

# การประยุกต์ใช้การเสริมแรงแบบตีอาร์กับเด็กวัยรุ่น ที่มีความบกพร่องทางสติปัญญา: กรณีศึกษาจากประเทศไทย

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## บทคัดย่อ

กรณีศึกษาในครั้งนี้ได้ประยุกต์ใช้เทคนิคการเสริมแรงแบบตีอาร์ในการลดความถี่ของการพูดคำหยาบคายของเด็กวัยรุ่นที่มีความบกพร่องทางสติปัญญา โดยใช้แบบการวิจัย ABABC ผลการวิจัย พบว่า กรณีศึกษาพูดคำหยาบลดลงและไม่พูดคำหยาบอีกเลย ในที่สุดเมื่อดำเนินการเชื่อมโยงการเสริมแรงแบบตีอาร์เข้ากับการแลกเปลี่ยนตอบสนอง

## **The Application of Differential Reinforcement with an Adolescent with Cognitive Impairment: A Case Study from Thailand**

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### **ABSTRACT**

*The present case study applies differential reinforcement techniques in the reduction of the frequency of spoken profanity in a cognitively impaired Thai adolescent. Following an ABABC design, the finds that inappropriate vocalizations decreased dramatically and were eventually extinguished when differential reinforcement was paired with a response cost.*

## Introduction

The implementation of special education in Thailand began in 1951 with the development of programs for the deaf. Since then, the field and discipline of special education has grown exponentially. No doubt contributing to the heightened awareness of individuals with disabilities was the revelation that members of the Royal Family had obvious cognitive impairments. In 1991, the government took the giant step of surveying the entire population with the expressed intent of identifying the prevalence of children with disabilities. This national census revealed that an estimated 1,057,000 individuals with disabilities (approximately 2% of the total population), the majority of whom reside in the northern regions of the country. In 1995, the network and infrastructure of special education programs had reached a threshold, warranting the *Education for All Act*, which proposed that no child should be discriminated from attending school because of physical, mental, social, or economic reasons. Advances in special education legislation have continued, and in 1999 the Ministry of Education mandated a movement toward the inclusion of students with disabilities in regular education programs (i.e., *Towards the New Century of Learning*).

Despite these remarkable achievements, approximately 7.9% of children from 6 to 14 years of age and 48.7% of those from 15 to 21 years of age have no formal schooling. Chitchupong (2004) cites a lack of financial resources, entering the labor force to provide additional income for the family, and chronic sickness or disability as the contributing factors for the lack of school attendance. Additionally, more than 85% of children with disabilities are from families considered at or below the poverty level (less than \$2,500 US annually) and/or from families with little or no formal education. An obvious reason for the lack of educational opportunities for children with disabilities is that while the majority of children with exceptionalities reside in the countryside, the schools best equipped to deal with special needs (e.g., assistive technology, transportation, and trained personnel) are located in Thailand's metropolitan areas. Often, the parents of a child with special needs perceive that the limited educative resources are best invested in children without delays and disabilities. Without easy access to early intervention programs, parents often postpone sending their child with disabilities to school, if at all. Essentially, the

government's well-intentioned mandates and policies are overshadowed by the economic realities of poverty. In consequence, the needs of many individuals with disabilities must be met by family members rather than educators with formal specialized training. Accordingly, an essential aspect of support for children and adolescents with disabilities is whether parents and caregivers can successfully apply behavioral intervention techniques in naturalistic nonclinical contexts.

The present case study features the implementation of differential reinforcement techniques by a family member of a Thai adolescent male identified as having moderate cognitive impairment. The objectives of the study are twofold. The primary objective is to diminish and reduce inappropriate verbalizations. A secondary objective is to determine whether behavioral interventions can be successfully implemented by family members with little or no formal training.

## **Method**

### ***Participant***

Kongsak is a 16 year old male who lives with his sister in a small resort village approximately 150 km south of Bangkok. Kongsak and his sister relocated to this area two years ago from the Northeast region of Thailand, one of the more impoverished areas in the country. Like many Thais, Kongsak and his sister send a significant portion of their monthly salaries home to their parents. Kongsak is able to care for himself with minimal supervision, performing most self-care and daily living skills independently. Kongsak's language skills are well developed, but typical of a child somewhat younger. While never formally diagnosed, Kongsak possesses many of the characteristics typical of individuals with mental retardation, specifically, (a) small stature in relation to his same age peers; (b), facial abnormalities (e.g., small eye openings); (c) poor motor coordination; (d) hyperactivity; (e) speech and language delays; and (f) poor reasoning and judgment. An intellectual assessment with the Universal Nonverbal Intelligence Test (Bracken & McCallum, 1998) estimated Kongsak's Full Scale IQ at 59 (1st percentile). Among those children in Thailand with special needs, 105,700 (approximately 10%) reportedly demonstrate cognitive impairments (Amatyakul, Tammasaeng, & Punong-ong, 1995). According to

Kongsak's sister, he attended school for approximately one year, at the age of 7 years. She states that Kongsak was frustrated and often cried at school. Additionally, she reports that Kongsak's frustration manifested itself as occasional aggression and disruptive episodes that were characterized by yelling, property destruction, and negative comments directed toward caregivers. After one year of schooling, Kongsak's parents allowed him to stay home. His sister reports that Kongsak is in good health, and he has never needed the care of a physician.

Kongsak and his sister work as food vendors on the beach, with the majority of customers being foreigners on vacation. As such, Kongsak has acquired a small vocabulary in English that is primarily composed of greetings and, unfortunately, slang obscenities. Kongsak's sister finds these verbalizations highly inappropriate and socially stigmatizing. Although Kongsak is often reinforced by his foreign customers (i.e., surprised facial reactions & laughter), his sister reports that she is "embarrassed" and "worries that Kongsak will get hurt" if he is confronted by an offended customer. Most important, Kongsak's verbalizations endanger his employment and only means of support.

### ***Behavior and Measurement.***

The verbalizations targeted for change were defined as any statement (single word, phrase, and sentence) about bodily functions, sexual conduct and behavior, and physique. For example, thinking he was attracting customers, Kongsak frequently made comments loudly to passing tourists that he/she was "sexy" and "compliment" them on an aspect of their physique by using slang terms acquired from listening to the comments of tourists. These verbalizations were clearly audible to anyone in the vicinity and occasionally drew complaints from customers, as well as verbal warnings from neighboring vendors. When confronted, Kongsak would become agitated and leave his work station to go home.

The frequency of verbalizations that included the topic of sex was recorded each weekday by Kongsak's sister at work. Tracking and recording was performed by making a tally on a recording form. During the baseline phase of the study, Kongsak was not aware of the recording procedure. Under the intervention conditions, Kongsak's sister

tallied the verbalizations in his presence in order to implement the consequences that were associated with the treatment strategies.

### ***Interobserver Agreement.***

Interobserver agreement checks were conducted during 25% of the 14 days comprising the implementation of the intervention and were distributed proportionately throughout all phases (i.e., every three days). The checks were performed by having a second individual record the frequency of inappropriate and undesired verbalizations simultaneously with the Kongsak's sister during daily periods that ranged from 1 to 4 hours. Agreement estimates were computed by dividing the smaller recorded frequency by the larger recorded frequency and multiplying by 100. On average, interobserver agreement was 98% (range 96 to 100%).

### ***Setting.***

The setting was Kongsak's work station, where Kongsak and his sister work each day. The intervention was timed to not coincide with the major holidays of New Years Day and Songkran, in which most Thais who have relocated to different parts of the country take a vacation from work and return to their home provinces.

### ***Interventions.***

The objective of the present intervention was to produce a gradual reduction in profane verbalizations through a DRL contingency (differential reinforcement of low-rate responding). As described by Deitz (1977), positive reinforcement in a DRL schedule can be delivered if the frequency of a target behavior during a fixed period is less than or equal to a prescribed limit (full session DRL) or a minimum duration separates each occurrence of the behavior (spaced responding DRL). The present study featured a full session DRL combined with response cost as methods of behavior support.

### ***Experimental Design and Procedures.***

The frequency of inappropriate verbalizations was recorded during two baseline and intervention phases in the context of an ABABC single-case evaluation design.

### ***Baseline.***

Inappropriate verbalizations were recorded in the absence of formal intervention. Typically, Kongsak's sister would issue a rebuke and verbal warning to him. Under the baseline observations, Kongsak received no correction.

### ***Intervention Formulation.***

Before a systematic method of intervention was implemented with Kongsak, observers identified antecedent and consequence conditions that appeared to be associated with his expressed profanity. This process included indirect and descriptive approaches to functional assessment consisting of direct observation, interviews with family, and review of A-B-C (antecedent-behavior-consequence) data that were collected during the baseline phase. Based on this information, a behavior hypothesis was formulated (Repp & Karsh, 1994), suggesting that Kongsak would benefit from a program that established differential consequences for the inappropriate verbalizations. This approach to intervention was implemented in the form of the DRL contingencies described below. The programmed contingencies and procedures were explained to Kongsak by his sister at the start of each intervention phase.

### ***Intervention I.***

In 2006, the government of Thailand issued a special yellow bracelet that commemorated the reign of King Rama IX. These bracelets are a limited edition and prized throughout Thailand as a symbol of patriotism and devotion to the Royal Family. Kongsak's sister noted that Kongsak had stated many times that he desired one of the bracelets. Each evening after work, Kongsak was allowed to wear this special bracelet if he had 10 or fewer profane verbalizations from the time he woke up on that day the end of his work shift (full session DRL-10). A limit of 10 verbalizations was selected because this quantity was two fewer than the daily average documented within the initial baseline phase and consequently optimized the potential for Kongsak's reinforcement in the initial implementation of the program. The frequency of verbalizations tallied on the recording form was used to monitor whether Kongsak remained below the imposed response criterion. When he made a statement that included an undesired verbalization, his sister would state,

'Kongsak, that's not acceptable. You should not say such things. You now have '(number of recorded profane verbalizations).' If Kongsak exceeded the criterion, his sister showed him the special bracelet and told him that he could not be permitted to wear it that evening, but to try again the next day.

## ***Intervention II***

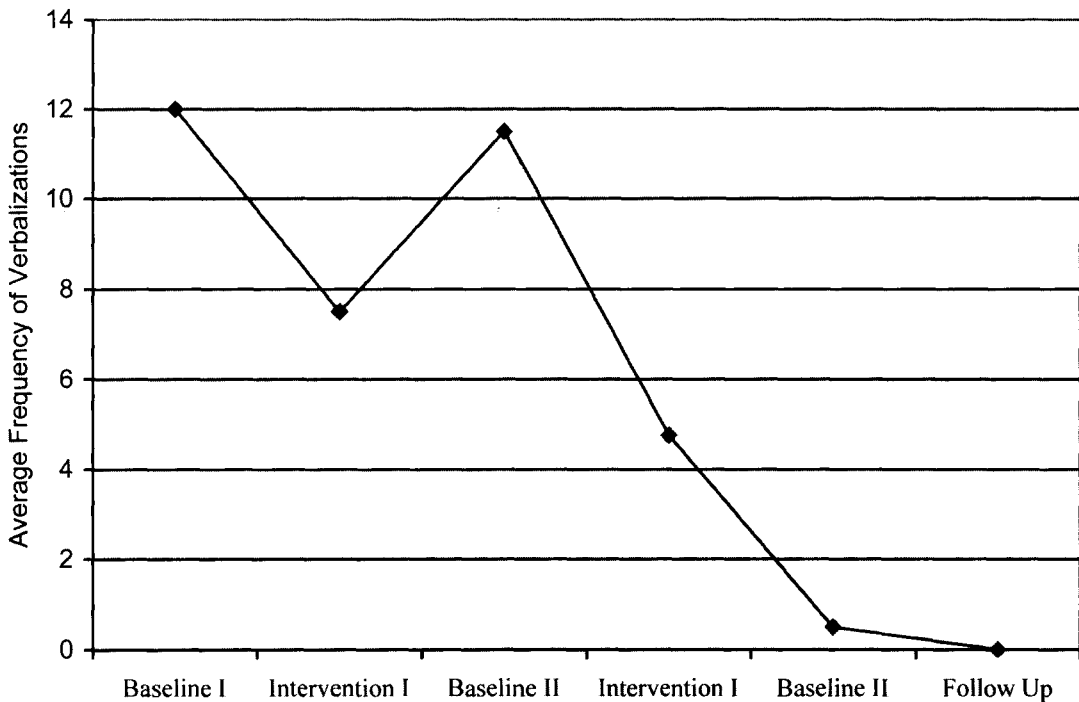
Intervention II included a DRL schedule combined with a response cost procedure. At the start of each day, Kongsak was given 10 plain rubber bands that he placed on his wrist. The number of rubber bands matched the requirements of the DRL contingency. Contingent upon the occurrence of an inappropriate verbalization, his sister requested that Kongsak forfeit one of the rubber bands. On occasion, Kongsak protested verbally that he did not wish to surrender a rubber band. In such situations, his sister continued to ask that Kongsak forfeit a rubber band until he complied accordingly. Similar to the Intervention I phase, Kongsak could 'earn' the privilege of wearing the commemorative bracelet if he had at least one rubber band in his possession at the end of the work shift. Therefore, this intervention functioned as a full session DRL-9 contingency. The objective here was to increase the likelihood that he would achieve the criterion for reinforcement, whereafter the response limit gradually would be decreased (made more stringent by reducing the number of rubber bands given in the morning).

## **Results**

Figure 1 presents the average frequency of verbalizations recorded during baseline, intervention, and follow-up phases. Baseline and Intervention phases consisted of 2 and 4 day blocks, respectively. Thus, the intervention spanned a 14 day period. During the initial baseline phase, an average of 12 inappropriate verbalizations was recorded each day. With the introduction of the intervention phase, response frequency decreased to an average of 7.5 verbalizations daily. After 4 days, the reinforcement (special bracelet) was withdrawn and Baseline II data collected. These data reveal that in the absence of reinforcement, Kongsak's inappropriate verbalizations recovered to the previous level (an average of 11.5 behaviors), with a spike of 14 inappropriate behaviors on the first day. Therefore, we concluded that the initial reduction of verbalizations was causally related to



the reinforcement value of the bracelet. On the first day of reintroduction of the Intervention I phase, Kongsak exhibited 3 incidents of inappropriate verbalizations. There was a slight increase in responding for two days, followed by a decrease to zero responses for the last day of the second intervention phase. Overall, the average frequency of verbalizations during reintroduction of Intervention I was 4.75 daily occurrences. With the introduction of Intervention II, verbalizations dropped to 0 on the first day. The second day of Intervention II found an absolute frequency of 2 verbalizations. The remainder of the Intervention II phase saw no verbalizations. Likewise, during the 14 days immediately following the study, inappropriate verbalizations did not occur. Kongsak was permitted to wear the special bracelet permanently at the end of the intervention. Although data were not collected in other settings, Kongsak's sister reported that inappropriate verbalizations were extinguished across all work and nonwork settings.



**Figure 1** Average Frequency of Inappropriate Verbalizations for Baseline (2 Days), Intervention (4 Days), and Follow-Up (14 Days) Phases.

## **Discussion**

Inappropriate and obscene verbalizations of a Thai adolescent with mental retardation were reduced and eventually eliminated when he was exposed to systematic behavioral intervention. Specific behaviors were targeted as the focus of intervention because they were noticeably stigmatizing, detrimental to his social adjustment, and impacted his ability to earn a livelihood. The positive outcome resulted in better acceptance by Kongsak's peers and more positive community experiences.

The results of the study indicated that although contingent access to a preferred stimulus was programmed as reinforcement during both intervention phases, different outcomes were achieved. Each Intervention included a full session DRL contingency that featured comparable criteria (10-response and 10-response limits) but differed in the method of implementation. Specifically, in reducing the frequency of socially inappropriate verbalizations, a response cost procedure (i.e., the forfeiture of a token rubber band) was more effective than differential positive reinforcement. The basic implication from this finding is that some individuals may be more motivated to express desired behaviors, or conversely, reduce the expression of inappropriate behaviors, by the avoidance of negative consequences (e.g., loss of a token rubber band) rather than the presentation of positive reinforcement.

In accounting for the superiority of the response cost procedure, providing Kongsak with tangible items such as token rubber bands and allowing him to keep this supply on his person may have served as a discriminative stimulus. In contrast to verbal reminders and corrections issued by Kongsak's sister, the presence of the rubber bands on Kongsak's wrist may have functioned as a more salient and ubiquitous cue that helped him discriminate progress toward the ultimate desired activity (i.e., wearing the special bracelet). It also is possible that possession of the rubber bands, independent of their exchange for the back-up reinforcer, was sufficiently motivating for Kongsak. In effect, maintaining the supply of rubber bands presented to him at the start of each day may have independently acquired conditioned reinforcement properties. Additionally, Kongsak's sister reported that his inappropriate verbalizations were eliminated entirely, regardless of setting. Thus, the

possession of the discriminative stimuli (i.e., rubber bands) in other settings appears to have promoted generalization to nonwork settings.

Research indicates that a critical component of a full session DRL schedule is the setting of response criteria to gain reinforcement, initially by establishing a limit that ensures success, and then gradually increasing the contingency requirements (Deitz, Repp, & Deitz, 1976). In the present study, Kongsak remained consistently below the criteria, with inappropriate verbalizations eventually being eliminated entirely. For this reason, there was no need to adjust the criteria downward in an attempt to produce a gradual decrease in responding. For both interventions, the average frequency of profanity that occurred during the second phase of Intervention I and the initial Intervention II phase was lower than the level recorded when Intervention I was implemented originally. It is possible that these outcomes were due to a carryover effect from the introduction of Intervention I. An alternative explanation of these findings may be that the notable decrease in responding may be attributed to the verbal instructions of Intervention II serving as a form of rule-governed mediation (Paniagua, 1998).

Although the clinical effects from intervention were noteworthy, some design limitations warrant discussion. First, notwithstanding the documented effectiveness of the response cost strategy, the study design could not distinguish the motivating value of the tokens (rubber bands) from the reinforcement value of the special bracelet. One way to test the reinforcement value of token rubber bands might have been to maintain the response cost procedure but to compare conditions during which the rubber bands could and could not be exchanged for the special bracelet. If Kongsak's inappropriate behaviors increased when he was not permitted to exchange the rubber bands, then it may be concluded that their value was associated only with the possibility of attaining the special bracelet. Second, use of an alternating treatments design across repeated intervention sessions (Barlow & Hayes, 1979) would have permitted a direct comparison between the two strategies. Therefore, a definitive judgment comparing the effectiveness of each strategy is not possible. As noted previously, the more potent outcome associated with the response cost procedure may have occurred simply because it followed implementation of the Intervention I phase. In each of these considerations, the spontaneous recovery of

inappropriate verbalizations when intervention was withdrawn imposed ethical considerations (i.e., loss of necessary income and continued social stigmatization) that required us to reintroduce and conduct the interventions in a timely manner.

Certainly, this study suggests that behavioral interventions can be effectively in culturally relevant naturalistic environments by nonprofessionals with little training, such as family members. These promising findings should serve as a catalyst for future research and practice in societies that do not have an established special education system.

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