world, mind-in-a-body. Also, action is regarded as mobilizing by what is felt and thought in the inner world. A stance in which the mind-in-a-body is focused on to explain an action is called *psychologism*. Logical positivism is different from psychologism in that it tries to copy facts of the outer world by eliminating effects of the inner world although it accepts the dichotomy as mentioned already.

In contrast, social constructionism insists that every action, including recognition, is made possible by a collective stream in which you are immanent. In other words, we are manipulated completely by collective streams. Actions are totally determined by collective streams. We have no way other than to be flown by collective streams. In this way, social constructionism is in direct opposition to psychologism. This concept was mentioned in Chapter 2, where canopy is the subject.

Misunderstandings about Social Constructionism

We often hold two misunderstandings with regard to social constructionism. We will clarify what social constructionism is while correcting them. The first misunderstanding is that social constructionism is a kind of social determinism in which a collectivity that is large enough to be called a society or a world is assumed and action and recognition are taken as determined by such a collectivity unilaterally. It is true that such a large collectivity is assumed by social constructionism. But, in addition to it, any collectivities are taken into consideration regardless of whether they are large or small, or they are sustained for a long or short period of time, depending on a phenomenon concerned in social constructionism. In a certain phenomenon, a small collectivity that lasts shortly around a particular person would become important. Social constructionism tries to understand action as being formed at a juncture of various collective streams.

The second misunderstanding is that social constructionism denies physical realities. This misunderstanding partly comes from the remark of a social constructionist him/herself that any realities are socially constructed. This remark is correct with respect to declaring a decision

to split from psychologism but it emphasizes a cognitive aspect too much. If you hear the remark, you might naturally wonder if it is possible to construct a fact that a newborn baby can run 100 meters in 10 seconds or a fact that the moon in the sky will fall down right now.

This misunderstanding can be removed if you remember that the nature of a collectivity consists of two aspects, physical and semantic natures, as was discussed in the beginning of Chapter 2. The physical nature includes physical constraints. It does not mean that everything is possible.

We can discuss the progress that natural sciences have made so far from the perspective of social constructionism as a theory of natural sciences. Natural sciences have made progress in an academic collectivity that includes both nature (physical nature), and research (semantic nature). The collectivity includes researchers and nature as a research object. In the collectivity, discourses on research results are depersonalized (see Chapter 6). Knowledge of natural sciences is nothing but the products of such a collectivity.

However, this is just a theory on natural sciences from the perspective of social constructionism. Actually, a natural scientist cannot perform a study if he/she regards research objects that are being socially constructed. For a natural scientist, it is integral to maintain a stance in which he/she discovers a fact that has not been translated into language. This stance is logical positivism.

Collaborative Practice

Logical positivism brings about an ironbound rule that a researcher and a research object should be separated by drawing a line between the two. If so, then, what ironbound rule is brought about by social constructionism? It is a fundamental assumption of social constructionism, as was mentioned already, that any action is possible when you are immanent in a certain collectivity and any action is nothing other than a piece of collective stream in which you are immanent.

A collective stream in which any research is carried out, and thus a researcher and a research object are never exceptions to the basic assumption. For example, suppose a researcher who started fieldwork in a certain community came to understand the problems of the community by intensive observation of the community and frequent interviews with the residents. This shows the researcher has been included in the collective stream (physical and semantic) of the community. The collective stream has enabled the researcher to discover something new, namely, have a new appearance (see Chapter 2 for appearance). In this way, it is integral for a researcher and a research object to be enrolled in the same collective stream from the viewpoints of social constructionism. Otherwise, the researcher cannot discover anything. Being enrolled in the same collective stream implies a situation in which the researcher and the research object are doing something together consciously or unconsciously, which is called collaborative practice between a researcher and a research object, although the term, *research object*, is not adequate anymore because he/she is a partner of practice for a researcher. The right half of Figure 10-1 shows the relation between a researcher and a research object who are referred to as people in the research field. Compare the right half of Figure 10-1 with the left half in which a relation between a researcher and a research object is illustrated in natural sciences. Group dynamics is an area of research in which collaborative practice is implemented intentionally.

Collaborative practice by a researcher and a research object is inevitable if you study something that has to do with the semantic nature of a collectivity even if you don’t feel involved in collaborative practice as consciously as group dynamics. You cannot understand meaning used in a certain collectivity without entering the community and being enrolled in it, because the meaning is necessarily formed and maintained in the collectivity. Some

collaborative practice is carried out, consciously or unconsciously, in the areas of humanities and social sciences that study real phenomena. It is only difficult to have a sense of collaborative practice when a collectivity in which collaborative practice is carried out is large such as in sociology and economics. It is also difficult to have such a sense when literature and physical materials of the past mediate communication between a researcher and people in the past like in history. But, even in these areas, a researcher is committed to collaborative practice with people in society or history even if a researcher is not conscious of it in the sense that a researcher put his/herself in the same collective stream as those people.

To sum up, social constructionism brings about a methodological ironbound rule of **collaborative** practice between a researcher and a research object, namely, people in the field site, while logical positivism brings about a methodological ironbound rule of **separation** between a researcher and a research object. Natural sciences stand on logical positivism and discover the facts that exist regardless of whether we find them or not. In contrast, human sciences stand on social constructionism and implement collaborative practice with people in the real world or the past world. Facts in social constructionism can become facts because participants in collaborative practice come to know them. In this way, the two are different from each other regarding what constitutes a fact.

What was Wrong?

We learned that economic prediction, behavioral science and counseling are examples in which a methodological ironbound rule of logical positivism cannot be adopted. As a matter of fact, collaborative practice between a researcher and people in the field site is carried out in each example. Each example includes an important process in which something becomes a fact only after participants in the collaborative practice become aware of the something.

In the example of economic prediction, prediction made by an economist is successful or unsuccessful depending on how it changes the economic activities of people. Regardless of whether something is successful or not people need to focus on predictions. Economic prediction is needed in order for people to perform economic activities. They want prediction. To respond to the demand, an economist makes predictions. Then, people change their activities depending on the prediction. This process is nothing other than collaborative practice by both the economist and people.

In the second example, we learned about a manager who implemented the XYZ theory after reading about it, and his/her subordinate. The manager is no different from a researcher working in university and other research institutes as far as how he studies and utilizes theories. You should not restrict a researcher to the category of researchers who belong to a university or a research institute. Anyone is eligible to be called a researcher as far as he/she studies a theory and take an action based on the theory.

The manager and the subordinate work in the same workplace in daily life. In this way, collaborative practice is going on by the manager and the subordinate. The XYZ theory is used in their collaborative practice. The example above shows an extreme case in which the subordinate came to know about the XYZ theory. But, we can assume a more moderate case. It is natural for a subordinate to wonder why a manager has changed his behavior suddenly, and start to explore the reason for that action. Or, instead, the subordinate might ask the manager about the reason for the change. The effect of this theory might be affected subsequently. In this way, after the manager comes to know about theory XYZ and tries to apply it to his workplace, it triggers a collaborative practice with his subordinates regardless of whether he wants to be involved in a collaborative practice.

The third and last example was about psychological counselling. Here, the counselor plays the role of a researcher. A counseling session starts from the stage in which a client's

personal sufferings are accepted by and shared with a counselor. This stage is nothing but collaborative practice by the counselor and the client. At this point, a so-called psychological problem definitely differs from a heart problem. The fact of heart disease exists even if a patient does not realize or know it and a medical doctor does not find it or know it. But, a psychological problem exists only when it is known by both a client and a counselor. Moreover, it becomes a fact through collaborative practice of the two. In the example above, the counselor misdiagnosed a psychological problem for a physiological problem

3. Discursive Space
---- Division of Work between Natural and Human Sciences ----

What kind of Discourse is Produced?

Needless to say, both natural sciences based on logical positivism and human sciences based on social constructionism are necessary. Human scientists should work with specialists in the natural sciences and the disciplines that make applications of natural sciences such as engineering, medical sciences, and agricultural sciences in many cases when they deal with the betterment of various real fields as group dynamics do.

Natural sciences and their applied disciplines are diverse in their individual specialties. But, beyond differences of specialization, we can see a large difference in what kind of discourses are produced between human sciences and natural sciences including their application disciplines. We should understand the difference in discourses that are produced in human sciences and natural sciences in order for there to be collaboration between the two kinds of science.

Perceptual vs. Conceptual Discourses

We will introduce three axes to classify discourses as a whole, a discursive space so that an area of discursive space is covered by human sciences and natural sciences. We already introduced two of the three axes, *analytical – conjunctive and personal* and *quasi-personalized – depersonalized* in section 4, Chapter 6. Here, we will introduce the third axis, perceptual – conceptual.

A perceptual discourse is defined as a discourse in which a concrete world or experience that appears for you is indicated as an object and is described. When you say, “What beautiful cherry blossoms!” while looking at a cherry tree, it is an example of perceptual discourse. In contrast, a conceptual discourse is defined as a discourse that is produced with the use of abstract concepts. For example, a discourse, “The cherry blossom is a flower of the genus *prunus*,” is produced by three concepts such as cherry, flower and *prunus*. Perceptual and conceptual are matters of degree. Even in a discourse such as, “What beautiful cherry blossoms!” a perceptual aspect, “What beautiful!”, is included while the conceptual, “cherry blossoms,” is included. In this sense, a discourse, What beautiful cherry blossoms!” is somewhere between a purely perceptual discourse and a purely conceptual discourse.

Division of Discursive Space

Let’s divide discursive space by using the three axes and then clarify the division of work between human and natural sciences. Figure 10-2 shows the division of discursive space using two of the three axes, perceptual – conceptual and personal –

Figure 10.2. Structure of Discursive Space of Science

	Personal	Quasi-depersonalized	Depersonalized
Natural sciences			
Perceptual			X
Conceptual			X
Human sciences			
Perceptual	X	X	
Conceptual	X	X	

Figure 10.2. Both natural and human sciences contribute to development of discourses but differ from each other regarding what kind of discourses are targeted. Black circles indicate which portion of discursive space is targeted by each of the two sciences when the space is classified by two dimensions, that is, perceptual – conceptual and personal –quasi-depersonalized – depersonalized.

quasi-depersonalized – depersonalized. Natural sciences are characterized by pursuing depersonalized discourses thoroughly. In a depersonalized discourse, its meaning and truth are not affected by who makes the remark. A discourse is not a discourse in natural sciences if it is not depersonalized. Depersonalized discourses of natural sciences consist of perceptual and conceptual discourses. A typical example of perceptual discourse is data obtained by observation and experiment while a typical example of conceptual discourse is a theory.

What happens if we add an axis, analytical – conjunctive, to the two axes above? Natural sciences have a strong tendency to proceed toward analytical discourses. But, not all discourses are analytical. For example, discourses in the theory of evolution of life include conjunctive discourses.

Work Division for Human Sciences

Discourses in the human sciences are characterized by the nature in which discourses cannot reach purely depersonalized discourse but remain to be quasi-depersonalized. They result from the fact that discourses in human sciences are produced in collaborative practices that are carried out in a specific locality, although the locality sometimes looks covering an entire world or it sometimes looks lasting forever.

Personal discourse plays an important role in collaborative practice by a researcher and people in the field site. The same discourse might move people but might not, depending on who speaks it. Not only collaborative practice by a researcher and people in the field site but also collaborative practice in general is preceded by personal discourses, like (1) person A insists something by some remark. (2) The meaning of the remark is closely connected with the fact that the remark was made by person A. (3) One of the other people, B, opposes A's idea. (4) Again, the meaning of B's remark for opposition is affected by the fact that it was made by B, and so on.

A quasi-depersonalized discourse is sometimes used in a personal discourse. For example, a quasi-depersonalized discourse, "An attempt of exchange with other communities is integral for revitalization of a community," has different impacts on people in a community, depending on whether it is mentioned in a personal remark of a person who knows the community well or a person who does not, even though the quasi-depersonalized discourse itself is taken to be accepted by all people.

This is also the case for a purely depersonalized discourse in the natural sciences. It is mostly used in a personal discourse of a researcher when it is used in collaborative practice by a researcher and people in the field site. The same depersonalized discourse is taken differently by the people, depending on what the researcher looks like.

A conjunctive discourse plays an important role in human sciences while an analytical discourse plays an important role in natural sciences as already mentioned. Ethnography is a typical example of a conjunctive discourse (see Supplement 3-2 in Chapter 3). But, an analytical discourse is also important in human sciences. Theories, or theoretical discourses are constructed by analytical discourses as was mentioned when we dealt with narrative therapy in Section 4, Chapter 6. But, we often have to depend on conjunctive discourses when we explain historical phenomena in terms of the theories.

Having put in order discourses used in collaborative practice by a researcher and people in the field site, we discussed how natural and human sciences take responsibility for each portion of discursive space. It is nonsense to discuss which type of discourse is more important or which type of discourse we should reduce other types to. Any type of discourse is of value as itself. At the same time, not only discourses in the same type but discourses in different types stimulate each other and contribute to enrichment of discursive space. The role of a researcher in collaborative practice is to enrich the discursive space as was mentioned in Chapter 3.

Chapter 11
Methodology of Human Sciences

Both natural and human sciences are necessary. But, it is very sad that academic journals in current group dynamics and social psychology are full of unproductive studies that imitate natural science methods. To tell the truth, I myself was involved in such an infertile study. In this chapter, we will use one of the papers I wrote at that time and indicate what mistakes I made. Based on this, we will discuss how an experimental study in the human sciences should be.

Data collection and data analysis are important in human sciences as well as in the natural sciences. But, data analysis in current social psychology and group dynamics is problematic. Clarifying the problems, we will see alternatives for our data analysis.

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1. Pseudo Natural Sciences

An Example of a Pseudo Natural Scientific Study

In the previous chapter, we learned that we need two kinds of science, natural and human sciences, and that they stand on different meta-theories. However, studies that should be made with a stance of human sciences have been done with a stance of natural sciences in some academic disciplines so far. We can see this typically in group dynamics and social psychology. We call such studies a pseudo natural scientific study. Internationally famous journals such as *Journal of Personality and Social Psychology*, *Journal of Experimental Social Psychology*, and others are filled with such pseudo natural scientific studies. Also, many papers of such pseudo natural scientific studies are published in the *Japanese Journal of Experimental Studies* published by Japanese Group Dynamics Association and *Japanese Social Psychological Research* published by Japanese Society of Social Psychology.

In this chapter, first, we will see an example of a pseudo natural scientific paper. It is a paper I wrote and published in *Japanese Journal of Experimental Social Psychology* (Vol. 16, No. 2) in 1977 when I was young, before I changed my coursework direction toward human sciences in the mid-1980s. We will see what mistakes were written in the paper.

Second, based on my self-criticism, we will discuss how experimental studies should be implemented in human sciences. Corroborative experiments are often made in engineering areas to compare a newly developed product with existing one. But, some of them are human scientific experiments rather than natural scientific ones. An experiment is one method used in the human sciences. You already learned about this, my own experiment, in which two evacuation methods for emergencies were compared in Section 5, Chapter 8. But, an experiment in human sciences is different from one in natural sciences although the same term, experiment, is used,

Third, we will see problems of data analysis in pseudo natural scientific studies including my paper. Numerical data has been emphasized in pseudo natural sciences but they have adopted data analysis method in which important information from the data is discarded. Data is also an important resource of information for human sciences, or collaborative practice by a researcher and people in the field site. We have to reflect on errors of data analysis in pseudo natural science so that we do not repeat the same error.

An Example of Pseudo Natural Scientific Paper

Look at an example of pseudo natural scientific paper at the end of this book. This paper is my master's thesis I wrote when I was involved in a natural scientific studies seriously. You see mathematical formulas at the beginning of the paper, which shows my desire to make it as scientific as possible. When I look back and reflect on that choice, the mathematical formulas were not necessary.

In short, this study aimed at corroboration of the following hypothesis on group decision-making; an inverted U-shape relation will be found between the equality of influence among group members and their satisfaction with the decision. In other words, a member's satisfaction is highest, not when group members exert their influence on the decision-making equally or extremely unequally but in-between.

More plainly, the hypothesis above is that group members are more satisfied with a decision when one of them leads the decision-making process by exerting more influence than the others to some extent than when they exert influences equally. You might assume this is obvious. You are right. But, at that time, only a rough comparison had been made between a one-person style and a participative style of decision making. It might have been that there was only one strength of my study to propose a quantitative concept, i.e. equality of influence. The above concerns hypotheses A in the paper but you see there is no basis for hypothesis B, and I was totally unsure about the basis.

Experimental subjects

I once heard an interesting story from a researcher who was ten years older than I. He was purely a human scientific researcher and was critical of pseudo natural sciences. He taught me how we could quickly identify pseudo natural scientific papers. It was a way of looking at the method section in a paper. He mentioned that it would be safe to identify a paper as pseudo natural scientific if the method section starts with brief description like 'Experimental subjects were 48 college students ------.' This is the case for my paper.

How are experimental subjects collected? It is not described in a pseudo natural scientific paper at all. But, it must be important what the subjects were doing immediately before they came to the laboratory or why they accepted becoming subjects. Such a factor must not be overlooked in an experiment of group dynamics or social psychology although it might not be important in an experiment of physiology. For example, a subject who came to the laboratory because he/she had nothing to do due to a sudden cancellation of class differs, in involvement in the experiment, from a subject who came to the laboratory reluctantly because he/she was asked by the experimenter to come to the laboratory while preparing for a regular examination.

When I did the experiment in my paper, I collected subjects depending on my friendships and my friends' friendships. Therefore, a combination of two subjects who participated in each experiment differs from one to another experiment (one member in the three person group was a colleague of the experimenter). Only the sex variable was controlled so that two subjects were the same sex. Both were sometimes talkative, sometimes taciturn and sometimes one was cheerful when the other was gloomy. I was not interested in what they did before coming to the experiment or who suggested that they participate. I wished to secure subjects anyway every day.

Generally, there are various ways to collect subjects. One of the simplest but most costly ways is to recruit subjects by paying them to participate. Or, it might be possible to use students who take your class as subjects if a questionnaire is delivered instead of doing an experiment by asking "How do you feel when one of three members decides everything?" When I entered a Department Psychology in a university in the US in the mid of 1980s, I saw a long table in a prominent place on which many registers were put. Each books represented one study in the

number of experiments that were going on at the time. Students in the Department of Psychology were required to sign up to become a subject in several experiments to get the necessary credits. Needless to say, the register book has now been replaced with online registration due to spread of internet.

Reproducibility of Experimental Results

One of the most important criteria of a scientific study in the natural sciences is to show that it is reproducible. Credibility of empirical studies including experimental studies depends on whether the results can be reproduced, which is common sense in natural sciences. Reproducibility means that you can obtain the same results as mentioned in the paper when you did the experiment following the experimental procedure described in the paper. Often researchers are criticized because they publish a paper before reproducibility has not been fully confirmed in a discipline in which a race for a new discovery is very fierce such as in molecular biology. How about my paper for its reproducibility? Frankly, I am not confident in its reproducibility at all. I might be able to reproduce the results because the hypothesis is not far from common sense but I am not sure if I can reproduce the results, using subjects I collected as I think fit. I can say only whether the results are reproduced with a 50% probability. I felt like this about my results when I did the experiment. I was relieved and said to myself, "Well, I can write my master's thesis at any rate," when I obtained a curvilinear relation shown in Figure 2.

I wonder whether reproducibility is secured in the results that are reported in most papers published in prestigious international journals and domestic journals that are introduced in the beginning of this chapter. I leave this judgment to you. If you can read Japanese, you can freely access to *Japanese Journal of Experimental Social Psychology* that is included in a journal database called J-STAGE that is run by Japanese Agency for Promotion of Science and Technology.

2. Experiments in the Human Sciences

The Laboratory as a Field

Is an experimental method useless in human sciences? No. It is natural to examine a new idea by performing an experiment rather than just speculating. For example, a corroborative experiment is often carried out in the area of engineering in which subjects use both old and new products and evaluate user-friendliness when the new product is developed with a new idea. Here, it is critical whether an ironbound rule of natural sciences described in Section 1, Chapter 9 can be adopted. Probably, the ironbound rule is available when physiological or simple behavioral indexes are sufficient. But, you should be aware that you are doing a human scientific experiment when it is not possible to separate a subject from the experimenter and it is inevitable to have interaction between the two.

A human scientific experiment is a kind of field study although it is conducted in a place called laboratory. Basically, a laboratory is not different from a real field such as an organization or community. We already saw five characteristics of collaborative practice by a researcher and people in the field site in Chapter 3, all of which are true for collaborative practice in a laboratory. An experimenter corresponds to a researcher while a subject corresponds to people in the field site in laboratory. A field called laboratory is characterized by the fact that a subject becomes one of people in the field site which he/she knows nothing about and is enrolled in collaborative practice with the experimenter unintentionally.

The most important information in any field study is what the field is like and what the people in the field site are like. Such information should be clearly described in a paper such as

the ethnography introduced in Appendix 3-2 in Chapter 3. It is far from sufficient to describe information such as like ‘Subjects are 48 male college students and ------.’ Also, a laboratory as a field should be described not just regarding its simple physical structure but what meaning the laboratory has for the subject. .

Reproducibility can never be guaranteed in a human scientific experiment because it is collaborative practice by the experimenter and the subjects. The same subject naturally shows different responses depending on whether the experimenter is an old professor or a young graduate student. Then, is it of value to do an experiment that does not guarantee reproducibility in the human sciences?

Exploratory Stance

Normally, a clear hypothesis is established prior to an experiment in natural sciences. For example, a hypothesis that a certain gas is produced more when catalyzer A is used than when catalyzer B is used. It is an experiment that supports or rejects the hypothesis. Needless to say, it is integral for the results of experiment to be reproduced by other people. The data obtained by the experiment is analyzed by a statistical method (which will be described later). In contrast, a pseudo natural scientific experiment imitates hypothesis testing despite the fact that reproducibility cannot be guaranteed.

A human scientific experiment should be made in an exploratory way. We have a great deal of knowledge about human activities in daily life although only specialists know complex medical or physiological facts about a human body. But, we don’t know everything about human activities and we have no ways other than to explore how things can be improved by repeated trial-and-error. Human sciences try to contribute to this attempt. If you try to develop a hypothesis rigorously as natural scientist does, you end up with having a too obvious hypothesis like ‘if your face is directed to the east, then your back is directed to the west.’

What is Exploratory?

How should we do an exploratory experiment? It is natural to have some hypothesis before the experiment. When you are lucky, you might get the results that support your hypothesis. But, you should remember that the reason is that you are lucky not anything else. You should listen to the subjects’ remarks regarding why they responded in the same direction as you predicted. Then, you might find subjects who responded as you predicted but with a different reason that you totally overlooked. This reason can expand your scope of view for the further studies.

You can find subjects who responded differently from your hypothesis even though the hypothesis was supported as far as only an average of data was focused on. You are required to explore why they responded that way. You might discover reasons that were completely outside of your prediction. You should not conclude your paper exultantly with a sentence; the hypothesis was supported by the results of experiment.

Contrarily, you should not be disappointed when you can’t obtain the data that supports your hypothesis. You are just unlucky. There are a few subjects who responded as the hypothesis predicted even though the average did not support the hypothesis. At the same time, most subjects did not respond as you predicted. All you have to do is to compare subjects who responded as the hypothesis predicted with those subjects who did not. For this purpose, you might be required to collect additional information after the experiment.

Whether the hypothesis was supported or not, it is important for us as, human science researchers, to collect information in an exploratory way and to expand our scope of view for grasping the reality. For this, we need to design an experiment to make various exploratory attempts possible. Moreover, a method for analyzing experimental data should be an

exploratory method in which a latent tendency in the data is illuminated rather than a hypothesis testing method. We will introduce specific methods of exploratory data analysis in the next section.

Experiment on Obedience to Authority

An experiment, especially an experiment in a laboratory, is far from the real world where we live. Therefore, it is hard to say that a theory you find out in an exploratory way in a laboratory is true in a real world. A laboratory experiment can only be applied to a few studies.

A laboratory experiment in the natural and human sciences is valuable when it brings about a result that is so surprising that we revise our common sense. But, in natural sciences, the experiment does not only bring a surprising result but contributes to cumulative knowledge step by step which is also valuable. But this is not the case in human sciences. In human sciences, only the experiment that brings a surprising result is valuable. You can see such an experiment in social psychology and group dynamics although there were just a few. Stanley Milgram, a social psychologist in the US, conducted such two experiments.

One of them was called an experiment on obedience to authority[15]. A subject was asked by a university professor to become his assistant and to pretend to react a certain way after an order was given. The professor studied the effect of punishment on the acquisition of simple task. Specifically, he was interested in how much punishment, like an electric shock, should be given to promote the acquisition of simple task when a mistake is made. When the real subject arrived at the laboratory, the alleged subject was looked as if he was going to start simple desk work. But, the person at the desk was a collaborator of the experimenter. He was supposed to pretend to react to the real subject when the real subject obeyed the directions of the professor. The real subject did not know he was being manipulated.

The professor told the real subject to give an electric shock to the subject at the desk whenever he made a mistake. After the experiment started, the alleged subject made many mistakes. The professor ordered the real subject to increase the level of shock each time the person at the desk, the alleged subject, made a mistake. The person at the desk reacted each time to the shock with a painful expression. In spite of that, the professor continued to order the subject to increase the level of shock. Surprisingly, the subject continued to follow direction of the professor while facing the subject who was now groaning loudly with pain.

It was authority of the professor that led the subject to enact cruel behavior. When people are ordered by a prestigious person to become involved in such cruel behavior, they respond in ways other than their ordinary value system. The experiment showed that the fear of obedience to authority was greater than a person's internal value system. The experiment was done in the 1960s when Adolf Eichmann was on trial for Nazi war crimes. Eichmann's excuse was that he was only following the orders of Adolf Hitler who had ordered the extermination of European Jews, Gypsies and other ethnic groups. Milgram wanted to see how strong authority could be by creating a laboratory experiment where an individual –in this case a student--was given an order by a professor to enact cruelty on another student regardless of how much the victim was suffering. Many people were surprised at the results of the experiment to realize that so many people bowed down to authority.

Small World Experiment

Milgram also conducted an interesting experiment called a small world experiment[16]. We sometimes say, "How small our world is," when we meet a person who has a relationship

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[15] Milgram, Stanley (1963). Behavioral study of obedience. *Journal of Abnormal & Social Psychology*, 10, pp.371-378.

[16] Milgram, Stanley (1967). The Small World Problem. *Psychology Today*, May, pp 60 - 67.

with another person you and the person know.

In the experiment, Milgram investigated how many people are required to connect two others who are chosen arbitrarily. Specifically, the name and picture of a certain stock broker living in Boston, the eastern part of the US, was shown to 160 people living in a certain town in the State of Nebraska, the middle part of the US. They were asked to write a letter to a person who they thought knew the stock broker and ask that other person to make a connection to someone else. The same procedure was repeated until the letter reached the stock broker. How many people were required to reach him?

As a result of the experiment, 42 out of 160 (26%) reached the target person. Moreover, they reached him through just six people on average. It is amazing to see how small our world is.

Lessons from Milgram's Experiments

Milgram's experiments are typical examples of a few experiments that make us say, "Oh, such a thing is possible!" and expand our scope of view. But, it should be noted that they are human scientific experiments and thus we can see two of the five characteristics of collaborative practice described in Chapter 3, that is, a shift from the first mode to the second mode and an expansion from local practice to interlocal practice.

The experiment on obedience to authority was collaborative practice carried out in the locality of laboratory by the professor, the alleged subject and the real subject. Also, the chain of letters in the small world experiment was a product of collaborative practice implemented by m subjects who wrote the letters to the next person and the experimenter who initiated the chain. Furthermore, readers who were impressed by Milgram's experiments developed an interlocal relation with the local collaborative practice that was carried out in the laboratory. By this, the readers realized an unrecognized premise that they had so far on the obedience to authority and the connectedness of people and then proceeded from the first mode to the second mode. In this sense, Milgram's experiment might be called a guerrilla's action to destroy the majority's unrecognized premise if we use a little bit of an aggressive expression.

Of course, reproducibility of the results is not secured even with Milgram's experiment. For example, the result of the obedience to authority experiment might be affected by the ability of the alleged subject to play the role of the victim; the professional appearance of the experimenter, and the characteristics of the subjects. In the small world experiment, it was found that the number of required steps was affected by whether a target person was white or black. Many factors that were not recognized even by the experimenter might have affected the results, which might have been changed by the alteration of such factors.

Here, let's turn to a pseudo natural scientific study that has occupied most part of a journal in current social psychology and group dynamics. A pseudo natural scientific study describes what is obvious with the use of unnecessarily difficult terminology and is enthusiastic in so-called conditional analysis that tries to examine what happens under what conditions. But, reproducibility of the data they analyze is not secure. Recently, experimenters have tried to save time and energy by using a questionnaire experiment, in which a subject reads a brief story and is asked what he/she would do if he/she were the person who appears in the story. To sum up the major characteristic of a pseudo natural scientific study, it is a study in which an unnecessarily described hypothesis is corroborated by unreliable data.

A pseudo natural scientific study has one more fatal problem. It is a problem of the method to analyze data whether data is obtained by experiment or a questionnaire survey. We will focus on this in the next section.

3. Problems of Data Analysis

Two Problems

Logical positivism underlies natural sciences as a meta-theory as mentioned in Chapter 9. Logical positivism bears a mission that a research object should be described by logical language through strict comparison of the object with the language, that is, work of corroboration. A typical logical language is mathematical language. Subsequently, it is ideal that a research object is described by mathematical language as much as possible in natural sciences.

It is natural that pseudo-natural scientific studies would want to yearn after natural sciences and thus traditional group dynamics and social psychology emphasize the use of numerical data. But, we can detect at least two problems in those studies. Data is important in human sciences as one of the perceptual discourses; more precisely semi-depersonalized perceptual discourses (see page ?? in Chapter 9). But, we should not repeat the errors of pseudo-natural scientific studies. In this section, we will not only criticize data analysis in pseudo-natural scientific studies but also propose a substitute for the human sciences.

Continuous Variable Proneness

The first problem we can detect in data analysis in pseudo-natural scientific studies stems from a desire to obtain continuous variables by any means, which you might call continuous variable proneness. Here, a continuous variable is a variable that is represented by real numbers such as height and weight. Continuous variable proneness of pseudo-natural scientists is so strong that data of a questionnaire item in which approval or disapproval for a certain opinion is inquired by choosing one of five choices such as *strongly agree; agree; can't say agree or disagree; disagree;* and *strongly disagree* are promptly transformed into 5, 4, 3, 2 and 1, respectively, for example. My paper at the end of this book is not exceptional. Subjects responded to four alternatives: *The way the decision was made was all right; I am a little dissatisfied with it; I am considerably dissatisfied with it;* and *I am so dissatisfied with it that I want it decided all over again.* These options are transformed to 4, 3, 2 and 1, respectively and are treated as real numbers.

Once data is transformed into real numbers, it starts to walk on its own as if it were continuous variables from the beginning. Even if we accept giving numbers such as 1, 2, 3, 4 and 5 for arguments sake, they are only a single digit number. But, such values as 3.45 for the mean value and 0.789 for a correlational coefficient are often reported in papers published in a so-called prestigious journal as if they had the precision of two or three places of decimals. This shows not only the lack of common knowledge of significant figures but derision for a natural scientist who tries hard to improve the precision of measurement even by one digit. Based on such quantification, an analysis method such as covariance structure analysis is often used to analyze causal relations by establishing a realistic assumption such as multi-dimensional normal distribution. It looks a computer game to me.

Inappropriate Method

The second problem of data analysis in pseudo-natural scientific studies is that inappropriate methods are used although they have to be learned as basic knowledge of statistics. In my paper, the average score of satisfaction with decision making was calculated for each combination of two independent variables, i.e., total amount of influence and equality of influence, and was treated with the use of statistical method called analysis of variance. Analysis of variance and t-test are representative methods of statistical analysis. The t-test will be simply explained later.

However, such methods as t-test and analysis of variance are not appropriate in group dynamics and social psychology although they have to be learned as basic fundamentals of statistics. T-test and analysis variance are something like the driving method you learn at a driving school. You can drive a car sometimes by the method you learned at the school but only sometimes. You can do well with a t-test and analysis of variance in physiological experiments, quality control and agricultural experiments but you cannot do well for data analysis in human sciences.

Roughly speaking, t-test and analysis of variance are appropriate when the three-sigma method is useful. Sigma in the three-sigma method is called standard deviation, namely, how much data varies. A statistical method assumes that data we obtain by experiment or observation is picked up randomly from the limitless number of data we would be able to obtain by repeating the experiment or observing limitless times. The limitless amount of data is called the statistical population. What we want to know by experiment or observation is the mean value, or the average, of the statistical population. The data we actually obtain by doing an experiment or observation is a measure to estimate the mean value of a statistical population. In the three-sigma method, the mean value of a statistical population is estimated to be between the mean value of data subtracted by a threefold sigma and the mean value of data added by a threefold sigma. This estimation would be correct with probability of more than 99% if the statistical population would take the form of normal distribution, namely, a bell shaped distribution.

Then, let us look at the data in my paper. The mean value of a total of 48 subjects is calculated as 3.2 and the standard deviation of data, i.e., sigma, is calculated 0.81 from the numbers in Table 1 and 2 although they are not referred to explicitly in the paper. When you apply the three-sigma method to my data, the mean value of statistical population is estimated to be between 0.8 and 5.6. Both estimated upper and lower edges are beyond the figures that data can take, i.e., 1-4. Such estimation is not estimation anymore. My data is not one for which the three-sigma method can be used. You might find this is the case in most results of questionnaire surveys that are reported in academic journals when you check mean the value and standard deviation.

Importance of Words

An alternative way to go about the study is simple and clear. We should not forget that respondents of questionnaires did not give a score but chose a phrase as an option. A questionnaire survey is a kind of verbal communication between those who run it and those who respond it although a predetermined uniform format of questions and options is used.

Therefore, as a principle, you should pay attention to frequency distribution, that is, how many respondents chose each option. Also, you should look at a cross-tabulation table to see how two questionnaire items are related with each other. Mean values and co-relational coefficient that you obtain by giving numbers to each option might be sometimes helpful as an easy method. Namely, you can compare two groups to some extent in terms of mean values if a bell-shaped frequency distribution is found in both groups. Also, it is sometimes possible to grasp the major information of a cross-tabulation table roughly in terms of a co-relational coefficient. But, that's the best you can hope for. You should report the frequency distribution and cross-tabulation table in your paper as a principle.

This is also true when interrelations among many variables are analyzed by multivariate analysis. Principal component analysis and factor analysis are often used after giving numbers to each option, but those methods make you forget meanings and that each option has a verbal expression. Moreover, as we will learn later, those methods have another problem because they depend on co-relational coefficients that indicate how two variables are related with each other just in a linear way.

Hypothesis Testing Data Analysis

Besides respecting words, we have to take one more important thing into account when we consider a substitute for traditional data analysis. It is how we locate the purpose of data analysis.

An exploratory stance is important in experiments in human sciences while hypothesis testing occupies a central position in experiments in natural sciences as mentioned in the previous section in this chapter. The difference has much to do with data analysis methods. Hypothesis-testing data analysis is required when you attempt to corroborate a hypothesis while exploratory data analysis is required when you take an exploratory stance.

In hypothesis testing data analysis, an imaginary set called a statistical population is assumed. For example, when you obtain 20 items of data by repeating the same experiment 20 times, they are regarded as samples that are randomly picked up from a set of limitless number of data that would be obtained by repeating the experiment limitless times. A population is just a theoretical set because it is a set of data that would be obtained by a limitless number of experiments.

Hypothesis-testing data analysis requires a strategy to assume a hypothesis concerning a population and then to check whether the data you obtained can be obtained naturally or can be rarely obtained under the hypothesis. We will explain it using a t-test, one of representative hypothesis-testing data analysis methods, as an example.

Suppose you did an experiment in which the amount of gas generation was compared using traditional and newly developed catalyzers. You repeated the same experiment twenty times for each catalyzer. In this case, two populations are assumed. One is a data set that would be obtained if you could repeat the same experiment limitless times with the use of a traditional catalyzer while another is a data set that would be obtained limitless times with the use of new catalyzer. Each data set of 20 that you really obtained for each catalyzer is regarded as being randomly sampled from each population.

Here, we make a hypothesis regarding distribution of population. You can represent the distribution as the familiar bar graph. When you collect data of the height of many people, you often summarize the data using a bar graph showing the number, or the percentage, of people who are fallen into each level such as intervals of numbers such as 60-65 inches, 65-70 inches. You can draw more a precise distribution when you make each level smaller.

In most hypothesis-testing data analysis, a bell-shaped distribution called a normal distribution is assumed for any population. A normal distribution is perfectly determined by mean value, i.e. a figure corresponding to the peak of the bell, and variance, i.e. how sharp, or flat, the bell is.

Null Hypothesis

Next, we set up a hypothesis concerning two populations both of which follow normal distribution. The hypothesis is that the two populations show the same distribution, namely, both mean values and variations are the same. This hypothesis implies that means and variations of distribution of the amount of gas generated by traditional and new catalyzers are not different from each other when you repeat the experiment limitless times. If this hypothesis were found to be true, you would be disappointed if you developed the new catalyzer and wanted to demonstrate its superiority over the traditional one. You wish to deny it, or nullify it. The hypothesis you wish to nullify is called a null hypothesis.

Here, you should look at the data you obtained by your experiment. You make a computation to see the data would be obtained frequently or rarely if the null hypothesis would be true. In the computation, you calculate what is called the t-value from your own data. What

you expect to have is a t-value that would be obtained frequently or rarely under the null hypothesis. If the t-value you calculated from your data would be rarely obtained under the null hypothesis, you can conclude that the null hypothesis itself is unreasonable, or it might be wrong and that more gas can be produced by new catalyzer than traditional one.

But, it is still possible for the null hypothesis to be true even if the probability is very small. The probability indicates the degree of danger you have to accept when you judge the null hypothesis is wrong. It has become customary to reject the null hypothesis when the probability is lower than 1% or, sometimes 5% as a loose criterion.

As mentioned above, hypothesis-testing data analysis focuses on whether a null hypothesis can be rejected by assuming a certain distribution of a population, a normal distribution in most cases. But, we wonder if we have a method to summarize information of data in an exploratory way without sticking to a distribution of a population. Or, we wonder if we have a method to explore what distribution of population is most probable when certain data is obtained, even if a distribution of a population is assumed. We will see such methods in the following.

Exploratory Data Analysis (1): Hayashi's Quantification Method III

We have to put the highest priority to frequency distribution without transforming a response to each option into numbers as mentioned already. But, you might fall into a pit if you depend on frequency distribution alone.

Suppose there are two items in a questionnaire that is administered to 1,000 male and 1,000 female respondents, one of which is “Q1. Do you support the present national government?” and the other of which is “Q2. Do you agree to an amendment to the constitution?” Options in both items are *yes* or *no*. Do you believe a newspaper article that reports the results of the questionnaire saying it is concluded that there are no difference between males and female as far as Q1 and Q2 are concerned because 50% of males and 50% females respond *yes* to both Q1 and Q2.

Here, look at Table 11-1. Certainly, half support and the other half don’t support the government and half agree and the other half disagree to the amendment in both male and female respondents when we see the results of frequency distribution of Q1 and Q2 separately. But, a remarkable difference can be found between males and females when you see a cross-tabulation table of Q1 and Q2. The table shows that males who support (or don’t support) the government are likely to agree (or disagree) to the amendment while females who support (or don’t support) the government are likely to disagree (or agree) to the amendment.

We tend to reach a conclusion by combining the results of different items with the use of *and*, easily. This is a pitfall of frequency distribution. You should examine not only the frequency distribution of each item but also the relation between two different items by cross-tabulation. It is important to see relations among items by cross-tabulation in addition to seeing frequency distribution.

Let’s rephrase the above with the use of term, *response pattern*. Response pattern is

Table 11.1. Difference between males and females that is found by cross-tabulation

Male

		Q2		
		Agree	Disagree	Total
Q1	Support	450	50	500
	Not support	50	450	500
	Total	500	500	1000

Female

		Q2		
		Agree	Disagree	Total
Q1	Support	50	450	500
	Not support	450	50	500
	Total	500	500	1000

Table 11.1. The relationship between Q1 and Q2 is different between males and females although marginal distribution is the same. You would not notice this if you focused on the frequency distribution of a single question alone.

defined as how responses to each item are connected with each other. We can observe there are two major response patterns both in males and females. That is, there are response patterns in males, i.e. 'yes' in Q1 combined with 'yes' in Q2 and 'no' in Q1 combined with 'no' in Q2. In contrast, there are two response patterns that differ from males in females, i.e. 'yes' in Q1 combined with 'no' in Q2 and 'no' in Q1 combined with 'yes' in Q2.

It is easy to find out major response patterns by cross-tabulation when you focus on just two items. And, it is possible to make plural cross-tabulation tables even when you focus on three items. But, how can you do if you focus on 10 or 50 items or more?

When you have multiple items, a statistical method to analyze how many variables are related with each other is called a multivariate analysis. But, many multivariate analyses can be applied to numerical data. Traditionally, such analyses have been adapted to data that is not numerical by giving numbers to options without any reasonable assumptions. But, we need a multivariate analysis method to use options, or the words that signify options, as they are.

What is Hayashi's Quantification III?

One of the most representative multivariate analysis methods is the Hayashi's Quantification Method III that was developed by the Japanese mathematical statistician, Chikio Hayashi[17]. Fortunately, I had the opportunity to work with him and to learn many things directly from him when I was young. He was interested in various real fields and developed mathematical statistical methods that were fitted to phenomena in each field. The methods he developed were given a series of numbers by someone else like I, II, etc. I once asked him which method he was most confident of and he said, "Quantification Method III."

He called the method 'Quantification Method for Classifying Response Patterns.' It is because the method was originally developed to analyze response patterns in a large-scale questionnaire survey named Survey of National Character of the Japanese that was conducted each five years since 1953 by a group of researchers in the National Institute of Mathematical Statistics where Hayashi played a role of director.

Let's start explaining Quantification Method III. Suppose you raise a question in which respondents are given a list of 50 electric goods and asked to check all the ones they have. Let the number of respondents be 100. In this example, a response pattern means a group of electric goods that are owned by a group of respondents. For example, a certain group of respondents might have high-quality home electric appliances but do not have personal computers and mobile phones. In contrast, another group of respondents might have electronic communication tools such as computers and mobile phones but do not have high-level home electric appliances. In this way, 100 respondents can be classified by their response patterns. The Quantification Method III aims at clarifying how many major response patterns can be found among 100 respondents.

What does *quantification* mean in Quantification Method III? The method deals with data that is not numerical and thus non-numerical as in our example. The method is to quantify non-numerical data according to a certain rule. Specifically, in our example, we set up an equation by assigning unknown variables such as x_1, x_2,…., x_{50} to each electric good and solved it under a particular condition. The equation is basically the same as simultaneous equations as you solved, or were forced to solve, in mathematics class when you were a high school student such as $3x+2y=16$ and $x+3y=25$. The only difference is that you have more unknown variables now.

Then, what is the particular condition? In Quantification Method III, the equations are

[17] Hayashi, Chikio et al. (1970). *Jyoho shori to tokei suri* [Information processing and statistical mathematics]. Tokyo: Sangyo tosho.

solved under the following condition because the method is to find out response patterns. A certain group of electric goods that tend to be owned by a certain group of respondents are given similar values, positive large values for example; while another group of electric goods that tend not be owned by the above group of respondents are given different values from the above group of electric goods, negative large values for example.

Examples of Quantification Method III

Let us explain more with a concrete example. In Quantification Method III, when there is a group of respondents who have a number of Internet communication tools such as a computer, or a smart phone, those tools are given similar values (positive large values) . At the same time, when another group of respondents have a number of high-level home electric appliances such as a luxurious air conditioner, fancy illumination or an induction cook top, but don't have internet communication tools, a group of high-level home electric appliances is given similar values (negative large values) that are far from the values given to internet communication tools. Following the same condition, a group of electric goods such as a television, a vacuum cleaner or a refrigerator, that are owned by both those who have internet communication tools and those who have high-level home electric appliances is given medium values between the values given to the internet communication tools and the high-level home electric appliances. These values are nearly zero. By solving equations under the above condition, a set of unknown variables such as x_1, x_2,…, x_{50} are determined.

In the above, we explained the example as if we had already known there were a group of respondents who have internet communication tools and another group of respondents who have high-level home electric appliances. However, such a fact is found out only after solving the equations. You solve the equations following the condition above, plot each electric good on a numerical straight line and interpret how they are divided. For example, while looking at the plot in Figure 10-1, you say to yourself, "Um, internet communication tools gather on the right side

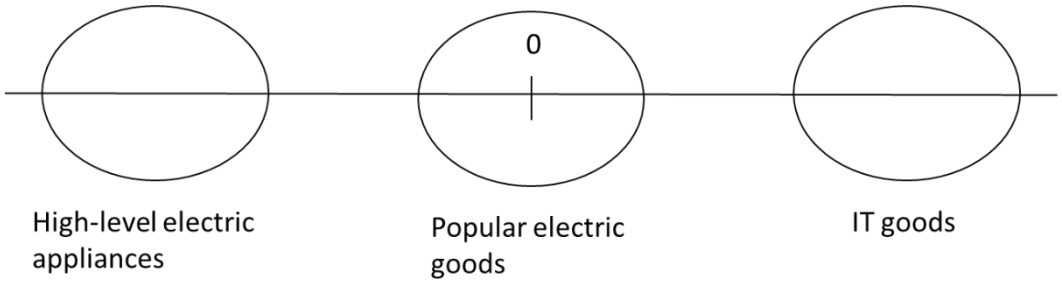

Figure 11.1. An example of result of the quantification method III on possession of electric goods

Figure 11.1. By plotting values of each electric product, you find that IT goods take large positive values while high-level electric appliances take large negative values.

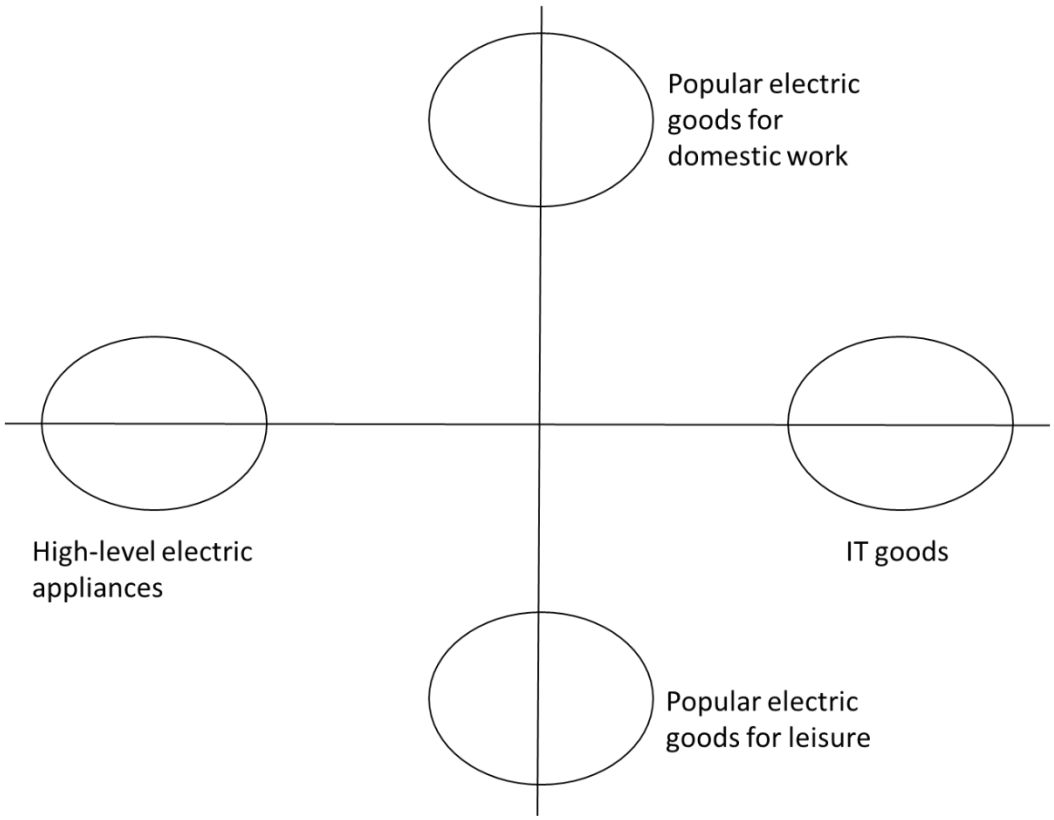

Figure 11.2. An example of subdivision of response pattern by adding the second axis

*Figure 11.2.*By adding the second solution, you find that popular electric goods that were closely located in the first solution are divided into goods for domestic work and for leisure.

of the line. In contrast, high-level home electric appliances gather on the left side. Then, respondents can be divided into two different response patterns! One response pattern is held by a group who has internet users and another is held by a group who enjoys luxurious home electric appliances."

From here, our story will become different from the simultaneous equations that we solved in high school. We have a single set of solutions in the simultaneous equations we solved in high school. But, in the simultaneous equations that are solved in the Quantification Method III, we can obtain as many sets of solutions as the number of unknown variables, namely 50 sets in the example of electric goods. The sets of solutions, however, are not in the same status. They can be ordered according to how much information on the response pattern they have. It is often possible to find out major response patterns if you use the top two or three solutions.

Even when you use the top three solutions, you should remember they are ordered. You should use the first solution that has the most information on the response pattern if you use one of the three solutions. First of all, you should see what value is given to each electric good in the first solution. The second solution does not have as much information as the first solution but it has additional information that is not summarized by the first solution. You can see how electric goods that are given similar values in the first solution are separated, or how response patterns discovered by the first solution are further divided by the second solution when you plot each electric goods in a two dimensional way by using the first and second solutions. You can divide further by including even the third solution. Figure 10-2 shows how response patterns by the first solution alone shown in Figure 10-1 are further divided when the second solution is added. You see the electric goods that most respondents have and thus are given values near zero in the first solution are divided into two groups, i.e. electric goods that are used for domestic work such as a washing machine, an electronic oven, etc. and electronic goods that are used for leisure such as a television, a DVD recorder, or camcorder.

We have used an example in which respondents check all electronic goods they have so far. But, in a general questionnaire, you have many questions each of which has two or more options to be chosen. For this, you can ignore separation by questions and focus on options only so that you take each option on each electric goods.

Exploratory Data Analysis (2): Akaike's Information Criterion (AIC)

Akaike's Information Criterion, AIC for short, is useful as an exploratory method to keep the importance of words like the Quantification Method III[18]. T-test and analysis of variance are almost inadequate in group dynamics and social psychology although they should be learned as a basic knowledge in statistics. AIC provides a method that substitutes for the t-test and analysis of variance.

A statistical population is assumed in the method in which AIC is used. But, the method differs from the hypothesis-testing method mentioned before in that various populations varying in distribution are hypothesized without sticking to the null-hypothesis. You can assess which population is most probable in terms of the data you collected. AIC is an index that indicates how probable each population is.

Let's explain with a concrete example. Suppose you have a population of 100 respondents who answered 30 questions in a questionnaire. Each question has two or more options for which respondents were asked choose one. Here, you focus on a certain question and you are interested in what other questions explain the response to the question most. An item you focus on is called a criterion variable while the other items are called explanatory

[18] Akaike, Hirotsugu (1973). Information theory and an extension of the maximum likelihood principle. *Proceedings of the 2nd International Symposium on Information Theory*, Petrov, B. N., and Caski, F. (eds.), Akadimiai Kiado, Budapest: 267-281 (1973).

variables. You are interested in finding explanatory variable(s) that can explain the criterion variable most.

You can take advantage of this method even more. Suppose Q1 is a criterion variable and includes two options. Let's focus on Q2 including four options, 2a, 2b, 2c and 2d, as explanatory variables. We can assume many populations when we just focus on Q2. First, we can assume a population in which distribution follows a cross-tabulation, that is, 2 (the number of options in Q1) x 4 (the number of options in Q2 as it is). Here, we assume a cross-tabulation table that we have at hand is produced from the data that is randomly picked up from such a population.

Moreover, a cross-tabulation in which two or more adjacent options are combined is possible when the options in Q2 are in order such as 2a (agree), 2b (agree to some extent) and 2c (disagree to some extent) and 2d (disagree). For example, you can combine 2a and 2b and combine 2c and 2d. In other words, it is possible to combine 2a and 2b (or 2c and 2d) and take them as a single option in the population in which distribution of the criterion variable in 2a is the same as in 2b while this is the case in 2c and 2d. Then, you can assume a population that has distribution of 2 (Q1) x 2 (Q2). In the same way, we can assume various populations that have s distribution 2 x 2 by combining 2b, 2c and 2d, or distribution of 2 x 3 by combining 2b and 2c while keeping 2a and 2d as they are.

We can find out the most probable population by comparing every combination patterns in terms of AIC that you calculate from the data you have as shown in Figure 10-3. To sum up, the most probable cross-tabulation distribution in a population is found by comparing all possible combination patterns when we focus on just Q2 as an explanatory variable. In this way, we look for the maximum explanatory power of Q2, or the maximum of AIC, and record it as AIC of Q2 alone. We can repeat the same thing for each of the explanatory variables. As a result, it becomes clear which cross-tabulation is most probable in a population when a single explanatory variable is focused on as you see in Figure 11-3.

We have focused on a single explanatory variable so far but we will see the case in which two explanatory variables are taken into account. For example, when we focus on Q2 and Q3 as explanatory variables, we have a cross-tabulation of a total of three variables including a

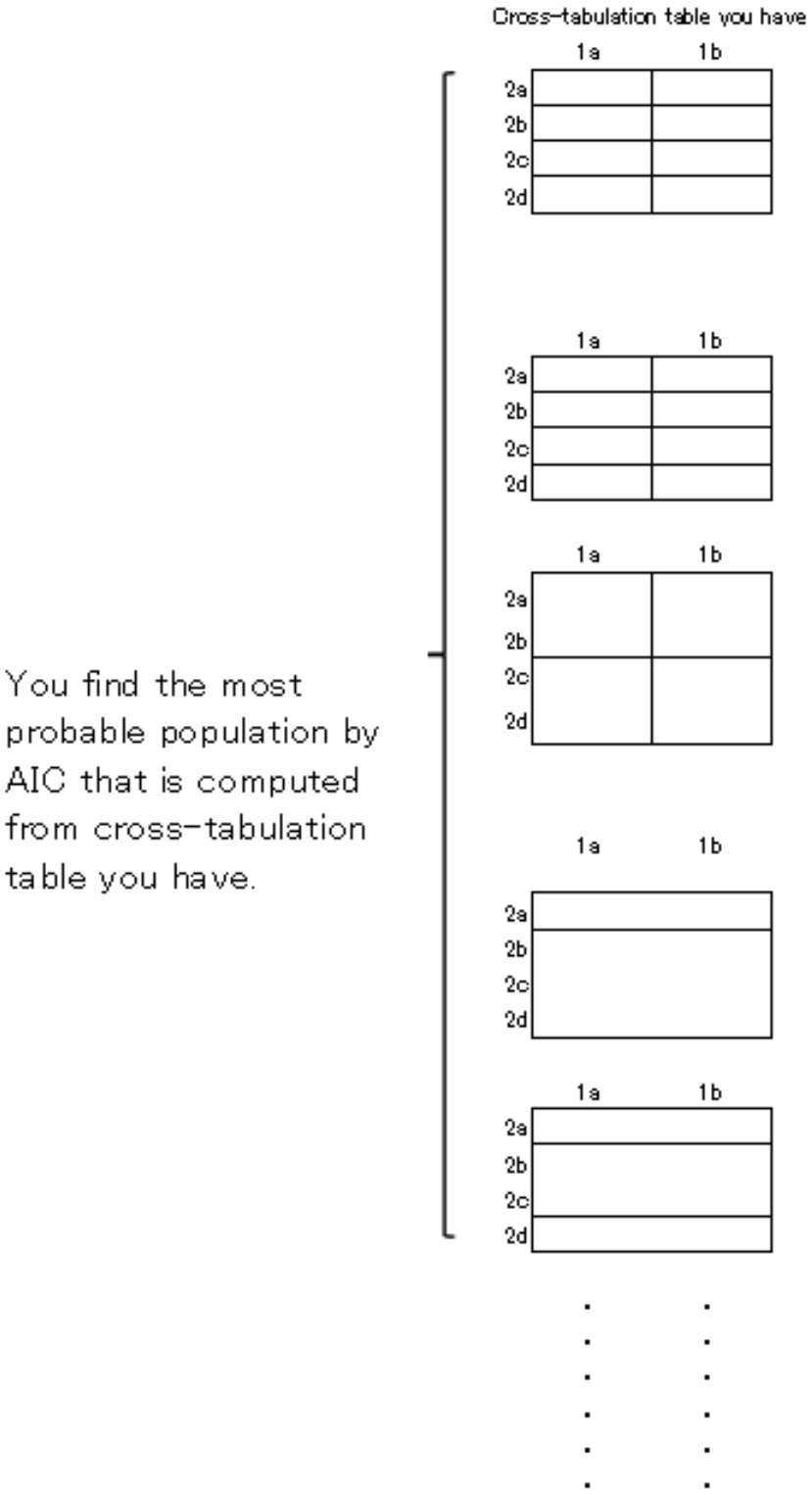

Figure 11.3. Cross-tabulation analysis by AIC

Figure 11.3 AIC can tell you which population can produce the cross-tabulation you actually most likely have.

criterion variable, Q1. We compare all possible combination patterns of adjacent options of both Q2 and Q3 in terms of AIC and then find out the most probable combination pattern. Now, you can compare it with the most probable cross-tabulation table in a population you already found with the use of a single explanatory variable. In the same way, you proceed to the case in which three explanatory variables are taken into account. Finally, you can find a set of explanatory variables that are the most probable in a cross-tabulation table in a population by AIC that you calculate from data you have. Also, you can find out how options are combined in the most probable combination patterns.

Non-linear Relation

Multi-regression analysis and multi-discriminant analysis have been often used as methods to find explanatory variables that describe a criterion variable well. Multi-regression analysis is used when a criterion variable is continuous while multi-discriminant analysis is used when it is discrete such as a pass or fail of an examination, although explanatory variables are continuous in both. In the both methods, a new variable called a composite variable is computed by adding up all explanatory variables which are weighed differently by multiplying different coefficients. The coefficient is computed so that correlation between the criterion variable and the composite variable becomes maximum. And, then, explanatory variables whose coefficients are large are interpreted to be powerful to explain the criterion variable.

However, multi-regression analysis and multi-discriminant analysis have a fatal deficit. First, the methods can be used only when each option is given a number arbitrarily for data obtained by a questionnaire survey. Second, even if you dare to ignore the first deficit, the relation of each explanatory variable with a criterion variable is not reflected properly when high correlation exists among explanatory variables. Roughly, when several explanatory variables are highly correlated, one of them is given a large coefficient while the others are given too small coefficients, or all of them are almost equally given coefficients that are not very large. Third, non-linear relations are excluded from the beginning because both methods are based on a correlation coefficient that represents how much two variables are related in a linear fashion.

Among the three deficits above, the third one is very important in human sciences. Linear relation is rather exceptional in the phenomena studied in human sciences. Or, we can say most phenomena that are characterized by linear relations are so obvious that data collection is not needed. In other words, it is the real flavor of human sciences to discover what non-linear relation exists. The flavor is given up from the beginning if you stick to correlational coefficients.

Deficits that stem from ignorance of non-linear relations are also true for principal component analysis and factor analysis mentioned above because these methods depend on correlational coefficients. In contrast, Hayashi's Quantification Method III can detect non-linear relations.

Chapter 12
From the Nature of Collectivity to the Collective Stream

The nature of collectivity changes from one moment to the next. We liken it to a stream or river and call it a collective stream. You are located at the junction of various collective streams. Importantly, the junction itself is a kind of collective stream, which is called the *here-and-now collective stream*. The here-and-now collective stream is small and short-lived in many cases but has important characteristics. The characteristics are emergency and creativity.

Memory and knowledge have been taken as something stored in our heads so far. But, is it possible to take it as influx into the here-and-now collective stream, of other streams?

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1. Collective Stream

The nature of collectivity and its changes were explained with the use of the metaphor of canopy in Chapter 2 and then concepts and theories on two aspects of the nature of collectivity, the physical and semantic nature of collectivity, were introduced in each chapter in Part II. The collective stream consists of physical and semantic streams that correspond to the two aspects of the nature of collectivity. The physical and semantic streams consist in a collective stream by determining each other.

Collective streams are put in order using two axes, a spatial scale and temporal continuity as shown in Figure 11-1. The spatial scale shows how many people and

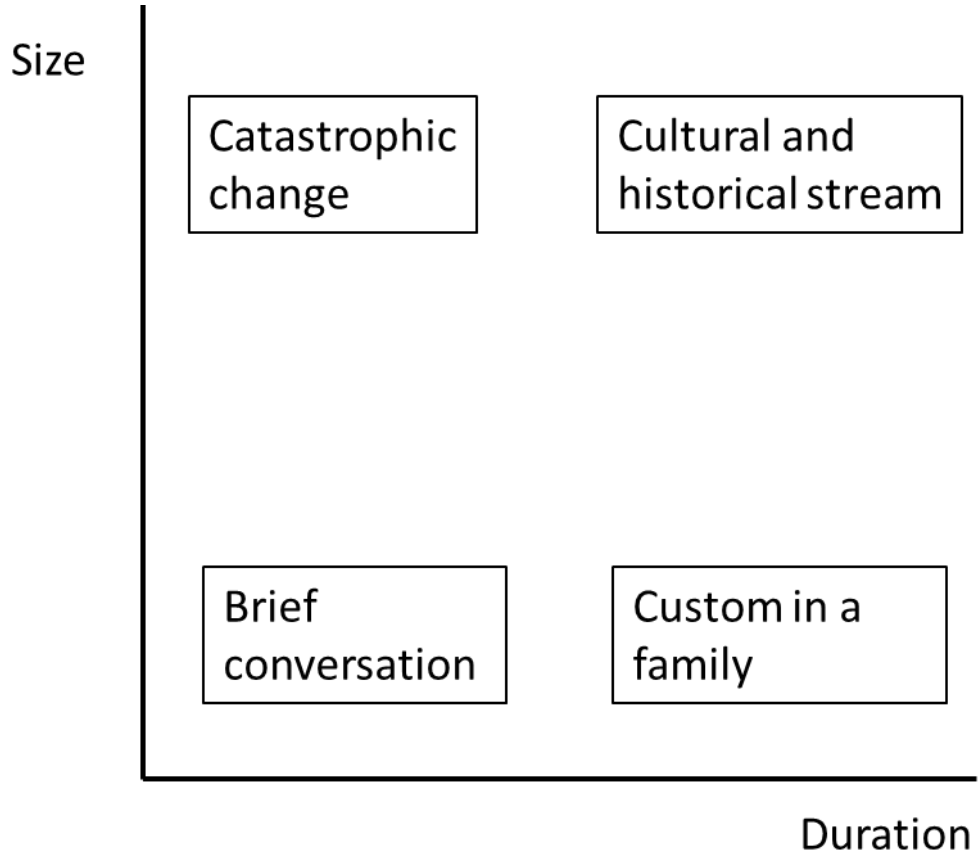

Figure 12.1. Two-dimensional classification of collective streams and examples
Figure 12.1 A collective stream is classified by using two axes, how many people and how many environments are included in the stream (size) and how long the stream has continued (duration).

environment, physical and institutional, are included in a collective stream. Some collective streams are so large that they include people in the nation and their environments while some are so small that they include only family members and their environments.

On the other hand, temporal continuity indicates how long a collective stream survives. Some collective streams are maintained through a history of more than a thousand years such as the use of characters of Japanese language while other collective streams are produced currently such as a fashion that became popular a couple of months ago. A short conversation between two persons who happened to meet on the road is an example of a short collective stream.

Collective streams are classified into four major types as shown in Figure 11-1. The first type is a large and long. The above example of the Japanese language belongs to this type. Generally, a phenomenon that is called cultural and historical falls into this category. The second type is long but small. It is a collective stream that just includes a small number of persons and their environments but is sustained for a long time. An example is a custom that has been kept for several hundreds of years in an old household. An elderly husband and wife are in small collective streams that are longer than the collective stream of a young couple. The third type is large but short. An example is a natural disaster that attacked a large area. Of course, such a disaster initiates and develops a long-term collective stream but a collective stream which affected a large area in a short period of time is also important. The fourth and last type is small and short. A casual chat between two people while standing in line for several minutes belongs to this type.

2. The Here-and-Now Collective Stream

What is the here-and-now collective stream? We are always located at the crossing of many collective streams that vary in spatial scale and temporal continuity. Importantly, the crossing itself is a collective stream. It is called the here-and-now collective stream. I am writing this line of this book in the here-and-now collective stream in my office. You are reading this line of this book in the here-and-now collective stream that includes you and this book at least although I am not sure where you are.

Traditionally, it looks like an individual person is assumed at such a crossing. Researchers who deny the concept of mind-in-a-body and try to explain human actions in terms of such a large and long collective stream such as cultural and historical contexts tend to show little interest in a concrete action of a particular person in a particular situation. But, it can't be helped to assume that a particular action is determined partly by the mind-in-a-body. That is how/why a denial of the mind-in-a-body cannot be denied sufficiently.

We already have theories that insist that action is not determined by the mind-in-a-body but is embedded in a field or situation. An example, the theory of situated cognition will be described later in this chapter. In the theory, it is assumed that a field or situation is determined by cultural and historical contexts. But, we have not had a concept that grasps both the field or situation and the cultural and historical contexts in an integrated way. It is possible to grasp both in terms of the concept of a collective stream if the concept of the here-and-now collective stream replaces the concept of field or situation.

Contingency and Creation

The here-and-now collective stream is one of small and short streams in many cases but it has important features of its own. That is, the here-and-now collective stream contains unpredictable contingent elements more or less regardless of whether you like it or not. When you feel, "I am living here and now," it is brought about by contingency and creativity of the

here-and-now collective stream.

Contingency and creativity of the here-and-now collective stream brings the nature of peculiarity. The peculiarity means only once without repeating as was mentioned in Chapter 6. We learned that something appears for you only when something has meaning, that is, something is not just something but it something as a book for example. In something as a book, distinctiveness or something derives from the here-and-now collective stream while meaning, a book, derives from the other collective streams that flow into the here-and-now collective stream.

The here-and-now collective stream is affected by various other streams that have different scale and duration. A large collective stream wraps around and swings the collective stream while a long collective stream penetrates it.

But, the here-and-now collective stream is not affected unilaterally by the other streams. The here-and-now stream selects which streams affect it. This selection is also contingent and creative. Therefore, it is not necessary but probabilistic for a certain collective stream to affect the here-and-now stream.

Duration of the Here-and-Now Collective Stream

Time is unique in the here-and-now collective stream. Time is stopped even though a clock is moving. It continued to be *now*. Now is not a moment but has width. You must have an experience in which you recovered your sense or you came to yourself in the past. The moment in which you came to yourself was the moment in which time started to proceed again. Time had been stopped until then and thus it had continued to be now.

Memory

The above discussion leads us to a problem of what memory is and what knowledge is. If you stand on the traditional concept of the mind-in-a-body, memory is defined as the traces of past events that are carved in one's mind or head. And, knowledge is defined as a stock of information in one's head. But, we can redefine memory and knowledge if we stand on a concept of collective stream.

Memory is redefined as inflow of long-term collective streams into the here-and-now collective stream. For example, an old tea cup reminds you of your grandfather who loves it because long-term collective streams that were initiated when your grandfather lived flow into the here-and-now collective stream that includes the cup.

When the concept of memory is taken in a broad sense, a term of meaning in the as-relation that is necessary for any appearance includes memory. That is, when something as ABC appears for you, the ABC requires for a semantic collective stream developed in the past to flow into the here-and-now collective stream. But, what is called memory in general indicates the phenomenon in which a narrative rather than just meaning is recalled. Memory is a phenomenon in which a collective stream that includes some narrative flows into the here-and-now collective stream.

Knowledge

Knowledge can be redefined in the same way as memory, but not the kind of knowledge in one's head. It is a phenomenon in which a collective stream that was initiated in the past flows into the here-and-now collective stream. When you see water and use knowledge that a molecule of water consists of two hydrogen atoms and one oxygen atom, a collective stream that has been maintained since the fact was discovered and in which you have been immanent since you learned the fact at school flows into the here-and-now collective stream.

As you see, memory, or recall; and knowledge, or knowing, are fundamentally the same

in that semantic collective streams flow into the here-and-now collective stream. If we distinguish the two, the concept of memory tends to be used for the influx of collective stream of conjunctive discourse while the concept of knowledge tends to be used for the influx of the collective stream of analytical discourse (see Chapter 6 for conjunctive and analytical discourses). For example, you say, "I remember it," when the collective stream of conjunctive discourse such as "When I met you for the first time, it began raining suddenly and we were wet through and through" flows into the here-and-now collective stream. However, you say, "I know it," when a collective stream of analytical discourse such as, "It stopped raining early this season." (i.e. rain in this season is one of the kinds of rains that stop soon) flows into the here-and-now collective stream.

Here, we return to the concept of memory and tap on bodily memory. Bodily memory refers to what you learned by practicing. For this concept, you should remember that a collective stream has two aspects, physical and semantic. We have mainly focused on semantic collective streams to explain memory and knowledge so far. But, we are immanent in physical collective streams, too. It is natural for a physical collective stream initiated in the past to flow into the here-and-now collective stream. You can demonstrate an excellent performance you have practiced hard on a musical instrument when a physical collective stream that has been formed and developed by your long practice flows into the here-and-now collective stream in a recital or when you have trained intensively for an athletic competition.

Physical Things

We have discussed memory and knowledge on the level of discourse and bodily memory so far but we can go a step further and discuss memory by physical things. Continuance of physical things can be taken as continuance of a physical collective stream. For example, a large building maintains a long-term physical collective stream initiated by its construction and flows into many of the here-and-now collective streams after that. This mechanism is the same as memory including bodily memory mentioned above. Therefore, production of a physical thing implies production of a physical collective stream that flows in to the here-and-now collective stream in the future. Of course, it depends on selection of the here-and-now collective stream whether a certain physical collective stream flows into it or not. However, production of a physical thing creates a physical collective stream that has the possibility to flow into the here-and-now collective stream in the future.

The use of characters is one of such productions of physical thing. Characters are physical things whether they are traces of ink or printing types. They sometimes consist of a single letter and sometimes take a form of thick book. Such use of characters creates the possibility for the physical and semantic collective streams initiated by the use of characters to flow into the here-and-now collective streams in the future.

Modern Society and the Here-and-Now Collective Stream

Our life proceeds with the here-and-now collective stream in these days as in the past. But, it looks that the here-and-now collective stream plays an important role in a different way than previously in the current society. It is often said that the modern era is over and we live in a post-modern world. The post-modern era is characterized by the decrease in the influence of *a big story* that prevailed in the modern era. A big story or grand story usually refers to a creation myth or a biblical explanation of existence and how to live one's life and understand the world according to only one system, ideology and values. In contrast, the postmodern world allows for a multiplicity of explanations and is characterized by individual or small discourses. For example, an ideological discourse of socialism lost its former impact after the cold war period ended. A discourse that simply appreciates the progress of science and technology has decreased

its persuasiveness while negative aspects of materialistic progress cannot be overlooked such as environmental destruction, decline of traditional culture, and other long held values. The big story is a collective stream produced and maintained by a large number of people. A collective stream of the big story flew into the here-and-now collective stream and determined its course in the past. Such influence of the collective streams of the big story on the here-and-now collective stream has decreased in these post- modern eras. This implies the contingency and creativity of the here-and-now collective stream has become much more eminent than before. This change tends to make our society more unstable and difficult to predict how our society is directed but, at the same time, we have more opportunities to create new activities we learned about in Chapter 5.

In addition to the decline of influences of the big story, the number of collective streams that flow into the here-and-now collective stream drastically increases because of the progress of information technology that is processed by the internet. The abundance of such information as we could not imagine a decade ago flows into the here-and-now collective stream through information terminals. Moreover, information that has not been carefully edited is sent at almost the same time from the other here-and-now collective streams flows into your collective stream without being put in order. In this sense, too, the post-modern era is the time when contingency and creativity of the here-and-now collective stream have a great influence to a degree that we could not see in the past. The here-and-now collective stream is one of fundamental concepts in group dynamics but it must be a key concept to understand our current society.

Appendix: An Example of Pseudo Natural Scientific Paper

A STUDY ON THE EFFECT OF PARTICIPATION IN DECISION-MAKING

TOSHIO SUGIMAN

Kyushu University, Japan

Problems

The purpose of this study is to introduce two factors, i.e., total influence and level of participation as operational concepts of participation in decision-making and thus examine the effect of these factors on the degree of group members' satisfaction with decision-making.

A large number of studies have been conducted on the role of participation in decision-making thus far, mostly in Europe and the United States (Stogdill, 1974). But most of them are field studies making comparison between "participative" and "non-participative" decision-making without analyzing pertinent factors in a strict sense. Undoubtedly, the phenomenon of participation is an interesting subject in view of its practical implications, too, but it may not necessarily be considered appropriate to use the concept of "participation" as a tool of analysis, because the concept itself, as is now generally used, is devoid of operationality. Therefore, the author selected two factors, namely "total influence" and "level of participation" as operational concepts to be applied to the analysis of the phenomenon of participation and examined the effects of these factors on the satisfaction of the group members participating in decision-making.

The following two factors are chosen as the operational concepts for the purpose of analyzing the phenomenon of participation:

(1) Total sum of the influences exerted by individual members of a group in the process of decision-making (called "total influence" for short).

(2) Distribution of varying degrees of influence exerted by individual members in the process of decision-making (called "level of participation" for short).

This level of participation (LP) is shown by the index which is determined as follows:

(i) Using as 1 the amount of influence of the member who exerts the highest influence upon decision-making, the amounts of influence of the other members are shown by proportionate decimal fractions.

(ii) Assuming that P_1, P_2, ...P_n represent proportionate amounts of influence exerted by individual members of a group of n persons, LP is defined as follows:

$$LP = \Sigma Pi - 1 / n - 1$$

Note: Obviously $0 \leq LP \leq 1$. If LP = 0, this means that the decision is made by only one person, while if LP = 1, this means that all the group members exerted an equal amount of influence upon decision-making.

Applying the two factors, (1) total influence and (2) level of participation, the hypotheses of this study can be formularized as follows:

Hypothesis 1: Where the total influence is constant, and if S represents an individual group member's satisfaction,

$$\frac{\partial^2 S}{\partial LP^2} < 0$$

and also there is an $\widetilde{LP}$ which will satisfy

$$\frac{\partial S}{\partial \widetilde{LP}} = 0$$

This $\widetilde{LP}$ is called "optimum level of participation" (OLP).

Hypothesis 2: Where there are two different amounts of total influence, T_1 and T_2, and if $T_1 < T_2$,

$$OLP_{T1} < OLP_{T2}$$

(Here OLP_{T1} and OLP_{T2} denote the optimum levels of participation for T_1 and T_2, respectively.)

Most of the previous researches focused on comparison between the two different levels of participative and non-participative decision-making. Under the hypotheses of this study, however, it is assumed that under the condition of a constant total influence, the degree of satisfaction considered as a function of the continuum "level of participation" can be graphed as an inverted U-curve. It is also assumed that the level of participation that will induce the maximum satisfaction, or the optimum level of participation (OLP) will approach 1 as the total influence increases.

Experiment I

Method

Fourty-eight male university students acted as subjects (8 subjects each for six different sets of conditions). Two factor completely randomized design was applied in the experiment. Two levels of the factor "total influence", large and small, as well as three levels of the factor "level of participation", LP = 0, LP = 0.5, LP = 1, were set up.

Three-member groups, each consisting of two subjects and a confederate of the experimenter, were formed and they were first briefed on the assignment they were to carry out. Namely, they were to cooperate in writing a composition using the twenty-four words that they had chosen from a list of 120 words. Each of these

twenty-four words was to be used at least once in the composition. During this preliminary briefing, special care was taken to impress upon the subjects the fact that the task had to be performed as a group work and that the decision to choose the twenty-four words was of particular importance.

The total influence and the level of participation were manipulated by varying the number of words which each member of the group was to decide upon in the process of selecting twenty-four words.

The groups with large total influence and those with small total influence were differentiated by limiting the number of words they were allowed to select. Those groups to which the selection of all the twenty-four words was assigned were assumed to have large total influence. Among them, the groups whose members were allowed to choose an equal number of words, or eight words each, were considered to have the index LP = 1. In the groups of LP = 0.5, half of the words (twelve) were chosen by the experimenter's confederate and one-forth (six words) were left to each subject to choose. In the groups of LP = 0, all of the twenty-four words were chosen by the confederate, without the subjects participating in the selection.

For the groups whose total influence was small, the experimenter gave an additional explanation before they began to select, saying, "I have already selected twelve words considered particularly important and now I want you to decide upon the other twelve words." Thus, in this case, each group had to choose twelve words. In the groups of LP = 1, each of the three members chose an equal number of words, or four words. In the group of LP = 0.5, the confederate chose one-half (six words) and the subjects were allowed to choose one-forth (three words) each. In the groups of LP = 0, the confederate decided on all of the twelve words, and thus the subjects had nothing to do with the selection.

When the selection of the words was completed, a few minutes' interval was given with the instruction: "Before you start talking among yourselves over what to write, I want each of you to think over what to write about during the interval." Then, during these few minutes, a questionnaire consisting of the following question was distributed to the subjects with the instruction: "To see how you feel about the procedure you have followed thus far, I ask you to answer a simple question."

How do you feel about this group work of selecting the twenty-four words (not about the meaning of the words but about the way you have decided upon them)? Please encircle the proper response, or the nearest one.

( ) The way the decision was made was all right.

( ) I am a little dissatisfied with it.

( ) I am considerably dissatisfied with it.

( ) I am so dissatisfied with it that I want it decided all over again.

When the subjects finished filling out the questionnaire, the end of the experiment was declared and the purpose of the experiment was briefly explained. Thus, writing of any composition was not actually carried out.

Results

In order to quantify the subject's degree of satisfaction, the following ratings were given to the alternatives of question: namely, 4 to the answer " the way the decision was made was all right"; 3 to "I am a little dissatisfied with it"; 2 to "I am considerably dissatisfied with it"; and 1 to "I am so dissatisfied with it that I want it decided all over again."

The means for different sets of conditions are shown in Tables 1. As a result of analysis of variance, the main effect of the level of participation is significant. Then, in order to examine whether such a relationship between the level of participation and satisfaction as proposed by Hypothesis 1 does exist, the results were treated by parabolic regression. The result shows that there are the following relationships between the level of participation (X) and satisfaction(Y):

In the groups with large total influence,

$$Y = -1.25X^2 + 2.375X + 2.5 \quad \text{.....(1)}$$

In the groups with small total influence,

$$Y = -1.5X^2 + 1.75X + 3.0 \quad \text{.....(2)}$$

Thus, Hypothesis 1 is supported. Deduced from Formulas (1) and (2), the optimum level of participation (OLP) of the groups with large total influence is rated at 0.95 and that of the groups with small total influence, at 0.58. This shows that the OLP of the groups with large total influence is nearer to 1, thus supporting Hypothesis 2. (See Fig. 1)

Experiment II

Method

In Experiment II, we tried to verify the hypotheses in further detail by introducing five levels of participation, i.e., 0, 0.25, 0.5, 0.7 and 1. As for the procedure of experiment, we used the same procedure as in Experiment I except that in a group of three we used all of the three as subjects without using any confederate and that we gave them seven alternatives in responding to the question concerning the degree of satisfaction. Table 2 shows the distribution of words to be decided by the subjects in each treatment.

Results

By way of comparison with Experiment I, let us show the data of the subjects

corresponding to those in Experiment I(those subjects underlined in Table 2). Table 3 shows the means in each treatment. As a result of analysis of variance, it was found that the main effect of the total amount of influence was significant. We treated it by parabolic regression and found the following relationships, thereby supporting Hypothesis 1.

In the groups with large total influence,

$$Y = -3.54X^2 + 3.84X + 5.15 \quad (OLP = 0.54)$$

In the groups with small total influence,

$$Y = -2.25X^2 + 3.52X + 3.69 \quad (OLP = 0.78)$$

In regard to the optimum level of participation, however, groups with smaller total influence were closer to 1, thereby contradicting Hypothesis 2.

Discussion

From the above two experiments, it became clear that the degree of satisfaction with decision-making considered as a function of the level of participation can be graphed as an inverted U-curve.

This study suggests that there are limits to the validity of the coventional approach of making comparisons between "equal decision-making" and "unequal decision-making" or between "participative decision-making" and "non-participative decision-making", and that the degree of satisfaction can become the greatest somewhere between "completely equal" and "completely unequal".

But the question of how the optimum level of participation changes in relation to the total influence, remains unresolved. Also, there is a need for further examination to find out more about those variables which act as media between the level of participation and the degree of satisfaction.

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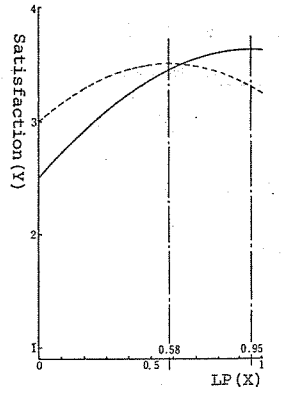
Table 1

Members' satisfaction with decision-making in each treatment (Experiment I)

Total influence	Level of participation		
	0	0.5	1
Large	2.5	3.4	3.6
Small	3.0	3.5	3.3



—— Large total influence
------- Small total influence

Fig.1. Effects of the level of participation on members' satisfaction (The result of parabolic regression)

Table 2

Distribution of words to be decided by the subjects in each treatment

Total influence	Level of participation				
	0	0.25	0.5	0.7	1
Large	24-0-0	16-4-4	12-6-6	10-7-7	8-8-8
Small	12-0-0	8-2-2	6-3-3	5-4-3	4-4-4

Table 3

Members' satisfaction with decision-making in each treatment (Experiment II)

Total influence	Level of participation				
	0	0.25	0.5	0.7	1
Large	5.0	6.25	6.0	6.0	5.5
Small	3.75	4.5	4.25	5.75	4.83

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