

# Kindergarten Children's and Teachers' Cognitions of “ *Mottainai* ” and Their Socio-Moral Judgments about Environmental Deviancy

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## Abstract

In the study, the cognition of “*Mottainai*” was defined as social cognition with “a sense of regret for wasting an object or resource whose intrinsic value is not utilized.” Characteristics of environmental ethic norms of young children and factors in its development were investigated. Kindergarten teachers (n=161) and young children (n=51) participated in the study. Situations eliciting the participant's cognition of “*Mottainai*” and their judgments on the wrongness of environmental deviancy were investigated. The results revealed that the teachers and children tended to have cognition of “*Mottainai*” toward situations where a large amount of water, food, and paper were being used. The teachers did not try to be stringent regarding behaviors that were environmentally deviant, and were more forgiving about excessive use of materials in play settings. Children reasoned and judged antisocial behaviors and dangerous behaviors based on social domain concepts, whereas they judged environmentally deviant behaviors as not bad relative to others and could not interpret the behaviors as a norm deviancy. However, the results showed that many children interpreted water waste from an ecological perspective, suggestive of a fledgling sense of environmental ethics in the children.

**Key Words** : Environmental Deviancy, Social Cognition, Moral Judgment, Early Education

## 1. Background

Wangari Muta Maathai (1940-2011) was the first Kenyan woman to receive the Nobel Peace Prize for her contribution to environmental conservation. She advocated using the Japanese word “*mottainai*” as a universal word to spread the concept of environmental conservation (Maathai, 2010). The word “*mottainai*” is a part of the Japanese religious and cultural heritage (Hirose, 2008). Maathai's campaign led to many studies on factors associated with the establishment of *mottainai* as a universal word, by linking emotions and cognition associated with *mottainai* with the development of environment conscious behaviors (e.g., Kurokawa, 2010).

In this study, we have defined *mottainai* as a social cognition associated with a sense of regret for wasting goods and materials, or resources, without utilizing their intrinsic value. Environmental moral standards of “taking good care of things” and “not being wasteful” are based on

the *mottainai* concept. Identifying the development of ethical norms related to the environmental is essential for planning and implementing environmental education for early childhood.

Many contemporary Japanese kindergartens use picture books explaining environmental conservation during environmental education classes (Inoue, 2010). Research on moral judgments have demonstrated that prescriptive social norms are not verbally conveyed in one-direction from adults to children, but instead, that children cognitively construct social norms within social situations defined by adults and children (Shuto & Ninomiya, 2003; Turiel, 2002; Wainryb, 2006). Therefore, the environmental ethics of teachers and the environmental conservation approaches teachers take with children are critical elements in the daily learning environment of children that are developing the norms of environmental ethics and the capacity for appropriate behavior regulation.

This study investigated situations that elicited the cognition of *mottainai* in kindergarten teachers and children and identified characteristics of their environmental ethical norms, by comparing their judgments about environmental deviance with judgments about social and moral deviance in situations that could be described as *mottainai*. We manipulated wasted materials and situations as situational variables that trigger environmental deviancy. Then, the characteristics of norms were analyzed by comparing judgments.

## **2. Study 1:**

Situations in which kindergarten teachers recognized *Mottainai* and teachers' responses in these situations

### **2.1 Purpose**

To investigate characteristics of teachers' cognitions regarding the word "*Mottainai*", their responses to situations of *mottainai*, and their judgments regarding environmental deviancy.

### **2.2 Method**

#### **Participants**

Female teachers (n = 161, mean age 29 years) working in 25 private kindergartens in the vicinity of Tokyo participated in the study.

#### **Procedures**

Questionnaires were distributed collectively to the participants at a regional training workshops held for kindergarten teachers. It took the participants approximately 30 minutes to complete the questionnaires.

#### **Questions**

##### **A. Teachers' cognition of the word "*Mottainai*" and their responses to children's *mottainai* behaviors.**

The participants freely wrote about the situations where they felt *mottainai* in their everyday teaching.

##### **B. Characteristics of judgments about environmental deviancy.**

The teachers described 18 different types of deviant behaviors in children, consisting of 6 environmentally deviant behaviors (2 behaviors each related to wasting water, food, and paper.

Socially and morally deviant behaviors based on the social domain theory (Turiel, 2006) including: antisocial behaviors, violating kindergarten rules, violating social conventions, violating self-regulation, prosocial deviancy (not being kind to others), and self-interest. Participants rated their responses to each of the 18 deviant behaviors in on a scale of 1 to 5 such that 1 (No involvement or disregard) indicated that the behavior was not considered to be bad; 2 (Watching) indicated interest and watching how things will go rather than get directly involved; 3 (Mild involvement) indicated gentle involvement using words and gestures, giving gentle warnings and asking children about their feelings and thoughts, or teaching the rules; 4 (Slightly strict) indicated involvement such as reproofing firmly, or scolding, and involvement until the problem is resolved; 5 (Strict involvement) indicated making the child change their behavior in the desirable direction forcefully, and rebuking.

## 2.3 Results and Discussion

### A. Cognition of *mottainai* by kindergarten teachers and their responses to children.

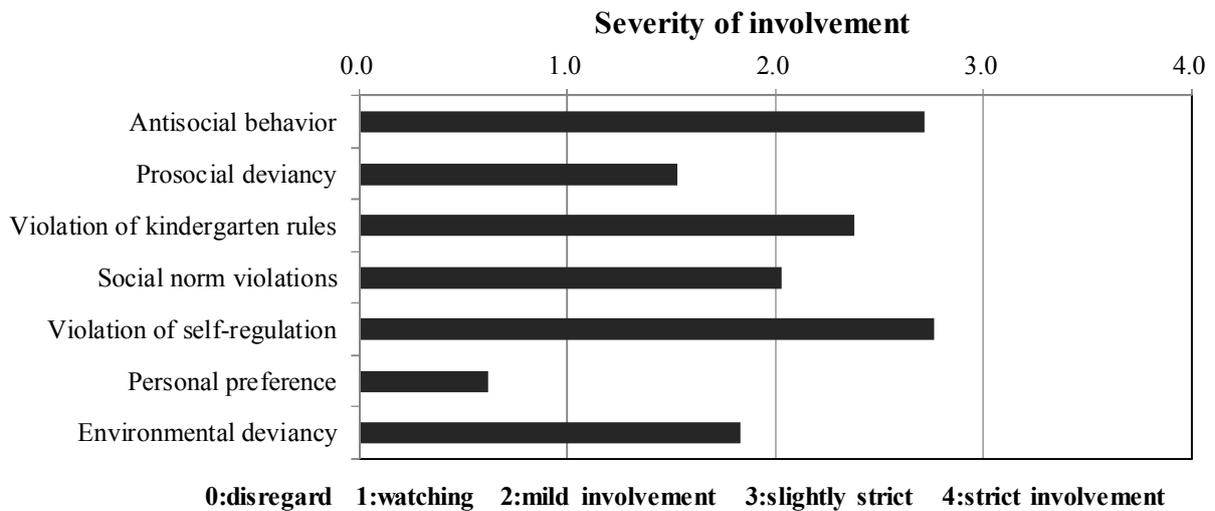
In this study, 270 situations in which the teachers felt *mottainai* were categorized by the goods or material that was wasted. The situation that teachers most frequently felt *mottainai* was in art projects (33.6%), followed by those related to water (30.4%), food (20.9%), and using Kleenex and toilet paper (15.0%). The teachers' involvement was grouped under 9 categories. More than 60% of teachers instructed the "ideal behavior" regardless of the goods or material that was being wasted. In the case of wasting water, teachers often explained the children, the potential impact of their behavior on nature and the environment, or made children think about ideal behaviors, and used the word "*mottainai*" most frequently. In the case of wasting food, teachers frequently empathized with the feelings of people that produced the food being wasted. In the situation with art projects and wasting Kleenex and toilet paper, the teachers' most frequent response was setting an example for the children about the desirable behaviors.

**Table 1** Frequencies of situations that teachers felt "Mottainai" and teachers' involvements by mottainai situation

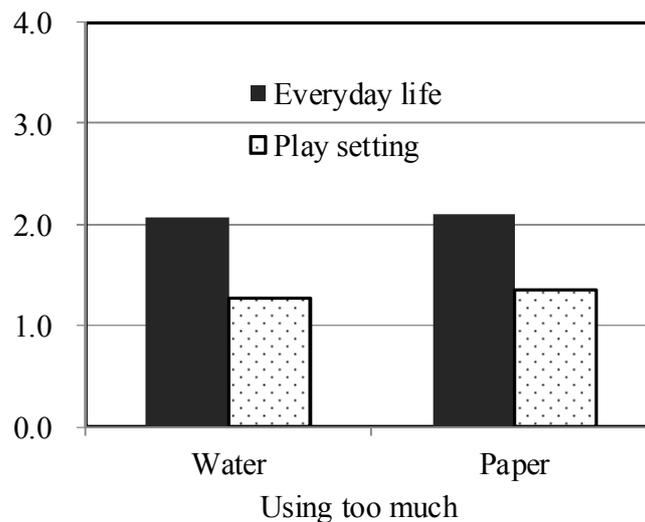
'Mottainai" situation:	n (%)	Teachers' responses					
		Instruction of desirable behavior	Instruction of potential impact of behavior on nature	Making children think about ideal behaviors	Empathizing with people that produced it	Setting exemplary usage	Using the word "mottainai"
<b>Food</b>	53 (20.9)	33 (62.3)	4 (7.5)	12 (22.6)	10 (18.9)	6 (11.3)	1 (1.9)
<b>Water</b>	77 (30.4)	48 (62.3)	16 (20.8)	27 (35.1)	0 (0.0)	8 (10.4)	13 (16.9)
<b>Kleenex and toilet paper</b>	38 (15.0)	21 (55.3)	2 (5.3)	3 (7.9)	0 (0.0)	11 (28.9)	3 (7.9)
<b>Handiwork and its materials</b>	85 (33.6)	56 (65.9)	1 (1.2)	17 (20.0)	0 (0.0)	23 (27.1)	0 (0.0)
<b>Total</b>	253 (100.0)	158 (62.5)	23 (9.1)	59 (23.3)	10 (4.0)	48 (19.0)	17 (6.7)

### B. Characteristics of environmentally deviant judgments

The mean ratings were calculated for the six socially and morally deviant situations and the one environmentally deviant situation regarding food. The results of an analysis of variance (ANOVA) performed on the mean values of the seven situations indicated a significant difference between each situation ( $F_{(6,900)}=513.71, p<.001$ ). The teachers considered dealing most harshly with violations of self-regulation and anti-social behaviors, followed by kindergarten policy violations, social norm violations, and environmental deviancy. Teachers intended to approach a child that exhibited environmental deviancy with the same stringency, usually by “gently telling,” similarly to children that exhibited social conventional deviancy (**Figure 1**).



**Figure 1 Teachers' judgments of severity of involvement by children's socio-moral behaviors**



**Figure 2 Teachers' judgments of severity by materiales and settings**

To assess how different goods and materials and the context of their use affected teachers' responses to environmentally deviant behaviors of children, an ANOVA was performed with the rating-scale scores in 2 situations (everyday life and play settings) for environmental deviancy related to 2 materials (water and paper)  $\times$  2 two contexts (daily living and play). Results indicated that only the main effect of context was significant ( $F_{(1,154)}=182.80, p<.001$ ), indicating that teachers' responses were more strict in relation to "using a lot of tissues for blowing one's nose" and "keeping water running while brushing the teeth," than when "using too much paper for pretend play" and when "using too much water for sandbox play." These results suggest that teachers are stricter when materials and resources were wasted in daily life situations than when the same materials and resources were used in the context of play (**Figure 2**).

### **3. Study 2:**

#### **Cognition of *mottainai* by kindergarten students and their socio-moral judgments regarding environmental deviancy**

##### **3.1 Purpose**

This study investigated children's understanding about situations involving *mottainai* and identified characteristics of children's ethical norms related to the environment by comparing their judgments about environmental deviancy and socio-moral deviancy.

##### **3.2 Method**

###### **Participants**

A total of 51 children (22 boys and 29 girls; mean age 5 years and 10 months) attending private kindergartens in the vicinity of Tokyo participated in the study.

###### **Materials**

We selected the following five situations from deviant situations used in Study 1: "antisocial behaviors," "violation of kindergarten rules," "violation of self-regulation," "environmental deviation related to food," and "environmental deviation related to water." Participants were presented with two situations for each deviation. They were assigned into two groups. Each group was presented with a total of five situations consisting of one situation each for "antisocial," "kindergarten rule violation," and "self-regulation violation," as well as two situations for environmental deviation related to water and food. The same situations were used for the two environmentally deviant behaviors to examine how the different contexts of wasting goods and materials affected children's judgments. To ensure that the children understood each situation well, the questions were presented as a simple story with illustrations depicting the content (**Figure 3**).

###### **Procedures**

###### **A. Characteristics of children's judgment regarding the undesirability of environmentally deviant behaviors.**

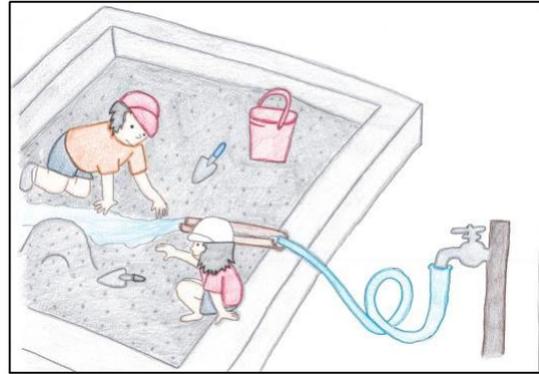
The participants were interviewed individually. After establishing a rapport with the child, the interviewer gave general instructions and presented illustrations of five stories in a random order and slowly read the stories aloud to the child. After reading the five stories, the interviewer checked the children's understanding of the story content. The interviewer initially asked the child

“Which of the five children in the stories did the worst act?” After the child chose an illustration in response to this question, the interviewer asked the child the reason for the decision. Then, the interviewer removed the illustration chosen by the child and asked the child again, “Which of the remaining four children did the worst act?” This process was repeated until all five illustrations were shown to the child.



everiday life setting:

"keeping water running while brushing the teeth"



play setting:

"using too much water for sandbox play"

**Figure3 Sample pictures - using too much water in everyday life and play settings**

### **B. Children’s cognition of *mottainai***

After finished the interviews inquiring about judgments and establishing the reasons for these judgments, the children were asked about their cognition of *mottainai*. The interviewer asked whether they had ever heard of the word “*Mottainai*” and from those that responded in the affirmative, the interviewer inquired, “In which situations did you use the word?” and “Who used the word?”

These interviews were conducted individually and lasted for approximately 15 minutes.

## **3.3 Results and Discussion**

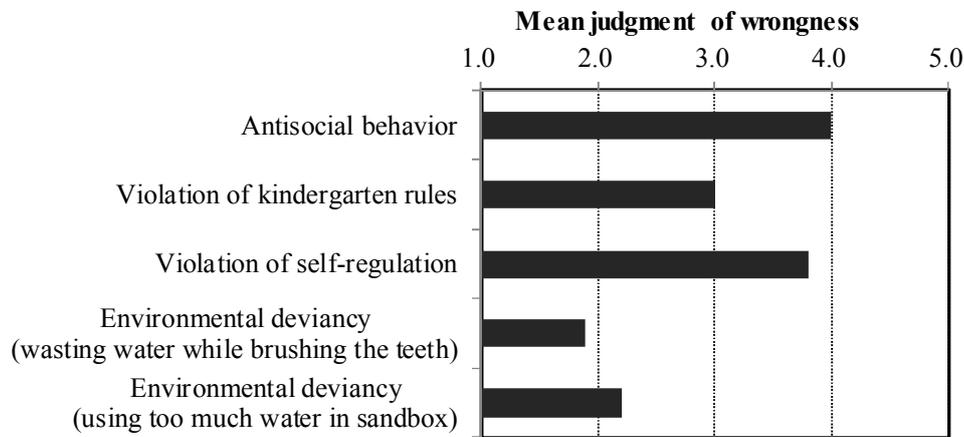
### **A. Children’s cognition of *mottainai***

Of the 38 children (74.5%) that had heard the word “*Mottainai*”, 17 responded that they used the word in situations associated with food, 10 responded that they used it with water, and 12 responded that their parents had used the word. Of the children that had heard of the word “*mottainai*”, approximately 30% to 40% responded that they did not know when it should be used, indicative of the ambiguous cognition held about this word by the children.

### **B. Characteristics of environmental deviancy judgments**

Each story was assessed on the basis of its score, which ranged between 1 and 5, with 1 indicating a story judged as least deviant and 5 indicating one that was judged as most deviant. A 2 (groups) x 5 (stories) ANOVA indicated that the main effect of the story was significant ( $F_{(4,196)}=28.65, p<.001$ ) and that the children’s judgment of undesirability was ranked in the following order: “antisocial, self-regulation violation” > “violation of kindergarten rules” > “2 deviant environmental behaviors.” This result is similar to the results regarding kindergarten teachers’

involvement (**Figure 4**). Unlike the results for teachers, the contextual differences (life vs. play or rice vs. side dishes) did not affect children’s judgments of environmental deviancy.



**Figure 4 Children's judgments of wrongness about the socio-moral behaviors**

Analyzing the reasons for negative judgments revealed that approximately 90% of the children mentioned empathy with people affected by the deviancy, violation of rights and unfairness, as well as the undesirability of the action itself such as, “it is absolutely forbidden,” and “it is something that we are not supposed to do.” Regarding reasons for violating kindergarten rules, 57% mentioned causing problems to others, or being scolded by adults. As reasons for violation of self-regulation, 92% mentioned its negative impact on safety and health, and the undesirability of the deviant behavior itself. These findings suggest that children used moral concepts in judging antisocial deviancy, social conventions in judging violations of kindergarten rules, and prudence when judging violations of self-regulation. These finding are consistent with earlier research demonstrating that 5-year-olds had developed the concept of a basic social domain.

In relation to environmental deviancy related to water, many participants mentioned environment related concerns such as, “there would not be enough water left in the future”. The reasons for this judgment varied with the context of water use; 16 (64%) mentioned environmental concerns over deviancy in daily-life situations, whereas 7 (28%) mentioned environmental-concerns over deviancy in play situations. However, only one participating child gave a reason for judgments about environmental concerns in a food-related situation. Many simply repeated the story, thought that the action of leaving food uneaten was bad, or showed some empathy with the person that prepared the food. These results show that young children judged environmental deviancy as being “less bad” than socio-moral deviancy. Moreover, they interpreted certain situations from an environmental perspective, depending on the goods and materials that were used, or was wasted. Similar to the results obtained with teachers, many children considered leftover food through empathy with the feelings of food producers, rather than from an environmental perspective, indicative of ethical norms in young children.

**Table 2** Frequencies of justification categories in each of socio-moral transgressions (%)

	Situational statement	n	Justification categories								
			Moral domain thinking			Conventional domain thinking					
			Categorical wrong	Others' rights / fairness	Others' welfare / empathy	Social order / Social rule	Consequences to the actor	Not bad			
Socio-moral transgressions											
Antisocial behavior	51	1 (2.0)	15 (29.4)	8 (15.7)	23 (45.1)	2 (3.9)	1 (2.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Violation of kindergarten rules	51	16 (31.4)	5 (9.8)	0 (1.0)	0 (0.0)	29 (56.9)	1 (2.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Violation of self-regulation	51	0 (0.0)	7 (13.7)	0 (0.0)	0 (0.0)	4 (7.8)	40 (78.4)	0 (0.0)	0 (0.0)	0 (0.0)	
Environmental deviancy (wasting water while brushing the teeth)	25	0 (0.0)	7 (28.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	16 (64.0)	0 (0.0)	
Environmental deviancy (using too much water in sandbox)	25	4 (16.0)	4 (16.0)	1 (4.0)	0 (0.0)	6 (24.0)	2 (8.0)	1 (4.0)	7 (28.0)	0 (0.0)	
Environmental deviancy (some leftover rice)	26	8 (30.8)	3 (11.5)	0 (0.0)	4 (15.4)	3 (11.5)	0 (0.0)	6 (23.1)	1 (3.8)	0 (0.0)	
Environmental deviancy (leftover dishes)	26	4 (15.4)	8 (30.8)	0 (0.0)	5 (19.2)	4 (15.4)	4 (15.4)	1 (3.9)	0 (0.0)	0 (0.0)	

\* "no response" are not included.

#### 4. Conclusion

Young children judged environmentally deviant behaviors, such as over using goods and materials and leaving food uneaten to be “less bad” than socially and morally deviant behaviors. Only a few children considered wasting water from an environmental perspective, however, almost no child considered “leaving food uneaten” from an environmental perspective. Many of the children knew the word “*mottainai*,” but they had little understanding of situations in which the word was used. This indicates that the children’s cognition of *mottainai* is at an early stage of development and not sufficiently strong to motivate environmentally conscious behavioral norms. It is suggested that further research be conducted on this issue using a wider sample of children.

The characteristics of children’s judgments and the reasons for their judgments about *mottainai* nearly corresponded with the characteristics of teachers’ cognitions of *mottainai* and how they responded to such situations. Young children develop social cognitions in an environment created by the teachers. Further research is necessary on the quality of environment related moral standards of teachers that forms the basis of their responses.

Antisocial behaviors are characterized by direct harm to others, whereas violations of self-regulation are characterized by direct harm to the self. Understanding these characteristics will promote the development of norms of morality and prudence. On the other hand, effects of deviant environmental behaviors are indirect, and targets of these behaviors, such as the self, humans, animals, the earth, or life after 10 years are unclear. Due to constraints imposed by cognitive development, children might have difficulties in understanding the effects of human-environmental interactions. Nevertheless, children could deduce a direct cause-and-effect relationship in situations related to water, such as wasting water when brushing the teeth, or using a large quantity of water in a sandbox. This was expressed in statements such as, “if the water is gone, then it is trouble for me,” and “flowers will die.” This suggests that the concept of water can be an effective medium for environmental education in early childhood. It is suggested that the concept of water be used as the theme of environmental education in the future.

The teachers had different judgments about wasting water based on whether water was wasted in daily life, or play situations. Water is an essential part of sandbox play that makes it more fun. Water in sandbox play also helps in the mental development of children, by teaching them the nature of sand, as well as providing social experiences; such as more play opportunities in playgroups. Therefore, water adds dynamism to sandbox play, although this perspective contradicts the environmental conservation argument. However, clearly both perspectives have a certain degree of merit. Therefore, it may be important for teachers to adjust their opinions on the use of materials and wasting food, and establish kindergarten rules by working closely with children’s families.

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## Appendix

### Deviant Situations Presented to Children (Names in parenthesis are for situations shown to girls)

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#### Group A (N=25)

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##### A1- Antisocial violation, cutting into a line

Some children are standing in line waiting for their turn to play on a slide. Jiro arrives there late, but doesn't wait for his turn and cuts into the line when everyone is standing and waiting.

##### A2- Violation of kindergarten rules (violations related to cleaning and organizing)

Yuki (Yuri) has just arrived at the kindergarten and goes into a classroom. Then, Yuki (Yuri) goes running outside to play with a friend without putting his (her) bag in the proper place, leaving it on the floor.

##### A3- Violation of self-regulation (dangerous play)

Kento (Momoko) is climbing up and jumping down from the window frame.

##### A4- Environmental deviation (wasting water while brushing the teeth)

Taro (Hanako) is brushing his (her) teeth after lunch in the kindergarten. Although he (she) doesn't use water while brushing, he (she) keeps the water running and does not turn off the water.

##### A5- Environmental deviation (using too much water)

Shota (Sakura) is playing in the sandbox. Shota pours water into the sandbox using a hose to make river.

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#### Group B (N=26)

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##### B1- Antisocial violation (breaking art works)

Jiro's (Kaori's) friend is having fun building a rocket (castle) with milk cartons. Jiro (Kaori) looks at the rocket (castle) and tells the friend "It doesn't look good" and "You are

- not good at it,” then, stomps on the rocket (castle) and breaks it.
- B2- Violation of kindergarten rules (making the classroom dirty by not taking off shoes)  
Kento (Momoko) is playing in the kindergarten playground. Kento (Momoko) suddenly says, “Oops, I forgot my hat!” and comes into the classroom with his (her) outside shoes on to get his (her) hat.
- B3- Self-regulation violation (sanitary practice violation)  
Yuki (Yuri) finishes playing outside with friends and comes inside the classroom without washing his (her) hands and gargling.
- B4- Environmental deviation (leftovers)  
Taro (Hanako) is eating lunch at the kindergarten. Taro (Hanako) finishes eating but his/her plate has some leftover rice.
- B5- Environmental deviation (having strong food preferences)  
Shota (Sakura) is eating lunch at the kindergarten. Shota’s (Sakura’s) plate has some leftover food that he (she) dislikes.
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