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Physical Activity Types Favored by Students with Developmental Disabilities: A Converging Study based on Q Methodology

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ABSTRACT

Background/Objectives: The purpose of this consumerism-theory-based study was to explore the types of physical activities favored by students with developmental disabilities using Q methodology.

Method/Statistical Analysis: This study used based on a small sample, of less than 30 participants. A total of 27 students with developmental disabilities who were aged between 13 and 18 years, attended special classes at regular schools, and lived in Y city participated in the study. The subjects were classified into 25 physical activity cards developed for this study, and their preference types were analyzed through QUANL pc program.

Findings: The results are as follows. First, students with developmental disabilities preferred four types of physical activities. Second, the characteristics of these four types were as follows: peer-centered (first type), family-centered (second type), music-centered (third type), and competition-centered (fourth type).

Improvements/Applications: Moreover, these results indicate that students with developmental disabilities are interested in various types of physical activities, and favor a variety of activities types depending on their background characteristics.

Keywords: *Q Methodology, A Converging Study based, Physical Activity, Developmental Disabilities, Types Favored*

Introduction

Increasing attention has been recently paid to self-determination as a measure of educational performance for people with disabilities in education practice. Self-determination is needed to express one's will and intentions by oneself without external intervention, and involves the ability to solve problems arising in daily life as an autonomous agent[1]. Self-determinationis valuable for people with disabilities to be able to make their own decisions, and can therefore increase their opportunities to pursue a satisfactory life[2]. In addition, many consumerism-based studies that put emphasis on humanistic values have been conducted in the field of adapted physical activity in Korea since 2000[3]. This phenomenon can be attributed to new policies based on a "tailor-made" welfare paradigm, which have come into focus due to social changes where growing attention is paid to human rights and self-realization. Such a social shift has changed the environment for people with disabilities to engage in physical activities, which has had an influence on the field of adapted physical activity in Korea. Students with disabilities, in particular, have difficulties in making reasonable decisions by themselves, as their self-determination ability is much lower compared to their non-disabled peers. Therefore, educational programs are often offered to children with disabilities who are deprived of their right to self-determination by parents or teachers who do not recognize their self-determination ability[4]. Furthermore, physical activity classes provided at schools focus excessively on education and rehabilitation, which makes students

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lose interest in the classes. This type of classes also prevents instructors from recognizing and understanding the diverse subjective viewpoints of theirstudents[5]. Kim, Kim, &Lee[1] advocated self-directed learning programs that can encourage more active participation of the students by catering to their preferences, and Park[6] emphasized that self-directed physical activity programs can achieve their educational goals while allowing children to have fun. In this regard, this study employed Q methodology, a research method to investigate individuals' subjectivity, with the aim to provide opportunities for students with disabilities, whose self-determination ability is lower than that of non-disabled students, to make their own choices and decisions. Q methodology is a process in which respondents compare and rank stimuli by themselves to establish a model and express their subjectivity[5]. That is, in Q methodology studies, hypotheses are set up from the perspective of the participants rather than the researchers. This method is used widely to explore a variety of subjectivities in the fields of psychology, sociology, education, and health science[5]. In the field of adapted physical education, Q methodology was used in an exploratory research on types of daily physical activities preferred by people with intellectual disabilities[7] and an exploratory subjectivity study on physical activities among children with developmental disabilities[3]. These studies offer meaningful research material for assessing the academic value of Q-methodology-based convergence research in the field of adapted physical education. This kind of research is significant in that it highlights the academic importance of the self-determination research that is being emphasized in current education practice, it provides a theoretical foundation for future research, and it indicates the need to conduct further studies on relevant programs. The purpose of this consumerism-theory-based study was to explore the types of physical activities favored by students with developmental disabilities using Q methodology. Research questions were as follows. Firstly, what are the types of physical activities preferred by students with developmental disabilities? Secondly, what are the characteristics of each type of physical activity preferred by the students with developmental disabilities?

Materials and Method

Research Participants (P Sample): When employing Q methodology, a large sample size may result in selection bias, which hinders the identification of differences between individual participants. The adequate sample size for Q methodology is thus around 50, which is sufficient to generate and compare factors[5]. Based on this principle, this study used a sample of less than 30 participants. A total of 27 students with developmental disabilities who were aged between 13 and 18 years, attended special classes at regular schools, and lived in Y city participated in the study. Firstly, among students diagnosed with development disabilities (but not with multiple disabilities such as visual, hearing, or physical disabilities), we selected those recommended by their homeroom teachers. Secondly, among these recommended students, we selected those with intellectual disabilities whose IQ was between 35 and 75 as measured with the Korean version of the Wechsler Intelligence Scale for Children – Fourth Edition, those with autism whose Childhood Autism Rating Scale result was between 30 and 36, and those with attention deficit and hyperactivity disorder (ADHD) whose result on the Korean version of the ADHD Diagnostic System was between 90 and 110. Thirdly, among the selected students, we selected those with a level of reading ability equivalent to that of first to third graders, able to communicate with researchers and rank picture cards appropriately, and whose parents provided written consent to participate in the research. Detailed characteristics of the participants are shown in <Table 1>

Table 1: Characteristics of research participants

Division	Male	Female	Total
Intellectual disabilities	10	7	17
Autism Spectrum Disorder	3	3	6
ADHD	2	2	4
13years old	1	3	4
14years old	3	1	4
15years old	3	2	5
16years old	3	1	4
17years old	2	2	4
18years old	4	2	6
Total	16	11	27

Research Process: This research followed the process suggested by Kim[5], which consists of four stages: Q sample development, P sample (research participants) selection, Q sort, and analysis of the Q sort.

Research tools

Q sample Development: Brown[8] suggested that there was no absolutely ideal size for the sample of items. Therefore, taking into account that the participants were students with developmental disabilities, 25 physical activities were selected as the Q sample in order to minimize the participants' burden of sorting and to raise the confidence level of their responses. Initially, physical activities were selected for Q sort by referring to physical education textbooks used in special needs schools and prior literature on physical activities[3, 6]. Subsequently, five individuals including teachers with experience in teaching students with disabilities, and postdoctoral researchers and professors in the field of adapted physical activities reduced the number of physical activities down to 25 through discussion. Selected activities were expressed in pictures easily understood by the participants, and these were printed on 10.5 cm × 14.5 cm cards, which are easy to use. The Q sample picture cards are presented in <Figure 1>.

Figure 1: Q sample picture cards

Q Sort: The Q sort method used by Combes, Hardy, and Buchan[9] with people with moderate intellectual disabilities was employed in this study. According to this method, the participants placed the Q sample, made up of 25 cards, on the sort table as shown in <Figure 2>. Enough time was given for the participants to choose physical activities during the sorting process, and interviews were conducted with the participants with regard to the sorting process, which were documented as individual interview records.

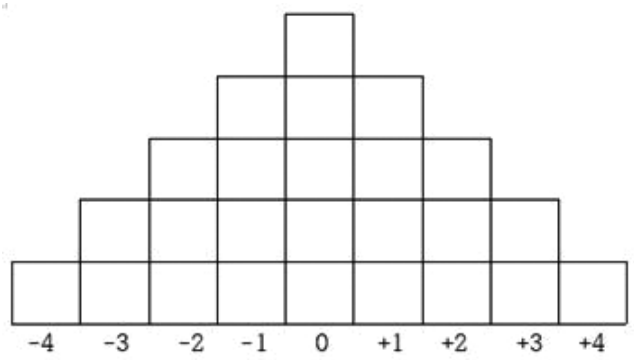

Figure 2: Q sort table and scores

Data Analysis

The collected data were coded using the QUANL PC program, developed for Q methodological analysis. A Q factor analysis was conducted on the 25 coded items by employing principal component factor analysis using the P sample as a basis. Factors that had eigenvalues greater than 1 and could capture the uniqueness of an activity type were extracted. This study sought to increase the validity of activity types by obtaining descriptions from respondents whose factor weight was high for that activity type.

Statistical Analysis

Mention the statistical details, the number of samples used, statistical tools/software used/SD/level of significance, repeatability etc.

Results and Discussion

In Q methodology studies, respondents with a high factor weight for a factor representing a corresponding

type. Considering that our study participants were students with developmental disabilities, the statements of those with relatively clearer verbal expression were interpreted in an effort to conduct a more valid analysis.

Development of Q-types: Physical activities preferred by the students with developmental disabilities were identified and are shown in <Table 2>. Only the factors with eigenvalues greater than 1 were extracted and categorized as four activity types, which explained 48% of the total variance. The first type explained 23.01% of the total variance, the second type 12.41%, the third type 6.99%, and the fourth type 5.2%. The students with developmental disabilities favored the first type of physical activities the most. The correlations between the activity types are shown in <Table 3>, and indicate the likeness between the types. The coefficients for the correlation of the first activity type with the second, third, and fourth types were .103, -.071, and .502, respectively. Those for the correlation of the second type with the third and fourth types were .349 and .095, respectively. Finally, the correlation coefficient between the third and fourth types was .051. In addition, factor weights and demographic characteristics of the participating students with developmental disabilities are presented in <Table 4>. The participant with the highest factor weight in each activity type is the person favoring the corresponding activity type the most among the other participants.

Table 2: Eigenvalues and explained variance by physical activity type

Division	Type1	Type2	Type3	Type4
Eigen values	6.2120	3.3500	1.8873	1.4028
Opercentages of total variance %	.2301	.1241	.0699	.0520
Cumulative%	.2301	.3541	.4240	.4760

A professor in adapted physical education, a teacher with experience in teaching students with developmental disabilities, and three postdoctoral researchers in adapted physical education and special education reviewed the characteristics of the four types and named each type accordingly.

Table 3: Correlations between types

Division	Type 1	Type 2	Type 3	Type 4
Type 1	1.000	-	-	-
Type 2	.103	1.000	-	-
Type 3	-.071	.349	1.000	-
Type 4	.502	.095	.051	1.000

Table 4: Factor weights and demographic characteristics of P samples

Type	Sample number	Factor weight	Gender	Age	Type of disability	School Type	Physical activity (PE classes) Experience
1Type (8people)	s01	1.0171	Male	14	Intellectual Disability Level 3	Ordinary schools	○
	s05	.7059	Female	13			○
	s10	1.1371	Male	18			○
	s11	.5698	Male	16			○
	s12	1.2947	Male	16			○
	s17	.8235	Male	14	ADHD		○
	s20	.7696	Male	15	Autism Spectrum Disorder Level 3		○
	s22	.9390	Female	17	ADHD		○
2Type (7people)	s6	.7087	Female	13	Intellectual Disability Level 3	Ordinary schools	○
	s8	1.3134	Male	18			○
	s9	.8109	Male	18			○
	s15	1.6052	Male	16			○
	s19	.7077	Female	14	Intellectual Disability Level2		○
	s26	.4344	Male	13	Autism Spectrum Disorder Level 2		○
	s27	.2987	Female	18	Intellectual Disability Level2		○

Conted…

3Type (6people)	s2	.4226	Female	13	ADHD	Ordinary schools	○
	s3	.3985	Female	16	Autism Spectrum Disorder Level 2		○
	s4	.8491	Female	18	Intellectual Disability Level 3		○
	s13	1.2077	Female	15	Autism Spectrum Disorder Level 2		○
	s23	.4029	Female	15	Intellectual Disability Level 2		×
	s24	.7249	Female	17			○
4Type (6people)	s7	1.3898	Male	18	Intellectual Disability Level 2	Ordinary schools	○
	s14	.8547	Male	17	Intellectual Disability Level 2		○
	s16	.8262	Female	15	Autism Spectrum Disorder Level 3		○
	s18	.7585	Male	14			○
	s21	.7564	Male	15	Intellectual Disability Level2		○
	s25	.9230	Male	17	ADHD		○

Characteristics of Physical Activity Types

First Type: Peer-centered Activities: The first type of activities preferred by the participants involved activities through which the students could play together with their peers. The most favored activities were badminton and soccer, as shown in <Table 5>.

> "Playing badminton relieves stress. Badminton is for two players, meaning four people can play, too. But when you run, you run alone. I like to do something with my friends." (Participant S01)
>
> "It's fun. I can have a conversation with my friends while playing, and I like that I sweat a lot when playing." (Participant S10)

Table 5: Type 1 Standard score by item

Q card	Standard score
21. Badminton 19. Football	1.68 1.60
8. Dance 2. Yoga	-1.54 -1.78
Sports with scores higher or lower than the standard score 1.5	

This result reflects the fact that the participants have fun and develop their interest in physical activities through interaction with their peers, and their confidence and self-recognition in terms of physical activities increased when engaging in this type of physical activities. In addition, it was discovered during the interviews that providing the appropriate opportunities and environment to the students with developmental disabilities to engage in playing with friends in gyms and schoolyards encouraged their voluntary participation in these playful activities. This finding is congruent with that of the study by Han[10], indicating that peer acceptance levels and social skills of male students with developmental disabilities improved through comprehensive playing programs.

Second Type: Family-centered Activities: The second type of activities favored by the students involved activities in which their family members could participate. The most favored activities were cycling and running, as shown in <Table 6>.

> "My daddy promised that he would go riding with me. I like being with my daddy. I don't like playing with friends because they like playing games at video game cafes more." (S26)
>
> "I like to ride a bike because it clears my mind. I have my bike at home. When I get stressed because of reading and writing, daddy asks me to ride together." (S06)

This result indicates that the participants relieved their mental stress related to their peers and classes by engaging in physical activities with their family, and efficient communication could be established between family members through such activities. In addition, it was found during the interviews that riding a bike was a medium through which emotional ties with parents were built, as most participants learned how to ride a

bike from their parents. This finding is in line with the result of a study conducted by Kim, Kim, Park& Lee[7], indicating that global and local motor skills of children with intellectual disabilities improved through community dance programs in which children and their parents could participate together.

Table 6: Type 2 Standard score by item

Q card	Standard score
9. Bicycle 10. Running	2.15 1.78
16. Goal ball	-1.50
Sports with scores higher or lower than the standard score 1.5	

Third Type: Music-centered Activities: The third most favored activity type involved activities where the students could move their bodies to their favorite music. As shown in <Table 7>, the most preferred activities was dancing.

> "I like songs. I also like to dance. I can lose weight when I dance, and dancing also makes me feel better. Usually I dance with my friends at lunch time. I love K-Pops music." (S04)
>
> "I like to dance because I can listen to music. But I'm actually not a good dancer. I found the choreography awesome so I danced along, but it was too hard for me." (S13)

Table 7: Type 3 Standard score by item

Q card	Standard score
8. Dance	2.07
12. Mountain climbing 18. Taekwondo	-1.51 -1.80
Sports with scores higher or lower than the standard score 1.5	

This result indicates that the participants had a stronger motivation and became more eager to participate in physical activities if they could listen to music they liked. In particular, all six participants who favored this activity type were female. With or without disabilities, dancing is something that all Korean-pop-loving girls enjoy. They teach choreographies to each other, through which communication is established. In addition, as confirmed during the interviews, participants' confidence level in physical activities was boosted as they mastered more complex dance movements, which in turn could increase voluntary participation. This result is congruent with that of Jung[11] that passive actions of children with developmental disabilities turned into more voluntary and cooperative interaction through musical activities that could increase socialness.

Fourth Type: Competition-centered Activities: This type of activities was preferred by those who enjoyed competing and winning. As shown in <Table 8>, the most favored activities were T-ball and basketball.

> "It's so much fun to watch the game between Lotte and SK. A defender caught the ball so they could win in the end." (S14)
>
> "You can jump and pass the ball to put the ball in the basket. It's fun to dribble and do pickup games with friends." (S21)

This result highlights participants' desire and hope to win when they played in competitions and club activities. T-ball, basketball, and soccer, in particular, are not played as formal games. Rather, they are played in a recreation-like situation such as after-school sports activities, where students with and without disabilities can play together. In the interviews, it was found that students with disabilities could gain a sense of achievement and confidence, which could encourage voluntary participation. This is in line with the result of a study conducted by Kim[12], which investigated the educational significance and characteristics of teaching competition activities in physical education classes.

Table 8: Type 4 Standard score by item

Q card	Standard score
17. Tee-ball 20. basketball	1.81 1.59
18. Taekwondo 11. Inline Skate 2. Yoga	-1.52 -1.57 -2.12
Sports with scores higher or lower than the standard score 1.5	

Conclusion

Based on the above discussion, the following conclusions can be drawn in this study regarding the types of physical activities favored by students with developmental disabilities. First, students with

developmental disabilities preferred four types of physical activities. Second, the characteristics of these four types were as follows: peer-centered (first type), family-centered (second type), music-centered (third type), and competition-centered (fourth type). Moreover, these results indicate that students with developmental disabilities are interested in various types of physical activities, and favor a variety of activities types depending on their background characteristics.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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