AN INVESTIGATION OF DIFFERENCES IN SOCIAL SPACE IN THE PLAYROOM
—THROUGH ANALYSIS BY THE QUOTIENT OF 'ASSOCIATED' BEHAVIOR—

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In this research which we try to clarify characteristics of children's 'associated' behavior depending on differences in make-up of therapist team, we investigate functions of these therapist's groups. Here two groupes are formed. One is a team which consists of two students learning the Behavioral Space Therapy along with their guidance instructor (this is termed the 'therapist team' below). The other team consists of three mothers of their object (target) children (the 'mother team'). In this research our aim is to clarify characteristic differences in children's 'associated' behavior in an instructional situation by these teams, with comparison and analysis by the quotient of 'associated' behavior. In this research, the six children were the object of scheduled experimental group therapy. These children all belong to the same special class, so a class member corresponds exactly to the instructional object group. The instructional space consisted of the CS; (Communicative Space) set up in the center of an 8m square playroom. The CS consised of a square (244cm×244cm) 'stage' 25cm in height, and on top of that a 180cm diameter round 'stage' which was also 25cm in height. Toys were limited to only large size blocks which could be assembled and moved. For bacground music, the same music tapes were used for both groups from the beginning to the end. The instructional setting of the therapist team is characterized by a higher 'associated' behavioral relationship in CS activity (located in the center of the Playroom), and this relationship is lower in RS (Round Space) activity area (which surrounds CS). Therefore, with the therapist team it is considered that the therapists strengthened the supportive functions of children's 'associated' behavior in the CS, which is a smaller space than the much wider RS space. Characterisitic differences of both teams were also exposed in the results of the 'associated' behavior quotient when the full therapy was broken into the two parts. Mention was made about the tendency with the mother team for the 'associated' behavior quotient to decline from the first half of therapy to the latter half, while with the therapist team it rose. The increase in 'associated' behavior from the first half to the latter half with the therapist team is assumed that 'associated' behavior of each constituent member at the beginning of therapy becomes a reference point, which was condensed as a whole group activity as time passes.

key words: Behavioral Space Therapy; The Behavioral Space Analysis; The Quotient of 'Associated' Behavior

Introduction

When one thinks about the meaning of an environment in which people try to give best teaching to the handicapped children, two topics come to mind. The first is "how to make a responsive environment" and another involves "the composition of the structured spatial surroundings". Traditional teaching styles emphsize the teacher's guidance as a "provider of stimulation". In order to activate children's communicative behavior, however, the two things most needed are the child's spontaneous behavior and a space where the children can express themselves freely. Therefore, in order to accomplish these tasks, it is required to respond in a positive manner to children's behavior, and also to make up for children who can not sufficiently express themselves, and finally to give some meaning to their behavior in the context of the particular environment offerd by the therapist. Moreover, "a scheme to lay out the playroom space" is necessary to give direction for indirectly focusing children whose attention tends to wander, thus making them more stable.

Based on our ealier studies, which implemented the tasks mentioned above, we have developed a unique methodology for group therapy of handicapped childrin, and had the opportunity to study some early research results. This has been promoted as a systematic tool for daily clinical activity, therefore it is termed "Behavioral Space Therapy" (Gotoh, Ogasawara, Gotoh, & Fukuhara, 1983, 1984). In this therapy method, interactive-type behavior (i. e. that which occurs in a situation in which time and space are shared with others) is assigned a high priority, and the task of actually setting up a space that promotes such behavior for children was undertaken. In this therapy method the following three items form the basic framework of the environment (Gotoh, 1993).

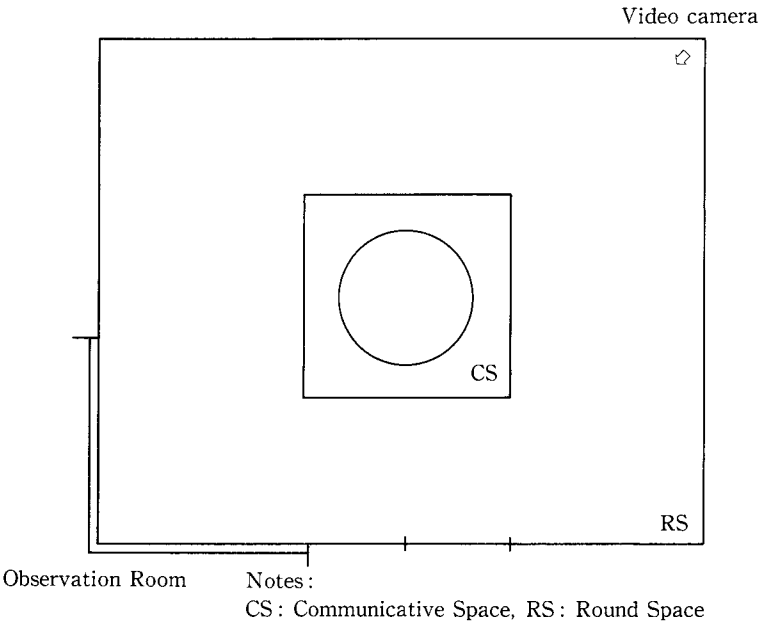


FIGURE 1 Schematic Layout of the Behavioral Space

(1) Physical Composition of Playroom Space: As shown in Figure 1, a type of two-level 'stage' was arranged in the center of the playroom, to make structurization easier. This part of the playroom is called the "Communicative Space" (CS). This CS is a relatively quiet area, and the amount of contact within a short distance is quite high. In general, it is hypothesized that the CS has a strong tendency to promote remarkable growth of personal relationships. Conversely, since a "Round Space" (RS) around the CS is rather large, it is a relatively dynamic space. Thus, children's activity spreads out, giving therapists many opportunities to contact children through toys. RS and CS serve to complement each other. According to a behavioral space therapy guidance hypothesis, CS enhances and strengthens characteristics as a figure, while RS has a tendency to enhance characteristics as a ground.

(2) Choice of Toys: From an assortment various toys, specific items are chosen, such as those which easily induce children's connective actions, and bring about common actions among the entire group. In therapy, very large blocks, which are possible to interconnect and move about by attaching pulleys, have been used so far.

(3) Psycological Composition of Playroom Space: With background music a guide flow is devised such that children can be aware of and prepare for the next activity. Moreover, a chief therapist mainly has preeminence over the other therapists and serves as a focal point of the CS. It is sought to direct the flow of children's 'associated' behavior so as to cohere and condense the behavioral space.

These three items form the basic framework of behavioral space therapy. An analysis method suitable for evaluating results of clinical activities which utilize this therapy has been developed (Gotoh, Ogasawara, Gotoh, & Fukuhara, 1991). The accuracy of this analysis method was improved by using the "Quotient of 'Associated' Behavior" (Kanazawa, 1991, Gotoh, Ogasawara, & Kanazawa, 1992).

Several findings have been made in behavioral space therapy research. The studies are all oriented towards handicapped children, and are investigated in view of three constituents-"personal relationships", "object relationships", and "common use of behavioral space" for associated aspects of behavior in social space (Gotoh, & Ogasawara, 1989, Ogasawara, & Gotoh, 1989, Kanazawa, 1994). Particularly, Kanazawa focused on physical environment in the playroom space and analyzed group 'associated' behavior. She subsequently made it clear that formation of the physical space (the existance of CS constituent) influenced an increase in group 'associated' behavior. In research so far, however, sufficient actual investigation has not been carried out concerning functional characteristics of therapists who have a close relationship with these children's 'associated' behavior. The research dose not clarify the relationship between differneces in arrangement of the physical environment and children's 'associated' behavior.

Thus, in this research while we clarify characteristics of children's 'associated' behavior depending on differences in make up of their therapists team, we investigate functions of those therapist's groups. Here two groups are formed. One is a team which consists of two students learning the Behavioral Space Therapy along with their guidance instructor (this is termed the "therapist team" below). The other team cosists of three mothers of their object children (the "mother team"). In this research

our aim is to clarify characteristic differnces in children's 'associated' behavior in an instructional situation by these teams, with comparison and analysis by the quotient of 'associated' behavior.

Methodology

1. Formation of Analytical Object Group and Space Setup

A summary profile of the instructional object children is given in Table 1. In this research, the six children shown in Table 1 were the object of scheduled experimental group therapy. These children all belong to the same special class, so a class member corresponds exactly to the instructional object group.

The chronological age shows the age at experimental time. The age distribution ranged from six years eight months up to eight years three months. The average age was seven years five months. Their IQ ranged from 42 to 74, with an average of 55.8. The Suzuki-Binet Test was used for IQ measurement.

On the other hand, the instructional teams consisted of a therapist team, made up of an instructor who is in charge of this therapy method, and two students who were continually studying the therapy method, and a mother team, made up of three mothers whose children were instructional objects. One of the mothers took the role of a team leader. Consequently, each group consisted of nine members, including six instructional object children who were common to both groups.

The instructional space, shown in Figure 1, consisted of the CS ; (Communicative Space) set up in the center of an 8m square playroom. The CS consisted of a square (244cm×244cm) 'stage' 25cm in height, and on top of that a 180cm diameter round 'stage' which was also 25cm in height. Toys were limited to only large size blocks which could be assembled and moved. For background music, the same music tapes were used for both groups from the beginning to the end.

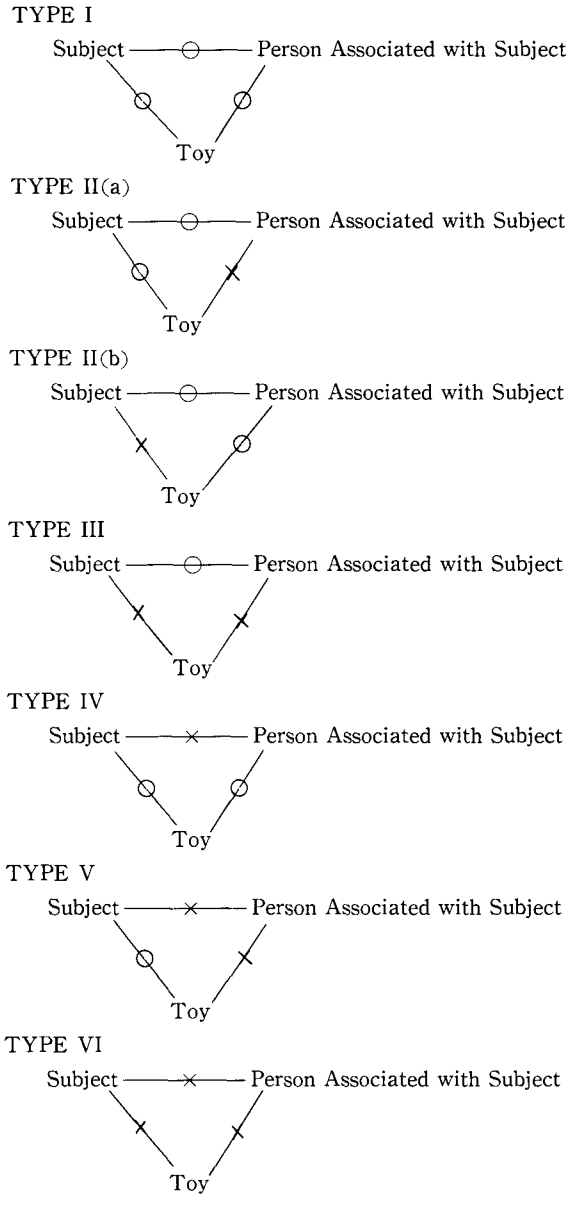
TABLE 1 Profile of Expermental Object Children

Object Children	Sex	Chronological age (CA)	Intelligent quotient (IQ)
Child A	F	6 : 10	74
Child B	F	6 : 8	47
Child C	F	6 : 9	53
Child D	M	8 : 3	51
Child E	M	8 : 3	68
Child F	M	7 : 10	42

2. Data Collection and analysis

Instructional settings of both groups were recorded by a wide-angle camera attached at one corner of the playroom ceiling, as shown in Figure 1. The wide-angle camera was adjusted to permit the entire playroom to be viewed.

For analysis, instructional spaces (CS and RS) were obtained with the same physical composition setting for both groups and were recorded by a video recorder to



Note) Marks on the line connecting each category denote the following:
○ : indicates a relationship exists
× : indicates no relationship exists

FIGURE 2 Relation Category Diagrame

be used as analytical material. Data were collected on September of 1993 for the mother team and on November 1993 for the therapist team.

In the first stage of analysis the basic data were generated using the analysis method (Behavioral Space Analysis) developed by Gotoh, *et al.* Based on this analysis method the degree of 'associated' behavior composition is determined from two parts, a personal relationship constituent and object relationship constituent. Figure 2

summarizes the relational category style, depending on the degree of the composition (Gotoh, Ogasawara, Gotoh, & Fukuhara, 1991, Ogasawara, 1993). For analysis, on the basis of data recorded by the video camera, the degree of 'associated' behavior composition was determined every five seconds, the analysis time unite. Analysis of the data included recording others with whom the subject associated. In deciding the relational category style, in the case which included a personal relationship, we decide to choose the category for which the composition degree was highest, connected within an analysis time unit between the specified others. Moreover, when we resolved the behavioral space within an analysis time unit, the category which placed highest was chosen as the formation space. Recall that the behavioral space is classified into the CS and RS as shown in Figure 1. This procedure was applied to each of the 9 members of both groups.

In the second stage of analysis, an 'associated' behavior quotient score was calculated for each date given above. The mathematical formula of the 'associated' behavior quotient is shown below (Kanazawa, 1991). This quotient was devised as an index to show the extent that three constituents—(1) Association with others, (2) Association with toys, (3) Sharing space with the team leader-were involved in the overall behavior of each member.

The 'Associated' Behavior Quotient is given by:

$$QI = \frac{Xi}{(N-1)V} \times \frac{Yi}{V} \times \frac{Ri+Ci}{V} \times 100$$

Where:

QI is Individual 'Associated' Behavior Quotient

Xi is the number of personal frames

(Categories TYPE I + TYPE II(a) + TYPE II(b) + TYPE III)

Yi is the number of object frames

(Categories TYPE I + TYPE II(a) + TYPE IV + TYPE V)

V is the number of analysis frames

N is the formation member number

Ri is the number of the frames of RS agreement with chief therapist

Ci is the number of the frames of CS agreement with chief therapist

This mathematical formula uses a ration to indicate the portion of the maximum possible value that could be obtained for each constituent within the analytical object film clips. Then by calculating the product of the three constituents, the formula gives the ration which represents the agglomerated 'associated' behavior. This quotient has characteristics that show how much the agglomerated 'associated' behavior (with a high degree of composition) is expressed in the behavioral space, shared with the team leader (the therapist in the equation), and expressed in the activity center. The maximum value of the quotient is 100 and the minimum value is 0, and it is assumed that the higher the member, the more the individual 'associated' behavior becomes highly affiliated social behavior. Other characteristics include;

As evident in the mathematical formula, if one of the three constituents is 0, for example there is no "object relation" constituent, then the resulting numerical value is 0 even though the other constituents may have a high value.

When the 'associated' behavior quotient is calculated, the behavior of mother A as a group leader, is determined as an index showing the degree of sharing of behavior space, in the same way as for the therapist team.

In analysis of recorded video data, the same analyst was in charge of the work since the analysis results of both groups are compared and investigated.

Results

1. Results of 'Associated' Behavior Quotient Based on Behavioral space

Table 2 shows the 'associated' behavior quotient results for the entire instructional space, and the 'associated' behavior quotient calculated depending on the behavioral space in which the chief therapist and Mother A (who supposedly constitute the core of group activity) are located. Here, for the entire instructional space of both teams, the portion of behavioral space occupied by the chief therapist and Mother A are expressed as a reference for analysis. The quotients are broken down into two categories-for activities in the RS and another for those in the CS. Then the 'associated' behavior quotient of each constituent member was calculated. The chief therapist

TABLE 2 'Associated' Behavioral Quotient for the Entire Instructional Space and Depending on the Behavioral Space

	Therapist Team				Mother Team			
Category of Frames	Overall 461	The RS Activity 131	The CS Activity 330	*Difference	Overall 454	The RS Activity 363	The CS Activity 91	*Difference
Chief Therapist								
Therapist A	7.67	5.58	7.99	+2.41				
Therapist B	3.38	5.02	2.30	−2.72				
Mother A								
Mother B					10.30	11.08	0.68	−10.40
Mother C					6.23	7.48	0	−7.48
Child A	5.31	3.23	5.90	+2.67	5.57	6.04	0	−6.04
Child B	1.81	2.80	0.79	−2.01	6.27	7.29	0	−7.29
Child C	4.18	1.18	5.79	+4.61	4.30	5.08	0	−5.08
Child D	4.67	2.76	5.38	+2.62	6.78	9.73	0.39	−9.34
Child E	5.96	4.38	6.50	+2.12	5.09	4.76	6.55	+1.79
Child F	3.91	0.73	6.04	+5.31	7.25	6.45	10.74	+4.29

* Difference=The CS Activity—The RS Activity

assumes a role as a giver of direction and flow to the entire group's activity, and the quotient of the chief therapist herself is not calculated for the same reason.

For the entire instructional setting, 461 analysis object film clips were obtained for the therapist team and 454 clips for the mother team. From these totals, the analysis revealed that the therapist team activity comprised 131 clips in the RS and 330 clips in the CS. On the other hand, for the mother team, RS activity amounted to 363 units and CS activity was 91 units. The RS activity, which resulted in 461 analysis object pieces for the therapist team, accounts for 28.4% and CS activity accounts for 71.6%, while RS activity of the mother team, which totaled 454 units, accounts for 80.0% and CS activity accounts for 20.0%. Thus there is a notable differnce between the therapist and mother teams.

Looking at the quotient for the entire instructional space, therapist A scorers 7. 67, the maximum value among the 8-member therapist teams, and Child B had the minimum value of 1.81. In the mothers team on the other hand, Mother B as a instructor obtained 10.30, the maximum value, and the minimum value was 4.30 for Child C. Therefore, by comparison of the quotient for constituent members of each team, a common tendency for both teams is that the maximum value is held by the instructor. Next, when the quotient is compared for the six children depending on the team (therapist or mothers), there is a common tendency. That is, there is a tendency that the quotient for five children (i. e. excluding Child E), to be higher in the mother team than in the therapist team. This results from the difference that the instructional space for both teams reflects on the children's quotient.

Next, when one subtracts the quotient obtained in RS activity from the quotient obtained in CS activity and looks at the general tendencies about the difference between the two, it is seen that there are six members our of eight in the therapist team for which the difference is positive. From this analysis result, it is concluded that on the whole there is a tendency that for the therapist team, the quotient was higher in CS activity than RS activity. In contrast, the mother team showed an opposite tendency to this and for six out of eight members the difference resulted in negative values. In the mothers team, the quotient for CS activity of six members out of eight are all less than 1.0, so the values are fairly low.

Summarizing the above results, in the entire instructing spaces there is a tendency for the mother team quotient to be higher than that of the therapist team. In the mother team the quotient obtained from RS activity is higher than that from CS activity, while in the therapist team the quotient obtained from CS activity is higher.

Looking next at individual differences among the children, three children—A, C and D—reflect the same tendency mentioned above for the teams; in the therapist team they show a positive difference, while in the mother team they show a negative difference. On the contrary, Child B shows a negative difference in both teams and Child E and F show a positive difference in both teams. these three children display a consistent tendency in their individual activity. In Child B, however, a difference of -2. 01 in the therapist team grows to -7.29 in the mothers team. Therefore, it is understood that the ration originating from RS activity is large in the mothers team compared to the therapist team. Moreover, Child E shows a difference of +2.12 and Child F

shows a difference of +5.31 in the therapist team, while in the mothers team Child E shows a relatively small difference of +1.79 and Child F +4.29. This result indicates that the quotient in RS activity is larger in the mother team.

Incidentally, in this research analysis a total of four zero values are obtained. These zeros all originate from CS activity with the mother team. The 'associated' behavior quotient is calculated by multiplication of three constituent ratios, "Association with Others," "Association with Toys," and "Shared Space With Team Leader." Therefore, it is necessary that one of constituents has a zero value in order to obtain the minimum value of zero. When we analyzed the film clips to find the particular costituent which had a zero value, "Shared Space With Team Leader" was zero for Child A, B, C and Mother C. As a result, the theoretical minimum value of 0.0 is actually obtained.

2. Results of 'Associated' Behavior Quotient Calculated at Different Times

Table 3 shows the 'associated' behavior quotient calculated after separating the whole instructional space into two parts based on time. For the therapist team 230 frames were obtained in the first half, and 231 frames in the latter half, while for the

TABLE 3 'Associated' Behavioral Quotient Calculated at Different Times

	Therapist Team			Mother Team		
Category of Frames	First Half 230	Second Half 231	** Difference	First Half 227	Second Half 227	** Difference
Chief Therapist						
Therapist A	5.62	10.23	+4.61			
Therapist B	2.86	3.42	+0.56			
Mother A						
Mother B				12.76	7.09	−5.67
Mother C				7.04	4.17	−2.87
Child A	7.90	2.72	−5.18	4.97	6.06	+1.09
Child B	2.74	0.84	−1.90	9.19	3.47	−5.72
Child C	3.15	4.74	+1.59	4.69	2.95	−1.74
Child D	3.40	6.08	+2.68	12.55	2.94	−9.61
Child E	4.55	6.68	+2.13	5.48	3.99	−1.49
Child F	2.35	5.42	+3.08	8.87	5.59	−3.28

** Difference = Second Half − First Half

mothers team 227 analysis object frames were obtained in both the first and latter parts.

Firstly, let's take a look at team tendencies by examining the quotient for the therapist team for different intervales of time. The time differnce mentioned herein refers to the differnce in the value of the quotient going this differnce in quotients going from the first part to the latter part (Second Part—First Part). The third column under "Therapist Team" shows this difference in quotients going from the first half of therapy to the latter half. It can be seen that Child A and B have a negative value. However, the change for the other four children is positive, which means a tendency exists for the latter half to be higher than the first half. Furthermore, the quotient for Therapist A and B also increase from the first half to the latter half. From these analysis results, it is concluded that the 'associated' behavior quotient becomes higher in the latter half of therapy than in the first half.

On the other hand, the mother team shows an opposite tendency to the therapist team. As shown in the column on the far right, the difference quotient for each constituent member, except Child A, is negative. From the facts above, we can say that in the mothers team there is a tendency for the 'associated' behavior quotient to decrease in the latter part of therapy compared to first part.

Comparing trends in the quotient for each child in the therapist team with the corresponding quotient in the mothers team, four children, C, D, E and F reflect the same tendency mentioned above for the teams. Specifically, for these four children the quotient in the therapist team shows a rising tendency ; that is, it is higher in the second half than in the first half. At the same time the quotient in the mother team shows a declining tendency; that is, it is lower in the second half than in the first half. On the contrary, Child A shows an opposite tendency, that is, the quotient declines in the therapist team and rises in the mother team. Moreover, the quotient for Child B shows a declining tendency both in the therapist and in the mothers team, the only instance for which a consistent tendency is exhibited for an individual subject. However, the quotient difference for Child B was -1.90 in the therapist team, but increased to -5.72 in the mother team. This child's declining tendency is strengthened in the mother team, which corresponds with the declining tendency of the quotient which is common to the mother team as a whole.

Discussion

In this research it was our aim to clarify functional characteristics of instructor groups based on Behavioral Space Therapy utilizing an analysis of children's 'associated' behavior in an instructional settings of two different instructor teams. In this discussion, further investigation of these analytical results will be made, along with additional considerations of the object children's 'associated' behavior in the therapist team and mother team instructional settings. We will also investigate functional charcteristics of the instructor groups using Behavioral Space Therapy.

The 'associated' behavior quotient is calculated as basic data from the results obtained by behavioral space analysis. It is a numerical value obtained by multiplication of three constituent ratios, (1) Association with Others, (2) Association with

Toys, and (3) Shared Space with Team Leader. Therefore, if the numerical value of the 'associated' behavior quotient for a subject is high, it means that a relatively high degree of 'associated' behavior with others involving toys is exhibited. In addition, it is a premise that 'associated' behavior involving the chief therapist, who leads the whole group, is formed in a context in which the chief therapist's behavioral space is shared.

First, we will consider the characteristics of the 'associated' behavior quotient for the entire instructional setting. From this analytical result, it is clear that for the approximately 38 minitues of recorded instructional setting, the quotient of each constituent member with the therapist team tended to be lower than with the mother team. This outcomes for the entire instructional setting shows that the strength of 'associated' behavior under the instructional setting of the mother team was higher than that by the therapist team. Moreover, comparing the quotient for both instructor teams and children, the instructor teams' quotient tended to be higher than the children's quotient. It is pointed out that therapists had a major role in forming children's 'associated' behavior. Regarding therapists' role in actually forming this behavior, the following two items should be considered: Association in which therapists directly appeal to work with children and try to interact with them, and another type of association in which therapists indirectly try to associate with children through toys. In research of Gotoh, Ogasawara, Gotoh and Fukuhara (1984), it was made clear that in the behavioral space therapy instructional setting, the previously mentioned 'association with toys' by the therapists is more remarkable. Judging from these aspects, there is a common result since instructors of both teams carried out functions to support children's 'associated' behavior formation. There was a difference, however, in the specific method.

As previously mentioned, the 'associated' behavior relationship of each constituent member in the overall instructional setting was higher in the mother team than in the therapist team. However, when one examines it again from the "Physical Composition of the Playroom" standpoint, as one of the Behavioral Space Therapy constituents, the situation is different. An earlier section described the "Physical Composition of the Playroom" in Behavioral Space Therapy, and the schematic was shown in Fig. 1. Basically, it consists of the CS containing a square 'stage' and on top of that a circular 'stage', surrounded by the RS. In turned out from the analysis that in the therapist team the quotient for CS activity was higher than for RS activity, and conversely, in the mothers team it was lower for CS activity than for RS activity.

In this way, the instructional setting of the therapist team is characterized by a higher 'associated' behavioral relationship in CS activity (located in the center of the playroom), and this relationship is lower in RS activity (which surrounds CS). Therefore, with the therapist team it is considered that the therapists strengthened the supportive functions of children's 'associated' behavior in the CS, which is a smaller space than the much wider RS space. In Behavioral Space Therapy the CS is considered as a type of "gathering place" for the entire group (Gotoh, 1993). A constituent of therapy is pointed out, namely, that while the chief therapist maintains contact with other therapists, she makes use of toys to indirectly influence each child's spontaneous action towards a certain direction, and creates a space in which the flow of the whole

group's activities is contained (Gotoh, Ogasawara, Gotoh, & Fukuhara, 1991). Thus, in Behavioral Space Therapy, the way CS, the "gathering place" is utilized by therapists in connection with the RS (which surrounds CS) as an overall group activity space involves the meaning of the therapy contents. The analytical results obtained in this research for the therapist team tells us that the rationale or philosophy in administration of these Behavioral Space Therapies was spacifically expressed in the instructional setting.

Characteristics of these Behavioral Space Therapies are further clarified by investigating the instructional setting of the mother team. In the mother team the 'associated' behavior relationship in the RS was higer than that of the CS activity, and in the behavioral space RS is more heavily weighted. Moreover, it may be pointed out that there were six constituent members whose quotient was zero, or nearly zero, in the CS. Namely, it is assumed that in the mother team CS did not function as a group "gathering place", but rather the RS was more meaningful for composition of 'associated' behavior.

Characteristic differences of both teams were also exposed in the results of the 'associated' behavior quotient when the full therapy was broken into the two parts. Mention was made about the tendency with the mothers team for the 'associated' behavior quotient to decline from the first half of therapy to the latter half, while with the therapist team it rose. As for these tendencies, we can say it may be necessary to divide the therapy into not only two parts (a first half and latter half), but rather three parts (a first, middle and final unite) and then calculate the respective quotients and compare and analyze the trends. However, the increase in 'associated' behavior from the first half to the latter half with therapist team is assumed that the 'associated' behavior of each constituent member at the beginning of therapy becomes a reference point, which was condensed as a whole group activity as time passes. In addition, when we consider that the relationship of the 'associated' behavior of the therapist team is higher for CS activity, compared to RS activity, the CS is considered to be a group activity space, and there 'associated' behavior having a more advanced relationship was formed. Furthermore, an increase in 'associated' behavior for the group in the latter part of therapy is assumed to be connected with the object children's aptness for a new space which will probably be constructed by the next therapy.

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