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自閉症者玩口水的固著行為之功能分析與介入

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摘　　要

本研究共有三個子研究，採功能分析的方法，試圖找出影響一位自閉症學童玩口水行為（saliva-play）的原因，再進行適當的介入處理。研究一、以類似功能分析（analogue functional analysis）從操弄四種情境，來分析該學童玩口水的行為是否具有逃避工作的要求、引起他人的注意、或造成自我感官刺激的功能。研究二、進一步地以功能分析操弄遮蔽情境，來分析造成此學童玩口水行為的感官功能。研究三、使用跨制約功能的多基準線設計來評估喜愛物及非後效增強（noncontingent reinforcement） 對玩口水的介入效果。研究顯示：多重增強對該學童玩口水的固著行為有決定性的影響，該學童玩口水的行為可能與觸覺刺激或社會性的注意有關。呈現最喜歡的物品或非後效增強可以成功地減少該學童玩口水的行為。

關鍵詞：喜愛的東西、固著行為、玩口水、功能分析、非後效增強

Introduction

Stereotypic behavior is a prevalent behavior of children with autism, mental retardation, or related developmental disabilities. Stereotypy often defined as repetitive and invariant movements that serve no apparent social functions (e.g., Greer, Becker, Saxe, & Mirabella, 1985; Lewis & Baumeister, 1982; Smith & Houten, 1996). It usually occur with the topographies of body rocking, mouthing, tapping objects, repetitive vocalizations, spinning objects, and saliva-play or finger movement (Berkson, Mor, & Tarnovsky, 1999; LaGrow & Repp, 1984; Schultz & Berkson, 1995). These stereotypic behaviors might affect learning activities if it exhibited at high levels (Epstein, Taubman, & Lovaas, 1985; Runco, Charlop, & Schreibmen, 1986). Excessive stereotypy is often resistant to efforts to replace with more socially valued behaviors (McEntee & Saunders, 1997). Therefore, detecting the functions of stereotypy and reducing such aberrant behavior becomes an important issue.

Past researches have shown that some behavioral techniques, such as overcorrection (Foxx & Azrin, 1973) differential reinforcement and extinction (LaGrow & Repp, 1984) can be used to reduce stereotypy, however, little attention was paid to the functions of stereotypy. Therefore, the effects of treatments have been inconsistent (Lovaas, Newsom, & Hickman, 1987). Further exploration to examine the functions that might exert their control over stereotypic behavior is needed. Recent studies used analogue functional analyses (Iwata et al., 1994) to simulate a lack of environmental stimulation. If environments occasion people engaging in stereotypy, individuals might exhibit high incidences of stereotypy in alone conditions either because of negative reinforcement (i.e., lowered levels of stimulation) or to self-stimulate themselves (positive reinforcement) owing to understimulation in the environment. This position was supported by research that documented that children with autism and mental retardation frequently exhibit stereotypic behaviors in the absence of environmental stimulation (Durand & Merges, 2001). In accordance with their findings, Mason and Newsom (1990) investigated 3 children with severe mental retardation and also found that sensory changes effectively reduced children's repetitive hand movements. These studies suggest that sensory consequences function as positive and/or negative reinforcers maintaining stereotypy. More evidence comes from studies using analogue functional analyses to detect the relationship between alone settings and stereotypic behaviors

(Applegate, Matson, & Cherry, 1999; Mason & Iwata, 1990; Sturmey, Carlsen, Crisp, & Newton, 1988; Wehmeyer, Bourland, & Ingram, 1993). These studies suggest a lack of stimulating environments can control high rates of stereotypic behaviors.

If stereotypy is maintained by sensory consequences, removal of those consequences could reduce or eliminate this behavior. For example, Rincover (1978) sequentially eliminated the reinforcing properties of stereotypic responses for three persons with mental retardation. In contrast, alternative sensory reinforcers (such as favorite toys and objects) have been used to substitute and decrease stereotypic responses in some studies (e.g., Goh et al., 1995; Piazza, Adelinis, Hanley, Goh, & Delia, 2000). It is unclear whether specific preferred items could be substitutable for the sensory consequences of stereotypic responses in people with developmental disabilities. Further studies to examine such relations are needed.

On the other hand, the occurrence of stereotypy could be relevant to social contingencies (e.g., Durand & Carr, 1987). In other word, stereotypy could display to gain social attention or to escape from task demand. For example, Durand and Carr (1987) studied four children with autism who exhibited stereotypy and found that high levels of stereotypy occurred only in demand conditions, suggesting that such aberrant behaviors could serve to escape from difficult demands (negative social reinforcement). Further evidence came from the study conducted by Mace and Belfiore (1990) who indicted that escape from difficult task demands could contribute to high rates of stereotypy in one woman with mental retardation. In contrast, stereotypies could function to draw attention from other persons in some cases as well. This perspective is supported by Frea and Hughes (1997) who demonstrated that stereotypy served to obtain attention (positive social reinforcement) in two adolescents with mental retardation. Further support came from Goh et al. (1995) who showed that stereotypy in one person with mental retardation was maintained by positive attention from others. If stereotypy is maintained by social contingencies, functional communication training could be adopted. Studies have shown that functional communication training, developed from the results of functional analyses could be effectively to teach student with developmental disabilities the functional equivalent to substitute and reduce aberrant stereotypy (e.g., Frea & Hughes, 1997). Another alternative way to reduce stereotypy maintained by social attention could be used non contingent

reinforcement (Lancaster, LeBlanc, Carr, Brenske, Peet, & Culver, 2004). Lancaster et al. (2004) studied four adults with mental retardation emitted stereotypy via functional analysis and found that two out of them exhibited stereotypy to gain attention from others. Further implementation of noncontingent reinforcement to participants showed that such reinforcement strategies may successfully eliminate this aberrant stereotypy.

Although stereotypic behavior could be maintained by either sensory or social reinforcement as mentioned above, no definite conclusions of functions can apply to all students with developmental disabilities who displayed stereotypy. This suggests that the functions of stereotypy might be multiple and even be complex in some individuals with developmental disabilities (Kennedy, Meyer, Knowles, & Shukla, 2000; Sprague, Holland, & Thomas, 1997). One single source could not be explained for all occurred functions of stereotypy. In sum, stereotypic behavior could be exhibited to maintain sensory or social consequences, respectively, in some students with developmental disabilities, but for other students, such aberrant behavior might be emitted to maintain multiple reinforcements.

Purpose of the Study

The first purpose of this study was to examine possible functions of one student's stereotypic saliva-play maintained mainly by positive and/or negative social reinforcement, and/or sensory reinforcement. Analogue functional analyses were used in Experiment 1 to detect such stereotypy which served as escape from task demand, obtaining attention from the investigator, and producing self-stimulation.

Second, if the functions for the student's stereotypic saliva-play were maintained by sensory consequences, this study would seek to further identify specific sensory reinforcers that maintain this stereotypy. To conduct experimental analyses of possible visual, auditory, or tactile sensory consequences that might maintain this stereotypy, functional analyses in Experiment 2 were used to mask the possible sensory consequences causing stereotypy.

Third, if specific sensory consequence maintained stereotypy could be marked to demonstrate its effect on stereotypy, this study would seek to detect possible preference objects that might compete with specific sensory consequences maintaining stereotypy. A

reversal design with a multi-element component was used in Experiment 3 to demonstrate the effect of favorite items.

According to these purposes, there were several hypotheses in this study:

Hypotheses of the Study

1. In Experiment 1, the functions of this autistic student's stereotypic saliva-play may be maintained either by sensory reinforcement, positive social reinforcement, or negative social reinforcement.
2. If the autistic student's stereotypy was maintained by sensory reinforcement as conducted in Experiment 1, it could be reduced by masking either visual, auditory, or tactile consequences in Experiment 2.
3. Preference objects developed from the results of prior functional analysis and preferred item assessment may be successfully used in Experiment 3 to decrease the frequency of the autistic student's stereotypy.

General Method

The current study used single subject methodologies to investigate one child who exhibited lots of stereotypical responses. Functional analyses were employed to examine possible contingencies which might maintain this student's stereotypy.

Student and Settings

Helen was enrolled in a special school which included one teacher and one teacher assistant in each class. She was selected because of her high levels of stereotypic saliva-play that were exhibited throughout the day. She was a 17-year-old girl who has been diagnosed with autism. She could walk and go to restroom independently. Helen rarely depended on others for her care. She could speak single words and follow simple two-step direction. She often displayed high rates of stereotypy in her classroom.

Measures

The dependent variables were saliva-play behaviors. The stereotypical saliva-play was defined as " the expulsion of saliva from her mouth and subsequent manipulation with either her palm or finger(s) in touch with her chin/lips". The investigator videotaped each condition using a videocassette recorder and a stopwatch. Two observers recorded the frequency of stereotypical responses by employing a 20-s partial interval sampling method. All data were converted to percentage of 20-s intervals during which stereotypical behavior occurred.

Interobserver Agreement

Before conducting the functional analysis, two graduate students in special education were trained for 5 hr to use the observational system and reached a 90% agreement criterion, and then served as observers for all sessions. These two observers recorded data independently and compared with data sheet simultaneously. Across experiments an average of 27% sessions (range, 20% to 33%) was scored for interobserver agreement. An agreement was computed using an interval-by-interval agreement method to assess percentage agreement for the frequency of stereotypical behaviors (Kazdin, 1982). Interobserver agreement was computed by dividing the number of agreements by the number of agreements plus the number of disagreements and multiplying by 100%. The interobserver agreement for Helen's stereotypic saliva-play behavior is 91% (87% to 100%) in Experiment 1, 95% (93% to 100%) in Experiment 2, 89% (80% to 100%) in Experiment 3.

Experiment 1: Analogue Functional Analysis

Method

Procedure

Before functional analysis was conducted, Helen was observed in classrooms to analyze possible antecedent and consequence events. She was observed 6 hr across activities for several days.

A multielement design (Sidman, 1960) was used to assess the occurrence of stereotypical saliva-play across four conditions: (a) attention, (b) demand, (c) alone, and (d) play (Iwata, Dorsey, Slifer, Bauman, & Richman, 1994). Each condition was presented once per day for 5 min with a random sequence occurring each day. Sessions were conducted at

the same time each day. All sessions were videotaped by a graduate student and recorded by two graduate students using data sheets. The graduate student positioned video camera facing the student from approximately 2 m, repositioning it if the participant moved. These conditions were used to identify possible operant functions that the saliva-play might serve. During the Attention condition, Helen was seated beside the investigator. When seated the investigator read a magazine, while the subject was provided with toys. If stereotypic saliva-play behavior occurred, the investigator provided 5 s of social comments to her, telling her not to engage in such stereotypical responses, and provided physical contact. After the 5 s of social comments elapse, the next occurrence of stereotypical saliva-play occasions a similar consequence. All other responses exhibited by Helen were ignored. During the Demand condition, the investigator sat beside Helen and delivered a verbal demand every 10 s (e.g., "Put the blocks in the box"). Correct responses were immediately praised and incorrect or no responses resulted in a partial physical prompt after 10 s elapsed. Any occurrence of saliva-play responses resulted in 30 s cessation of task demands. During the Alone condition, Helen was seated on a chair in the room. No social interaction or activities occurred during this condition. During the Play condition, Helen was seated beside the investigator. Helen was provided with various toys identified by the teachers as being preferred and was praised every 30 s in the absence of saliva-play stereotypy (occurrences of stereotypical responses were ignored).

Results

Figure 1 displays the results of the functional analysis for Helen’s stereotypic saliva-play responses. Throughout 36 sessions Helen exhibited high levels of stereotypy in the Alone and Attention conditions, and low levels of such aberrant behavior in the Play and Demand conditions. For all of the sessions a mean of 48% (range, 13% to 80%) of intervals contained stereotypy in the Alone condition, a mean of 14% (range, 0% to 33%) of intervals contained stereotypy in the Play condition, a mean of 7% (range, 0% to 13%) of intervals contained stereotypy in the Demand condition, and a mean of 33% (range, 13% to 60%) of intervals contained stereotypy in the Attention condition. The results showed that her function of stereotypic saliva-play might be maintained by sensory and positive social reinforcement. Therefore, Experimental 2 was further conducted in order to examine the

sensory properties of Helen's stereotypic saliva-play.

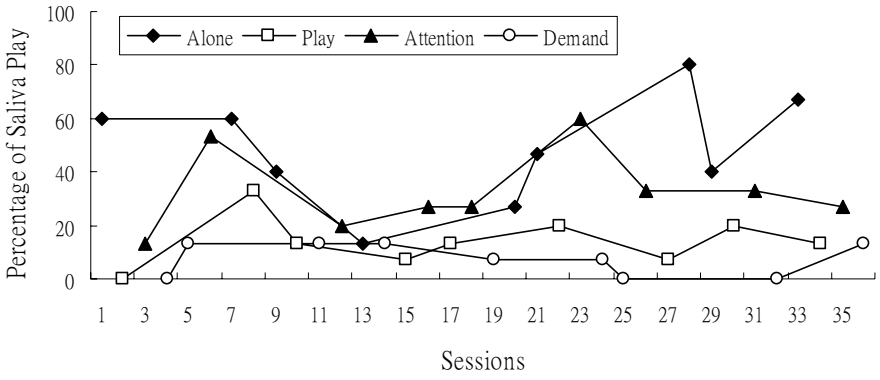

Figure 1. Helen's percentage of intervals engaged in saliva-play in analogue functional analysis

Experiment 2: Analysis of Sensory Modalities

Method

The second study further analyzed high levels of saliva-play behaviors occurring in the Alone condition identified in Experiment 1 to assess possible sensory functions that caused these behaviors. The same definitions of stereotypical responses, measures, settings, and interobserver agreement in Experiment 1 were conducted through this study.

Procedure

Experiment 2 used functional analyses to assess the possible sensory consequences of stereotypic saliva-play for this student. A multielement design was used to assess the occurrence of stereotypy across four conditions: (a) Alone, (b) Auditory masking, (c) Tactile masking, and (d) Visual masking conditions. If the lowest levels of stereotypy occurred in the auditory masking condition, this would suggest that Helen's stereotypy could be maintained by auditory stimulation. In contrast, if the lowest levels of stereotypy occurred in

the visual masking condition, this would suggest that Helen's stereotypy could be maintained by visual stimulation. Similarly, if the lowest levels of stereotypy occurred in the tactile masking condition, this would suggest that Helen's stereotypy could be maintained by tactile stimulation. Besides, the alone condition without any masking was used as a control condition. During the Visual masking condition, the investigator and the target student were seated next to each other. One pair of plastic safety goggles was used to mask the visual effects for Helen. The goggles surrounded her eyes approximately two cm away from the top, bottom, and sides of her eyes, with the front shield approximately two cm from her face. The goggles were held in place by an elastic band that wrapped around the back of Helen's head and attached at the sides of the goggles. During the Auditory masking condition, Helen was seated alone on the chair. A pair of plastic safety earplugs was put in her ears to mask possible auditory consequences produced by stereotypy. The earplugs are circular cones with a diameter of 0.6 cm and 1.5 cm in length. During the Tactile masking condition, a pair of gloves was used for her to cover tactile effects possibly produced by her stereotypy. During the Alone condition, Helen sat on a chair and received no social interaction or activities. Each condition was presented once per day for five minutes with a random sequence occurring each day. Sessions were conducted at the same time each day.

Results

Figure 2 displays the results for Helen's analysis of sensory modalities.

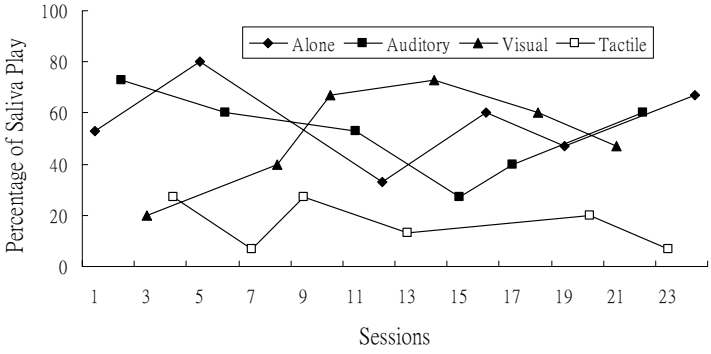

Figure 2. Helen's percentage of intervals engaged in saliva-play in analysis of sensory modalities

Throughout 24 sessions Helen exhibited a high frequency of stereotypy within the Alone, Auditory, and Visual masking conditions, but a lower frequency of stereotypy in the Tactile masking condition. The results suggest that tactile stimulation is functioning as reinforcer for Helen. Through repetitive touch between her fingers and saliva around her mouth, Helen might gain sensory consequences, especially tactile stimulation by herself. It could be that she no longer obtained tactile stimulation through finger-mouth response during tactile masking conditions. For all of the sessions a mean of 57% (range, 33% to 80%) of intervals contained stereotypy in the Alone condition, a mean of 52% (range, 27% to 73%) of intervals contained stereotypy in the Auditory masking condition, a mean of 51% (range, 20% to 73%) of intervals contained stereotypy in the Visual masking condition, and a mean of 17% (range, 7% to 27%) of intervals contained stereotypy in the Tactile masking condition.

Experiment 3: The Effect of Object Preferences on Saliva Play

Method

This experiment examined competing sensory stimulation as a means to decrease stereotypy and to further test the sensory consequences identified in Experiment 2.

Procedure

Assessing Preference

Object preference ratings were determined by presenting five different kinds of objects or items in a horizon row. No instructions were given; the experimenter waited for the student to choose an object or item. The preference sessions began by seating the student with items in front of her. Five preassessment sessions were conducted. The student had free access to the stimuli for 30 min each session. Stimuli for the student were chosen according to the results of experimental 2. All stimuli in Helen's preference assessment consisted of tactile objects or items. Preference was assessed using a multiple-stimulus without

replacement (MSWO) procedure (DeLeon & Iwata, 1996). The experimenter presented 5 items to the student in a linear array. The student was permitted to choose one stimulus item from the array. After a particular stimulus was chosen, he had 10s access to the item, after which time the trials resumed. This procedure continued until all items were chosen, or until no choice was made. This procedure was repeated 3 times. Preference was determined as the percentage of times an item was selected. The most preferred stimulus was used during the treatment evaluation phase.

Treatment evaluation

A multiple baseline design across operant functions was used to evaluate the effects of prefer items and noncontingent reinforcement on Helen's stereotypic saliva- play behavior.

Baseline. Possible operant functions identified in Experimental 1 and 2 were incorporated into the baseline. The two conditions were Alone and Attention and were employed to assess the possibility that sensory and positive social reinforcement was related to Helen's saliva-play. The procedure of Alone and Attention sessions in baseline were the same as those conducted in analogue functional analysis in Experiment 1. The student was exposed to baseline condition until her data were stable.

Intervention. A noncontingent reinforcement and extinction was then implemented to intervene in Attention conditions. The investigator ignored Helen's repetitive saliva-play and gave her 5 s comments (e.g., praise) regarding her absence of saliva-play every 20 s. In contrast, the most-preferred stimulus (a power tooth bush) from the preference assessments was conducted for 5 min in Alone conditions.

Each condition was presented once per day for 5 min occurring each day. Sessions were conducted at the same time each day. The procedures of videotaped and recorded process were the same as those conducted in analogue functional analysis in Experiment 1.

Results

Figure 3 displays the results for Helen's analysis of treatment evaluation data. During the Alone condition, Helen's mean percentage of saliva-play responses occurring in the baseline was 62% (range, 53% to 73%). After 4 sessions of presenting the most preferred object (a power tooth bush) in this Alone condition, her playing saliva behavior was reduced to a mean percentage of 23% (range, 13% to 33%) with a decreasing mean and trend.

Therefore, noncontingent positive comments were started to implement in the Attention condition. In sum, after 12 sessions of intervention in the Alone condition, the mean percentage of her stereotypic saliva-play was reduced to 12% (range, 0% to 33%). In contrast, during the Attention condition, Helen's mean percentage of saliva-play responses occurring in the baseline was 42% (range, 27% to 60%). After 8 sessions of delivery noncontingent positive reinforcement, her playing saliva behavior was reduced to a mean percentage of 15% (range, 7% to 27%).

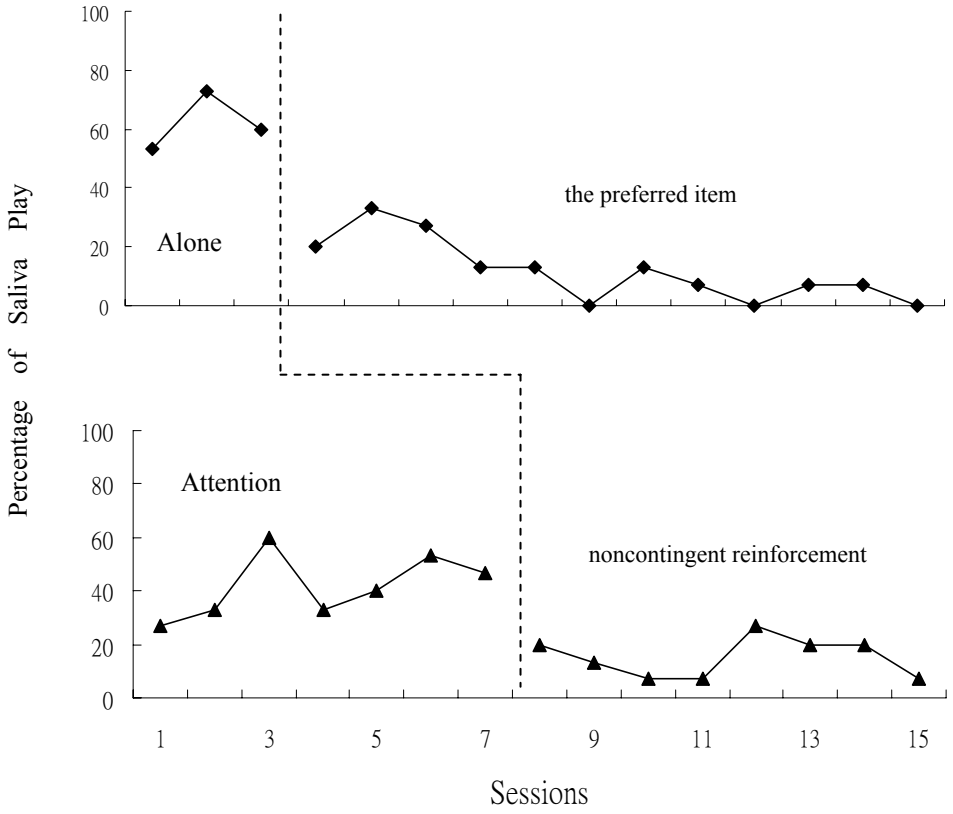

Figure 3. Helen's percentage of intervals engaged in saliva-play during analysis using concurrent operant conditions

Discussion

Results of the current study indicated that multiple sources of reinforcers contribute to Helen's stereotypic saliva-play. One source came from sensory reinforcement which served to maintain Helen's saliva-play behavior. Specifically, the sensory functions of her stereotypic saliva-play might be maintained by tactile stimulation. In Experiment 1, Helen's high levels of stereotypic saliva-play occurred merely in the Alone and Attention conditions, suggesting that multiple reinforcements could be the factors contributed to this aberrant behavior. Such findings were consistent with prior studies which have demonstrated that high levels of stereotypical behavior occurring across several conditions could relate to multiple reinforcers (Kennedy et al., 2000; Sprague et al., 1997). The results of these studies suggest that stereotypic behavior functions to obtain social and sensory reinforcers. However, specific sources of sensory consequences of these functions have never been found by these studies. Thus, to evaluate specific sensory consequences is needed before conducting effective interventions.

With regard to interventions for stereotypy, reductions of repetitive saliva-play responses were seen during noncontingent delivery of positive comments in Attention condition. This finding was consistent with a previous study which indicated that social attention was the main factor contributed to occurrence of stereotypy, and provision of noncontingent attention to adults with developmental disabilities could effectively reduce such aberrant behavior (Lancaster et al., 2004). Further similar perspectives came from the study conducted by Goh et al. (1995) who demonstrated that noncontingent reinforcement can effectively decrease the levels of stereotypy maintained by social attention in one person with mental retardation.

In contrast, as for the effectiveness of participant's treatment in Alone condition, decreases of stereotypy were also seen with the favorite stimulus. However, little is known whether appearance of such a preferred item acted as an alternative sensory stimulation or an incompatible response for Helen's saliva-play behavior. The data from the analogue functional analysis in Experiment 1 revealed that one of the functions of Helen's saliva-play could be maintained by sensory reinforcement. Additionally, the preferred object was assessed and intervened in Experiment 3. Providing preference objects may be incompatible

to occurrence of saliva-play only when the subject was trained to select and manipulate objects and obtained reinforcement later. However, in this case, Helen had free choice to decide to manipulate with the preferred item or continuously engaged in her stereotypic saliva-play. It is unlikely for her to play with a preferred object in order to compete with engaging saliva-play behavior by herself. On the contrary, she might obtain the sensory reinforcement from manipulation of objects to substitute those consequences derive from engaging in saliva-play responses.

Moreover, specific sensory consequences were detected in this study as conducted in Experiment 2 and showed that finger/hand stimulation was one source to execute its impact on Helen's saliva-play behavior. The results of this current study supported a past study (Goh et al., 1995) which has shown that hand stimulation contributed to occurrence of stereotypic behavior because most of preferred toys picked up by subjects in their study were used for hand manipulation and stimulation. On the other hand, it is uncertain whether chin/lips stimulation was strongly influencing Helen's saliva-play behavior as well. Despite of better masking effects in finger/hand stimulation than those in chin/lips stimulation as demonstrated in Experiment 2, the preferred object (power tooth brush) provided in this study could be used for finger/hand stimulation or chin/lips stimulation for Helen at times. Therefore, it is still difficult to determine exact sources of stimulation for Helen's saliva-play behavior. More researches conducted to demonstrate the mechanism under sensory reinforcement are needed.

References

Applegate, H., Matson, J. L., & Cherry, K. E. (1999). An evaluation of functional variables affecting severe problem behaviors in adults with mental retardation by using the Questions about Behavioral Function Scale. *Research in Developmental Disabilities, 20*(3), 229-237.

Berkson, G., Mor, N. R., & Tarnovsky, S. (1999). Body-rocking and other habits of college students and persons with mental retardation. *American Journal on Mental Retardation, 104*(2), 107-116.

DeLeon, I. G., & Iwata, B. A. (1996). Evaluation of a multiple-stimulus presentation format forassessing reinforcer preferences. *Journal of Applied Behavior Analysis, 29,* 519-533.

Durand, V. M., & Carr, E. G. (1987). Social influences on self-stimulatory behavior: Analysis and treatment application. *Journal of Applied Behavior Analysis, 20,* 119-132.

Durand, V. M. & Merges, E. (2001). Functional communication training: A contemporary behavior analytic intervention for problem behavior. *Focus on Autism and Other Developmental Disabilities, 16*(2), 110-120.

Epstein, L. J., Taubman, M. T., & Lovaas, I. (1985). Changes in self-stimulatory behaviors with treatment. *Journal of Abnormal Child Psychology, 13,* 281-294.

Foxx, R. M., & Azrin, N. H. (1973). The elimination of autistic self-stimulatory behavior by overcorrection. *Journal of Applied Behavior Analysis, 6,* 1-14.

Frea, W. D., & Hughes, C. (1997). Functional analysis and treatment of social communication behavior of adolescents with developmental disabilities. *Journal of Applied Behavior Analysis, 30,* 701-704.

Goh H. L., Iwata, B. A., Shore, B. A., DeLeon, I. G., Lerman, D. C., Ulrich, S. M., et al. (1995). An analysis of the reinforcing properties of hand mouthing. *Journal of Applied Behavior Analysis, 28,* 269-283.

Greer, R. D., Becker, J. B., Saxe, C. D., & Mirabella, R. F. (1985). Conditioning histories and setting stimuli controlling engagement in stereotypy or toy play. *Analysis and Intervention in Developmental Disabilities, 5,* 269-284.

Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis, 27,* 197-209. (Reprinted from *Analysis and Intervention in Developmental Disabilities, 2,* 3-20, 1982)

Iwata, B. A., Pace, G. M., Dorsey, M. F., Zarcone, J. R., Vollmer, T. R., Smith, R. G., et al. (1994). The functions of self-injurious behavior: An experimental- epidemiological analysis. *Journal of Applied Behavior Analysis, 27,* 215-240.

Kazdin, A. E. (1982). *Single-case research designs*. New York: Oxford University Press.

Kennedy, C. H., Meyer, K. A., Knowles, T., & Shukla, S. (2000). Analyzing the multiple functions of stereotypical behavior for students with autism: Implications for assessment and treatment. *Journal of Applied Behavior Analysis, 33,* 559-571.

LaGrow, S. J., & Repp, A. C. (1984). Stereotypic responding: A review of intervention

research. *American Journal of Mental Deficiency, 88,* 595-609.

Lancaster, B. M., LeBlanc, L. A., Carr, J. E., Brenske, S., Peet, M. M., & Culver, S. J. (2004). Functional analysis and treatment of the bizarre speech of dually diagnosed adults. *Journal of Applied Behavior Analysis, 37,* 395-399.

Lewis, M. H., & Baumeister, A. A. (1982). Stereotyped mannerisms in mentally retarded persons: Animal models and theoretical analyses. In N. R. Ellis (Ed.), *International review of research in mental retardation* (pp.123-161). New York: Academic Press.

Lovaas, I., Newsom, C., & Hickman, C. (1987). Self-stimulatory behavior and perceptual reinforcement. *Journal of Applied Behavior Analysis, 20,* 45-68.

Mace, F. C., & Belfiore, P. (1990). Behavioral momentum in the treatment of escape-motivated stereotypy. *Journal of Applied Behavior Analysis, 23,* 507-514.

Mason, S. A., & Iwata, B. A. (1990). Artifactual effects of sensory-integrative therapy on self-injurious behavior. *Journal of Applied Behavior Analysis, 23,* 361-370.

Mason, S. A., & Newsom, C. D. (1990). The application of sensory change to reduce stereotyped behavior. *Research in Developmental Disabilities, 11,* 257-271.

McEntee, J. E., & Saunders, R. R. (1997). A response-restriction analysis of stereotypy in adolescents with mental retardation: Implication for applied behavior analysis. *Journal of Applied Behavior Analysis, 30,* 485-506.

Piazza, C. C., Adelinis, J. D., Hanley, G. P., Goh, H-L. & Delia, M. D. (2000). An evaluation of the effects of matched stimuli on behaviors maintained by automatic reinforcement. *Journal of Applied Behavior Analysis, 33,* 13-27.

Rincover, A. (1978). Sensory extinction: A procedure for eliminating self-stimulatory behavior in developmentally disabled children. *Journal of Abnormal Child Psychology, 6,* 299-310.

Runco, M. A., Charlop, M. H., & Schreibman, L. (1986). The occurrence of autistic children's self-stimulation as a function of familiar versus unfamiliar stimulus conditions. *Journal of Autism and Developmental Disorders, 16*(1), 31-44.

Schultz, T. M., & Berkson, G. (1995). Definition of abnormal focused affections and exploration of their relation to abnormal stereotyped behaviors. *American Journal on Mental Retardation, 99*(4), 376-390.

Sidman, M. (1960). *Tactics of scientific research.* New York: Basic Books.

Smith, E. A., & Houten, R. V. (1996). A comparison of the characteristics of self-stimulatory behaviors in normal children and children with developmental delays. *Research in Developmental Disabilities, 17,* 253-268.

Sprague, J., Holland, K., & Thomas, K. (1997). The effect of noncontingent sensory reinforcement, contingent sensory reinforcement, and response interruption on stereotypical and self-injurious behavior. *Research in Developmental Disabilities*, *18*, 61-77.

Sturmey, P., Carlsen, A., Crisp, A. G., & Newton, J. T. (1988). A functional analysis of multiple aberrant responses: A refinement and extension of Iwata et al.'s (1982) methodology. *Journal of Mental Deficiency Research, 32,* 31-46.

Wehmeyer, M. L., Bourland, G., & Ingram, D. (1993). An analogue assessment of hand stereotypies in two cases of Rett syndrome. *Journal of Intellectual Disabilities Research, 37,* 95-102.

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Functional Analysis and Treatment of Stereotypic Saliva-play in One Adolescent with Autism

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Abstract

The current study included three experiments that functionally analyzed one autistic student's stereotypic saliva-play. An analogue functional analysis was used in Experiment 1 to detect the function of the student's saliva-playing stereotype which might serve to escape from task demands, obtain attention from others, or produce sensory self-stimulation. An analysis of sensory modalities was conducted in Experiment 2 to further analyze the possible sensory consequences causing the student's saliva-play behavior. A multiple baseline design across operant functions was used to evaluate the effects of prefer items and noncontingent reinforcement on the student's stereotypic saliva-play behavior. Results of the current study demonstrated multiple reinforcements were a determinant of stereotype in this student. The specific functions of this student's stereotypic saliva-play might be maintained by tactile stimulation and social attention. The most preferred object or noncontingent reinforcement may successfully reduce this student's saliva-play behavior.

Key words: preferred object, stereotypic, saliva-play, functional analysis, non contingent reinforcement.