A Developmental Study on Delay of Gratification

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Two studies were conducted to investigate development of delay of gratification. In Study 1, the personal delay of gratification test, social delay of gratification inventory and personality inventory were administered to kindergarteners aged 3 to 6 years. The personal delay of gratification test included three reward pairs and subjects were instructed to choose between a less valuable reward which was immediately available and a more valuable reward which was available tomorrow. In the personality inventory, a teacher rated the kindergartener's social competencies and achievement behavior. The results were as follows: (1) effects of gender were observed for personal and social delay of gratification, (2) effects of age were observed only for girls in personal delay of gratification, (3) personal delay scores did not correlate with social delay scores, and (4) social delay of gratification displayed stronger relationships with social competencies and achievement behavior than personal delay of gratification. In Study 2, a hypothetical 'waiting for a turn' situation was used, and kindergarteners aged 3 to 6 years participated. In this situation, subjects could either wait to play with a favorite toy, renounce waiting and immediately play with the less favorite toy or break the rules of waiting for a turn. The children were presented with two conditions: a position towards the front of the line and a position towards the back of the line. The personality inventory used in Study 1 was again administered. Results were as follows: (1) developmental changes of delay of gratification were observed in the two conditions, (2) the middle group was more flexible in changing behavior from waiting to renunciation than the younger group when position in line was towards the back, and (3) relationships between behavior patterns such as waiting, renunciation and transgression and personality traits were not observed.

Key words: Delay of gratification, social delay of gratification, personal delay of gratification, waiting behavior

Study 1

It is rarely practical to immediately and directly translate one's desires, urges and impulses into action. Often, behaviors that would be the most immediately gratifying are prohibited by higher authority or the society at large. The developing child must simply learn to wait for rewards that may indeed be forthcoming, but often only after a delay. The ability to delay immediate gratification is a key social ability (Funder, Block & Block, 1983).

This ability is referred to as delay of gratification and has received a good deal of research attention from Mischel and his colleagues (e.g., Mischel, 1974, 1976). Their studies have typically employed a paradigm in which subjects are confronted with situations to make choices between immediately available but less valued rewards, as opposed to delayed but more valuable options. Mischel (1974) argued that the choice of delayed rewards is conceptualized as the ability to overcome the desire for immediate gratification.

Using this paradigm, much research concerning developmental changes of delay of gratification has been conducted. These studies have yielded the following results. Melikan (1959)

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presented Arab children, aged 5-10 years, with the choice between 2.5 cents that was immediately available or 5 cents to be awarded 2 days later and found the major shift to preponderance to delay reward choices occurred at age 6. While Mischel & Metzner (1962), using delay intervals ranging from 1 day to 4 weeks and the choice between a small or large candy bar, located the major shift at 8.5 to 9 years with no further changes in the proportion of delayed choices between ages 9 and 12.

Nisan (1974) instructed children aged 6, 7, 8 and 9 to choose between an immediate reward and a delayed larger reward. Half of the children in each age group saw the rewards before choosing, while the other half did not. The results indicated that the major shift to a preponderance of delayed reward choices occurred at 7 under the reward situation (i.e., standard situation).

These studies suggested that there is a variation of age at which a major shift of delayed reward choices occurs. However, the results of these studies were consistent in that preference for delayed reward is positively related to age.

The studies described above used subjects ranging in age from kindergarten to elementary school. Considering Furuhata's premise that self-regulated behavior develops remarkably during early childhood, it is necessary to investigate developmental changes of delay of gratification during early childhood in detail. Inoue & Sato (1977) administered delay of gratification test among kindergarteners aged 3 to 6 years. The results, which indicated that delay of gratification does not develop remarkably during early childhood, challenged Furuhata's position.

However, there are only a few studies that focused on early childhood and investigated developmental changes of delay of gratification in detail. The previous research also does not investigate gender difference in delay of gratification. Therefore, the first purpose of the present study was to elucidate developmental changes of delay of gratification during early childhood and gender differences and to further investigate the validity of Furuhata's premise.

In the previously described delay of gratification situations, failure to delay gratification resulted in renunciation of obtaining the delayed reward and it was the individual that suffered loss by failure to delay gratification. We refer to this paradigm as the renunciation-type paradigm and refer to delay of gratification measured in this paradigm as personal delay of gratification.

However, delay of gratification includes more than the renunciation-type paradigm. In daily life, there are situations in which delay gratification is a social norm. For example, there is the situation in which a person must wait for a turn. In this situation, the failure to delay gratification results in rule-breaking. We refer to this paradigm as transgression-type paradigm and refer to delay of gratification measured in this paradigm as social delay of gratification.

Previous research has focused on classifying renunciation-type or transgression-type paradigms. Delay of gratification in accordance to social rules and norms is important. Therefore, the second purpose of the present study was to investigate developmental changes of delay of gratification during early childhood and gender differences in the renunciation-type paradigm and the transgression-type paradigm. We presented social situations of delayed gratification and a questionnaire was administered to measure the ability to delay gratification in these situations.

To investigate how delay of gratification develops during early childhood is an important research question. Therefore, the third purpose of the present study was to investigate this topic in relation to renunciation and transgression-type paradigms.

Much research concerning relationships between personality variables such as need for achievement, future time perspective, locus of control and cognitive style and delay of gratification has been conducted. Mischel (1961), using subjects aged 11-14 years, tested the relationship between preference for an immediate smaller reward or a delayed larger reward in selected situations and the need for achievement. Results indicated a significant positive relationship between delayed reward and need for achievement. However, Mischel & Gilligan (1964), using sixth grade boys, could not replicate those results.

The studies (Klineberg, 1968; Mischel &

Metzner, 1962) that investigated the relationship between future time perspective and delay of gratification also indicated that preference for delayed reward was related to the degree to which images of personal future events in general were endowed with a sense of reality, the degree of everyday preoccupation with the future, and more realistic estimates of when future events would occur.

Looking at the studies that investigated the relationship between locus of control and delay of gratification, Zytkoskee & Strickland (1971) found that there was no relationship between locus of control and delay behavior among black and white ninth-grade adolescents. However, Strickland (1972), used black and white sixth-grade children, and reported that the relationship between locus of control and delay of gratification was observed only for white children, and that children with internal locus of control chose more delayed rewards than children with external locus of control. Furthermore, Strickland (1973), using third- and fourth-grade white children, found similar results.

Inconsistent results have also been obtained in studies that investigated the relationship between cognitive style measured by MFF test and delay of gratification. Mann (1973) reported that among first graders, reflective children are more likely to choose delayed rewards than impulsive children. However, Wards (1973) found no relationship for delay of gratification and impulsivity or reflectivity among preschoolers.

Toner, Holstein & Hetherington (1977) attempted to examine the performance differences among reflective and impulsive children as well as fast-accurates and slow-inaccurates in a delay situation. The results indicated that the fast-accurates make more delayed choices than the impulsives. However, Inoue & Sato (1977), used kindergarteners ranging from 5 to 6 years, and found that slow-inaccurates chose the more delayed reward than those in the other three MFF quadrants; those results were contrary results to Toner et al. (1977).

Thus, much research concerning relationships between personality variables such as the need for achievement, future time perspective, locus of control and cognitive style and delay of gratification have been conducted. However, these studies have not focused on personality variables such as social competencies. It is necessary to focus on the variables described above and the social competencies when investigating relationships between delay of gratification measured in transgression-type paradigm and personality variables. The fourth purpose of the present study was to focus on personality variables such as achievement behavior and social competencies and investigate relationships between delay of gratification measured in both transgression-type and renunciation-type paradigms and personality variables.

Method

Subjects Kindergarteners registered in an older class (aged 5-6 years), a middle class (aged 4-5 years) and a younger class (aged 3-4 years) served as subjects. There were 27 (boys 11, girls 16) in the older class; 35 (boys 20, girls 15) in the middle class; and 13 (boys 8, girls 5) in the younger class.

Procedure The experiment was conducted in a large room located in the kindergarten. The subjects were brought to the room, in groups of three and six. Each group was accompanied by a female student experimenter. The subject-experimenter pairs sat down on the floor, with a long distance between one another, so that the children could not hear each other.

First, the personal delay of gratification test was administered. After the experiment was finished, social delay of gratification inventory and personality inventory were given to the teacher in charge of the child's class.

The personal delay of gratification test was based on the delay of gratification test devised by Mischel (1966). A series of three different pairs of reward items (rewards in each pair differed only in quantity) were employed. The objects included an eraser, a sticker and a coloring book. These objects are popular with kindergarteners.

Each pair was presented separately on the floor. For each of the pairs, the subjects were asked to select either a less preferred reward that could be obtained immediately or a more preferred reward

that would be available tomorrow. The subjects were also instructed to choose carefully, because for one of the choices they would actually receive the items they selected, either immediately or tomorrow, depending upon their reported preference.

For all reward pairs, there were three delayed rewards and one immediate reward. The pairs were randomly presented for all subjects. The number of delayed preferences for each subject was recorded and summed to give a total score of delay choices.

Eight items were used in the social delay of gratification inventory to describe delay of gratification in social situations. These were selected from the self-regulated inventory devised by Kashiwagi (1992). This inventory is shown in Table 1. The teacher in charge of the class rated the kindergartener's ability to delay gratification in social situations, using a five-point scale.

Personality inventory was devised to measure the personality of kindergarteners. This inventory is shown in Table 2. This inventory included five subscales. The first subscale measured prosocial behavior and included seven items. The second subscale measured empathy and included five items. The third subscale measured aggressive behavior and included ten items. The fourth subscale measured the degree to which the child was accepted by peers and included four items. These subscales measured the child's social competencies.

In addition to these subscales, the subscale that measured the kindergartener's achievement behavior was set. This subscale was composed of five items. The teacher in charge of a class rated the kindergartener's achievement behavior and social competencies using a three-point scale.

Results

Table 3 shows the mean personal delay scores for boys and girls of each age group. ANOVA was performed [3 (age) × 2 (gender)] using personal delay scores as the dependent variable. The interaction effects between age and gender were significant (F (2, 69) =3.47, p<.05). Therefore, the simple main effects of age were analyzed for boys and girls. The results indicated that the simple main effects of age are significant for girls (F (2, 69) =4.36, p<.05) and that personal delay scores were higher for the younger (t (69)=2.08, p<.05) and the older groups (t (69)=3.32, p<.01) compared to the middle group.

The simple main effects of gender were also analyzed for each age group. The simple main effects of gender were significant for the younger group (F (1, 69) =4.54, p<.05) and personal delay scores were higher for girls than for boys. Furthermore, the simple main effects of gender approached the significant level for the older group (F (1, 69) =3.30, .05<p<.10) and personal delay scores were higher for girls than for boys.

Table 4 shows the mean social delay scores for boys and girls for each age group. ANOVA was performed [3 (age) × 2 (gender)] using social delay scores as the dependent variable. The results indicated that main effects of gender approached the significant level (F (1, 69) =2.93, .05<p<.10) and that social delay scores were higher for girls than for boys.

First, correlation coefficients between personal delay scores and social delay scores were calculated, including both age and gender. However,

Table 1 Social delay of gratification inventory

The child can wait when instructed to wait a minute.
The child can wait for a turn to play (swing and slide).
The child immediately robs the toy from a friend when he or she wants it.
The child can play on the swing or slide in turn or exchange with other child.
The child can wait for the midafternoon snack to be distributed.
The child can wait to speak to the teacher when another child is speaking.
The child can wait for a turn when a large crowd of children are either speaking or discussing.
The child can wait when instructed to do something later.

Table 2 Personality inventory

Aggressive behavior
The child frequently gets into fights with peers.
The child displays rough or rude speech.
The child is dishonest.
The child does not obey the orders of the teacher.
The child resorts to violence very quickly.
The child pinches and hits peers.
The child bangs things about.
When something does not work out as desired, the child is unruly.
The child is hard on younger children.
The child is quiet.
Prosocial behavior
The child frequently takes care of peers.
The child treats younger children with affection.
The child is kind.
The child frequently treats living beings with affection.
The child frequently helps the teacher.
The child is kind to peers.
The child has consideration for peers.
Empathy
The child occasionally cries over a sad story.
The child empathizes with an animal that is hurt or suffering.
The child looks unhappy when he or she sees another child crying.
The child looks happy when a peer smiles sweetly.
The child has a concerned expression when he or she sees a depressed child.
Acceptance
The child has many playmates.
The child is invited to play by many peers.
The child has many friends that assist him or her when something gets lost.
The child is a favorite with many classmates.
Achievement behavior
The child immediately gives up after a trifling or accidental failure.
The child shrinks from assigned tasks that are somewhat difficult.
The child is dispirited when his work (picture and constructions) is mauled.
The child can complete an assigned task without giving up halfway.
The child can complete the task assigned even if it is difficult and unpleasant.

Table 3 The mean personal delay scores in the boys and the girls for each age group

Younger group		Middle group		Older group	
Boys	Girls	Boys	Girls	Boys	Girls
1.00	2.00	1.45	0.87	1.27	2.13

Table 4 The mean social delay scores in the boys and the girls for each age group

Younger group		Middle group		Older group	
Boys	Girls	Boys	Girls	Boys	Girls
29.0	34.8	31.7	33.7	32.0	31.8

significant correlation coefficients were not observed. Second, correlation coefficients between personal delay scores and social delay scores were calculated for each age group. However, significant correlation coefficients were not observed for any age group. Finally, correlation coefficients between personal delay scores and social delay scores were calculated for boys and girls. However, significant correlation coefficients were not observed for boys or girls.

Factor analysis was performed for the data of personality inventory. A four-factor solution, using principal factor analysis with varimax rotation, yielded the most conceptually and empirically interpretable set of factors. Subscales derived from factor analysis and factor loading for the items are presented in Table 5. Items displaying factor loading less than 0.40 in any factor were excluded.

Factor 1 and 2 were designated as empathy and acceptance, respectively. Factor 3 and 4 were designated as aggressiveness and non-achievement, respectively. Correlation coefficients between

Table 5 The results of the factor analysis

	Factor 1	Factor 2	Factor 3	Factor 4
The child is kind.	.47	.25	-.30	.00
The child frequently treat living beings with affection.	.51	.22	.08	-.14
The child is kind to peers.	.55	.39	-.26	-.35
The child empathizes with an animal that is hurt or suffering.	.56	.16	.14	-.02
The child looks unhappy when he or she sees another child crying.	.70	.14	.00	-.07
The child looks happy when a peer smiles sweetly.	.70	-.00	-.05	.14
The child has a concerned expression when he or she sees a depressed child.	.79	.02	-.03	.15
The child frequently takes care of peers.	.27	.56	-.19	-.09
The child treats younger children with affection.	.38	.51	-.03	.02
The child frequently helps the teacher.	.29	.65	.05	.01
The child has many playmates.	-.01	.78	.01	-.03
The child is invited to play by many peers.	.04	.82	.16	-.18
The child has many friends that assists him or her when something gets lost.	.34	.58	-.01	-.00
The child is a favorite with many classmates.	.24	.64	-.21	-.06
The child frequently gets into fights with peers.	.04	.00	.53	.33
The child displays rough or rude speech.	-.09	-.04	.40	.06
The child does not obey the orders of the teacher.	-.20	-.16	.52	-.12
The child resorts to violence very quickly.	.11	-.02	.73	.28
The child pinches and hits peers.	-.01	.07	.76	.15
The child bangs things about.	-.05	-.06	.73	.04
When something does not work out as desired, the child is unruly.	.17	.02	.44	.16
The child can complete an assigned task without giving up halfway.	.17	.17	-.42	-.63
The child immediately gives up after a trifling or accidental failure.	-.03	-.05	.13	.79
The child shrinks from assigned tasks that are somewhat difficults.	-.19	.03	.04	.71
The child can complete the task assigned even if it is difficult and unpleasant.	.06	.29	-.19	-.75

personal delay scores and four subscale scores for personality inventory were calculated, including both age and gender. Table 6 shows the results. As shown in Table 6, significant correlation coefficients were not observed for any of the four subscale scores. Correlation coefficients between personal delay scores and four subscale scores were calculated for each age group. Table 7 shows the results.

For the younger group, significant positive correlation coefficients between personal delay scores and acceptance scores were observed. Significant negative correlation coefficients between non-achievement scores and personal delay scores were also observed.

For the middle group, negative correlation coefficients between personal delay scores and aggressiveness scores approached the significant level. For the older group, positive correlation coefficients between personal delay scores and acceptance scores approached the significant level.

Correlation coefficients between personal delay scores and four subscale scores for personality inventory were calculated for boys and girls. Table 8 shows the results. For boys and girls, significant correlation coefficients were not observed for the four subscales.

Correlation coefficients between social delay scores and four subscale scores for personality inventory were calculated, including both age and gender. Table 9 shows the results. Significant positive correlation coefficients between social delay scores and acceptance scores were observed. Significant negative correlation coefficients between social delay scores and aggressiveness scores were also observed. Furthermore, significant negative correlation coefficients between social delay scores and non-achievement scores were observed.

Correlation coefficients between social delay scores and four subscales for personality inventory were calculated for each age group. Table 10 shows

Table 6 The correlation coefficients between personal delay scores and four kinds of subscale scores for personality inventory

Empathy	Acceptance	Aggressiveness	Non-achievement
.04	.22	-.01	.02

Table 7 The correlation coefficients between personal delay scores and four kinds of subscales scores for personality inventory for each age group

	Empathy	Acceptance	Aggressiveness	Non-achievement
Younger group	.39	.41	-.21	-.54
Middle group	.05	.20	.28	.02
Older group	.28	.35	-.25	.05

Table 8 The correlation coefficients between personal delay scores and four kinds of subscale scores for personality inventory for the boys and the girls

	Empathy	Acceptance	Aggressiveness	Non-achievement
Boys	.10	.32	-.01	-.20
Girls	-.04	.03	.06	.24

Table 9 The correlation coefficients between social delay scores and four kinds of subscale scores for personality inventory

Empathy	Acceptance	Aggressiveness	Non-achievement
.21	.31	-.73	-.44

the results. For the younger group, positive correlation coefficients between social delay scores and empathy scores approached the significant level. Significant negative correlation coefficients between social delay scores and aggressiveness scores were also observed.

For the middle group, significant positive correlation coefficients between social delay scores and empathy scores were observed. Significant negative correlation coefficients between aggressiveness scores and social delay scores were also observed. Furthermore, significant negative correlation coefficients between social delay scores and non-achievement scores were observed. For the older group, significant negative correlation coefficients between social delay scores and aggressiveness scores were observed.

Correlation coefficients between social delay scores and four subscales for personality inventory were calculated for boys and girls. Table 11 shows the results. For boys, significant negative correlation coefficients between social delay scores and aggressiveness scores were observed. Significant negative correlation coefficients between social delay scores and non-achievement scores were also observed.

For girls, significant positive correlation coefficients between social delay scores and acceptance scores were observed. Significant negative correlation coefficients between social delay scores and aggressiveness scores were also observed.

Discussion

Effects of gender were observed for personal and social delay scores. For social delay scores, the main effects of gender approached the significant level and social delay scores were higher for girls than for boys. For personal delay scores, interaction effects between age and gender were significant and personal delay scores were higher for girls than for boys in the younger and older groups. These results can be interpreted in terms of traditional gender role perspectives. Parents are stricter with girls than with boys; therefore girls are more likely to self-regulate behavior. Thus, effects of gender might be observed for personal and social delay scores.

Effects of age were also observed only for girls in personal delay of gratification and personal delay scores were higher for the younger and older groups than for the middle group. Thus, the results of the present study did not support Furuhata's premise that self-regulated behavior develops remarkably during early childhood.

The results can be interpreted in terms of environmental transition from home to kindergarten. In the early period of attending kindergarten, younger children expend an intense effort to adjust to kindergarten life. Therefore, impulsive behaviors might be suppressed. In addition, parents are stricter with girls than with boys, so girls are more likely to self-regulate behavior. Thus, personal delay scores might be higher for girls than for boys in the younger group.

Table 10 The correlation coefficients between social delay scores and four kinds of subscale scores for personality inventory for each age group

	Empathy	Acceptance	Aggressiveness	Non-achievement
Younger group	.49	.28	-.84	-.37
Middle group	.42	-.07	-.70	-.59
Older group	.03	.28	-.68	-.28

Table 11 The correlation coefficients between social delay scores and four kinds of subscale scores for the personality inventory for the boys and the girls

	Empathy	Acceptance	Aggressiveness	Non-achievement
Boys	.12	.17	-.83	-.63
Girls	.33	.46	-.51	-.19

However, in the middle period of the kindergarten experience, girls might become accustomed to kindergarten life and thus display impulsive behaviors as frequently as boys. On the other hand, in the latter period of kindergarten life, girls are trained more strictly by parents and teachers than boys, so girls are more likely to self-regulate behavior. Thus, effects of age might be observed only for girls and personal delay scores might be higher for the younger and older groups compared to the middle group.

If this interpretation is valid, the results for personal delay scores should be similar to social delay scores. However, effects of age were not observed for social delay scores; therefore, this interpretation might be invalid. Further research is needed to better understand these results.

Personal delay scores did not correlate with social delay scores. The personal delay of gratification test measured personal goal-oriented behavior. On the other hand, social delay of gratification inventory measured the ability to delay gratification in accordance with social rules and demands. Thus, personal and social delay of gratification tests would measure different aspects of delay of gratification.

Looking at the results of relationships between personal delay scores and personality traits that included both age and gender, significant correlation coefficients were not observed for any of the four subscales of the personality inventory. For relationships between personal delay scores and personality traits for boys and girls, similar results were also obtained.

Personal delay scores related positively with acceptance scores for the younger group. Preference for immediate reward when given a choice might reflect a tendency towards impulsiveness. Furthermore, the extent of peer acceptance might be low for impulsive children. Thus, significant positive correlation coefficients between acceptance scores and personal delay scores might be observed.

Personal delay scores also related negatively with non-achievement scores. The choice of the immediate reward means that personal goal-oriented behavior has not developed. Thus, personal delay scores might relate negatively with non-achievement scores.

For the middle group, personal delay scores related negatively with aggressiveness scores. Choice of the immediate reward suggests impulsiveness. Aggressive behavior is associated with impulsive behavior. Thus, personal delay scores might relate negatively with aggressiveness scores.

For the older group, personal delay scores related positively with acceptance scores. This interpretation is described above.

Looking at results of social delay, this score related positively with empathy scores and negatively with aggressiveness scores for the younger and middle groups. This suggests that empathy and non-aggressiveness is necessary in order to exercise social delay of gratification.

For the older group, social delay scores related negatively with aggressiveness scores. Impulsive control capacity is necessary in order to perform social delay of gratification. Aggressiveness refers to lack of impulsive control capacity. Thus, social delay scores might relate negatively with aggressiveness scores.

For boys and girls, social delay scores related negatively with aggressiveness scores. Interpretation of the results is described above. For girls, social delay scores related positively with acceptance scores. Development of impulsive control capacity is necessary to display social delay of gratification. Children with limited impulsivity control are disliked by peers. Thus, social delay scores might relate positively with acceptance scores.

For boys, social delay scores related negatively with non-achievement scores. Social delay of gratification refers to social goal-oriented behavior. Non-achievement refers to lack of goal-oriented behavior. Thus, social delay of gratification might relate negatively with non-achievement.

Looking at total results, significant correlation coefficients between acceptance, aggressiveness, non-achievement scores and social delay scores were observed. These results suggested that social delay of gratification is related to peer acceptance, non-aggressiveness, and achievement behavior.

In conclusion, social delay of gratification has stronger relationships with social competencies and achievement behavior than personal delay of

gratification.

Study 2

As described in Study 1, delay of gratification paradigms included the renunciation-type and transgression-type paradigms and much research has focused on the renunciation-type paradigm. Therefore, Study 1 focused on the renunciation-type paradigm and the transgression-type paradigm in relation to delay of gratification.

However, Study 1 measured renunciation and transgression behaviors in different situations. Study 2 measured renunciation and transgression behaviors using a hypothetical 'waiting for a turn' situation.

In this situation, there was a more valuable toy and less valuable toy. Hypothetically, the child had to wait for a turn to play with more valuable toy. However, when child wanted to play with the less valuable toy, he could immediately play with this toy because nobody else wanted to play with it.

In this situation, the behavior is labeled as waiting behavior when child decided to wait to play with more valuable toy. When the child refused to wait and decided to immediately play with the less valuable toy, this behavior was labeled as renunciation behavior. The behavior was labeled as transgression behavior when child either broke into the queue or robbed the more valuable toy from another child.

Study 2 utilized the same research questions as Study 1. The first research question related to developmental changes of delay of gratification during early childhood and gender difference. The effect of waiting for a turn was investigated.

In this situation, effects of age on delay of gratification might be determined by order in line. Our hypothesis was that if the child's position was towards the front of the line, kindergarteners, aged 3 4, 5, and 6, were likely to show waiting behavior and effects of age might therefore not be observed; however, when the position was towards the back of the line effects of age might be observed.

Therefore, the first purpose of Study 2 was to investigate effects of order in line on delay of gratification. The second purpose was to investigate developmental changes of delay of gratification during early childhood and gender difference when the child's position was towards the front (front order condition) or the back (back order condition) of the line. The third purpose was to investigate relationships between personality variables and delay of gratification similar to Study 1. The present study focused on personality variables such as achievement behavior and social competencies and elucidates personality traits that characterize waiting behavior, renunciation behavior and transgression behavior in the waiting for a turn situation.

Method

Subjects Kindergarteners registered in an older class (aged 5-6 years), a middle class(aged 4-5 years)and a younger class(aged 3-4 years) served as subjects. There were 28(boys 11, girls 17) in the older class; 37(boys 20, girls 17) in the middle class; 16(boys 11, girls 5) in the younger class.

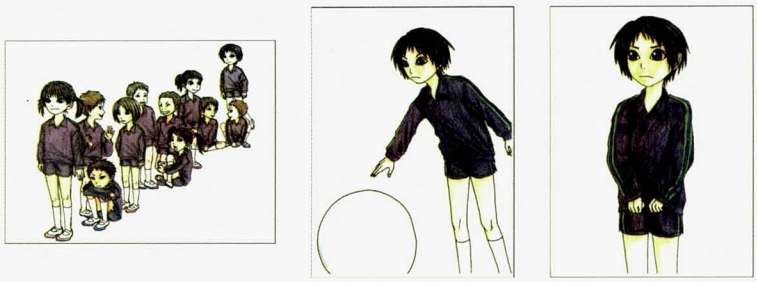
Materials The hypothetical waiting for a turn situation was explained, using picture cards. These cards are shown in Figure 1.

Procedure The experiment was conducted in a large room located in the kindergarten. Subjects were brought to the room in groups of three to six, each attended by one of the female student experimenters. The subject-experimenter pairs sat down on the floor, with a long distance between one another, so that the children could not hear each other.

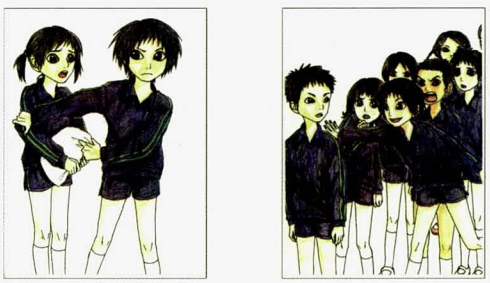
First, subjects were instructed to identify the favorite toy and the less favorite toy. The following instruction was given while pointing to picture card 1. "Your favorite toy is popular and many children stand in line and are waiting for a turn to play with the favorite toy. If you want to play with the favorite toy, you must wait for your turn." Pointing to picture card 2, the experimenter also instructed the subjects that "The less favorite toy is immediately available, because the less favorite toy is not popular and nobody wants to play with this toy".

After receiving the instructions, the following two questions were given to the subjects in order to confirm comprehension: (1) "When can you play with the favorite toy?" and (2) "When can you play with less favorite toy?"

Subject's order in line was explained using



Picture card 1　Picture card 2　Picture card 3



Picture card 4　Picture card 5

Fig.1 The picture cards used in the study 2

picture card 1. When order in line was towards the front, experimenter gave the following instruction, pointing to the fifth child in line, "This child is you. Your order is fifth." When order in line was towards the back, experimenter gave this instruction, pointing to the eleventh child in line, "This child is you. Your order is eleventh."

After that, subjects were presented with picture cards that depicted four actions that they could perform in the waiting for a turn situation. Four actions included: 1) wait to play with favorite toy (picture card 3); 2) renounce waiting and immediately play with the less favorite toy (picture card 2); 3) take the favorite toy from another child (picture card 4); and 4) break into the queue to play with favorite toy (picture card 5). The experimenter explained each picture card; subjects chose the picture card that depicted the action that they would perform from among four options.

Before subjects chose, the experimenter presented picture card 1 again and asked subjects, "What is your number?"; thus the experimenter confirmed order in line. Two stories, about waiting for a turn where order in line differed, were randomly presented.

After the experiment finished, the personality inventory used in Study 1 was given to the teacher in charge of the class. The teacher rated the subject's achievement behavior and social competencies using a three-point scale.

Results

Subjects' behaviors were classified into waiting, renunciation or transgression behaviors. Transgression behavior included breaking into the queue to play with the favorite toy and the behavior of robbing the favorite toy from another child.

No large difference in percentage of waiting behavior and non-waiting behavior that comprised transgression behavior and renunciation behavior were observed between boys and girls at each age level under the two conditions of order (front or back of line). Therefore, in the following analysis, the data of boys were combined with the data of girls.

Table 12 and Table 13 show the number of subjects that displayed waiting behavior and non-waiting behaviors for each age group in the front and

back order conditions respectively. To investigate effects of age on delay of gratification, 3 (age) × 2 (waiting vs non-waiting) x^2 test was performed. In the front order condition, effects of age were observed ($x^2(2, N=81)=7.73, p<.05$), and percentages of waiting behavior were higher for the middle ($x^2(1, N=37)=4.15, p<.05$) and older groups ($x^2(1, N=28)=7.42, p<.01$) than for the younger group. In the back order condition, effects of age were again observed ($x^2(2, N=81)=7.04, p<.05$) and percentages of waiting behavior were higher for the older group than for the middle ($x^2(1, N=37)=4.76, p<.05$) and younger groups ($x^2(1, N=16)=5.50, p<.05$).

Non-waiting behaviors were classified into transgression behavior or renunciation behavior to perform analysis of patterns of failure to wait. No large differences in percentages of transgression and renunciation behaviors between boys and girls were observed at each age level for the two order conditions. Therefore, in the following analysis, the data of boys were combined with the data of girls.

Table 14 and Table 15 show the number of subjects that displayed transgression and renunciation behaviors for each age in the front and back order conditions, respectively.

For each order condition, 3 (age) × 2 (failure pattern) x^2 test was performed. No significant differences in percentages of transgression and renunciation behaviors among three age groups were observed for the two different orders. However, percentage of renunciation behavior was higher than percentage of transgression behavior for all age groups under the two conditions.

Subjects' behavior patterns were classified into consistent behavior patterns that did not change behavior by order in line or inconsistent behavior patterns that changed behavior by order in line. Consistent behavior patterns included: consistent transgression behavior pattern, consistent renunciation behavior pattern, and consistent waiting behavior pattern.

Inconsistent behavior patterns comprised

Table 12 The number of the subjects that displayed the waiting behavior and non-waiting behavior for each age group in the early order condition

	Younger group	Middle group	Older group
Waiting	6	25	22
Non-waiting	10	12	6

Table 13 The number of the subjects that displayed the waiting behavior and non-waiting behavior for each age group in the late order condition

	Younger group	Middle group	Older group
Waiting	5	15	19
Non-waiting	11	22	9

Table 14 The number of subjects that displayed the transgression and renunciation behaviors for each group in the early order condition

	Younger group	Middle group	Older group
Transgression	3	2	1
Renunciation	7	10	5

Table 15 The number of the subjects that displayed the transgression and the renunciation behaviors for each age group in the late order condition

	Younger group	Middle group	Older group
Transgression	4	6	0
Renunciation	7	16	9

logically interpretable behavior patterns and irrational behavior patterns. Logically interpretable behavior patterns comprised three behavior patterns. The first pattern was waiting-transgression pattern where behavior changed from waiting to transgression when order in line shifted from fifth to eleventh. The second pattern was waiting-renunciation pattern where behavior changed from waiting to renunciation when order in line shifted from fifth to eleventh. The third pattern was transgression-waiting pattern where behavior changed from transgression to waiting when order in line shifted from fifth to eleventh.

Irrational behavior patterns included two behavior patterns. The first pattern was the renunciation-waiting pattern where behavior changed from renunciation to waiting when order in line shifted from fifth to eleventh. The second pattern was the renunciation-transgression pattern where behavior changed from renunciation to transgression when order in line shifted from fifth to eleventh.

First x^2test was performed, by combining the data of boys with the data of girls. Table 16 shows the number of subjects that displayed each behavior pattern for each age group; 3 (age) × 2 (consistent vs. inconsistent) x^2 test was performed. Significant differences in percentage of consistent behavior patterns among three groups were observed ($x^2(2, N=81)=7.95, p<.05$) and percentages were higher for the younger group than for the middle group ($x^2(1, N=37)=5.88, p<.05$).

For the younger group, percentage of consistent behavior patterns was higher than percentage of inconsistent behavior patterns. However, among consistent behavior patterns, there were no large differences in percentages among waiting, renunciation and transgression behavior patterns.

For the middle group, no large differences between percentage of consistent behavior patterns and percentage of inconsistent behavior patterns were observed. Among consistent behavior patterns, percentage of waiting behavior pattern was higher than percentages of the other two behavior patterns. Among inconsistent behavior patterns, percentage of logically interpretable behavior patterns were higher than percentage of irrational behavior patterns and among logically interpretable behavior patterns, percentage of waiting -renunciation behavior were higher than percentages of the other two behavior patterns.

For the older group, percentage of consistent behavior patterns was higher than inconsistent behavior patterns and among consistent behavior patterns percentage of waiting behavior pattern was the highest.

Next, analysis was performed, including both age and gender. Table 17 shows the number of

Table 16 The number of the subjects that displayed each behavior pattern for each age group

	Consistent behavior patterns			Inconsistent behavior patterns				
				Logically interpretable behavior pattern			Irrational behavior patterns	
	Waiting	Renunciation	Transgression	Waiting-transgression	Waiting-renunciation	Transgression-waiting	Renunciation-waiting	Renunciation-transgression
Younger	4	6	3	1	1	0	1	0
Middle	10	4	1	3	12	1	4	2
Older	15	2	0	0	7	1	3	0

Table 17 The number of the subjects that displayed each behavior pattern

Consistent behavior patterns			Inconsistent behavior patterns				
			Logically interpretable behavior patterns			Irrational behavior patterns	
Waiting	Renunciation	Transgression	Waiting-transgression	Waiting-renunciation	Transgression-waiting	Renounciation-waiting	Renounciation-transgression
29	12	4	4	20	2	8	2

subjects that displayed each behavior pattern. As shown in Table 17, no large differences between percentage of consistent behavior patterns and percentage of inconsistent behavior patterns were observed. Among consistent behavior patterns, percentage of waiting behavior pattern was higher than percentages of the other two patterns. Furthermore, percentage of renunciation behavior pattern was higher than percentage of transgression behavior pattern.

Among inconsistent behavior patterns, percentage of logically interpretable behavior patterns was higher than percentage of irrational behavior patterns. Among logically interpretable behavior patterns, percentage of waiting - renunciation behavior was higher than percentages of the other two behavior patterns.

Finally, relationships between behavior patterns such as waiting, renunciation and transgression and personality traits were analyzed. Table 18 shows the means for empathy, acceptance, aggressiveness and non-achievement scores for waiting, transgression and renunciation groups in the front order condition. One way ANOVA that used the group as the factor was performed, using each personality score as the dependent variable. The results indicated that the main effects of group were not significant for any of the four subscales.

Table 19 shows the means for empathy, acceptance, aggressiveness, and non-achievement scores for waiting, transgression and renunciation groups in the back order condition. One way ANOVA that used the group as the factor was performed, using each personality score as the dependent variable. The results indicated that the main effects of the group were not significant for any of the four subscales.

Discussion

The first purpose of the present study was to investigate effects of order in a line on delay of gratification. Looking at the results for age and gender, no large differences between percentage of consistent behavior patterns and percentage of inconsistent patterns were observed. Among consistent patterns, percentage of waiting behavior was the highest. Among inconsistent behavior patterns, percentage of logically interpretable behavior patterns was higher, with percentage of waiting-renunciation behavior being the highest. These results suggested that kindergarteners either consistently show waiting behavior or change the behavior from waiting to renunciation when order in line shifts from fifth to eleventh.

Looking at results for each age group, the younger children consistently showed either waiting behavior, renunciation behavior, or transgression behavior when order in line shifted from fifth to eleventh. However, the middle group was more flexible about changing behavior from waiting to renunciation compared to the younger group when

Table 18 The means for empathy, acceptance, aggressiveness and non-achievement scores for waiting, transgression and renunciation groups in the early order condition

	Waiting	Renunciation	Transgression
Empathy	2.53	2.50	2.98
Acceptance	2.61	2.45	2.57
Aggressiveness	1.24	1.42	1.28
Non-achievement	1.87	2.18	1.93

Table 19 The means for empathy, acceptance, aggressiveness and non-achievement scores for waiting, transgression and renunciation groups in the late order condition

	Waiting	Renunciation	Transgression
Empathy	2.51	2.54	2.84
Acceptance	2.54	2.61	2.69
Aggressiveness	1.22	1.33	1.29
Non-achievement	1.89	2.00	2.00

order in line shifted from fifth to eleventh. On the other hand, the older group consistently showed waiting behavior even when the position in line was towards the back. These results suggested that effects of order in line vary with age group.

The second purpose of the present study was to investigate developmental changes of delay of gratification and gender differences during two different positions in line conditions. In both conditions, effects of gender were not observed. Therefore, data of boys were combined with data of girls. When the position was towards the front of the line, percentage of waiting behavior was higher for the older and middle groups than for the younger group. Thus, developmental changes of delay of gratification during early childhood were observed in this condition.

On the other hand, when the position was towards the back of the line, developmental changes of delay of gratification were again observed. However, the percentage of waiting behavior was higher for the older group than for the younger and middle groups. In contrast, when the position was towards the front of the line, more children in the middle group showed non-waiting behaviors than children in the older group. These results suggest that being towards the back of the line makes it more difficult for children to display waiting behavior than if they are towards the front of the line.

Analyzing patterns of failure to wait, no large differences in percentage of renunciation behavior and percentage of transgression behavior among three age groups were observed for the two conditions. However, percentage of renunciation behavior was higher than percentage of transgression behavior for each age group under these conditions. The results suggested that even the younger group recognizes the rules of waiting for a turn.

The third purpose of the present study was to investigate relationships between behavior patterns such as waiting, renunciation and transgression and personality traits. Looking at these results, significant relationships between personality traits and behavior patterns such as waiting, renunciation and transgression were not observed in the two situations.

The reason that significant relationships were not observed might be that 'waiting for a turn' was hypothetical. In spite of transgression or renunciation behaviors in an actual waiting for a turn situation, some kindergarteners might demonstrate waiting behavior. The present study measured delay of gratification in a hypothetical situation and relationships between behavior patterns such as waiting, transgression and renunciation and personality traits therefore might not be observed. It is necessary to conduct research concerning delay of gratification in an actual waiting for a turn situation.

General Discussion

Effects of gender were observed for personal and social delay of gratification. For social delay of gratification, social delay scores were higher for girls than for boys regardless of age. For personal delay of gratification, personal delay scores were higher for girls than for boys in the younger and older groups. These results can be interpreted in terms of traditional gender role perspectives. Parents are stricter with girls; therefore girls are more likely to self-regulate behavior; thus effects of gender might be observed for personal and social delay of gratification.

Effects of age were also observed only for girls in personal delay of gratification and personal delay scores were higher for the younger and older groups than for the middle group. This suggests that Furuhata's premise that self-regulated behavior develops during early childhood is invalid. Further research is needed to better understand these results.

Personal delay scores also did not correlate with social delay scores. Social delay of gratification inventory measures ability to delay immediate gratification in social situations. On the other hand, the personal delay of gratification test measures personal goal-oriented behavior. Thus, personal and social delay of gratification tests might measure different aspects of delay of gratification.

Looking at results concerning relationships between personality traits and delay of gratification, social delay of gratification displayed stronger relationships with social competencies and achievement behavior than personal delay of gratification. Particularly, social delay of

gratification inventory measures the ability to delay gratification in accordance with social rules and norms. Therefore, social delay of gratification might display stronger relationships with social competencies than personal delay of gratification.

Study 1 measured transgression behavior and renunciation behavior in different situations. However, these behaviors occur in similar situations. Therefore, Study 2 measured transgression behavior and renunciation behavior in similar situations, using the hypothetical waiting for a turn situation.

Looking at results from Study 2, developmental changes of delay of gratification were observed in the two order conditions. These results suggested that Furuhata's hypothesis that self-regulated behavior develops remarkably during early childhood is valid. However, the results obtained in Study 2 are inconsistent with results of Study 1. Further research is needed to better understand these results.

Looking at results concerning gender differences, inconsistent results were observed. In Study 1, gender differences in delay of gratification were observed. However, in Study 2, gender differences were not observed. These differences might reflect differences in the measurement method. Study 1 measured actual delay of gratification. On the other hand, Study 2 measured delay of gratification in hypothetical situations. In a hypothetical situation, some boys might display waiting behavior and gender difference might not be observed; whereas either renunciation behavior or transgression behavior might be displayed in an actual situation. Thus, differences in the measurement method might cause different results. The reason that percentage of renunciation behavior is higher than percentage of transgression behavior might also be related to the hypothetical situation. It is necessary to investigate developmental changes of delay of gratification in an actual waiting for a turn situation.

Study 2 also investigated effects of order in line on delay of gratification. The younger group showed either waiting, renunciation or transgression behaviors consistently when order in line shifted from fifth to eleventh. On the other hand, the middle group was more flexible about changing behavior from waiting to renunciation than the younger group, when order shifted from fifth to eleventh. However, the older group consistently showed waiting behavior even if order in line shifted from fifth to eleventh; thus effects of order in line varied among age groups.

In a personal delay of gratification situation, there were some situational variables such as length of delay interval and the difference in the value between immediate reward and delayed reward. It is necessary to investigate effects of situational variables on delay behavior among different age groups.

In Study 1, social delay of gratification displayed stronger relationships with social competencies and achievement behavior than personal delay of gratification. However, in Study 2, relationships between behavior patterns such as waiting, renunciation and transgression and personality traits were not observed for any of the four subscales for personality inventory. The reason might be related to the hypothetical situation used in Study 2. In the hypothetical situation, some kindergarteners might display waiting behavior. Relationships between behavior patterns and personality traits therefore might not be observed; whereas either renunciation or transgression behavior could be displayed in an actual situation.

When actually waiting for a turn, children who show transgression behavior and children who show renunciation behavior might have disorders of social competencies and achievement behaviors, respectively. It is necessary to investigate relationships between behavior patterns such as waiting, renunciation and transgression and personality traits using an actual waiting for a turn situation.

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