Practical Research

Effects of Self-Monitoring Package to Improve Social Skill of Students With Autism Spectrum Disorders in Japanese Regular Classrooms

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This study evaluated effects of a self-monitoring package to improve a targeted social skill and problem behavior of two elementary school students with autism spectrum disorders placed in regular classrooms. Non-concurrent multiple baseline across participants and A-B-A designs were used. Assessment information was collected through interviews with teachers and behavioral observation. The targeted social skill and problem behavior were holding their heads up and touching stationery respectively, both while teachers were talking during Japanese and math classes. Students were instructed to monitor their target behaviors by themselves. Data were collected during the intervention and generalization settings by using direct observation for discussing the effects the program. Additionally, the information of the package’s acceptability to teachers and subjective assessment of understanding of classes by students and teachers were also gathered. The results showed that students increased their target social skill and decreased their problem behavior in the intervention and generalization settings, and these effects were maintained. Moreover, the data concerning acceptability and subjective assessment of understanding of classes were highly evaluated. These results were analyzed in terms of rule control.

Key Words: self-monitoring, social skills, autism spectrum disorders, regular classroom

Introduction

Compared with students of the same age, students with autism spectrum disorder (ASD) show a lack of social skills (Church, Alisanski, & Amanullah, 2000). Without appropriate social skills in their repertoire, students with ASD have significantly greater difficulty to be socially integrated into their schools and neighborhood communities (Haring, 1990). Japanese schools are focusing on establishing effective interventions to improve social skills of students with ASD because the formation of human relations was added as a category within activities to promote independence in courses at special needs education schools (Ministry of Education, Culture, Sports, Science & Technology, 2009).

Scattone (2007) reported the usefulness of self-monitoring to improve social skills of students with ASD. Self-monitoring involved students observing and recording their own behaviors and results (Heward, 2007). Additionally, self-monitoring promoted paying attention to a behavior which students already have in their own repertoire and reinforcing it (Reid, 1996). Koegel, Koegel, Hurley, and Frea (1992) evaluated the effects of self-monitoring to improve responsiveness to verbal initiations from others in settings such as the community, home, and schools. Self-monitoring involved (a) students recording responsiveness to others timed by a wrist counter, and (b) the treatment provider reinforcing students, depending on recorded results. The results showed that students could learn responsiveness to others and that such improvements were associated with concomitant reductions in a problem behavior without the need for special intervention. Furthermore, self-monitoring requires minimal presence of the treatment provider (Koegel et al., 1992). Similarly, Heward (2007) and Osborne, Kosiewics, Crumley, and Lee (1987) identified a number of
advantages of self-monitoring over other behavioral interventions including minimal teacher management along with more time to teach and application of strategy in a regular classroom.

Meanwhile, Reid (1996) proposed that there is still a need to explore self-monitoring procedures so that they are effective but less intrusive than those used in current research. Self-monitoring procedures by Prater, Joy, Chilman, Temple, and Miller (1991) and Levendoski and Cartledge (2000) asked students with disabilities in a regular classroom to record their behaviors, timed by special equipment that used taped tones, headsets, and tape recorders, with alarms going off once every one to six min. These procedures involve equipment and frequencies that might not be readily available or easily programmed into a regular classroom (Maag, Reid, & DiGangi, 1993). Fuchs, Fuchs, Fernstrom, and Hohn (1991), for example, found that regular classroom teachers rejected self-monitoring as too troublesome to facilitate inclusion of students with disabilities in a regular classroom. It can be said that these self-monitoring procedures disturb teacher’s classroom management and classmates’ learning in Japanese regular classrooms. Furthermore, they could cause feelings of unfairness among the classmates.

To resolve this problem, Levendoski and Cartledge (2000) evaluated a simple self-monitoring procedure with four elementary school students with serious emotional disturbances to assess their on-task behavior and academic productivity in a self-contained classroom. In simple self-monitoring, students recorded their behavior with a timer bell at low frequency, i.e., approximately every 10 min. The results showed a positive relationship between simple self-monitoring and targeted behaviors. If Levendoski and Cartledge’s (2000) simple self-monitoring is applicable to social skills of elementary school students with ASD in a regular classroom, self-monitoring will be more widely implemented in schools.

The present study examined the effects of a self-monitoring package with two elementary school students with ASD in regular classrooms to improve a target social skill and problem behavior. The self-monitoring package used simple self-monitoring in which students recorded their behavior timed by the sound of chime used in Japanese schools at low frequency of every 45 min.

Furthermore, listening to others has been the target social skill to be improved in some intervention research on students with ASD in Japan (Ohtsuki, Aoyama, Iha, Shimizu, Nakano, Miyamura, & Sugiyama, 2006; Okajima, Tani, & Suzuki, 2014; Yoshida & Inoue, 2008). Listening to other’s talk involves not only listening itself but also holding up the head and turning the body toward the speaker. Students can perform an action according to what the teacher says if students adequately perform the social skill of *listening to the teacher talk in class*. In particular, listening to the teacher talk in class relates to adaptation to school life and is an achievement of students’ studies (Foulks & Morrow, 1989; McClelland, Morrison, & Holmes, 2000). Moreover, listening to the teacher talk in class has been taken up as learning-related social skills in Children’s Social Skills Scale (Isebo, Sato, Sato, & Okayasu, 2006). For students with ASD in a regular classroom, this is a very important skill. Therefore, this study identified the effects of the self-monitoring package with students who have difficulty performing the social skill of listening to the teacher talk in class.

**Method**

**Participants, Teachers, Intervention Provider, and Settings**

A fourth-grade female student with suspected ASD (Hiro) and a sixth-grade male student with an ASD diagnosis (Kei) participated in the present study. Hiro’s full IQ (tested at CA10:0) was 92 on the Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV). Kei’s full IQ (tested at CA11:11) was 89 on the WISC-IV. Each participant was enrolled without special needs education in a regular classroom in an elementary school. Their teachers described each participant as tending to be oversensitive to their failures and unexpected accidents; e.g., participants cried and were extremely depressed when they missed a test and could not make a comment in class. In contrast, they tended to be very pleased with being praised and having their answers marked correct with “○” at tests and being commented in classes.

Hiro’s teacher, a female in her 50s, had 31 years’ teaching experience. Kei’s teacher, a female in her 40s, had 20 years’ experience. Neither teacher had been in charge of a special needs educational classroom.
Intervention was conducted by a graduate student in special needs education (first author), and was supervised by a professor in special needs education and applied behavior analysis (second author). The first author had been visiting the school about 2–3 times a week as a volunteer, and had been directing children with special needs education.

Every weekday, participants had six classes, 45 min long each. Hiro's class had 31 students and Kei's had 36 without a teaching assistant. Their teachers described participants as having limited friendships with classmates, but they could appropriately communicate with close classmates.

**Target Behaviors and Planning Procedures**

Target behaviors and planning procedures were decided after an interview with teachers and behavioral observations during Japanese and math classes. During the interview, the first author asked the two teachers about the participants' behaviors they felt problematic. Additionally, the first author acquired information about three-term contingency of the definite behaviors. The teachers replied that the students put their heads down while the teachers talked in Japanese and math classes. They also played with stationery while teachers were talking. Moreover, teachers wanted participants to control their behaviors by themselves because of teachers' tight schedules in the schools and participants' grades.

The first author implemented behavioral observation during Japanese and math classes and observed the students putting down their heads and playing with stationery, as described in the interview. Then, participants could not perform an action according to teachers' instructions. However, participants did not always put their heads down and play with stationery while listening to the teacher. At first, participants listened with their heads up, not playing with stationery. Unfortunately, participants gradually reverted to the behaviors described above.

From these observations, the following two hypotheses were considered. First, an intrinsic reinforcement contingency, in which participants could perform an action according to the teachers' instructions, could not control the participants' behavior of holding their heads up while listening to the teacher. Second, an intrinsic punishment contingency, in which participants could not perform the action according to the teachers' instructions, could not control the participant's behavior of playing with stationery while listening to the teachers. Furthermore, in Japanese and math classes, participants' classmates listened with their heads up, without touching stationery; thus, implementing an intervention on the whole class was unnecessary.

Therefore, target behaviors involved participants maintaining a heads-up position (target social skill) and refraining from playing with stationery (problem behavior) both while listening to the teacher during Japanese and math classes. Furthermore, according to the hypotheses above, at the request of the teachers and for classmates, we planned to implement a self-monitoring package with an adjunctive reinforcer for the target social skill and an adjunctive punisher of for the problem behavior.

**Procedures**

This study was conducted for one year (Hiro) and three months (Kei).

**Baseline phase.** Baseline phase was one week. No intervention for target behaviors was implemented during this week. Furthermore, the first author requested teachers to teach everyone as usual from baseline phase to follow-up phases and to keep the participants' seating position from baseline phase to probe phase.

**Pre-training.** Before implementing the classroom intervention, the first author trained the participants for the self-monitoring package for approximately 30 min, in a one to one setting in a vacant classroom in their schools. Participants themselves arranged the textbook and stationery on their individual desks.

Participants were explained the self-monitoring package in a one to one setting by the first author. The procedure of the self-monitoring package was as follows. Participants recorded occurrences and non-occurrences of target behaviors timed by the sound of chime signaling the end of the class; they recorded results on a self-monitoring sheet which was 5 cm long × 8 cm wide (see Fig. 1). As participants had Japanese and math classes four times a day at most, this sheet had four spaces for recording target behaviors. Standard responses were as follows: If the participants performed the target social skill throughout a class they record “○”; if they could not, they record “×”. For the problem behavior, standard responses were similar: If participants did not perform the problem behavior throughout a class, they
record “○”; if they performed the problem behavior, they record “×”. Moreover, the self-monitoring sheet was always pasted on the left side of the on the participant's desk.

In pre-training, the first author taught participants a 10-min Japanese and math classes each as teacher. The educational contents were decided though discussion with teachers. Participants recorded the occurrence and non-occurrence of target behaviors timed by the sound of chime which the first author orally presented. Participants also recorded occurrence and non-occurrence of target behaviors on the self-monitoring sheet and received feedback on its accuracy from the first author.

Intervention phase. Participants implemented the self-monitoring package in the regular classroom during all Japanese and math classes for a month. On the morning of the first day, teachers and the first author explained the procedure of the self-monitoring package to participants again and handed them the self-monitoring sheet. During the first week, teachers told participants to record on the self-monitoring sheet when a class of Japanese and math was over. Additionally, participants fetched the self-monitoring sheet from the teacher's desk every morning and pasted it on the sheet used the day before. On the last school day of the week, participants handed teachers that week's self-monitoring sheets and received social praise from the teacher for their records. Two weeks later, the teachers did not tell participants to complete the self-monitoring sheet when a class was over.

Probe phase. Probe phase was one week. The self-monitoring package was interrupted in the probe phase.

Follow-up phases. Hiro's follow-up phases were carried out three times; one month, three months and ten months later. Kei’s follow-up phase was only carried out one month later because he already graduated from his school three months later. The self-monitoring package was discontinued at the time of the follow-up.

Experimental Design

This study used a non-concurrent multiple baseline across participants and an A-B-A design.

Dependent Variables

Dependent variables were the target behaviors and the number of use of certain teacher's phrases in Japanese and math classes (intervention setting) and morning homerooms (generalization setting). The teacher used individual phrases for the target behaviors, e.g., “Look at me” and “Don't touch stationery.” Japanese and math classes were always conducted for 45 min, and the morning homerooms were always conducted for 10 min.

The first author collected data by direct observation in intervention and generalization settings from baseline to follow-up. Direct observation was carried out about 2–3 times a week. Direct observation focused on target behaviors when teachers talked for more than 10 s. However, occurrences when participants had to listen to teachers' talking while looking at a textbook and writing in a notebook were excluded as direct observation's targets. Regarding the teacher's phrases, all occurrences of the phrases directed to the participants by teachers were included. Target behaviors were recorded as 10-s time sample recording. The teacher's phrase was recorded as event recording.

On the other hand, this study did not evaluate the accuracy of the self-monitoring.

Inter-Observer Agreement

During 36.5% of the phases, target behaviors and the teacher’s phrases were recorded by two independent observers (the first author and a graduate student who was uninformed of the study’s purpose). The percentage of agreement between observers (calculated separately for occurrences and non-occurrences) was calculated by dividing the number of agreements by the sum of the number of agreements and disagreements and multiply-

| Class | Behaviors | ○ or × |
|-------|-----------|--------|
| You listened to the teacher with your head up. | ○ or × |
| You listened to the teacher without playing with stationery. | ○ or × |
| You listened to the teacher with your head up. | ○ or × |
| You listened to the teacher without playing with stationery. | ○ or × |
| You listened to the teacher with your head up. | ○ or × |
| You listened to the teacher without playing with stationery. | ○ or × |
| You listened to the teacher with your head up. | ○ or × |
| You listened to the teacher without playing with stationery. | ○ or × |
| Do not forget to record this after Japanese and math classes. | ○ or × |
ing by 100. Consequently, inter-observer agreement for the target social skill ranged from 80 to 100% (Mean=95.2%), for the problem behavior from 80 to 100% (Mean=95.5%), and for the teacher’s phrase 100%.

**Acceptability**
In the probe phase, the acceptability of the package was assessed using a questionnaire (questions listed in Table 1), which was developed based on one by Witt and Martens (1983). Teachers responded on a four-point scale (very much=4; a little=3; not especially=2; not at all=1). The questionnaire was composed of 5 parts including appropriateness of the target behaviors and procedures (items 1, 2, 3); the risk and cost of the procedures (items 4, 5, 6); improvement of target behaviors (items 7, 8); procedures’ flexibility and convenience (items 9, 10); and necessity of expertise regarding procedures’ implementation (item 11).

**Subjective Assessment of Understanding of Classes**
In baseline phase and probe phase, participants and teachers evaluated subjective assessment of the participants’ understanding of classes. The question for participants was “Were you able to understand what was taught in the classes?” The question for teachers was “Did the participants understand what was taught in the classes?” Participants and teachers responded on a four-point scale (very well=4; a little=3; not especially=2; not at all=1).

**Ethical Considerations**
The Ethics Committee of the Graduate School of Comprehensive Human Sciences, University of Tsukuba, approved this study. This study’s purposes, procedures, and publication were explained orally and in writing to the principal, teachers, parents of the participants, and participants, upon which they agreed to participate in this study.

**Results**

**Participants’ Behaviors**

**Intervention setting.** Figure 2 shows the transitions of the percentage of intervals at which participants performed target behaviors in the intervention setting. Hiro’s mean intervals percentage of the target social skill during baseline phase was 33.4% (range: 14.2 to 48.6%) and that of Kei was 14.5% (range: 0.0 to 27.8%). Hiro’s mean intervals percentage of the problem behavior was 59.7% (range: 54.7 to 67.4%) and that of Kei was 69.7% (range: 50.0 to 100.0%).

After introducing intervention, participants showed an immediate, substantial increase of the target social skill and decrease of the problem behavior as compared with the baseline. Mean intervals percentage of the target social skill was 82.0% (range: 72.7 to 92.9%) for Hiro and 82.3% (range: 72.3 to 93.0%) for Kei. Mean intervals percentage of the problem behavior was 16.3% (range: 6.7 to 28.6%) for Hiro; 6.8% (range: 0.0 to 13.3%) for Kei.

During probe phase and follow-up phases, participants maintained performance level as that of the intervention phase. In probe phase, the mean inter-
vals percentage of the target social skill was 86.7% (range: 81.3 to 94.6%) for Hiro and 91.6% (range: 85.7 to 100.0%) for Kei. In follow-up phases, the mean intervals percentage for the target social skill was 88.8% (range: 76.9 to 95.8%) for Hiro and 93.8% (range: 85.7 to 100.0%) for Kei. Moreover, in probe phase, the mean intervals percentage of the problem behavior was 15.8% (range: 10.8 to 21.9%) for Hiro and 2.8% (range: 0.0 to 11.0%) for Kei. In follow-up phases, the mean intervals percentage of the problem behavior was 10.1% (range: 3.0 to 23.1%) for Hiro and 0.0% for Kei.

**Generalization setting.** Figure 3 shows the transitions of the percentage of intervals at which participants performed target behaviors in the generalization setting. Hiro’s mean intervals percentage of the target social skill during baseline phase was 47.7% (range: 35.7 to 60.0%) and that of Kei’s was 12.5% (range: 0.0 to 25.0%). Hiro’s mean intervals percentage of problem behavior was 48.8% (range: 40.0 to 64.3%) and that of Kei’s was 83.4% (range: 66.7 to 100.0%).

After participants implemented the simple self-monitoring procedure, they showed a gradual increase in the target social skill and a decrease of the problem behavior as compared with the baseline. Mean intervals percentage of the target social skill was 77.1% (range: 40.0 to 96.4%) for Hiro and 73.1% (range: 50.0 to 100.0%) for Kei. The mean intervals percentage of the problem behavior was 20.5% (range: 7.1 to 40.0%) for Hiro and 27.0% (range: 0.0 to 75.0%) for Kei.

In addition to the intervention setting, participants maintained the performance level as that of intervention phase during probe phase and follow-up phases. In probe phase, the mean intervals percentage of the target social skill was 92.1% (range: 84.2 to 100.0%) for Hiro and 84.0% (range: 68.0 to 96.4%) for Kei. In follow-up phases, the mean intervals percentage of the target social skill was 95.0% (range: 87.9 to 100.0%) for Hiro and 91.7% (range: 75.0 to 100.0%) for Kei. Additionally, in probe phase, the mean intervals percentage of the problem behavior was 7.9% (range: 0.0 to 15.8%) for Hiro and 10.7% (range: 0.0 to 32.0%) for Kei. In follow-up phases, the mean intervals percentage of the problem behavior was 3.9% (range: 0.0 to 12.1%) for Hiro and 8.3% (range: 0.0 to 25.0%) for Kei.

**Teachers’ Behavior**

Neither teacher used the target phrases during baseline, intervention, or follow-up phases.

**Acceptability**

The acceptability ratings by teachers, rated during the probe phase, are shown in Table 1. The follow-
ing questions were evaluated positively, rated 4 (very much) or 3 (a little): appropriateness of target behaviors and procedures (items 1, 2, 3); improvement of target behaviors (items 7, 8); and flexibility and convenience of procedures (items 9, 10). Meanwhile, the risk and cost of procedures (items 4, 5, 6) and necessity of expertise regarding procedures’ implementation (item 11) were evaluated negatively, rated 1 (not at all) or 2 (not especially).

Subjective Assessment of Understanding of Classes

In baseline phase, all participants and teachers evaluated subjective assessment of understanding of classes negatively, rating 2 (not especially). Meanwhile, all participants and teachers provided positive evaluations in probe phase as follows: Participants and Hiro’s teacher evaluated subjective assessment of understanding of classes as 3 (a little), and Kei’s teacher evaluated it as 4 (very well).

Discussion

This study examined effects of a self-monitoring package, in which simple self-monitoring was implemented with two elementary school students with ASD to improve a target social skill and to reduce a problem behavior in each regular classroom. This study evaluated target behaviors and teachers’ phrases in intervention and generalization settings; furthermore, it evaluated acceptability of the self-monitoring package and subjective assessment of understanding of classes. The results showed that participants improved target behaviors in intervention and generalization settings, and they maintained these effects. Additionally, results indicated that acceptability ratings were high, and subjective assessment of understanding of classes improved from baseline phase to probe phase. These results clearly show that the self-monitoring package is effective in improving target behaviors. Therefore, the simple self-monitoring procedure used by Levendoski and Cartledge (2000) is applicable to social skills of students with ASD in a regular classroom. The mechanism of improving participants’ target behaviors through the self-monitoring package and factors for which the self-monitoring package was effective are considered as follows.

As mentioned above, in baseline phase, presumably, an intrinsic reinforcement contingency, in which participants could perform an action according to the teachers’ instruction, could not control the participants’ behavior of holding up the head while the teacher talks. Also presumably, an intrinsic punishment contingency, in which participants could not perform an action according to the teachers’ instructions, could not control the participants’ behavior of playing with stationery while listening to the teacher. These intrinsic contingencies were considered ineffective; they had low worth when participants performed target behaviors (see Figs. 4, 5).

This study implemented a self-monitoring package with an adjunctive reinforcer for the target social skill and with an adjunctive punisher for the problem behavior. Participants recorded results on the
self-monitoring sheet as “○” or “×”. Recording “○” is considered a reinforcer because agreement on a goal and its result typically become a reinforcer in a self-monitoring procedure (Takeuchi & Sonoyma, 2007). Presumably, reinforcement by the presentation of a reinforcer, where participants could record “○” on the self-monitoring sheet, controlled this study’s target social skill. Furthermore, punishment by the prevention of the presentation of a reinforcer, where performing the problem behavior would forbid participants from recording “○” on the self-monitoring sheet, controlled the problem behavior in this study (see Figs. 4, 5). However, it is not likely that improving participants’ target behaviors was directly controlled by reinforcement of participants recording “○” on the self-monitoring sheet, because they could do so only once in 45 min. Thus, control of the self-monitoring package was likely an indirect-acting contingency (analog contingency).

What would a direct-acting contingency, i.e., directly controlling participants’ target behaviors, be in this study? Rule control is assumed to be the answer (Heward, 2007; Sugiyama, Simamune, Sato, Malott, & Malott, 1998). A rule is a verbal stimulus describing a behavioral contingency. The first author and teachers explained in pre-training and on the first intervention day, “When you listen to the teacher with your head up, you can record “○” on the self-monitoring sheet.” They also stated, “When you listen to the teacher without playing with stationery, you can record “○” on the self-monitoring sheet.” These statements correspond to rules in this study. Sugiyama et al. (1998) suggested that rule control in self-monitoring produces anxiety (punisher) when a person performs a behavior against the rule (establishing operation for a punisher), and this punisher produces the direct-acting contingency of self-monitoring. First, participants experienced anxiety about being unable to record “○” on the self-monitoring sheet according to its rule control. Next, participants performed the problem behavior. Then, they continue to experience anxiety about being unable record “○” on the self-monitoring sheet. In other words, punishment by the prevention of the removal of a punisher, in which case participants continue to experience anxiety (punisher) that would be reduced gradually, controlled the problem behavior (see Fig. 5).

Additionally, when performing the target social skill and avoiding the problem behavior resulted in the ability to take action according to the teacher’s instructions, the intrinsic reinforcement contingency and the intrinsic punishment contingency, respectively, increased. Then, the improved target behaviors were maintained during probe phase and follow-up phases because the intrinsic reinforcement contingency and the intrinsic punishment contingency controlled target behaviors. In subjective assessment of understanding of classes, both participants and teachers recognized improvement of participants’ understanding of classes, confirming the hypotheses.

As explained, the mechanism of improving participants’ target behaviors with the self-monitoring package is assumed to be rule control. However, this study cannot completely prove this mechanism as it did not evaluate participants’ anxiety. Moreover, there was no occurrence of teachers’ phrases for participants from baseline to follow-up. However, this study cannot completely deny a relationship between a direct-acting contingency by teachers and participants’ targeted behaviors because the study did not evaluate teachers’ attention. Therefore, in view of participants’ anxiety and teachers’ attention, the mechanism’s validity requires further investigation.

There were two effective factors of the self-monitoring package. The first was the characteristics of participants, who tended to be oversensitive to their failures and unexpected accidents and showed pleasure when successful. In the introduction to the intervention, participants mentioned, “I will try very hard to record “○” on the self-monitoring sheet.” They were very particular about recording “○”. In this study, recording “○” on the self-monitoring sheet produced a reinforcer because participants possessed that specific characteristic. If students were not reinforced by recording “○” on the self-monitoring sheet, an additional reinforcer would have been necessary (Fritz, Iwata, Rolider, Camp, & Neidert, 2012). For example, Tanaka, Matsumi, and Ichii (2008)
had the intervention provider give students a sticker depending on recorded results when students were not reinforced by recording “○” on the self-monitoring sheet.

The second was the placement of the self-monitoring sheet on the participants’ desks. Kirby, Fowler, and Bear (1991) investigated effects of placing the self-monitoring sheet to improve academic accuracy for students having difficulty completing independent work in a regular classroom. Consequently, they showed that the condition in which the self-monitoring sheet was placed on top of the participant’s desk was slightly more effective than the condition in which the self-monitoring sheet was placed inside the participant’s desk. Takeuchi and Yamamoto (2001) also observed that the self-monitoring sheet becomes a discriminative stimulus as it is placed within the participant’s sight, thus promoting spontaneous behaviors. In this study, the self-monitoring sheet became a discriminative stimulus of participants’ target behaviors. However, Kirby et al. (1991) noted a few differences between conditions—whether the sheet was placed on or inside a participant’s desk—but the current study did not compare these conditions. These results do not clearly show that placing the self-monitoring sheet on a participant’s desk is necessary to produce the self-monitoring effect. Therefore, studying the self-monitoring sheet’s placement and identifying factors directly producing the self-monitoring effect is necessary.

An important question for further investigation is a change of social interaction of participants. Ohtsuki et al. (2006) found that the participants’ appropriate social interaction with others increased by teaching participants the social skill of listening to the teacher. The present study did not evaluate the participants’ social interaction with others, but there is a possibility that the present study changed it as well as in Ohtsuki et al. (2006). Therefore, the participants’ social interaction with others requires further investigation.

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