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Brief Report

Form, Content, and Gender Differences in Lego® Block Creations by Japanese Adolescents

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Abstract

This study examined general features of Lego block creations produced by Japanese adolescents with no known mental health disorders. The block creations of 33 participants were assessed for form, content, and gender differences. Time spent on the task, amount of area covered, and quantity and types of blocks used were measured and correlated with the participants' genders and past experiences with block play. Results showed that males used the dimension of height more frequently than females, and females used plants in their compositions more frequently than males. The number of basic blocks used and the size of the area utilized were greater with participants who had past experiences with block play. This brief report suggests that the projective use of Lego blocks may be an attractive medium in art therapy, especially among adolescents who played with Legos during childhood.

Introduction

Blocks have been used and developed as one of the many kinds of toys for children. Pre-formed Lego blocks are an attractive material for expression because the colorful blocks engage the imagination and allow for the three-dimensional creation of entire scenes and relationships in miniature. Not only children but also adolescents and adults enjoy playing with blocks in certain contexts. Although blocks were developed originally as toys, they are used in fields such as the arts, education, and technology. Blocks can also serve as a useful material in art therapy. In Japan, blocks are used in play therapy, psychotherapy, and counseling as an expressive technique.

Review of the Literature

Several studies have been conducted on the use of blocks in therapeutic settings. Imagawa, Ohnishi, Yamaguchi, and Nakai (1985) compared the use of blocks as a medium of expression with conventional psychotherapy for patients diagnosed with schizophrenia and indicated the positive effect that the blocks had on their patients. In a case study of a child with elective mutism, Irie and Ohmori (1991) discussed how blocks were used as a means of communication between the client and therapist in each session of therapy. The child's mutism decreased while verbal expressions gradually increased in content and creativity.

Based on a study of the various uses of blocks in art therapy, Kato (2006a) developed an expressive technique using blocks and examined its effects. His technique was based on the theory of sandplay and the use of collage, which is quite popular in Japan. Kato provided Lego blocks for the participants in his study, including basic cubic blocks and specially shaped blocks such as plants, animals, and figures. Participants were asked to complete the Profile of Mood States (POMS) as a pre-test, followed by free block play where they could express anything they desired using the blocks on a base plate. Finally, they completed the POMS as a post-test and the results were compared. The POMS scores after the block play were significantly lower on the five scales of Tension-Anxiety, Depression-Dejection, Anger-Hostility, Fatigue-Inertia, and Confusion-Bewilderment. These results indicated that the use of Lego blocks may have induced a positive, therapeutic effect on the mood state of the participants.

Although the block technique is commonly used in individual psychotherapy or counseling in Japan, a study in the United States provided evidence of its value with group work. Legoff (2004) introduced an expressive technique using blocks with groups of autistic children and found that it was useful for increasing the children's social skills.

Collage technique is closely related to block play and was developed in Japan by Moritani (1988) as a method of psychotherapy. Subsequently, many studies concerned with psychological assessment have been conducted that utilized collage technique. Sato (2002) examined relationships between features found in collage works and personality. In Sato's study, the forms and contents of collages were compared with scores on the Yatabe-Guilford personality test. The number of pieces used and the amount of time spent on the task were counted as forms; the number of human

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beings, animals, plants, buildings, vehicles, and objects (including furniture, tools, and so on) that appeared in the collage were counted as contents. Sato found significant relationships between features of collage works and personality traits.

Kato (2005) replicated Sato's (2002) study to examine collage features as indicators of a child's adaptability or orientation to school. Kato counted the number of pieces and total area of expression as the formal features of a collage, and counted the number of human beings, animals, plants, buildings, vehicles, and so on as an expression of content. He found that some features of collage works reflected adaptability to school. Because Kato's block technique was based on collage, which is a useful projective tool in art therapy, the similarities between these two techniques are worth considering.

In a second study, Kato (2006b) examined the effects of the block technique with respect to gender and participants' past experiences with block works, and found that the effects were linked to both gender and past experience. There were significant interactions between gender and past experience with blocks as measured on the POMS scales of Vigor-Activity and Tension-Anxiety. Among female participants, scores on the Vigor-Activity scale were significantly higher for those who had played with blocks during childhood. Kato concluded that gender and past experience were important factors to consider in the therapeutic effects of the block technique.

The focus of the present study was on the forms and contents found in block creations produced by Japanese adolescents with no known mental health disorders. "Form" is defined as the quantifiable formal features of block works, such as the number of blocks used in a composition, the amount of area used for expression, and the height that is created from stacking the blocks. "Content" is defined as the particular objects used to express ideas, such as animals, plants, vehicles, and buildings. These two features of expression are very important in the study of projective techniques such as collage (Sato, 2002; Kato, 2005). Therefore, we hypothesized that examining these same features in block work would be useful in understanding their projective qualities of expression. In addition, we compared the compositions of male and female participants and took into account their past experiences with block play. We hypothesized that some forms and contents would be influenced by participants' gender or past experience with block play.

Method

Participants

A total of 33 Japanese volunteers participated in the study. Among the participants, 22 were undergraduate students, graduate students, and office workers (9 males and 13 females; mean age = 24.4 years). Although considered young adults in the United States, in Japan most of the participants would be identified with late adolescence. Eleven participants were undergraduate students (3 males and 8 females; all 18 or 19 years old) enrolled in a clinical psychology class. None of the participants had any known mental health disorders.

Materials

We provided Lego blocks to use for expression in this study. Among the basic blocks provided were standard brick-shaped blocks in the colors of red, blue, green, yellow, white, black, and brown. We also offered a variety of specially shaped blocks such as animals, plants, wheels, windows, doors and other common objects. Lego sets usually contain human figures and for the study a number of male and female figures were provided. The figures had identifying details such as uniforms and clothes that corresponded with a variety of jobs, such as office workers, carpenters, and police officers. Belongings (e.g., tools and bags) for the figures also were provided. Finally, participants were given green plastic base plates (25 cm x 25 cm) on which to assemble their block creations.

Procedure

After obtaining consent, the participants were given the directive to "express anything you desire on the plate by using these blocks and figures." In order to obtain a large enough sample, we collected data from two groups and analyzed the combined results from both groups. A total of 22 participants created block compositions individually in separate rooms, each selecting from about 350 blocks and 15 figures. Eleven participants experienced the block technique as part of a clinical psychology class and were each able to select from about 1,700 blocks and 60 figures. They created with the blocks individually in the classroom and the time offered for expression was not limited. After completing their block creations, all participants were asked to describe their impressions of the block technique and their experiences with block play in the past. For the participants who played individually in separate rooms, the mean time for expression was about 22 minutes; in the psychology class all participants finished their expressions in about 30 minutes. Because participants were given an unlimited time to complete their creations, the mean time of 30 minutes indicates the medium's suitability for use in individual art therapy or counseling.

Results

The formal features of the block creations (the number of basic blocks, specific blocks, figures, height, and area of expression) were examined. The mean number of basic blocks used was 47.3 (*SD* = 27.9), the mean number of specialized blocks (other than human figures) selected was 21.8 (*SD* = 13.0), the mean number of human figures used was 4.1 (*SD* = 2.9), and the mean height of the creations was 7.5 cm (*SD* = 1.9). The total area used for expression was measured using a computer. Each block creation was photographed from above using a digital camera. These pictures were then uploaded into a computer and the area of expression was measured using Photoshop. The mean

Table 1
Correlation Among Forms of Block Works

	Basic Blocks	Specific Blocks	Figures	Height	Area of Expression
Basic blocks	1.00				
Specific blocks	-0.17	1.00			
Figures	-0.09	0.50 **	1.00		
Height	-0.09	0.28	0.18	1.00	
Area of expression	0.53 **	0.25	0.17	0.17	1.00

** p < .01

Table 2
Forms of Block Works

		Basic Blocks	Specific Blocks	Figures	Height	Area
Male	Mean	41.0	20.3	4.4	8.3	26.4
	SD	33.6	11.8	3.3	2.3	8.8
Female	Mean	51.0	22.7	3.9	7.0	27.6
	SD	24.2	13.8	2.7	1.6	9.2
Level of significance		n.s.	n.s.	n.s.	†	n.s.
Experience	Mean	54.0	22.2	4.0	2.0	29.2
	SD	27.1	14.4	2.6	7.1	8.2
No experience	Mean	26.6	20.6	4.3	1.8	20.8
	SD	20.1	7.5	3.8	n.s.	8.9
Level of significance		*	n.s.	n.s.	n.s.	*
Total	Mean	47.3	21.8	4.1	7.5	27.1
	SD	27.9	13.0	2.9	1.9	9.0

* p < .05 † p < .10

area of expression was 27.1% (*SD* = 9.0). Correlations among forms of block works were then examined. We found that there was a significant positive correlation between the number of basic blocks used and the area utilized for expression ($r = 0.53$, $p < .05$). There also was a significant positive correlation between the number of specialized blocks used and the number of figures used ($r = 0.50$, $p < .05$). Table 1 shows correlations among formal features of the block creations.

Formal features of the block creations were compared between male and female participants. The heights of expressions for males were higher than they were for females, $t(31) = 1.94$, $p < .10$. The block creations also were compared between participants who had experienced block play in their childhoods and those who had not. As a result of the analysis, we found that the number of basic blocks used was greater for participants who had childhood experiences of block play, $t(31) = 2.62$, $p < .05$, as was the area of expression, $t(31) = 2.47$, $p < .05$. Table 2 shows means and standard deviations for the formal features of the block creations.

The contents of expression as defined by the use of particular objects to convey ideas were also examined. The number and frequency of popular contents (e.g., animals, plants, vehicles, and buildings) were examined using Fisher's exact test between male and female participants. The frequency of the use of plants in the block creations by females was found to be greater than in the expressions created by males, $p = .012$ (two-sided test). A further comparison found that there was no significant difference in the formal features and in the frequency and number of popular contents between participants who had a childhood experience of block play and those who did not. Table 3 shows the number of contents of block creations.

Discussion

The main purpose of this study was to examine the general features of Lego block expressions produced by Japanese late adolescents. We reasoned that it is important to understand the features of block works produced by participants with no known mental health disorders in order to provide a basis of comparison for when therapists utilize the block technique in art therapy or in counseling.

To understand the specific features of the block technique, we quantified expressions with respect to two dimensions: formal construction and contents as expressed with particular objects. These two dimensions were compared with the participants' gender and past experiences with block play. As a result of this study, we were able to identify some differences in the features of block expres-

Table 3
Number and Rate of Contents of Block Works

		Animals		Plants		Vehicles		Buildings	
		Number	%	Number	%	Number	%	Number	%
Male	Appear	7	58	8	67	7	58	7	58
	Not appear	5	42	4	33	5	42	5	42
Female	Appear	10	48	21	100	10	48	17	81
	Not appear	11	52	0	0	11	52	4	19
Level of significance			n.s.		*		n.s.		n.s.
Experience	Appear	12	48	21	84	12	48	18	72
	Not appear	13	52	4	16	13	52	7	28
No experience	Appear	5	62	8	100	5	62	6	75
	Not appear	3	38	0	0	3	38	2	25
Level of significance			n.s.		n.s.		n.s.		n.s.
Total	Appear	17	52	29	88	17	52	24	73
	Not appear	16	48	4	12	16	48	9	27

* $p < .05$

sions between males and females, as well as between those with and without past experience with block play.

There was a significant positive correlation between the number of basic blocks utilized and the total area used for expression. Participants who used a large number of blocks also used a large area. In studies of the collage technique, the number of pieces and the area of expression found significant relationships to participants' personalities (Sato, 2002) and other psychological features such as adaptability to school (Kato, 2005). This research suggests that the number of blocks and area of expression may be important factors that can be used to assess for personality or other psychological aspects of expression.

We found a positive correlation between the number of specialized blocks and the number of figures used in the block creations. Participants who used a large number of specific blocks also used an abundance of figures. Basic blocks are brick-shaped and simple; by comparison, specialized blocks and figures have several shapes, which makes it possible to produce more creative and active works using these items.

In addition, the base plate is an important material or feature of this technique. Participants were allowed to express anything they desired on the plastic plates, and each 25 cm x 25 cm square was considered to be of adequate size. The plate maintained and held the expression, and functioned much the same as the frame for the sandplay technique, or the paper for the collage technique.

We compared features of block works with respect to gender and past experience with block play. As noted above, the heights of expressions were greater in the creations made by male participants than in the creations made by females. One hypothesis for this result is that male participants experienced an increase of vigor or activity as a direct result of the block play. Kato's (2006b) study found that male participants' POMS scores on the Vigor-Activity scale increased significantly after using the block technique, regardless of past experience with block play. His result supports the hypothesis above. Additionally, the number of basic blocks used and the area utilized for expression were greater in the participants who had experienced block play in their childhoods. Participants who experienced block play in their childhoods may be more comfortable with expressing things with blocks. However, as was found in this study, though experience is an important factor concerning richness of expression, participants who had no past block play experience also could express themselves using the blocks, and their expressions had great individuality. Thus, although experience is one of the important factors regarding creative works, participants with no prior experiences with block play can still express what they wish using blocks. Accordingly, we can introduce this technique to many of our clients.

With respect to the contents of the block creations, we focused on the presence of animals, plants, vehicles, and buildings. In this study, a majority of participants utilized these pieces in their expressions. Sugiura (1993) examined the features of collage works of Japanese participants and found that animals, plants, vehicles, buildings, and the like are key components. In our study, the percentage of plants was higher in expressions by female participants than those by male participants. Sugiura similarly found that the percentage of plants was high in collage works made by female subjects. Sugiura reasoned that flowers may be considered a symbol of femininity and trees may be interpreted as symbolizing nurturance or vitality. Expression of plants such as flowers and trees in the block creations of Japanese adults or adolescents may offer the same association with femininity as in collage works.

In the present study, we identified general features of block expression along the dimensions of formal features and contents. Although results of this study can be used to indicate predictable features of block creations made by participants with no known mental health disorders, we

Figure 1

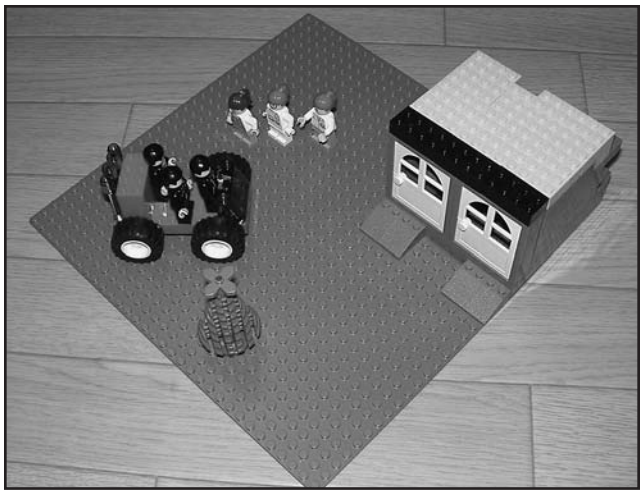

Figure 2

have to acknowledge that this study includes some limitations of internal and external validity. First, the sample in this study was comprised from data obtained with two conditions. Some of the participants created the block expressions individually in separate rooms and others made their creations in a clinical psychology class. Second, the total sample is small in this study. We have to carefully qualify the results of this study in consideration of these points.

Examples of Block Expressions

To further an understanding of the features of block creations, we include two examples in this report. Both were made by participants who played with blocks during childhood. Figure 1 was created by a 24-year-old female participant and Figure 2 was created by a 23-year-old male participant. As compared to the mean number of blocks used by participants in this study (47.3), the creations shown in Figure 1 and Figure 2 include a large number of basic blocks (63 and 61, respectively). Both examples also show a slightly larger area of expression (32.2% in Figure 1 and 28.5% in Figure 2) in comparison to the mean (27.1%). These examples support the finding that the number of basic blocks used and the total area utilized for expression are higher for participants who had past experiences with blocks.

In this study, we also indicated that plants are used more frequently in creations made by female participants than in those made by males. Figure 1 includes many flowers, which is a frequent feature of block creations made by female participants. In addition, both participants used a large number of specialized blocks and figures. They were able to use these materials to express their own imaginations and originality.

Although these two examples include similar items such as people, cars, and houses, by comparison, the theme of each block creation is entirely different. The title of Figure 1 is "Daily Life," and depicts a very peaceful and quiet scene. The scene shows a house and a yard that is decorated with colorful flowers and a tree. Two figures are in the scene: a male and a female. The female is tending the garden and the male is driving home. This work expresses the daily life of young couples. The title of Figure 2 is "The Gang" and, according to the creator's verbal description, depicts an active, thrilling world. A sturdy house is built on a corner of the plate and some gangsters are in front of it. There is a car with three other gangsters inside, returning to their safe house; the other gangsters are welcoming them home.

Conclusion

In this study, the features of Lego block expressions, especially their forms and contents, were examined and compared with respect to gender and past experiences with playing with blocks. We examined some general features of block works made by Japanese late adolescents and found differences in expression between males and females, as well as among participants who had different levels of past experience playing with blocks. We concluded that this study supports the value of Lego blocks as a useful material for art therapy.

In future research, we believe that it would be important to examine features of block creations with respect to psychological factors such as personality. An examination of the developmental stages present in the works or a comparison of data obtained from a normative sample and data from a clinical group also may prove useful in understanding the value of this technique. In addition, the projective use of Lego blocks is a constructive technique that allows for creating three-dimensional works. Because there is little research on the effects of working in three dimensions, further research on the technique would contribute to understanding its potential for being added to the repertoire of clinical tools for use in fields such as art therapy and play therapy.

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