功能評量與介入策略對普通班學童問題行為之分析
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摘要

以功能評量或功能分析來發覺學童問題行為的原因，進而根據所評量的結果，設計有效的介入方案是相當重要的。可惜，大多數的研究只探討功能分析在特殊教育領域的應用，卻很少用於普通教育情境去解決學童情緒困擾和行為異常的問題。本文即以六篇對普通學童問題行為進行功能分析之實證性研究為例，透過檢視其功能評量或功能分析程序的妥適性、行為功能假設發展的合理性，以及實驗介入的有效性，從方法論上逐地評鑑其優劣，最後並進一步地建議研究者初步以描述性的分析方式來篩選問題行為的可能原因，再以實驗性分析同時於類似與自然的情境中檢查問題行為的功能。

（關鍵詞：功能評量；功能分析；類似功能分析；問題行為）

An Analysis of Studies regarding Functional Analysis and Assessment-Based Intervention for Children with Disruptive Behavior in Regular Education Classroom

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ABSTRACT

It is of importance to use functional analyses to examine students' problem behaviors and to design effective intervention programs based on the results of functional outcomes. However, to date few studies employing functional analyses have been conducted in regular classroom regarding student's aberrant behaviors. The purpose of this article was to find out
reasonable procedures a researcher should employ to conduct such a study. Six empirical studies using functional analysis to deal with disruptive behaviors for typical children are examined respectively by procedures used in functional assessment, processes forming functional hypotheses, and the treatment effects. The analysis emphasizes how research uses functional analysis and the effectiveness of assessment-based intervention in each study. The limitations of current studies are discussed and implications for further research are offered.

(KEY WORDS: functional assessment; functional analysis; analogue functional analysis; disruptive behavior; problem behavior)
Functional analysis can be used to find out the operant functions of problem behavior. It usually attempts to identify the maintaining variables that control the disruptive behaviors. When these variables are identified correctly, assessment-based interventions can be devised (Durand & Carr, 1987; Repp, Felce, & Barton, 1988). The use of pretreatment functional analyses has increased the likelihood of successful treatment for problems displayed by persons with developmental disabilities (Mace, Lalli, & Lalli, 1991). There was more evidence that showed assessment-based interventions matched to the functions of problem behaviors yielded more effective results (Carr & Durand, 1985).

However, the early functional analysis research only focused on self-injury and on other maladaptive behavior occurring in institutions housing persons with developmental disabilities. Likewise, when researchers moved the functional analysis into natural environments, the subjects in studies were primarily persons with mental retardation (Day, Horner, & O’Neill, 1994; Lalli & Casey, 1996). In spite of researchers paying increasing attention to natural environments, the majority of studies manipulated variables that may still be more relevant to segregated special educational settings. Regular educational settings were rarely the environment for conducting functional analyses (Symons, McDonald, & Wehby, 1998). So far, there is still a lack of abundant evidence that functional analysis is feasible in school settings for students identified as functioning at normal levels of intelligence and having been identified as having emotional and behavior disorders (Dunlap et al., 1993). How to demonstrate the results of functional analyses in regular classroom settings rather than segregated special educational settings and applying them from students with developmental disabilities to typical students still need to be detected. Therefore, the purpose of this paper is to examine whether the procedures used in functional analysis studies are appropriate for children without disabilities in regular education settings. Second, the effectiveness and limitations of the studies are addressed. Third, implications for future research are offered.

**Criteria for Selecting Empirical Studies**

I conducted an analysis of literature to locate empirical studies that use functional analysis for typical children (functioning at normal levels of intelligence). The selection criteria were limited to studies that use functional analysis and typical children with disruptive behavior in regular classrooms and excluded children with disabilities, such as mental retardation, communication disorders, vision, and hearing impairment.

Three computer searches were conducted. The first one was from the Educational Resources Information Center (ERIC) from 1966 through 1999. The second was from PsycINFO from 1967 through 1999. Finally, Exceptional Children was researched from 1966 to 1999. Key descriptors included children, elementary, behavior problem/disruptive behavior, and functional analysis.
A manual search of the Education and Treatment of Children from 1968 through 1999 and Behavioral Disorders from 1980 to 1999 was also conducted. Six studies employed functional analyses to deal with typical children's disruptive behavior were found. Two of the studies (Lawry, Storey, & Danko, 1993; Storey, Lawry, Ashworth, Danko, & Strain, 1994) used functional assessment interviews and intervention to deal with disruptive behaviors of kindergarten children. One study (Kamps, Ellis, Mancina, Wyble, Greene, & Harvey, 1995) used functional analysis for young children with behavior problems. Two studies (Lewis & Sugai, 1996; Umbreit, 1995) used both descriptive and experimental functional analyses to improve the children's appropriate behavior. Finally, one study (Ellis & Magee, 1999) integrated functional analysis into the school assessment process for three elementary-aged boys.

Methods for Analyzing Studies

This review is organized to critically examine the studies along the procedures of functional analyses and the effectiveness of interventions. First, the procedures for the functional assessment and the effectiveness of interventions were examined in three studies (Kamps et al., 1995; Lawry et al., 1993; Storey et al., 1994). Second, the hypotheses derived from both descriptive and experimental functional analyses and the effectiveness of intervention were scrutinized in two studies (Lewis & Sugai, 1996; Umbreit, 1995). Finally, the procedures used both functional analyses in the analogue and classroom settings and the effectiveness of assessment-based intervention were examined in one study (Ellis & Magee, 1999).

The Study by Lawry et al. (1993)

Lawry et al. (1993) conducted a case study of functional analysis to assess a five-year-old child with problem behavior. First of all, the functional analysis interview was conducted with the child's teacher. Second, a direct observation and functional behavior analysis was conducted in a classroom to determine the frequency, the concurrent events, the perceived function, and the consequences of these inappropriate behaviors. A partial, 10-second interval recording system was used to record data. The results showed that the perceived functions and the most frequent consequences of problem behavior were to obtain attention from peers and get tangible items. The intervention, a reinforcement system--receiving verbal praise from peers and a happy face from his teacher, was focused on two behaviors: not making inappropriate noises and keeping hands to self. The effectiveness of intervention was assessed by an AB case study design. The results of the study showed that the child's disruptive behavior and inappropriate movement decreased. However, inappropriate noises did not change and talking out increased slightly.

The authors only used descriptive analyses to form their hypotheses about the disruptive behaviors. The perception from interview and direct observation is prone to
inaccurate and truncated information (Fisher, Piazza, Bowman, & Amari, 1996; Umbreit, 1995). Furthermore, although the functions of problem behavior were perceived as peer attention, staff attention, and obtaining tangible items, no further experimental exploration of the functions of the problem behavior is conducted. Thus, the exact functions of disruptive behaviors may not substantiate (Axelrod, 1987; Lennox & Miltenberger, 1989). As for the intervention, the investigators directly focused on both teacher and peer attention regardless of the perceived function of obtaining tangible items. Thus, they may be unable to draw definite conclusion about the effect of the intervention. On the other hand, despite trying to focus on only two behaviors, the investigators still reported eight problem behaviors to decrease due to their intervention. They did not mention how behavior changed during baseline and intervention phases. Instead they only described problem behavior by a total percentage. Thus, it is hard to understand the trend, stability, and overlap of data, and thereafter, the real effect of intervention. In addition, after intervention, the frequency of the target behaviors, such as inappropriate noises, apparently did not reduce. Therefore, the effect of intervention is dubious. Finally, this study using an AB design, at best, generated descriptive-quantitative information that allows investigators to hypothesize correctional, rather than functional relationships between the intervention and disruptive behaviors. Because experimenters did not control for potential confounding variables, such as maturation and history events, the findings cannot be said to have internal validity (Tawney & Gast, 1984). Therefore, whether the effect of treatment can be attributed to the intervention or other extraneous variables is uncertain.

The Study by Storey et al. (1994)

Storey et al. (1994) conducted a functional analysis to assess the disruptive behavior of a six-year old child in a classroom. First, a functional analysis interview was conducted with his teacher. Second, based on the interview, a functional analysis observation was conducted to determine the frequency and functions of his disruptive behaviors. Observations were made over a three-day period in his kindergarten classroom. The data were recorded the target behaviors, setting events, perceived functions, and the consequences. All sessions were 20 min long and a partial, 10-second interval recording system was used. The results showed that the perceived functions of the disruptive behaviors were obtaining attention and getting items. Finally, based on the functional assessment, a self-management program was designed to reduce the problem behaviors. An ABAB single subject withdrawal design was used to assess the effects of the intervention. An overall decrease in the occurrence of problem behaviors occurred during the intervention phases.

The investigators paid more attention to connecting the functional assessment and intervention by providing teacher attention when the subject's problem behavior is absent. However, their functional analysis was only conducted by interviews and direct
observation. These analyses, especially behavioral interviews, provide the least reliable information about controlling variables and only offer the potential for examining a wide range of variables (O’Neill, Horner, Albin, Storey, & Sprague, 1990; Sturmy, 1994). They do not allow documentation of functional relationships (Sturmy, 1994). Without experimentally manipulating the independent variable accounting for the function of disruptive behavior, the perceived functional relationships between independent variables and problem behavior are uncertain (Axelrod, 1987; Lennox & Miltenberger, 1989). As for intervention, they only used a self-management program (teacher praise and attention) to decrease all disruptive behaviors regardless of the other perceived functions, such as peer attention and getting items and activity. The authors, therefore, can only draw weak conclusions about the treatment effect. With respect to the study design to assess the treatment effect, an ABAB reversal design in this study is stronger in terms of the characteristics of the designs. With each replication of the effect (A-B), the internal validity of results was strengthened (Tawney & Gast, 1984). However, during the second baseline phase the data were only collected for two days making it hard to demonstrate the reversal effect (Tawney & Gast, 1984).

**The Study by Kamps et al. (1995)**

Different from prior two studies conducted in one single subject, Kamps et al. (1995) conducted functional analyses for ten children with disruptive behaviors, ranging in age from four to six years old. They divided the ten children into three subgroups with similar problem behaviors. Procedures of functional analyses consisted of direct observations, teacher reports, hypothesis development, consultation with teachers, and testing of specific interventions. Hypotheses regarding the function of problem behaviors included: tangible rewards for inappropriate behaviors, low interactions between teacher and children, and attention by adults for problem behaviors. Based on hypotheses, interventions consisted of improved teacher monitoring during play, teaching and promoting of social skills, and increased reinforcement schedules for performance. A simple AB or ABB design was used to assess the effect of intervention for each student. The results of the study showed that improvements in children's compliance, peer interaction, and decreasing inappropriate behaviors.

The study of Kamps et al. (1995) may offer stronger data than prior two studies, since they conducted ten case studies to provide for multiple clinical replications. In addition, intervention conditions were staggered in time across children in a way similar to a multiple probe design. However, their hypothesis was only developed with teacher reports and direct observations which may be merely viewed as a screening tool to guide more effective functional hypotheses (Lennox & Miltenberger, 1989). Despite using intervention as hypothesis testing, they did not repetitively and experimentally manipulate the independent variables to examine their influence for disruptive behavior. Thus, they might not precisely determine variables which are functionally related to the
problem behavior (Axelrod, 1987; Lennox & Miltenberger, 1989). Further sessions
needed to be done to examine and confirm the functions of disruptive behavior. As for
intervention, although reduction to deliver attention to the target child may decrease
problem behavior maintained by attention, it seems to be questionable to employ
supervision and feedback to compete equivalently with problem behavior maintained by
obtaining tangible items. On the other hand, it is worth noting that their baseline and
intervention phases did not last for a period of time long enough to demonstrate some
trends and levels. Therefore, the stability and reliability of the data are dubious (Tawney
& Gast, 1984). Again, since the investigators used AB or ABB designs to assess the
effect of intervention, the data had no chance to reverse to baseline level to replicate the
treatment effect. Thus, whether independent variables other than extraneous variables
could account for the disruptive behavior is uncertain (Tawney & Gast, 1984).
Furthermore, different cases had different degrees of problem behaviors. The same
category of aggression may differ in physical, verbal, mild, or severe aggression. Thus,
the effective intervention for one case might not be effective for another case. Similarly,
different teacher interventions were not the same in monitoring, coaching, or praising
procedures. The effects of these ten cases, therefore, could not be added up. They, at
best, could be used to describe general interpretation for disruptive behavior. There
might exist specific stimuli that control problem behavior in specific context (Horner,
1994). Therefore, specific functions of problem behavior and specific intervention or
strategy need to be reexamined.

The Study by Lewis and Sugai (1996)

Lewis and Sugai (1996) conducted a functional analysis to evaluate the problem
behaviors of a six-year old student in a first grade classroom. They used a four-step
process to develop a hypothesis about the function of the problem behaviors. First, the
teacher of the student completed a Problem Behavior Questionnaire to provide
information about a definition and the possible function of the problem behaviors.
Second, a structured interview was conducted to follow-up the information provided by
the questionnaire. Third, the authors conducted direct observations during academic
periods and two graduate students to confirm the initial hypotheses generated by the
teacher using an A-B-C functional assessment. Finally, the hypotheses were tested
through repetitive manipulation of teacher and peer attention in natural classroom
conditions. The results from the functional analysis showed that the student's off-task
behavior was maintained by peer attention. Three interventions, peer differential
reinforcement of incompatible behavior (DRI), peer DRI plus free time, and peer tutor
were tested to assess the treatment effect. Each procedure was implemented for about
one school week using an ABC/DCD design. The results indicated that the only
intervention to significantly change the student's behavior was the peer tutor
intervention.
Lewis and Sugai's (1996) study combined descriptive with experimental functional analyses has more strength than the three prior studies. Based on a questionnaire, an interview, and direct observation, they found that the target student's problem behavior functioned to gain peer and teacher attention. Then they experimentally manipulated the peer and teacher attention to test and confirm the hypothesis concerning the functions of the inappropriate behavior in general education classroom. Since the experimental analyses may provide the most reliable information regarding the functions of behavior (Neef & Iwata, 1994), the authors had more confidence in asserting their hypothesis. Additionally, the intervention of peer DRI and peer tutor may reasonably compete with off-task behavior maintained by peer attention. Therefore, they provided an effective and useful strategy to enhance the student's on-task behavior as well as to decrease disruptive behavior. On the other hand, as for the procedure for functional analysis, despite providing more evidence about how to experimentally manipulate related variables to examine the functions of problem behavior in a regular classroom, the investigators only conducted three daily sessions to demonstrate the relationships between independent variables and on-task behavior. It seemed too weak to display their functional relationships. Further sessions needed to be done in order to verify the functional relationships between peer attention and problem behavior. Finally, although only four peers arranged to pay attention to the target student's off-task behavior during the condition of peer attention, the other 25 peers still interacted with the target student during the condition of peer extinction in general education classroom. The investigators may be difficult to arrange the condition for an experimental analysis in classroom settings due to multiple treatment interference (Symons et al., 1998). It seems hard for them to experimentally manipulate the independent variables to detect their impact on problem behavior unless they totally control the quality and quantity of peer interaction with the target student.

The Study by Umbreit (1995)

Umbreit (1995) conducted a case study of functional analysis to assess an eight-year old child with disruptive behavior. First, he used a brief functional (analogue) analysis to assess the disruptive behavior. Nine sessions were conducted. The first four sessions included free play, escape, attention, and tangible conditions. The fifth and sixth sessions were replicated escape (highest frequency) and attention (lowest frequency) conditions. The last three sessions were contingency reversal phases that included escape contingent on functional communication (FC), disruptive behavior, and FC. The result showed that the subject's problem behaviors were maintained by escape from task demands. Second, a curriculum-based assessment which included teacher and student interviews and A-B-C structured observations was conducted. The result showed that the subject's problem behavior occurred most frequently during specific seating and grouping arrangements (obtained social attention). Finally, the investigator
used a multiple baseline design to assess the effectiveness of intervention. The result showed an immediate reduction in problem behavior and an increase in appropriate behavior.

Compared to the studies of Lawry et al. (1993) and Storey et al. (1994), Umbreit (1995) employed stronger data to demonstrate the functions of problem behavior. He used both experimental and descriptive analyses to examine the function serving to the problem behavior. With brief functional analysis, interview, and direct observation (A-B-C analysis), he formed hypotheses about the disruptive behavior. However, his analogue functional analysis was only nine sessions which may not demonstrate strongly the relationship between independent variables and dependent variables. For example, there is a discrepancy between different analyses in his study. The attention from the teacher served the function of the target student's disruptive behavior in the A-B-C analysis rather than in the analogue functional analysis. Therefore further sessions replicating the first four conditions are needed to examine the functions of disruptive behavior in his analogue functional analysis. On the other hand, compared to AB and ABB designs used in Kamps et al. (1995), the investigator used a better design, multiple baseline design to assess the effect of intervention (Tawney & Gast, 1984). The result showed that the assessment-based intervention successfully decreased the disruptive behavior and increased the appropriate behavior.

**The Study by Ellis and Magee (1999)**

Ellis and Magee (1999) employed a functional analysis to assess three male students with disruptive behaviors. They conducted 24-hour prebaseline observations for each subject. Then each subject was observed for 10 days across all settings during the baseline phase. During prebaseline, baseline, and intervention, partial interval recording with one-minute intervals was used. A multielement design was used to assess the problem behaviors. The design included four specific conditions: attention, play, demand, and alone (or tangible). For all subjects each condition ran five times for 10-min. Two subjects participated both in the analogue and classroom settings while one subject only participated in the analogue functional analysis. The result showed that one subject's problem behaviors were maintained by the attention condition that a teacher attends to peers in the subject's presence. One subject emitted high rates of problem behaviors during the demand condition while one subject during demand and tangible conditions. Based on outcomes of the functional analyses, interventions were developed respectively to decrease the problem behavior of each child. The authors employed AB designs to assess the effectiveness of the intervention. The results showed that all three students significantly reduced disruptive behaviors during intervention implemented by teachers without assistance.

Ellis and Magee's (1999) study is stronger than the other four studies in using functional analyses. They tried to combine descriptive and experimental analyses to find
out the functions of disruptive behaviors. Outside teachers' reports and direct observation in classes, they also conducted both functional analyses in the analogue and classroom conditions to experimentally manipulate the possible variables accounting for problem behaviors. Through repetitively manipulating related variables in settings, they had more confidence to confirm the functions of the target behaviors (Axelrod, 1987; Lennox & Miltenberger, 1989). Based on the functions of the problem behavior, training appropriate peer and teacher attention-seeking behavior was used reasonably to reduce disruptive behavior maintained by obtaining attention and task alteration, escape extinction, and academic tutoring was appropriately employed to decrease the disruptive behavior maintained by escape from demands. In addition, since the hypotheses-driven intervention was implemented by the teachers in a natural environment, the effects of intervention may generalize to classroom routine and last a long period of time. On the other hand, one subject's problem behavior functioned to escape from demands and obtain tangible items. But the intervention addressed only dealt with escape from demands. Probably multiple control behaviors are too complex to totally control (Lalli & Casey, 1996). Therefore, the investigators are unable to conduct the multiple interventions to reduce problem behavior. Additionally, five sessions did not seem to demonstrate strongly the functions of aberrant behaviors, especially when the functions coming from analogue and natural functional analyses are somewhat inconsistent. Finally, an AB design was used to detect the effect of the intervention. Since experimenters did not control for extraneous variables, such as maturation and history events, the findings cannot be attributed completely to the intervention (Tawney & Gast, 1984).

**Overall analysis of the six studies**

Although six studies all try to use functional analyses to detect the functions of disruptive behaviors, they adopted different procedures to conduct analyses. The investigators of the first three studies (Lawry et al., 1993; Storey et al., 1994; Kamps, et al., 1995) merely use interview and direct observation. They might find out correlation relationship between variables and problem behaviors. But they cannot interpret the casual functions between the independent variable and dependent variable (problem behavior). They, at best, used intervention to examine the functions of problem behavior again. In contrast, the study done by Lewis and Sugai (1996) and Umbreit (1995) may overcome this barrier. They conducted both descriptive and experimental analysis to detect the functions of problem behavior. Thus, through experimental manipulation, they can find out the functions serving to the problem behavior. Finally, Ellis and Magee (1999) used both analogue and classroom functional analyses to test the functions of disruptive behavior. They had more confidence to find out the variables that account for problem behavior.
As for examining the effectiveness of intervention, three studies employed AB designs (Ellis & Magee, 1999; Kamps, et al., 1995; Lawry et al., 1993). Without reversing to baseline and replicating the data, the treatment effect is difficult to be attributed to the independent variables. In contrast, an ABAB reversal design (Storey et al., 1994), an ABCD design (Lewis & Sugai, 1996), and a multiple baseline design (Umbreit, 1995) had the chance to replicate the treatment effect. Thus, they can attribute the treatment effects to independent variables rather than extraneous variables.

**Implications for Future Research**

From the reviews and discussions of six studies, what researchers have to do in the future is addressed below. First of all, researchers may employ descriptive analyses to screen and narrow the range of variables that may affect the disruptive behavior. Especially they can use student interview as well as other informal assessment in regular classrooms to obtain abundant information about disruptive behavior because typical children can provide the functions of their problem behaviors and suggestions about effective intervention in the future. In addition, the use of direct observation is needed to confirm informal assessment. After direct observing in natural settings, an A-B-C analysis may employ during this period to find out the relationship among antecedent events, problem behavior, and the consequence of problem behavior (Horner, 1994). Through this environmental analysis, researchers may gradually form their hypothesis about the target behavior.

Second, brief functional analyses will not be conducted unless teachers have no resource or assistance from researchers. Although they might be convenient for general educational teachers to examine possible functions serving problem behavior, they still need other evidence to confirm their analyses.

Third, researchers may use experimental analyses developed from descriptive analyses to examine the functions of problem behavior. They may experimentally manipulate the independent variables to examine the functions of problem behaviors in analogue conditions and then in general education classrooms. Yet unrelated variables that may affect the target student's problem behavior are probably difficult to be controlled in regular classrooms owing to the interaction among lots of students in natural settings. Researchers should cooperate with teachers to develop a standardized procedure to control or keep constantly students' interaction in order to prevent confounding the intervention effect. In addition, the experimental manipulation should last a long period of time, such as five or six sessions in each independent variable, to demonstrate the functions of problem behavior.

Fourth, the assessment-based intervention should involve active participation of the students with disruptive behaviors. The target typical students need self-management strategies, such as using self-monitoring sheets and charts, to decrease their disruptive behaviors in regular classrooms. In addition, the intervention should be
developed appropriately from functional analysis. It should provide with functional equivalent behavior to compete with the disruptive behavior. With respect to multiple control behavior, rather than merely focus on one specific function, researchers have to scrutinize the multiple reasons maintained the problem behavior and develop appropriately functional equivalent behaviors to decrease the problem behavior.

Finally, researchers should employ better designs, such as ABAB reversal design and multiple baseline design, to examine the effect of assessment-based intervention in order to promote the internal validity of the study.

References


