

**The Dissertation Committee for Hyung Mee Kim
Certifies that this is the approved version of the following dissertation:**

**Functional Communication Training
for Korean Immigrant Children
with Developmental Disabilities**

Committee:

Herbert J. Rieth, Supervisor

Melissa L. Olive

Mark F. O'Reilly

Stuart Reifel

Terry S. Falcomata

**Functional Communication Training
for Korean Immigrant Children
with Developmental Disabilities**

by

Hyung Mee Kim, B.A.; M.A.

Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

May 2012

ACKNOWLEDGEMENTS

I am deeply grateful to my advisor, Dr. Melissa L. Olive for providing direction, scholarly insight, support, and encouragement throughout the study. She helped make it possible for me to achieve this goal, and I will be ever grateful. I would like to thank the chair of my committee, Dr. Herbert J. Rieth, for his support and supervision. I sincerely thank the members of my committee, Drs. Mark F. O'Reilly, Stuart Reifel, and Terry S. Falcomata, for sharing their valuable insights and expertise and enriching this study.

I would like to thank to my family. Without their support and encouragement, I could never have achieved as much as I have. Especially, I thank my sister, Hyung Ja, and brother-in-law, Andrew, for their love, help, and patient support throughout my studies. I give my deepest gratitude and love to my father, who has continuously believed in, inspired, and supported me. To my mother, who passed away and never got to see this study, I send out to her my gratitude for her love and support. I also thank my brother, Hyung Soo and another sister, Hyung Sook.

I give my thanks and best wishes to my friends, Sook Jung Kang, Yongsuk Cho, Jeong Won Woo, Youngmi Jang, Su Hyun Kim, Youngsun Baek, Steve O, and Yijeong Kwon, whose emotional support and encouragement have been invaluable.

I thank you to all the children and mothers who participated in this study for freely sharing your time and personal experiences.

Finally, I thank you to God, who has so richly blessed me and given me the gifts to make this accomplishment possible.

Functional Communication Training for Korean Immigrant Children with Developmental Disabilities

Hyung Mee Kim, Ph.D.

The University of Texas at Austin, 2012

Supervisor: Herbert J. Rieth

ABSTRACT

This study was undertaken to determine whether functional communication training (FCT) could be used effectively with Korean immigrant children who have developmental disabilities in order to reduce their challenging behaviors and increase their communication responses in home settings. Three Korean immigrant children with developmental disabilities were recruited, and their mothers were trained to implement assessment and intervention procedures. The results showed that FCT effectively decreased challenging behaviors and increased communication responses. The effects of FCT were also maintained and generalized in different home routines or activities. The mothers rated FCT as an acceptable and effective intervention for their children. Perceptions of other Korean parents regarding FCT were also investigated. Cultural differences in functional analysis and FCT for Korean immigrant children and families are discussed.

Table of Contents

List of Tables.....	viii
List of Figures.....	ix
Chapter One: Introduction.....	1
Statement of Purpose.....	8
Research Questions.....	8
Chapter Two: Literature Review.....	10
Introduction.....	10
Method.....	11
Literature Search.....	11
Coding Articles.....	14
Results.....	20
Demographic Characteristics.....	28
Assessment of Challenging Behavior.....	30
Study Methodology.....	32
FCT Procedures.....	33
FCT Results.....	34
Discussion.....	35
Chapter Three: Methodology.....	42
Participants.....	42
Settings & Implementers.....	47
Materials.....	50

Response Definitions.....	51
Dependent Variables.....	51
Independent Variables.....	54
Data Collection & Interobserver Agreement.....	56
Experimental Design.....	57
Experimental Procedure.....	58
Assessment.....	58
Intervention.....	62
Social Validity.....	66
Chapter Four: Results.....	73
Observation, Interview, & Record Review.....	73
Functional Analysis.....	75
Functional Communication Training.....	77
Generalization.....	83
Interobserver Agreement.....	85
Social Validity.....	87
BIRS.....	87
Social Validity Video Observations.....	90
Chapter Five: Discussion.....	91
General Results.....	91
Question One: Effectiveness of FCT.....	93
Question Two: Maintenance.....	97

Question Three: Generalization.....	98
Question Four: Social Validity of FCT	
Reported by Participants' Mothers.....	102
Question Five: Social Validity of FCT	
Reported by Other Korean Parents.....	105
Implications.....	112
Limitations.....	121
Contributions to the Literature.....	122
Suggestions for Future Research.....	124
Appendix A. Article Coding Form.....	129
Appendix B. Coding Form	130
References.....	131

List of Tables

Table 1. Inter-Observer Agreement in Coding the Reviewed FCT Studies.....	14
Table 2. Summary of the Reviewed Articles.....	21
Table 3. Participant Characteristics in the Reviewed FCT Studies	29
Table 4. Topography of Targeted Challenging Behavior.....	29
Table 5. Assessment Methods	30
Table 6. Setting for Assessment and Intervention.....	31
Table 7. Implementer in Assessment and Intervention.....	32
Table 8. Communication Responses in FCT Treatment	34
Table 9. Participant Characteristics	45
Table 10. Summary of the Selected Home Areas, Routines, and Materials.....	48
Table 11. The Order of Presenting the Video Sections of the Three Children.....	72
Table 12. Summary of the Observation, Interview, & Record review.....	74
Table 13. Mean Percentage & Percentage Reduction of Intervals of Challenging Behavior.....	83
Table 14. Mean and Range of the Korean Mothers' Behavior Intervention Rating Scales.....	87
Table 15. Mean and Range of the Behavior Intervention Rating Scale Items	88
Table 16. Social Validity Ratings of the Korean Evaluators	90

List of Figures

Figure 1. Behavioral intervention rating scale.....	68
Figure 2. The rating scale provided to the parents who report social validity ratings.....	71
Figure 3. The percentages of the intervals of the challenging behavior in the functional analysis for each participant.....	76
Figure 4. The percentages of the intervals of the mothers' mand prompt in the intervention and follow up.....	78
Figure 5. The percentages of the intervals of the challenging behavior and the communication response for each participant in the baseline, intervention, and follow-up.....	79
Figure 6. The percentages of the intervals of the challenging behavior and the communication response for each participant in the generalization.....	86

CHAPTER ONE

Introduction

The populations of culturally and linguistically diverse children and families are rapidly increasing in the United States (Hernandez, Denton, & Macartney, 2009). Because they have different cultures, languages, and values, such people frequently experience difficulties in education, health care, and other social services, all of which have been designed for this country's majority culture (Leone & Bartolotta, 2010; Perreira, Chapman, & Stein, 2006). Social service providers such as teachers and health care practitioners have therefore begun to consider cultural differences when they provide services to culturally and linguistically diverse groups (Emde, 2006; Karoly & Gonzalez, 2011). Researchers are investigating culturally appropriate education practices for early childhood (Lee et al., 2003). Because children and families live within culturally constructed environments, cultural influences must be considered in order to provide appropriate interventions (Sylva, 2005).

Increases in culturally and linguistically diverse populations have also been reported specifically in those who require special education. Researchers have discussed cultural influences in relation to early intervention practices (Barrera, 1993; Bowman, 1992; Conway Madding, 2000), perspectives on disability (Florian et al., 2006; Diken, 2006), collaboration with special education professionals (Harry, 2008), and parent–infant interaction (McCollum & McBride, 1997). Immigrant families who have children with disabilities have reported many difficulties due to cultural and language barriers, limited access to health services, and economic hardship (Waldman & Perlman, 2008).

They also experience conflicts between home and educational settings due to differences in culture, language, ethics, and behavior (Welterlin & LaRue, 2007). For these reasons, it is necessary to develop culturally sensitive supports for children with disabilities from diverse ethnic groups. Culturally and linguistically diverse children with disabilities and their families have been disadvantaged in special education practices and research (Morrier & Gallagher, 2011; McHatton & Correa, 2005).

In the U.S., despite the rapid growth of the ethnic group of Asian immigrants (Camarota, 2000), the needs of Asian children and their families have not been sufficiently addressed in special education, for several reasons. First, the proportion of Asian immigrants in the U.S. population is relatively smaller than that of African Americans or Hispanic immigrants (Morrier & Gallagher, 2011). Second, the cultural characteristics of Asian immigrants vary because Asian immigrants have come from many different countries (Cho, Singer, & Brenner, 2003). It is therefore relatively difficult for professionals in special education to identify or define characteristics of Asian immigrant children and their families generally (Chiang, 2000). Yet despite this difficulty, researchers in special education have recently focused on Asian immigrants (Baker et al., 2010; Poon-McBrayer & Garcia, 2000). They have reported that Asian immigrants suffer many difficulties in dealing with special education and other services, difficulties originating in cultural differences, language barriers, and different values and beliefs (Jegatheesan, 2009; Jegatheesan, Fowler, & Miller, 2010). Thus, Asian immigrants also need culturally sensitive supports within the U.S. social service systems.

Korean immigrants are one of the large immigration groups in the U.S. (U.S. Census Bureau, 2010). Researchers have noted that Korean immigrants have distinct cultural values that differ from those of the majority American culture (Jung & Stinnett, 2005) with respect to child rearing (Jung & Honig, 2000) and child development (Kim, Kim, & Rue, 1997). Park, Turnbull, and Park (2001) have provided details on difficulties of Korean immigrant families in dealing with special education. These researchers interviewed 10 Korean immigrant parents of children with disabilities. The Korean immigrant parents reported various difficulties in relationships with professional special education service providers due to language barriers, different values and practices, a lack of information and advocacy, inappropriate attitudes of service professionals, excessive paperwork for obtaining funds, and so forth. Early interventionists, teachers, and other special education service professionals need guidance for providing suitable support for Korean immigrant children with disabilities and their families. Some researchers have investigated the beliefs and attitudes of Korean immigrants regarding child development, disability, behavior, and interventions (Cho, Singer, & Brenner, 2003; Farver & Lee-Shin, 2000). However, more information is needed to support practitioners working with Korean immigrant children with disabilities.

Language barriers for Korean, Asian, and other immigrant children with disabilities can have an impact on behavior problems. In general, most young children in the early stages of social, emotional, and behavioral development tend to engage in behaviors such as anxiety, tantrums, and aggression (Campbell, 1995). Some outgrow these behaviors and develop appropriate behaviors before school age (Powell, Dunlap, &

Fox, 2006). However, in some children, these challenging behaviors may be both repeated and severe, and may continue to occur (Powell, Dunlap, & Fox, 2006). Although there are many reasons for such challenging behaviors, several researchers have recommended early interventions to teach appropriate communication in the hope that this strategy may prevent the onset of challenging behaviors (Olive & McEvoy, 2004; Sigafoos, 2000; Symons, 2000). Because of language barriers, children can demonstrate severe delays in expressive communication, resulting in the challenging behavior (Sigafoos, 2000). Preschoolers with insufficient development in social skills who demonstrate challenging behaviors tend to have more problems in language development than do typically developing peers (Kaiser, Hancock, Cai, Foster, & Hester, 2000).

Many immigrant children with disabilities experience language differences between their home and educational settings (Waldman & Perlman, 2008). Some of these children may demonstrate challenging behaviors in school or other special education contexts that are due to difficulties in communication, and they therefore need special support to facilitate their learning of functionally effective communication skills (Garrett & Holcomb, 2005). With appropriate behavioral support, they may be able to develop their communication skills and therefore engage in less challenging behavior.

Functional communication training (FCT) is one potentially beneficial intervention for such immigrant children with disabilities and challenging behaviors. Through FCT, children learn to use appropriate communication responses in lieu of challenging behaviors, resulting in a decrease of that behavior. FCT is one of the most generally used interventions for children and adolescents with developmental disabilities

(Matson, Dixon, & Matson, 2005), although there are other behavioral intervention strategies for treating challenging behavior in various populations as well (Kahng, Iwata, & Lewin, 2002; Sigafos, Arthur, & O'Reilly, 2003). FCT has been implemented by identifying the challenging behavior's function for the individual and teaching appropriate communication strategies that serve the same function, thus replacing the challenging behavior (Durand, 1990; Reichle & Wacker, 1993).

In FCT, as children are prompted to learn new communication skills (Durand & Carr, 1991), they obtain reinforcement for those skills that matches the reason for the challenging behavior (e.g., desire for attention, breaks, or tangibles). Reinforcement is not provided following challenging behaviors. Through such FCT procedures, children with disabilities acquire new communication skills that replace their challenging behaviors when they want something.

FCT has been conducted in almost 100 peer-reviewed studies since Carr and Durand (1985) introduced it for interventions in individuals with challenging behavior (Olive, Delacruz, Davis, & Lang, 2006). Many researchers have reported that FCT has successfully reduced challenging behaviors and increased appropriate communication responses (Reichle, Drager, & Davis, 2002; Vollmer, Marcus, & LeBlanc, 1994). However, culturally and linguistically diverse children have not been included in many FCT studies (for an example, however, see Campbell & Lutzker, 1993), and the ethnicity of participants has rarely been reported (Kim & Olive, 2006). Two studies by Dunlap and colleagues (2006) and Dalmau and colleagues (2011) are an exception: Children and families from the Hispanic population in the United States participated in FCT, with

positive outcomes. The Hispanic mothers implemented FCT with their children at home, and the children's challenging behaviors decreased while their communication responses increased.

Culture is also an important factor to be considered in research on children's challenging behaviors. The challenging behavior of children is influenced by their interactions with their caregivers (Smith & Fox, 2003), and certain aspects of the relations between parents and children vary across cultures. Nonetheless, researchers have not considered participants' ethnicity as important data in behavioral interventions for challenging behaviors. Few studies of positive behavioral support for children with challenging behaviors have reported the participants' ethnicity (Conroy, Dunlap, Clarke, & Alter, 2005). Therefore, professionals in special education need to investigate variation across ethnicities and cultures by reviewing the cultural backgrounds and origins of children who participate in behavioral interventions such as FCT.

Just like other Asian immigrant children with special needs, Korean immigrant children with disabilities have rarely been involved in FCT. Only one FCT study has been implemented with a Korean immigrant child with developmental disability (Cummings & Carr, 2005). In that study, a Korean immigrant boy with autism and lax joint syndrome participated in FCT along with other behavioral interventions at home. The Korean boy reduced his challenging behavior and joint dislocations during the intervention sessions, which combined FCT with interventions such as noncontingent reinforcement, extinction, and curricular revision. This study could not show whether the effects of FCT observed in Korean immigrant children with disabilities were similarly

obtained, because the effect of FCT was not examined separately. More FCT studies with immigrant children, including studies with Korean immigrant children, are needed.

To verify that FCT is an acceptable intervention for culturally and linguistically diverse children and families, the social validity of FCT should be investigated with diverse immigrant parents as participants. People from other ethnic groups may have different perspectives on children's behaviors and interventions, given their specific cultures and values. Kwon (2003), for example, showed that Korean parents reported various perspectives on children's behaviors and did not have strict attitudes regarding challenging behaviors because their ideas about emotional and behavioral problems were uncertain. Therefore, it is essential to investigate how immigrant parents feel about the FCT procedures and their children's behaviors in FCT before recommending FCT to practitioners working with immigrant children with disabilities in special education services.

The social validity of FCT has been examined in some FCT studies, but culturally and linguistically diverse parents have rarely been involved. It is therefore not known whether parents from diverse ethnic groups have perspectives on FCT similar to those reported for parents from the majority culture in the U.S. (Kim & Olive, 2006). It is important to examine the social validity of FCT in culturally and linguistically diverse parents to determine whether FCT is effective for immigrant children's behaviors and acceptable within immigrant families' circumstances because diverse populations are increasing in the U.S.

Statement of Purpose

Research on FCT for culturally and linguistically diverse children is needed to extend the literature on FCT and especially to respond to the increase in the population of Korean immigrants in the U.S. The first purpose of this study is to determine whether FCT is an effective intervention to reduce challenging behaviors and increase communication response in Korean immigrant children with developmental disabilities. Maintenance and generalization of the effectiveness of FCT intervention are also evaluated. The second purpose of this study is to extend the social validity of FCT by examining the perspectives on FCT of the participating mothers who implemented FCT intervention with their children, as well as the perspectives of other participating Korean parents.

In this dissertation, *challenging behavior* is defined as repeated dangerous or undesirable behavior that is a problem in relations with others (Smith & Fox, 2003). Challenging behaviors include self-injury, aggression, tantrums, disruption, noncompliance, or destruction. Maladjustment in routines is also considered to be a challenging behavior; this includes problems in sleeping, eating, and washing.

Research Questions

Specific research questions are:

- (a) Does FCT intervention decrease challenging behaviors and increase communication responses in Korean immigrant children with developmental disabilities in a home setting?

- (b) Are a decrease in challenging behavior and an increase in communication responses maintained over time?
- (c) Are a decrease in challenging behavior and an increase in communication response generalized to another home routine or activity?
- (d) What is the social validity of FCT intervention reported by Korean immigrant mothers who participated in this study?
 - a. Do they think that FCT intervention is effective?
 - b. Do they think that FCT intervention is acceptable?
 - c. What do Korean immigrant parents who are not originally familiar with FCT think about their child's challenging behavior in baseline and in FCT intervention?

CHAPTER TWO

Literature Review

Introduction

Special issues should be considered when providing early intervention and behavior support for children with challenging behavior (Neilsen & McEvoy, 2003; Harrower, Fox, Dunlap, & Kincaid, 2000). First, family involvement is important in early intervention and special education (Pang, 2010; Dirks & Hadders-Algra, 2011). Most parents have close relationships with children as their caregivers and the challenging behavior of children is almost always related to the relations and interactions with caregivers. The involvement of parents and other family members in FCT studies is essential to understanding the children and to identifying the function of the challenging behavior. Second, comprehensive early intervention and special education services are essential to support families, based on their unique needs (Ziviani, Feeney, & Khan, 2011). Families who have children who engage in challenging behavior need special support for their varying needs. Third, for children receiving the services of early intervention and special education, the Individuals with Disabilities Education Improvement Act (IDEIA) mandates the utilization of the child's natural environment (U.S. Department of Education, 2004). Intervention at home or in a day care or school setting is recommended for children. Fourth, a number of children with disabilities experience communication difficulties (Horn & Kang, 2012). An effective communication mode is needed to teach them new communicative responses.

These special issues should be emphasized for children in FCT research, which is one part of positive behavioral support. However, it is unclear whether these important issues have been considered in FCT studies with children because a literature review of FCT for children has been rarely conducted. Mancil (2006) reviewed FCT studies for children with autism and analyzed the settings and the implementers in FCT and the effects of FCT. Nonetheless, Mancil (2006) reviewed only eight FCT studies in which children with autism and their families participated. He excluded FCT studies for children with other disabilities from the literature review. For these reasons, a systematic analysis of the studies on FCT for children is necessary to identify what procedures of assessment and intervention are used, whether these approaches are appropriate for children, and to examine the outcomes of FCT for children.

The purpose of this review was to complete a literature review of the studies on FCT for children (i.e., under the age of 9). The specific research questions guiding the review were:

- (a) what is the effectiveness of FCT treatment for children?;
- (b) what is the quality of the single subject design studies on FCT for children, published in peer-reviewed journals?; and
- (c) what participants' characteristics, behaviors, assessment methods, and FCT intervention procedures are found in existing studies?

Method

Literature Search

First, a search for all the studies using FCT was completed. The procedures recommended by Cooper (1998) were used to ensure that all existing studies were included. Searches of PsychInfo, Psychology and Behavior Sciences Collection, Social Sciences Collection, Academic Search Premiere, Professional Development Collection, and ERIC were conducted using the following keywords: “functional communication training,” “functional communication,” “challenging behavior and functional communication,” and “challenging behavior and child.” The next searches were completed using authors’ names found in the database more than three times. The cited references of obtained articles were reviewed to find studies unidentified by the database searches. Finally, a hand search was completed of the journals including two or more cited articles. In addition, the articles analyzed in two literature reviews on FCT (Kim & Olive, 2006; Olive, Delacruz, Davis, and Lang, 2006) were examined to ensure that all studies using FCT with young children were located.

Articles were selected based on the following inclusion criteria:

- (a) Published in a peer reviewed journal reporting individual participant data on challenging behavior, assessment, FCT intervention, and demographic information
- (b) The purpose was to examine the effects of FCT on challenging behavior
- (c) At least one participant nine years old or younger

- (d) Designed to teach communicative responses as a replacement for challenging behavior
- (e) Written in English

In some studies included in this review, the authors did not use the term FCT. However, their interventions were to teach appropriate communication to replace challenging behavior. For example, in the study by Vollmer and colleagues, the authors identified their intervention as a differential reinforcement of communication (Vollmer, Northup, Ringdahl, LeBlanc, & Chauvin, 1996). This study was included because the authors differentially reinforced a communicative replacement for tantrumming.

The studies were excluded that did not: (a) report individual data on some coding categories. Four large group studies without individual data on participants were excluded (e.g., Hagopian, Fisher, Sullivan, Acquisto, LeBlanc, 1998; Kurtz, Chin, Huete, Tarbox, O'Connor, Paclawskyj, & Rush, 2003; Wacker, Berg, Harding, Barretto, Rankin, & Ganzer, 2005). The authors did not report individual data on the results of FCT intervention, selected communicative responses, the communication mode before FCT, and so on; (b) examine the effects of FCT only. Some studies set out to investigate the effects of a combination of FCT and another treatment. Mildon and colleagues (2004) implemented FCT with noncontingent escape which was an intervention to provide a break to the child on a fixed time schedule. Not only FCT but also noncontingent escape influenced behaviors of the child. For that reason, their study was excluded from this literature review; or (c) teach communication as a replacement for challenging behavior. For example, the Carr and Kemp (1989) study, the study by Tait and colleagues (2004), and the Tirapelle and Cipani (1991) study were

excluded because the participants in these studies did not engage in challenging behavior.

New communication responses were taught to replace prelinguistic behavior.

Coding Articles

All the articles included in this study were reviewed by the author. Another coder independently scored 30% of all articles to obtain a measure of inter-rater reliability. The reliability was calculated by dividing the number of agreements by total agreements plus total disagreements and multiplying by 100. The overall agreement across 30% of all coded articles was 89.1% (range= 50%-100%). Table 1 represents the agreements across all coding categories.

Table 1

Inter-Observer Agreement in Coding the Reviewed FCT Studies

	%	Range
Participant demographic characteristics	92.9	76-97.6
Assessment		
Method	100	100
Setting	90.0	71.4-100
Implementer	100	100
Function of challenging behavior	100	100
Intervention		
Inter-observer agreement	75.0	64.7-82.4
Experimental Design	94.4	88.2-100
Social validity	82.4	82.4
Setting	100	100
Implementer	100	100
Communication response	91.3	66.7-100
Consequence with FCT	88.9	50-100
Effect of FCT	82.4	76.5-94.1
Follow-up and generalization	90.2	82.4-94.1

A coding form (See Appendix) was developed from a coding form utilized in another review of studies of FCT with AAC strategies for children (Kim & Olive, 2006). The coding form was designed to include all the variables of interest for this review. Not all categories were mutually exclusive; therefore, the summaries or percentages may not add to the total N or to 100%. If a study included participants of all ages, only the data for the child(ren) under nine were scored. Therefore, this review included more data sets (i.e., individual participant data) than total studies (i.e., published articles).

Participant demographic characteristics. Participants' age, gender, and disability were recorded exactly as the authors described in the study. Participants were categorized into two age groups: (a) birth through two years and (b) three through five years. These age groups were used because they have been described as typical transition periods for young children (i.e., from early intervention to preschool services). Descriptions of participants' expressive communication prior to FCT intervention were categorized exactly as the authors reported. Two additional categories included "no data" and "other."

The participants' target challenging behaviors were also sorted into seven topographies. This information was scored solely on definitions and the reports given by the authors of the reviewed articles. For example, if the author reported that the child engaged in disruption, this behavior was scored as disruption. However, definitions of challenging behavior were different in each study included in this review. For example, Moes and Frea (2002) reported that their participants' disruptive behaviors consisted of crying, screaming, whining, dropping to the ground, banging, and throwing items, while Mildon and colleagues defined disruptive behavior as hitting, kicking, head-banging,

biting, throwing objects at others or around the room, overturning furniture, and screaming (Mildon, Moore, & Dixon, 2004). Hanley and colleagues (1997) defined ‘throwing objects’ behavior as disruption but Arndorfer and colleagues (1994) and Dalmau and colleagues (2011) classified ‘throwing objects’ and ‘throwing toys’ as destruction.

If the authors reported single topographies of behavior such as hand-biting, the coder scored the behavior in the most appropriate category. Aggression might include hitting another person, while self-injury included hitting oneself. Disruption consisted of behaviors such as running around the room, while destruction included damage to property or materials. Tantrums included behaviors such as crying and screaming for extended periods of time. Noncompliance included not following instructions. Other behaviors included stereotypical behaviors such as hand-flapping and behaviors which didn’t fit into other categories.

Assessment of challenging behavior. In the reviewed studies, various methods were used to assess the functions of the challenging behaviors. Assessment methods were sorted into six categories: (a) functional analysis, (b) interview, (c) observation or descriptive assessment including an A-B-C chart, (d) record review, (e) the Motivation Assessment Scale, and (f) not identified.

The results of the FBA (i.e., function of challenging behavior) were coded. These functions were categorized into three groups based on the assessment results in the reviewed studies: (a) escape from non-preferred demands or tasks, (b) attention, or (c)

desire for a tangible item or a preferred activity. While other functions of the behaviors exist, these were the only functions reported by the authors.

Settings and implementers. The settings in which the assessment and intervention procedures were conducted were sorted into five categories as reported by the authors: (a) classroom, (b) hospital or clinic, (c) home, (d) treatment room/pull-out room or (e) not reported. The settings for assessment and intervention were coded separately because assessment and treatment were conducted in two different places in some studies.

The implementers in the assessment and intervention were coded and categorized into three groups: (a) researcher, (b) family member, or (c) teacher. The ‘researcher’ group involved research assistants, trainers, experimenters, and therapists.

Study methodology. Horner et al. (2005) suggested quality indicators for single subject designs. These consisted of descriptions of the participants and settings, descriptions and measurement of the dependent and independent variables, the inclusion of a baseline phase, demonstration of experimental control, and demonstration of external and social validity. Several criteria were used to determine the methodological adequacy of the reviewed studies.

First of all, the presence or lack of interobserver agreement (IOA) was scored as well as the average IOA and the ranges reported by authors. Measurement and reporting the IOA were recommended to reduce observer bias and increase the reliability of the measurement in single subject research studies (Kazdin, 1982).

The coder recorded whether the study established external validity as described by Horner and colleagues (i.e., replication across participations, settings, or materials).

Single subject designs in these studies included reversal designs, alternating treatments designs, and multiple baseline designs. Studies without baselines or with AB designs not replicated across participants were classified as not demonstrating external validity.

Last, it was scored whether the social validity of the FCT was measured and what was reported in the measurement of social validity. The social validity of FCT is important to examining the acceptability of parents, teachers, participants, or other implementers of FCT.

FCT with communicative response package. FCT interventions were implemented alone or with consequences for challenging behaviors. The consequences were coded exactly as the authors reported in the studies: (a) extinction, (b) time out, (c) guidance, (d) blocking, (e) redirect, and (f) no data. The communicative responses were categorized into five groups: (a) signs, (b) gestures, (c) pictures/symbols, (d) Voice output communication aids (VOCA), or (e) verbal words. VOCAs included voice output devices with micro-switches. In some studies, two or three response strategies were used and the coder scored all responses.

Study results. Individual participant data from the baseline, intervention, maintenance, and generalization were extracted from each article to recreate data sets (e.g., Marquis et al., 2000). The maintenance and generalization of the intervention effects were tested in some studies. Maintenance data were collected on the child's target behaviors after the intervention had been completed. The duration of the maintenance sessions varied across studies. Generalization data were collected on the child's behaviors

in another setting, with another person, or with different materials. Implementing the generalization also varied in the reviewed studies.

To measure the effects of the FCT intervention, a percentage reduction measure and a visual analysis were conducted for each participant. The percentage reduction measure has been used previously with single subject studies to calculate an effect size (e.g., Campbell, 2000; Marquis et al., 2000; O'Brien & Repp, 1990; Olive & Smith, 2005; Parker & Brossart, 2003). The percentage reduction was calculated by averaging the data from the last three baseline sessions and the last three intervention sessions. The intervention average was subtracted from the baseline average and that number was divided by the baseline average and multiplied by 100. However, some researchers reported the averages of the all baseline sessions and the all intervention sessions instead of the data of the last three sessions of baseline and intervention. In this case, the percentage reduction was calculated by the averages of the all baseline and intervention sessions and a footnote was made to notice that. In addition, some children participated in FCT intervention and different treatments such as non-contingent reinforcement or choice making. Only the data from the FCT phases were used for this analysis. In a reversal design, the data from each baseline were used together as one set of baseline data. The procedures were repeated for the intervention data.

Most participants frequently demonstrated challenging behavior in the baseline and decreased the frequency of the challenging behavior during the intervention. This allowed the calculation of a percentage reduction in the targeted challenging behavior. However, many of the participants had not demonstrated any communicative responses

during baseline. It was, therefore, not possible to calculate a percentage of change in communicative behavior. For this reason, the percentage reduction measure was used to analyze the effects of FCT on only the challenging behavior. A visual analysis was able to be conducted on the data on new communication responses and the targeted challenging behavior. The data of most participants were depicted in graphs.

The outcomes in communication were analyzed using a visual analysis to rate whether the child showed a change in level, trend, or variability. Level, trend, and variability, as applied to this visual analysis, were defined by Richards, Taylor, Ramasamy, and Richards (1999). First, the level refers to the performance of the target behavior and where the data points meet the y-axis. The level was determined by drawing horizontal lines to indicate the range of performance. Second, the trend refers to the distinctive direction in the performance of the behavior. The split-middle line method was used to indicate the trend line. Third, variability refers to the scatter of the data points around the trend line. The coder rated 'flat' if the data points were centered on the trend line, while 'variable' was coded when the data points were scattered and no trend line was predictable.

Results

Table 2 represents a summary of the articles included in this review. Eighty four individual data/participant sets from 38 articles were identified in the literature search based on the inclusion criteria in this review and subsequently analyzed. Seventeen articles (44.7%) were published in the *Journal of Applied Behavior Analysis*. The remaining articles were published in a variety of journals including *Behavior*

Table 2

Summary of the Reviewed Articles

Citation	Name Age (Mos)	Diagnosis	Topography of Behavior	Function of Behavior	Assessment Method	Comm. Response	Percent Reduction CB
Arndorfer et al. (1994)	Anna, 36	Speech delay	Agg, Tantrum, Dest	Attention	Int, Obs, MAS	Verbal	1 in Rev, 1 in FCT 90.4%
	Jacob, 24	Fetal alcohol	SIB, Dest,	Tangible	Int, Obs, MAS	Verbal	1 in Rev, 1 in FCT 75%
Berg et al. (2007)	Calvin, 60	DD	Agg, NC, Dest	Escape	Int, Obs, FA	Verbal	100%
	Brent, 48	DD	Agg, NC, Dest	Escape	Int, Obs, FA	Verbal	100%
	Theo, 48	DD	Agg, NC, Dest	Escape	Int, Obs, FA	Verbal	100%
	Alex, 48	DD, Language disorders	Agg, NC	Escape	Int, Obs, FA	Symbol	66.9%
Brown et al (2000)	Jim, 84	AU, MR, Seizure	SIB	Attention, Tangible	FA	Sign	NA
	Kelly, 108	MR	SIB	Attention	FA	Sign, Verbal	NA
	Corey, 60	DD, MR	Agg, NC, Dest, Stereotopy	Escape	FA	Sign, Symbol	NA
Dalmau et al. (2011)	Sofia, 63	DD, other	SIB, Agg, Dest	Escape	FA	Picture, VOCA	65.9% (Spanish)
	Javier, 74	AU, MR	SIB, Agg, Dest	Escape	FA	Picture, VOCA	97.1% (Spanish) 92.5% (English)

Table 2 (Continued)

Summary of the Reviewed Articles

Citation	Name Age (Mos)	Diagnosis	Topography of Behavior	Function of Behavior	Assessment Method	Comm. Response	Percent Reduction CB
Derby et al (1997)	Billy, 24	DD, VI, other	SIB, Dest, Tantrum	Attention	FA, Int, Obs, AA	Sign	80.8%
	Kelly, 41	MR, CP	SIB, Tantrum	Attention	FA, Int, Obs, AA	Verbal	99.4%
	Danny, 24	DD	Dest, NC	Escape	FA, Int, Obs, AA	Sign	78.6%
	Matt, 36	DD, VI	SIB, Dest NC, Tantrum	Escape Attention	FA, Int, Obs, AA	Sign	92.9%
Drasgow et al. (1998)	Ann, 39	DD, AU	Leading, Reaching, Grabbing	Tangible	Int, Obs	Sign	MBL 100%, 100%, 100%
	Kate, 40		Leading, Reaching, Grabbing	Tangible	Int, Obs	Sign	MBL 75%, 50%, 25%
	Tom, 36	DD, AU, other	Tantrum	Tangible	Int, Obs	Sign	MBL 100%, 93.4%, 75%
Dunlap et al. (2006)	Alexis, 33	Language delay	Agg, Tantrum, Other	Attention, Other	Int, Obs	Verbal	100%
	Maria, 30	Speech delay	Agg, Dest, Other	Attention, Tangible	Int, Obs	Verbal	100%

Table 2 (Continued)

Summary of the Reviewed Articles

Citation	Name Age (Mos)	Diagnosis	Topography of Behavior	Function of Behavior	Assessment Method	Comm. Response	Percent Reduction CB
Durand (1993)	Michelle, 66	CP, MR	Agg, Tantrum	Escape Attention	MAS	VOCA	98.4%
	Joshua, 42	MR	Agg, Tantrum	Tangible	MAS	VOCA	91.8%
Durand (1999)	Matt, 66	CP, MR	SIB, Tantrum	Escape	FA, MAS	VOCA	95.1%*
	Mike, 42	MR	SIB, Dest	Tangible	FA, MAS	VOCA	88.9%*
Durand & Carr (1991)	Ben, 108	MR, PDD	Agg	Escape, Attention	FA, MAS	Verbal	81.1%*
Durand & Carr (1992)	Jaynie, 56	AU	Tantrum, NC	Attention	FA, MAS	Verbal	NA
	Sam, 62	MR	Tantrum, Dest	Attention	FA, MAS	Verbal	NA
	Ted, 42	DD	Tantrum, NC, Dest	Attention	FA, MAS	Verbal	NA
	Ian, 59	DD	Tantrum, NC, Dest	Attention	FA, MAS	Verbal	NA
	Ray, 40	DD	Agg, Tantrum, Dest	Attention	FA, MAS	Verbal	NA
	Mike, 60	DD	Tantrum	Attention	FA, MAS	Verbal	NA
Falconata et al. (2010)	John, 60	AU	Elopement	Other	FA	Gesture	100%
Fisher et al. (2000)	Ken, 36	MR, CP	SIB, Agg, Dest	Attention	FA	Gesture	100%
	Jan, 84	MR, other	SIB, Agg, Dest	Tangible	FA	Sign, Gesture	NA
Frea et al. (2001)	Tim, 48	MR, AU	Agg, Tantrum	Other	FA, Record	Picture	100%
Gibson et al. (2010)	Shane, 48	AU	Elopement	Tangible	Int, FA	Gesture	94.6%
Hagopian et al. (2005)	Matt, 84	MR, AU, ADHD	Agg	Attention Tangible	FA	Verbal, Picture	NA

Table 2 (Continued)

Summary of the Reviewed Articles

Citation	Name Age (Mos)	Diagnosis	Topography of Behavior	Function of Behavior	Assessment Method	Comm. Response	Percent Reduction CB
Hanley et al. (1997)	Tony, 48	CP	Agg, Disrupt	Attention	FA	Verbal	100%
	Carla, 96	MR, Seizure, others	Agg, Disrupt	Attention, Tangible, Escape	FA	Symbol	100%
Harding et al. (2005)	Tanya, 69	MR, CP, Seizure, VI, others	SIB	Tangible	FA	VOCA	NA
	Lyle, 16	DD	SIB	Tangible	FA	VOCA	NA
Harding et al. (2009)	Al, 36	Language delay	Agg, Disrupt, Dest	Escape, Tangible	FA	Verbal, VOCA	100%*
	Lou, 35	DD, other	Agg, Disrupt, Dest	Tangible	FA	Verbal, VOCA	100%*
	Kit, 22	None	SIB, Agg, Disrupt, Dest	Attention	FA	Verbal, sign, picture	100%*
Hines & Simonsen (2008)	Andrew, 42	AU	Disrupt	Tangible	Int, Obs	Picture	59.8%*
Koegel et al. (1998)	Child1, 70	AU	Agg	No data	No data	Verbal	NA
	Child2, 51	DD	Agg	No data	No data	Verbal	NA
	Child3, 58	AU	Agg	No data	No data	Verbal	NA
Kuhn, Chirighin, & Zelenka (2010)	Angela, 96	AU, MR, Other	SIB	Attention	FA	Verbal	100%
	Greg, 108	MR, Cerebral	Agg, Disrupt	Attention	FA	Verbal	100%
Lerman et al. (2002)	Timmy, 48	MR, Physical disability	Disrupt	Escape	FA	Picture (comm. card)	NA

Table 2 (Continued)

Summary of the Reviewed Articles

Citation	Name Age (Mos)	Diagnosis	Topography of Behavior	Function of Behavior	Assessment Method	Comm. Response	Percent Reduction CB
Marcus & Vollmer (1995)	Sally, 60	MR, Down Syn, other	Disrupt	Escape	FA	Verbal	97.7%*
Moes & Frea (2000)	Matthew, 36	AU	Disrupt	Escape	Obs	Verbal	NA
Moes & Frea (2002)	Sue, 43	AU	Agg, Disrupt	Tangible	FA, Int., AA	Verbal	100%
	Jack, 39	AU	Agg, Disrupt	Tangible	FA, Int., AA	Verbal	NA
	Tim, 42	AU	Agg, Disrupt	Tangible	FA, Int., AA	Sign	100%
Moore et al., (2010)	Justin, 18	TBI	SIB	Attention	FA, Int, Obs	VOCA	56.3%
Northup et al., (1994)	Mike, 60	MR, Seizure	SIB	Escape	FA, Int, Obs, RR	VOCA, Sign	NA
	Rebecca, 72	Other	SIB	Escape, Attention	FA, Int, Obs, RR	Sign	NA
	Kit, 108	Blind, Other	SIB	Sensory	FA, Int, Obs, RR	VOCA	NA
	Jane, 96	Blind, Other	SIB	Attention	FA, Int, Obs, RR	VOCA	NA
Peck et al., (1996)	Alex, 22	DD, other	SIB, Dest, Tantrum, Agg	Attention	AA, FA	VOCA	NA
	Max, 48	DD	SIB, Agg, NC Dest, Tantrum	Escape	AA, FA	Symbol, Gesture	NA
	Kevin, 24	Other	Agg, NC	Escape	FA	Symbol, Verbal, Gesture	NA

Table 2 (Continued)

Summary of the Reviewed Articles

Citation	Name Age (Mos)	Diagnosis	Topography of Behavior	Function of Behavior	Assessment Method	Comm. Response	Percent Reduction CB
Peterson et al. (2005)	Brad, 48	DD, Other	Tantrum, NC	Escape	FA	Sign	NA
	Teddy, 108	MR, Blind, Other	SIB, Disrupt, Dest	Escape, Tangible	FA	Verbal	NA
Richman (2001)	Mike, 36	DD	Agg	Attention, Tangible	FA	Sign	100%
Schieltz et al. (2011)	Juan, 46	AU	SIB, Agg, Dest, Disrupt	Escape, Tangible	FA	VOCA, Gesture	NA
	Cam, 35	DD	SIB, Agg, Dest, Disrupt	Escape, Tangible	FA	VOCA, Gesture	NA
	Bud, 42	AU, MR	SIB, Agg, Dest, Disrupt	Escape, Tangible	FA	VOCA, Gesture	NA
Schindler & Horner (2005)	Neal, 60	AU	Agg	Tangible	Int	Picture	65.5%*
	Ellie, 48	AU	Tantrum	Escape	Int	Symbol	76.6%*
	Kit, 48	AU	Tantrum, NC	Escape	Int	Symbol	64.8%*
Steege et al. (1990)	Ann, 60	MR	SIB	Escape	FA, Int	VOCA	NA
	Dennis, 72	MR	SIB	Escape	FA, Int	VOCA	NA
Vollmer et al. (1996)	John, 48	Language delay	Tantrum	Attention, Tangible	FA	Verbal	Attention 100%* Tangible 87.5%*
	Will, 47	Language delay	Tantrum	Tangible, Attention, Escape	FA	Verbal	Tangible 50%* Attention 76.6%* Escape 94.9%*
	Jeffrey, 32	Language delay	Tantrum	Tangible	FA	Sign	Toy 15.5%* Food 95.5%*

Table 2 (Continued)

Summary of the Reviewed Articles

Citation	Name Age (Mos)	Diagnosis	Topography of Behavior	Function of Behavior	Assessment Method	Comm. Response	Percent Reduction CB
Wacker et al. (2011)	Tina, 47	AU, DD	Agg, Dest	Escape, Tangible	FA	VOCA, Picture	100%
	Jose, 52	Fragile X	SIB, Agg, Dest	Escape	FA	VOCA, Picture	NA
Winborn et al. (2002)	Ike, 30	DD Seizures	SIB, NC, Dest	Escape	FA	Verbal, Gesture, VOCA	NA
	Julie, 29	DD Seizures	SIB, Agg, Tantrum, NC	Escape	FA	Symbol	NA
Winborn-Kemmerer et al. (2010)	Evan, 36	Down Syn	Agg, Tantrum, Dest	Escape	FA	Verbal, Picture, Gesture	37.5%*
	Annie, 36	DD, other, ADHD	Agg, Tantrum, Dest	Escape, Attention	FA	Verbal, Picture, Sign	93.1%*

CB= challenging behavior; AU = autism; DD = developmental disability; MR = mental retardation; PDD = pervasive developmental disability; CP = cerebral palsy; VI = visual impairment; TBI = traumatic brain injury; ADHD = attention deficit hyper activity; Agg = aggression; SIB = self-injury behavior; NC = noncompliance; Dest = destruction; FA = functional analysis; Int = interview; Obs = observation; RR = record review; AA = antecedent analysis, MBL = multiple baseline.

* Based on data of all baseline and FCT sessions.

Modification, the Journal of Autism and Developmental Disabilities, Augmentative and Alternative Communication, Educational Psychology, the Journal of Positive Behavior Interventions, the Journal of the Association for Persons with Severe Handicaps, American Journal on Mental Retardation, the Journal of Early and Intensive Behavior Intervention, the Journal of Behavioral Education, the Journal of Early Intervention, Topics in Early Childhood Special Education, Education and Treatment of Children, Beyond Behavior, Brain Injury, the Journal of behavioral Education, and the Journal of the Experimental Analysis of Behavior.

Demographic Characteristics

Table 3 shows the demographic characteristics of the participants included in the reviewed studies. Most of the participants in FCT were male (N=59; 70.2%). Many participants were diagnosed with a developmental disability (N=29; 34.5%), mental retardation (N=27; 32.1%), or autism (N=25; 29.8%). Many participants were 3 to 5 years old (N=55; 65.5%). The expressive communication modes used by the participants prior to FCT varied. Some participants were nonverbal (N=13; 15.5%) and others used spoken language (N=24; 28.6%). Some participants spoke several one-words (N=15; 17.9%). Others communicated with gestures (N=12; 14.3%) or signs (N=12; 14.3%).

Table 4 displays the topographies of the challenging behaviors demonstrated by the participants. The most common challenging behaviors were aggression (N=42; 50.0%), destructive behavior (N=33; 39.3%), self-injurious behavior (N=32; 38.1%), and tantrumming (N=26; 31.0%).

Table 3

Participant Characteristics in the Reviewed FCT Studies

Characteristic	N	%
Gender		
Male	59	70.2
Female	25	29.8
Age		
0-2	15	17.8
3-5	55	65.5
6-9	14	16.7
Disabilities*		
Developmental disabilities	29	34.5
Mental retardation	27	32.1
Autism	25	29.8
Cerebral palsy	7	8.3
Low vision/blind	6	7.1
Seizure	7	8.3
Language delay	10	11.9
Others	23	27.4

* Some data sets may include more than one disability.

Table 4

Topography of Targeted Challenging Behavior

Behavior*	N	%
Self-injury	32	38.1
Aggression	42	50.0
Tantrums	26	31.0
Disruptive behavior	17	20.2
Destructive behavior	33	39.3
Noncompliance	16	19.1
Others	11	13.1

* Some data sets may include more than one targeted challenging behavior.

Assessment of Challenging Behavior

Assessment methods. Table 5 shows the types of assessment methods employed in the reviewed studies. A functional analysis was used for most participants (N=66; 78.6%). The variables manipulated in the functional analysis were modeled on those used by Iwata, Dorsey, Slifer, Bauman, and Richman (1982), Carr and Durand (1985), or Wacker, Northup, and Cooper (1992). Each researcher modified the analysis conditions somewhat and described those modifications in their methods section. For example, Peck et al. (1996) conducted a brief functional analysis that consisted of only an attention condition and a demand condition for one participant. In the assessment used by Moes & Frea (2002), antecedent variables, rather than consequence variables, were manipulated to determine the effects on behavior.

Table 5

Assessment Methods

Method*	N	%
Functional analysis	66	78.6
Interview	30	35.7
Observation	28	33.3
Record review	4	4.76
MAS	13	15.5
No data on assessment	4	4.8

* Some data sets may include more than one assessment method.

Function of the challenging behavior. Most participants engaged in challenging behaviors in order to escape (N=37; 44.1%) from undesirable tasks or demands or to obtain attention (N=33; 39.3%) from parents, teachers, or caregivers. Challenging behaviors to acquire tangibles (N=30; 35.7%) were also common in the reviewed studies.

Settings and Implementer in Assessment and Intervention

Settings. Table 6 displays the settings where assessment and intervention procedures were implemented. Many treatment sessions were conducted in the same setting as the assessment. Most assessment and treatment sessions were implemented in home settings, treatment/pull-out rooms, or classrooms. In some studies, several settings were used in the FCT sessions. For example, in the study by Schindler & Horner (2005), participants received FCT in a pull-out room, classroom, and home setting.

Table 6

Setting for Assessment and Intervention

Setting*	Assessment	Assessment	Intervention	Intervention
	(N)	(%)	(N)	(%)
Classroom	14	16.7	19	22.6
Hospital/Clinic	11	13.1	15	17.9
Home	36	42.9	37	44.1
Treatment/pull-out room	19	22.6	23	27.4
No data	9	10.7	0	0

* Assessment and intervention may have occurred in more than 1 setting for each child.

Implementers. Table 7 represents the implementers in assessment and intervention. Many procedures in assessment and intervention for children were implemented by the researchers and family members. Teachers were involved as implementers in some FCT studies.

Table 7

Implementer in Assessment and Intervention

Implementer*	Assessment	Assessment	Intervention	Intervention
	(N)	(%)	(N)	(%)
Researcher	36	42.9	39	46.4
Family member	36	42.9	39	46.4
Teacher	17	20.2	10	11.9

* Assessment and intervention may have been conducted by more than 1 implementer for each child.

Study Methodology

Thirty-seven of the reviewed articles (97.4%) reported interobserver agreement rates ranging from 0% to 100%. The average IOAs were higher than 90% in most of the data sets (N=61; 72.6%). The authors conducted single-subject experimental designs with replication (e.g., multiple baseline or reversal) for 60 participants (71.4%). Single-subject experimental designs without replication were used for nineteen participants (22.6%). These included an AB design and treatment sessions with no baseline conditions. The social validity for the FCT was reported in only 19 data sets (22.6%). An increase in

positive feeling, sustainability, or acceptability was reported in all the studies with a measurement of social validity.

FCT Procedures

Many children's challenging behaviors resulted in extinction (N=53; 63.1%) during FCT. Some implementers blocked (N=18; 21.4%) challenging behavior like self-injury behavior or redirected (N=12; 14.3%) what participants were supposed to do in FCT. Time out (N=7; 8.3%) and guidance (N=3; 3.6%) were also used as consequences on challenging behavior.

Table 8 represents the data for the types of communicative responses used in the reviewed studies. Many participants were taught to use verbal words (N=38; 45.2%) to obtain the same reinforcements acquired by demonstrating challenging behavior prior to FCT intervention. Utterances in the studies included "am I doing good work?" "play with me," "finished," "can I have a break?" and "I need help." VOCAs (N=23; 27.4%), pictures or symbols (N=19; 22.6%), and signs (N=18; 21.4%) were used in many of the studies for participants who were nonverbal or needed augmentative and alternative communication methods (AAC). Target utterances for participants using pictures, symbols, or signs consisted mostly of single words such as "more," "food," "no," "help," "please," and "done." VOCAs were used to record whole sentences, such as "Please come here"; "I want more, please," and "I want to be with the group."

Table 8

Communication Responses in FCT Treatment

AAC strategy*	N	%
Signs	18	21.4
Gestures	11	13.1
Pictures/ Symbols	19	22.6
VOCAs	23	27.4
Verbal Words	38	45.2

* Some data sets may include more than one AAC strategy.

FCT Results

Only the studies demonstrating experimental control were involved in the outcome analysis which included such things as a percentage reduction calculation on challenging behavior. Some data sets with no data on target challenging behavior in the FCT were excluded in this outcome analysis. Some researchers presented only graphs of challenging behavior without exact data such as average scores of baseline and FCT sessions. In this case, a percentage reduction on challenging behavior was not calculated and that study was excluded from the outcome analysis.

For those reasons, some data sets were excluded and only 48 data sets were used for this outcome analysis. The percentage reduction data are presented in Table 2. Forty one (85.4%) of the 48 participants demonstrated a percentage reduction of 50% or higher. Twenty nine (60.4%) of the 48 participants demonstrated a percentage reduction of 90% or higher.

Authors reported conducting follow-up sessions for 18 participants (21.4%) and all maintained decreased levels of challenging behavior and an increase in their use of the

new communicative behavior. Finally, authors reported generalization data for 21 participants (25%). Among these participants, 15 children generalized decreases in the challenging behavior and increases in the utilization of the communicative response.

Visual analyses were completed and indicated that 65 (77.4%) of the 84 participants experienced increases in the mean level and trend of the new communicative behavior. For the remaining 19 participants, it was impossible to conduct visual analyses due to no data on communicative responses or the lack of a baseline.

Discussion

Thirty-eight studies were reviewed in this chapter. Children between the ages of 3 to 5 were more often included in FCT studies than children at any other ages. In particular, not many children ages birth through 2 years participated in FCT studies. However, FCT may play an important role as an early intervention to prevent increasing challenging behavior and to facilitate communication development in early childhood. More research is needed on the procedures and effects of FCT for very young children. FCT for children has been conducted with male participants and with children who have a developmental disability, mental retardation, or autism. The children in the FCT studies demonstrated various topographies of challenging behavior such as aggression, destructive behavior, self-injurious behavior, tantrums, disruptive behavior, and noncompliance. Despite the fact that the researchers reported various characteristics of the participants of FCT, the ethnicity of the children and their parents was rarely described in the FCT studies. However, data on the ethnicity of the children are essential to prove the effects of FCT across children from various ethnic groups. Cultural

differences should be considered in future FCT research, to promote effective family involvement and successful intervention for children with challenging behavior (Fox, Dunlap, & Powell, 2002).

The results of this review supported that FCT was an effective intervention for children to decrease challenging behavior and to increase communication skills. This conclusion was based on several findings in the review. First, many of the reviewed studies demonstrated high quality in the single subject designs. The level of experimental control was replicated across 60 participants and acceptable interobserver agreements were reported for many of the participants. Second, the percentage reduction of challenging behavior was high in a large number of participants. Third, many children learned and used new communicative responses. Fourth, the effects of FCT were maintained and generalized in the studies which reported the data of follow-up or generalization sessions. Many of the findings met the quality indicators recommended by Horner and colleagues (2005). Therefore, it was recommended to consider FCT as an intervention program in early intervention to reduce challenging behavior that serves the same function as a communicative response.

One important finding in this analysis was that functional analysis was commonly used in the assessment for children, with the procedures modified in many studies. Some researchers discussed that the use of formal functional analysis procedures was not often required in the assessment of young children because their behaviors were not complicated and their learning histories were comparatively brief (Dunlap & Fox, 1996). However, most researchers used functional analysis to assess the challenging behavior of

the children even though many researchers in the reviewed studies modified functional analysis to create a brief form. Functional analysis was considered as a necessary method to find the function of the challenging behavior (Derby et al., 1997; Moes & Frea, 2002), while observation, interview, and record review were used to obtain fundamental information on the challenging behavior, such as the specific settings or situations in which the challenging behavior was frequently demonstrated or to make the hypotheses on the challenging behavior. For example, Derby and colleagues (1997) implemented two or three conditions in the functional analysis to confirm the hypotheses obtained from the previous interview and observation. Another finding was that functional analysis for children was conducted by family members in home settings (Berg et al., 2007; Brown et al., 2000; Dalmau et al., 2011; Derby et al., 1997; Harding et al., 2005; Harding et al., 2009; Moes & Frea, 2002; Schieltz et al., 2011; Wacker et al., 2011; Winborn-Kemmerer et al., 2010). Parents were asked to give or withhold attention or to demand a task of their child in home environments.

The natural environment is important to provide assessments and interventions for children with challenging behavior. A natural environment is defined in Part C of the Individuals with Disabilities Education Improvement Act (IDEIA) as a normal and natural environment for the child's age-peers who are developing typically. Children under the age of 3 would be served by the state's Part C programs within the child's natural environment such as a home setting, while natural environments for 3- through 9-year-olds refers to home and educational environments such as day care, kindergarten programs, and schools. Therefore, home settings and classrooms are considered natural

environments for children under the age of 9. Based on the results of this literature review, fifty out of 84 children were assessed and fifty-six out of 84 children received intervention in home settings or classrooms. Especially, in the recently published FCT studies, assessment and FCT procedures for children were conducted in home or classroom settings. However, many children have still received assessment and FCT sessions within unnatural environments. Thirty eight out of 84 children received intervention in pull-out rooms, treatment rooms, and hospitals. Natural environments need to be emphasized in planning assessments and FCT interventions for children with challenging behavior (Mancil, 2006).

Appropriate implementers for children during assessments and interventions should be also considered in future research (Mancil, 2006). Many assessment and FCT procedures for children were implemented by research assistants, therapists, or trainers. In some studies reviewed here, assessment and intervention procedures were conducted in the children's homes but implemented by researchers (Drasgow et al., 1998; Peck et al., 1996; Mildon et al., 2004). On the other hand, Wacker and colleagues (2005) recruited parents of 25 young children with developmental delays or multiple disabilities who engaged in challenging behavior and trained the parents to implement functional analysis and FCT procedures in their homes. Most parents reported that the procedures were acceptable and FCT was effective to decrease challenging behavior across almost all children. Family members should more often be involved in FCT studies as direct implementers and researchers should provide training in FCT to those family members.

The results of this review should be considered with the following limitations. First, a publication bias could exist. Studies with unsuccessful outcomes of FCT might be unpublished. Second, large group studies (N=4) on this topic were excluded from this review because they did not report individual data on some coding categories (Hagopian et al., 1998; Kurtz et al., 2003; Reeve & Carr, 2000; Wacker et al., 2005). It is possible the results of this review may be modified if the four large group studies were included in this review. To generally review the four studies, a total of 45 children participated, a functional analysis was conducted, and high percentages of reduction in the challenging behavior were reported in the 4 studies. For these large group studies, many children were assessed and received FCT in not natural environments. Only 18 children received the assessments and FCT interventions in home settings (Wacker et al., 2005), while the assessments and FCT sessions for 27 children were conducted in treatment rooms or tutorial rooms (Hagopian et al., 1998; Kurtz et al., 2003; Reeve & Carr, 2000). On the other hand, parents or caregivers were involved in many assessment and FCT sessions as implementers. For example, 35 children (Wacker et al., 2005; Kurtz et al., 2003) received assessments and FCT interventions conducted by parents or caregivers, while research assistants or therapists implemented assessment and FCT sessions for other 10 children (Reeve & Carr, 2000; Hagopian et al., 1998). Third, another limitation is that insufficient inter-observer agreements were obtained on several coding categories when the author and the second observer independently coded 30% of the all studies. Some inter-observer agreements were lower than 80% on some coding categories. The results of this review should be considered regarding these insufficient inter-observer agreements.

Some issues remain. First, other applied settings should be considered for conducting future FCT research. Various places in the communities are available to implement FCT. Durand (1999) conducted FCT at a store and a movie theater, and reported a decrease in the challenging behavior and an increase in using the new communication skills. Second, research is needed to find how much training and support is required for family members or teachers to implement assessment and FCT. Researchers did not report the specific procedures for training parents or teachers (Derby et al., 1997; Dooley et al., 2001; Koegel et al., 1998; Moes & Frea, 2002). Third, no one has compared the effectiveness of communication modes in FCT. Children who have limited expressive language skills need to learn new communicative responses using an effective mode. Fourth, there is little data on the social validity of FCT (Charlop-Christy et al., 2002; Durand & Carr, 1992; Peck et al., 1996; Winborn et al., 2002). Among the reviewed studies, some researchers examined social validity of FCT but used a simple method such as a questionnaire with Likert type rating scales (Gibson et al., 2010; Harding et al., 2005; Harding et al., 2009; Moes & Frea, 2000; Moes & Frea, 2002; Schindler & Horner, 2005). Various aspects of social validity of FCT should be examined using multiple methods to find out whether teachers, parents, and early interventionists would find FCT acceptable and effective.

In summary, early intervention and early childhood special education teams should conduct assessment in natural environments to identify the function of the challenging behavior when children demonstrate challenging behaviors. The team should consider functional communication training to reduce challenging behavior and to teach

appropriate communication skills which serve the same function as the challenging behavior. In addition, behavioral intervention like FCT should start early for young children with challenging behavior.

One suggestion from the results of this literature review is that researchers should examine the effects of FCT for culturally and linguistically diverse children with challenging behavior and their families. Children and families from diverse ethnic groups have rarely been involved in FCT studies even though they need an effective intervention like FCT to support their difficulties in developing appropriate behaviors and communication skills. It is recommended to train diverse immigrant parents to implement FCT for their children within home routines or activities. In addition, researchers should investigate various aspects of social validity on FCT from diverse immigrant people. It is important to examine perspectives on FCT from culturally and linguistically diverse people who have different values, beliefs, and traditions before recommending FCT to children from diverse backgrounds.

CHAPTER THREE

Methodology

Participants

Three Korean immigrant mothers and their children with developmental disabilities participated in this study. They were recruited based on following four criteria.

First, the mother was a first-generation Korean immigrant¹ in the United States. Researchers of FCT studies have rarely reported ethnic backgrounds of the participants as discussed in the chapter two of this study. Thus, very little is known about the effects of FCT to culturally and linguistically diverse children and their acceptability on FCT. The outcomes of FCT intervention should be examined across children from diverse ethnic groups. Korean immigrant children are considered as a diverse ethnic group compared to Caucasian due to their exposure to two distinct cultures. It is important to investigate whether similar outcomes are observed when the FCT intervention is applied to Korean immigrant children.

Second, the child was diagnosed with developmental disabilities such as autism spectrum disorders, Down syndrome, or other developmental delays.

Third, the child frequently engaged in challenging behavior that was inappropriate or dangerous such as self-injurious behavior, aggression, destruction, tantrum, noncompliance, disruption, and difficulty in routines.

Fourth, the child was from birth through age 9; this age range was chosen based on the definition of ‘child with a disability’ described in the IDEIA. Special education

¹ One father was Taiwanese.

and other related services are provided to children and youth aged 3 to 21 with disabilities according to the Part B of IDEIA and ‘a child with a disability’ is defined as children aged 3 to 9 (U.S. Department of Education, 2011). Especially infants and toddlers with disabilities from birth through age 2 are under the Part C of IDEIA and early intervention services are delivered to them. Since FCT was introduced, FCT studies have been applied to children aged 0-9 (Kurtz et al., 2011; Mancil, 2006). However, more data on the procedures and outcomes of FCT for children are needed to develop FCT as an effective intervention in early childhood.

Participants were recruited from Korean communities of a large city in southeast US. The author contacted early intervention agencies, private therapy centers, children’s hospitals, Korean immigrant churches, Korean immigrant associations related to people with disabilities, Korean daycare centers, and other Korean community associations in Atlanta to find Korean children who satisfied the criteria. Four Korean children with developmental disabilities were recruited according to the criteria. However, one of them moved to another state during initial interviews with the mother. Thus, three Korean children with developmental disabilities and their mothers participated in this study.

Peter was a 7-year-old boy who had been diagnosed with developmental delays. He started speaking several simple one-word such as ‘mom’, ‘bye’, and ‘hi’ at the beginning of this study. Despite his lack of verbal skills, he generally communicated using gestures like pointing and signs learned at his special education classroom like ‘more’, ‘eat’, and ‘thank you’. Peter frequently engaged in challenging behavior with aggression, tantrum, and destruction.

Dustin was a 5-year-old boy who had been diagnosed with autism. He did not speak any one-word utterances. Dustin verbalized certain sounds like ‘a’ and ‘i’. In the study, he mainly communicated through gestures such as pointing and hand pulling. For example, he went to the pantry pulling his mother’s hand and pointed to cookies and chips as a requesting. Dustin’s challenging behavior included tantrum, snatching, grinding teeth, self-injury, and stereotypical behavior.

Hans was a 7-year-old boy who had been diagnosed with autism. He uttered simple one-word or two-word to requests. However, if someone asked him a question, he repeated the question without understanding what he was saying or said what he wanted that was not related to the question. For example, when an adult visited and asked ‘how are you?’, he answered ‘coke’ and repeated ‘coke’ many times. Hans engaged in challenging behavior including self-injury, aggression, leaving the seat, elopement, and stereotypical behavior.

All the children were concurrently enrolled in a special education programs in the local school districts where they attended five hours a day, five days per week. In addition, they were not involved with any medication treatment, behavior service, or therapy during the participation in this study.

Table 9

Participant Characteristics

Participant	Age (year-months)	Sex	Diagnosis	Expressive communication	Target challenging behavior
Peter	7-4	Male	Developmental delays	Several one-word utterances, gestures, signs	Aggression, whining
Dustin	5-1	Male	Autism	Nonverbal, gestures	Tantrum, snatching
Hans	7-9	Male	Autism	One-word utterances	Self-injury, aggression, out of Seat

Mothers

Peter's mother was 45 years old and had graduated from a college in South Korea. Having lived in the U.S. for 18 years, she had originally immigrated looking for a job. When this study began, she was a housewife rearing, with her husband, Peter and his older brother. Peter's father was 54 years old. Holding a bachelor's degree in management from a Korean University, he had, for 22 years, worked in America as a hat seller. They had been married for 14 years. Their primary language in the home was Korean. However, the mother spoke English words within Korean sentences to teach simple English words to Peter. She wanted to help him speak and understand English words at school.

Dustin's mother was an immigrant who had been in the United States for 19 years. Having come here with her parents when she was in a high school, she was now 36 years old. She held a bachelor's degree in art from an American university. Dustin's father, Taiwanese and 40 years old, had lived in the US for 33 years. He was a medical doctor and had gotten his degree in the US. They had been married for 11 years. All the family members spoke English. The mother spoke English fluently but communicated with the author in Korean. She was the primary caregiver for Dustin and his younger brother. The mother did have, however, a part-time job and, when she was at work Dustin's grandparents took care of him and his younger brother. His grandparents spoke only Korean to the children and the mother and the grandparents communicated in Korean.

Hans' mother was 41 years old and prior to the study had lived in the United States for 9 years. She lived with her husband, Hans, and his younger sister. She held a

bachelor degree in hotel management from a Korean college. Before moving to the US, the mother and father lived for 10 years in Japan. The father was 48 years old. He was Korean but had graduated from a Japanese law school and had worked at a Japanese firm. The family's primary language in the home was Korean. The mother did not speak English fluently but she would say to Hans simple English words (e.g., "candy," "coke," and "water") to help him communicate with teachers and classmates in English.

The author, throughout the study, communicated with the mothers in Korean. All written materials for the mothers were translated into Korean because their first language was Korean and they preferred Korean. The consent forms, written information on functional analysis and FCT, and the Behavior Intervention Rating Scale were translated into Korean before being provided to the mothers.

Settings & Implementers

All assessment, intervention, follow-up, and generalization procedures were conducted by each child's mother in their homes. The mothers selected specific home areas and routines that had specific needs for family members and also where their children frequently engaged in challenging behavior. Each mother selected two different sets of home setting and routine; one for assessment, intervention, and follow-up and the other one for generalization. A summary of the selected home areas and routines is provided in Table 10. In addition, another family member, Peter's older brother, participated in several generalization sessions as an implementer. The brother conducted generalization sessions according to directions given from the author and his mother.

Table 10

Summary of the Selected Home Areas, Routines, and Materials

	Assessment, intervention, & follow-up				Generalization			
	Home area	Routine	Target CB & function	Materials	Home area	Routine	Target CB & function	Materials
Peter	Dinning room	Snack time Play time	Aggression & whining (tangible)	Sticker, flash card, ball, character card, and food like bread, candy and pizza	Living room	Software game time	Aggression & whining (tangible)	Wii, computer game, small game device like game boy
Dustin	Dinning room & living room	Snack time	Tantrum & snatching (tangible)	Food items (cookie, chip, chocolate & cereal)	Play room & bed room	Play time	Tantrum & snatching (tangible)	Circle shaped items (CD, o-ball, & face powder case)
Hans	Study room	Academic task	SIB, aggression, & out-of seat (escape)	Puzzle, flash card, story book, & hand writing	Kitchen	Picking up pictures	SIB, aggression, & elopement (escape)	Pictures on grocery flyer & magazine

The mothers spoke either Korean or English to their children in implementing all procedures. Peter's mother and her family members spoke Korean at home; his mother conducted all the procedures in Korean. Although Peter's mother did not speak fluent English, she spoke simple English words or sentences to Peter. Dustin's mother spoke English during all procedures. His family members communicated in English at home but his mother spoke Korean to the author. All family members of Hans spoke Korean at Home and the mother implemented all sessions in Korean. However, she often talked to Hans with rudimentary English words while speaking Korean sentences despite her lack of skills in English. Peter's and Hans' mothers thought their children had difficulties in acquiring language skills, and both of mothers wanted to help their children in communicating with others in school. Therefore, the two mothers tried to speak even simple English words to their children despite their insufficient English speaking skills. For example, both of mothers spoke one-word English utterances to their child like 'cookie', 'want', 'more' or 'sorry' and explained definitions in Korean.

All parents chose to implement procedures within their home which aligns with researcher's concerns regarding the importance of conducting assessment and intervention for children demonstrating challenging behavior in a natural environment (Neilsen & McEvoy, 2003; Harrower, Fox, Dunlap, & Kincaid, 2000). A natural environment for children in early intervention is mandated by the Individuals with Disabilities Education Improvement Act (IDEIA). Home is one of the natural environments and assessment and intervention in home settings is recommended as an appropriate environment for children, rather than in highly controlled environments such

as clinics or experimental rooms. Furthermore, family members who maintain intimate relationships with children are considered as implementers. For that reason, the mothers conducted all procedures within specific rooms of their home during the course of this study.

It was essential to provide adequate training to implementers to attain treatment reliability. The training for the mothers consisted of providing written information on how to implement functional analysis and FCT, on-site coaching by the author, and feedback following watching some of their videotapes. All of the training for the mothers was conducted in Korean.

Materials

Various materials were provided to each child, based on selected routines and the function of challenging behavior. For Peter and Dustin, their preference of tangible objects was considered in selecting materials used in this study. Both mothers reported that their children engaged in challenging behavior to obtain specific items and described their children's preferred items. For Hans, he had often engaged in challenging behavior to escape from an academic activity such as picking up number or worded flash cards. The mother recommended several items used in academic activities. Details of the materials provided for each participant were described in Table 10.

Peter had an interest in food items, computer games, small game devices, carton character cards, and stickers. These items were presented as tangible objects to Peter. Dustin requested food items and circle shaped objects such as a CD and a face powder

case. Some academic tasks were provided to Hans utilizing books, puzzles, flash cards, pictures, color pens, and paper.

All sessions were recorded, using a digital camera and digital tape. The author and the assistant researcher independently reviewed videotapes to count intervals of dependent and independent variables. The mothers viewed some of their tapes once the author had an opportunity to complete the initial coding. The author selected portions of the tapes and used them to coach the mothers about FCT strategies.

Response Definitions

Dependent Variables

Child behaviors observed in this study were challenging behaviors and communication responses. The dependent variables were the percentages of the intervals of the challenging behaviors and the percentages of the intervals of the communication responses. The data on the dependent variables were collected using a 10-second partial interval method.

Challenging behavior. Two or three challenging behaviors were targeted for each child following discussion about all challenging behaviors performed by the child. The mother and the author considered the family's needs and the seriousness of the challenging behavior. In addition, the specific topography of each target challenging behavior was identified and used to collect data.

Peter's target challenging behaviors were whining and aggression. He often whined in a high pitched and long-lasting vocal sound like /a/ or /iu/; his mother complained that his whining was usually very noisy and interrupted family's daily life

and activities in school, church, or community. Peter engaged in aggression via hair pulling, hitting, slapping, or pinching.

Dustin's target challenging behaviors were tantrum and snatching. Dustin cried, screamed, and stamped on his feet as means of showing tantrum. Dustin often snatched objects in his mother's hands with speed and force. Snatching was coded when Dustin did not do any communicative behavior and stretched a hand within 10 cm from a tangible in his mother's hand.

The target challenging behaviors of Hans were self-injury, aggression, and leaving the chair. For the self-injury, Hans engaged in head banging, hand biting, slapping and hitting his own body, and eye poking. His aggression included hitting, slapping, scratching, pinching, and kicking. Leaving the chair was defined as jumping up from the chair. Leaving the chair was coded if he stood up and his hips were separated from the chair.

Communication response. The author discussed with the mothers to determine their children's appropriate communication responses, which were taught in FCT intervention. The communication response was selected considering the reinforcement of the targeted challenging behavior, the child's communication ability, the family's needs, and the child's current learning experience in school.

First, the selected communication response gained access to the same consequence which had reinforced the target challenging behavior. Consequences were provided preferred tangible items for Peter and Dustin and breaks for Hans.

Second, the children's communication ability was considered. The selected communication response had to be easily learned and used by the child. For example, if one of the children was nonverbal and communicated with gestures and signs, the mother and the author selected a simple sign language as a communication response and taught it in FCT intervention. One verbal word was chosen when the child spoke one word utterances without any difficulty.

Third, the communication response was decided based on the family's needs. Each child's family members were included in selecting a communication response that would be frequently used at various home contexts.

Fourth, the author and the mothers reviewed their children's current learning experience in school related to language development. If the child was trained using one of Alternative and Augmentative Communication options such as sign, symbol, and VOCA in school, the same option was considered as a communication response.

According to the consideration, a specific communication response and mode were identified for each child. Peter's selected communication response was two combined signs of 'please give me'. Dustin's selected communication response was a sign of 'please'. Peter and Dustin were nonverbal and learned several signs in their special education classroom. They made signs to communicate with others in school and used the trained signs at home. Hans' selected communication response was a verbal word of 'break'. He uttered one-word and pronounced 'break' easily. The selected communication responses were taught during the FCT intervention. Prompted and unprompted verbal requests or signs were coded as communication responses.

Independent Variables

The independent variables were the percentages of the reinforcements per child's communication response and the percentages of the intervals of mand prompts.

Use of Reinforcements. Reinforcement was coded if the mother provided the stimulus, which reinforced the challenging behavior following her child's selected communication response. The data on reinforcement for the child's communication responses were monitored for the baseline, intervention, follow-up, and generalization. The data were recorded as percentages of reinforcement per child's communication response. For example, if only 7 of 10 of the child's new communication response were correctly reinforced by the mother, the use of reinforcements for communication responses was scored as 70%. Observers scored only reinforcement which the mother delivered within 5 seconds following the occurrence of the child's communication response. Reinforcement included tangible items for Peter and Dustin and escape for Hans. Tangibles were defined as providing requested tangible objects to the child following a use of the communication response taught in FCT intervention. Escape was defined as taking a break following a request with the selected communication response. Hans' mother removed task materials and allowed him to take a break for 20 seconds when he said 'break'. During the break, Hans just sat on the chair without any demands or walked around the room.

Extinction was used contingently on challenging behavior in intervention, follow-up, and generalization. Extinction was defined as no response or no reinforcement following challenging behavior. In addition, blocking was used in cases where child's

behavior was dangerous and harmful. For example, Peter's mother held his hand or stood up between Peter and his brother if he raised a hand to hit his brother. Dustin's mother took hold of Dustin's both hands for a while when he got upset and pulled out his hair. Hans' mother held his hand or head if he engaged in SIB like hand biting, head banging, and hitting himself.

Mand prompts. The mothers provided mand prompts, which were scored as percentages of 10-second intervals of mand prompts. The mothers prompted their children to make verbal or signed requests taught in FCT and the observers recorded their mand prompts. Mand prompts included verbal prompts, modeling, and physical guidance. Verbal prompts were defined as any statement to stimulate the child's selected communication response such as 'if you want to get a cookie, show me a sign of give me' and 'say break if you want a break.' Modeling was defined as demonstrating the selected sign expecting the child to imitate making the sign. Every modeling occurred with verbal prompts in this study. For example, the mother of Peter demonstrated the sign of 'please give me' to him saying 'show me please give me'. Dustin's mother showed the sign of 'please' with verbal prompts like 'sign please' or 'you should say please'. Physical guidance was defined as direct touch to the child to facilitate the communication response. Peter and Dustin did not make any signs in the beginning of FCT intervention with verbal prompts or modeling. The mothers directly held their children's hands and made the signs together.

Participating mothers gradually decreased assistance using prompts, which is called as most-to-least prompts. Mothers began prompting with physical guidance and

then used modeling. Only verbal prompts were provided once the child used to make the communication response without any help. For example, the mother held the child's hands and made the selected sign together in the beginning of FCT intervention. If the child was able to make the sign himself, the mother demonstrated the sign looking at the child with verbal prompts such as 'sign please' without physical contact with the child. The next step was mother asking 'do you want this cookie?' and expecting the child to make the sign. However, for Hans, his mother used only verbal prompts and did not need to decrease assistance in providing prompts.

A time delay was also used to fade prompts. Mothers did not present prompts and waited for five seconds watching their children's eyes. It was to facilitate the child to respond without prompts. A time delay was not to prompt any communication response of the child. Therefore, a time delay was not scored as a mand prompt.

Data Collection & Interobserver Agreement

All sessions were videotaped using a Panasonic High Definition mini-DV digital camcorder and mini-DV digital tapes. The author and another observer independently viewed videotapes of sessions and collected data of the variables using codes designed by the author. The data were collected with a 10-second partial interval procedure and recorded on a coding sheet designed specifically for this study. The coding sheet was presented in Appendix B. The data were saved to an IBM laptop computer and data analyses were completed by using Microsoft Excel®. This software was also used for graphic displays.

Independent and dependent variables were recorded as a code on a coding sheet as the behaviors occurred. Another assistant researcher watched 30% of all videotaped sessions across whole phases and collected data using the codes to obtain reliability between two observers. The assistant researcher was a Korean graduate student and had knowledge of and experience with behavior analysis. The two observers reviewed definitions of the dependent variables and independent variables and exercised coding until they reached 85% agreement on all responses. They scored the videotapes using a 10-second partial interval procedure. Interobserver agreement was computed with an interval-by-interval basis. The percentage of agreements between the two observers was calculated as the total number of agreements divided by the total number of agreements plus disagreements. The interobserver agreement was measured for all the independent and dependent variables. The means of the interobserver agreements and the ranges of the agreements were reported for all the children.

Experimental Design

Functional analysis was conducted using a multi-element design to identify a function of challenging behavior. A multiple probe design across participants was conducted including the baseline, FCT, and follow-up. Generalization sessions were also conducted using a multiple probe design across participants to examine the generalization of the FCT intervention effect. In order to reduce numbers of baseline sessions in which children engaged in challenging behaviors such as SIB, aggression, and tantrum, a multiple probe design was used for FCT intervention and generalization; it was important to minimize the possibility of the children from hurting themselves when engaging in

challenging behavior. One more reason was that this design was conducted to execute sufficient experimental control over the dependent variables. Experimental control was achieved by initiating the FCT intervention to different children at different times (Kazdin, 1986).

The mother implemented ten-minute sessions during activities or routines in which the targeted challenging behavior had occurred. Two or three sessions were conducted per week for each child. The total number of sessions was 20 to 30 per child.

Experimental Procedure

All procedures were conducted in the participants' home settings. The author trained and coached the mothers to implement functional analysis, baseline, FCT intervention, follow-up, and generalization.

Assessment

Observation, interview, & record review. The author visited the child's home to explain the experimental procedures and to gain consent for participation in this study. The author observed the child's behavior during home activities and routines in which the child often engaged in challenging behavior.

The author, accompanying (one after another) the mother of each child, visited every child's classroom. At these meetings with each child's special education classroom teacher, the author was asked by each mother for help with translation. In such fashion, the author acquired information about the child's behavior towards his peers and teacher. The author also directly observed the child's behaviors in classroom, cafeteria, or playground.

The author interviewed the mother to obtain general information about the child and family members. The interview focused on antecedent and consequent conditions in which challenging behavior had frequently occurred, the mother's reactions to challenging behavior, and descriptions of challenging behavior. The researcher used the Functional Assessment Interview to complete a formal interview with the mother (O'Neil et al., 1997). The formal interview revealed the child's challenging behavior, seriousness of challenging behavior, family needs related to challenging behavior, possible causes of challenging behavior like sleeping problem, medicine, health issues, and so on.

The researcher reviewed various kinds of records related to the child's disabilities and behavior to gain descriptions of the level of functioning and behavior of the child only when the mother provided records to the author. The review of records included medical documents and school records such as portfolio, IEP meeting documents, early intervention screening results, and teacher's daily notices.

Functional analysis. Each mother conducted a functional analysis to identify a reinforcement of their child's target challenging behavior. The functional analysis was conducted following the procedures developed by Iwata and colleagues (1994). The author explained a functional analysis to the mother with written information and planned details of functional analysis conditions with the mother. The author reminded the mothers about the main points of functional analysis prior to conducting a functional analysis session. The researcher coached the mothers during functional analysis sessions if the mother made errors in providing reinforcements to maintain a specific condition. Coaching for the mother consisted of verbal reminding and prompting.

The multi-element design was used with 5-minute sessions. Four assessment conditions were designed and randomly assigned for each child.

First, a free play condition was used to prove that the child did not or rarely engaged in the target challenging behavior when attention was available, tangible items were unlimitedly provided, and the mother did not make any demand. The mother provided continuous attention by sitting by and looking at the child and saying compliments like ‘you’re doing well’ and ‘good job’. Various kinds of toys, materials, and food which the child liked were placed near to the child. The mother did not ask the child to do any task or activity. The mothers ignored and did not reinforce challenging behavior.

Second, an attention condition was used to identify effects of the mother’s attention on the challenging behavior. During this condition, the child played or did various activities while the mother read a book or did other work such as washing dishes or cleaning. The mother ignored the child’s behavior if the child played appropriately without demonstrating the challenging behavior. However, if the child engaged in the challenging behavior, the mother came to the child and delivered attention for 20 seconds by saying gentle reprimands like ‘don’t do that’, ‘stop it’ or ‘play with your toys.’

Third, a tangible condition was used to evaluate whether the child engaged in the challenging behavior to obtain preferred food or objects. During this condition, the child was allowed to play with a preferred toy or to eat a favorite food. The mother arranged the toy or food out of the reach of the child. If the child demonstrated the challenging

behavior, the mother provided the toy or food to the child. The mother retained the toy or food again if the child stopped the challenging behavior.

Fourth, a demand condition was employed to examine whether the child engaged in the challenging behavior when demands were presented and whether the challenging behavior was presented to escape from demands. During this condition, the mother asked the child to do a task such as a puzzle, reading a book, or writing letters and numbers. Every time the child engaged in the challenging behavior, the mother stopped requesting a task and allowed him to take a break from the task for 20 seconds. The mother continued to deliver task requests if the child did not engage in the challenging behavior.

The author provided additional explanation and information if the mothers had difficulty (being Korean immigrants with different culture values) understanding or conducting the procedures of functional analysis. For example, some mothers did not understand why, in certain conditions of functional analysis, they should avoid giving attention or tangibles. They also reported emotional difficulties when their children demonstrated challenging behaviors like crying or hitting them. In addition, each child's challenging behaviors occurred in a particular condition of functional analysis. The mothers were asked to establish repeatedly those conditions. However, all the mothers felt those procedures precipitated their children's upset feelings and challenging behaviors. When the mothers were reluctant to repeat a functional analysis condition that frequently brought on challenging behaviors, functional analysis was suspended and begun another day.

Intervention

Baseline. The author observed and videotaped the child and the mother in home settings prior to the FCT intervention. Baseline consisted of 10-minute observation sessions and data were collected on all dependent and independent variables. Baseline sessions were staggered to perform the multiple probe design across participants.

Baselines of the three children were initiated at the same time.

Once analysis on data from the first child showed a stable baseline, intervention for the first child was started, and baseline data collection for the other children continued. Baseline for the second child was completed and intervention began once intervention data of the first child revealed a trend in a predicted direction with three consecutive data points. Baseline data continued for the last child. Similar sequences were continued until intervention for the last child began.

Baseline sessions were conducted in a routine or activity in which the target challenging behavior had frequently occurred. The mother responded to the challenging behavior in the usual manner. For example, the mother who usually delivered a verbal reprimand for challenging behavior, said ‘stop it’ to the child when he screamed. The mother did not introduce the selected communication response. Some of the mothers prompted communication behaviors as they had been doing to their child. For example, Dustin’s mother said ‘say cookie’ or ‘say chip’ and Peter’s mother spoke ‘say thank you’ or ‘say sorry’ in the baseline sessions. However, these were different from the selected communication responses. The mothers simply tried to facilitate their child’s verbal language. The selected communication responses were not taught and prompted in baseline sessions.

Baseline for generalization was started concurrently with baseline for FCT intervention and was conducted in a different routine or activity. Baseline in generalization test was also implemented within a multiple probe design across participants.

FCT. The author discussed with each participating mother and other family members regarding results of assessment and identified function of the target challenging behavior. One appropriate communication response for each child was selected considering a function of the challenging behavior and current language development of the child. For instance, Peter and Dustin had difficulty making a verbal request. Thus, a sign of ‘please give me’ was selected for Peter and a sign of ‘please’ was decided for Dustin. Hans was able to speak simple one word so that a verbal request of ‘break’ was selected for him as a communication response. FCT sessions were conducted in the same routine or activity chosen for the baseline.

FCT intervention sessions for the first mother and child dyad were conducted after stable data in the baseline were obtained. When an intervention effect was observed with the first pair, intervention sessions began for the second pair and so forth. During FCT, the mothers trained their child to use a selected communication response to obtain reinforcement. The mothers prompted their children to make a request with the new communication response and the mother provided reinforcement to the communication response. The mothers also tried to provide prompts before the child demonstrated the target challenging behavior. For example, Peter and Dustin engaged in challenging behavior to obtain tangibles. Peter was taught to make a sign of ‘please give me’ and

Dustin was trained to make a sign of 'please' instead of engaging in challenging behavior. Hans demonstrated challenging behavior to escape from task requests. His mother taught him to say 'break' to stop task requests and take a short break. With regard to reducing the targeted challenging behavior, the mothers ignored or blocked the challenging behavior. Reinforcement was not provided when the child engaged in the challenging behavior. For example, if the child engaged in aggressive behavior or self-injuring behavior, the mother blocked aggression and self-injury by holding the child's hands or head without any verbal reprimands. The mother did not deliver a tangible or a break following the challenging behavior and reminded the child to use the selected communication response instead of the challenging behavior after the child stopped aggression and self-injury.

The mothers prompted their children to make a request in the beginning of FCT intervention. They used verbal prompts, modeling, and physical guidance to facilitate their children's communication response and withdrew prompts according to fading strategies. The mothers were also asked to use delayed prompting. They delivered prompts after waiting for 5 seconds to provide opportunities for the child to respond without any prompt.

The mothers were trained to implement all FCT procedures to their child at home. Training on FCT consisted of written instructions on implementing FCT procedures, modeling FCT strategies by the author, on-site coaching, and providing feedbacks during viewing videotapes together. The mothers were able to contact the author to ask questions on FCT by phone call or email. The first session of FCT intervention was implemented

once each mother rightly prompted their children's new communication responses and ignored the challenging behavior. The mothers practiced using of prompts and extinctions prior to FCT. The intervention began if the mother achieved over 80% in the percentage of extinctions or blockings per challenging behavior and the percentage of reinforcement per the child's communication response. Intervention sessions were finished if a percent of reduction was higher than 80%. A percent of reduction was calculated by the same formula used in the chapter 2.

Follow-up. Follow-up sessions were conducted at 4 months after completing FCT intervention. The purpose of follow-up was to monitor progress at home and to examine effectiveness of FCT intervention on the communication response and challenging behavior maintained over time. The author visited the child's home at least 3 times and videotaped 10- minute follow-up sessions during the same routine or activity as that FCT sessions had been conducted. The author did not provide any coaching or comments to the mother in process of the follow-up. The mother continued to implement FCT procedures as previously did during the last session of FCT intervention.

Generalization. Generalization sessions were completed in order to evaluate effectiveness of FCT intervention transferred to another family routine or activity. Generalization probes were conducted within a multiple probe design across participants. Baselines in generalization were made prior to beginning of FCT. Generalization sessions were implemented concurrently with FCT sessions but in a different home setting and routine from one in which FCT intervention was conducted. Details of setting, routine, and materials in generalization sessions were described in Table 10. All generalization

sessions were also videotaped. At least one generalization session was implemented within each phase of the study (e.g., baseline, intervention, and follow up).

The mothers conducted all generalization procedures. The mothers delivered prompts, faded prompts, and delayed prompts as they did in FCT intervention. They also provided reinforcement to their children if they made the same communication responses learned in FCT intervention with or without prompts. Especially, one family member, an older brother of Peter, participated in generalization sessions as an implementer. His brother was a male middle school student and involved in rearing Peter. One of Peter's challenging behaviors was aggression to the brother and his aggressive behavior was serious when his brother played a computer game. Peter's mother and brother considered his aggression as a critical family issue and wanted to reduce his aggressive behavior. The brother² provided prompts and reinforcements in some of generalization sessions according to coaching by the mother and the author.

Social Validity

Social validity data were collected to investigate perceptions of the Korean mothers participated in this study, as well as perspectives of other Korean parents who were not familiar with FCT.

First, the author asked the three mothers to fill out the Behavioral Intervention Rating Scale (BIRS) containing 24 questions before and after the FCT intervention and interviewed the mothers following completing FCT.

² The brother was willing to participate in all generalization sessions but he lost interest and refused to participate after several generalization sessions

Second, the video reviewing procedures conducted by Carr, Levin, McConnachie, Carlson, Kemp, Smith, and McLaughlin (1999) were modified and conducted to examine perceptions of other Korean parents concerning FCT. The modification was reduction in the length of the videotapes. Carr and colleagues (1999) played 15- minute video sections for parents. However, the parents in this study viewed 2- minute video sections.

Behavior intervention rating scale. The BIRS developed in the study by Elliot and Trueting (1991) was modified and used to evaluate social validity according to the Korean mothers conducting the FCT intervention and other procedures in this study. Modifications in BIRS were made for this study: “classroom” or “classroom setting” to “home” and “teacher” to “parents.” The modified BIRS was presented in Figure 1. The BIRS was used to examine perceptions of the mothers on acceptability and effectiveness of FCT (Elliot & Trueting, 1991). The BIRS consisted of 24 questions and the mothers were asked to rate each question on a Likert scale from 1 to 6 levels. Fifteen questions were asked about acceptability and 9 questions about effectiveness. Rating scales of acceptability and effectiveness were separately calculated and analyzed. A higher score of a sum of questions indicated more positive attitude of the mother toward FCT. Questions in the BIRS were translated into Korean to help the mothers understand the questions.

Figure 1. Behavioral intervention rating scale.

Date _____

Child Name _____

Adult Name _____

Behavioral Intervention Rating Scale

You have just read about a child with a behavior problem and a description of an intervention for improving the problem. Please evaluate the intervention by circling the number which best describes *your* agreement or disagreement with each statement. You *must* answer each question.

Score each question using the following scale:

1 = Strongly Disagree; **2** = Disagree; **3** = Slightly Disagree; **4** = Slightly Agree;

5 = Agree; **6** = Strongly Agree

1. The intervention would quickly improve the child's behavior.	1	2	3	4	5	6
2. Soon after using the intervention, the parents would notice a positive change in the problem behavior.	1	2	3	4	5	6
3. Most parents would find this intervention appropriate for behavior problems in addition to the one described.	1	2	3	4	5	6
4. The intervention was a good way to handle this child's behavior problem.	1	2	3	4	5	6
5. I would suggest the use of this intervention to other parents.	1	2	3	4	5	6
6. The intervention would produce a lasting improvement in the child's behavior.	1	2	3	4	5	6
7. Most parents would find this intervention suitable for the behavior problem described.	1	2	3	4	5	6
8. Using the intervention should not only improve the child's behavior at home, but also in other settings (e.g., classroom, community).	1	2	3	4	5	6
9. The intervention would <i>not</i> result in negative side effects for the child.	1	2	3	4	5	6
10. The intervention was a fair way to handle the child's problem behavior.	1	2	3	4	5	6
11. When comparing this child with a well behaved peer before and after use of the intervention, the child's and the peer's behavior would be more alike after using the intervention.	1	2	3	4	5	6
12. I like the procedures used in the intervention.	1	2	3	4	5	6
13. Overall, the intervention would be beneficial for the child.	1	2	3	4	5	6
14. The intervention would improve the child's behavior to the point that it would not noticeably deviate from other peers' behavior.	1	2	3	4	5	6

Figure 1 (continued). Behavioral intervention rating scale.

15. The intervention would be appropriate intervention for a variety of children.	1	2	3	4	5	6
16. The child's behavior will remain at an improved level even after the intervention is discontinued.	1	2	3	4	5	6
17. The intervention should prove effective in changing the child's problem behavior.	1	2	3	4	5	6
18. The intervention is reasonable for the behavior problem described.	1	2	3	4	5	6
19. Other behaviors related to the problem behavior also are likely to be improved by the intervention.	1	2	3	4	5	6
20. The child's behavior problem is severe enough to warrant use of this intervention.	1	2	3	4	5	6
21. This would be an acceptable intervention for the child's problem behavior.	1	2	3	4	5	6
22. The intervention should produce enough improvement in the child's behavior so the behavior no longer is a problem at home.	1	2	3	4	5	6
23. The intervention is consistent with those I have used at home.	1	2	3	4	5	6
24. I would be willing to use this at home.	1	2	3	4	5	6

The mothers were asked to complete the BIRS, following baseline and training on FCT. In addition, the BIRS was provided and completed one more time at follow-up. The author was not able to access the mother's answers on the BIRS directly. A package with a copy of the BIRS and a return envelop was provided to the mothers. The package was delivered to the assistant researcher who worked on interobserver agreement after completing the BIRS. She computed each sum score of acceptability consisted of 15 questions and effectiveness included 9 questions using Microsoft Excel®. Total scores were reported anonymously to the author. The author was not able to realize exact scores reported by the mothers. The author explained these procedures to the mothers before answering the BIRS. These procedures were to prevent any possibility of the mothers reporting high scores due to personal relationship with the author.

Watching video sections. Thirty two Korean parents were recruited as evaluators from Korean communities in the United States. The evaluators were Korean parents who had at least one child and who were able to donate sufficient time to complete the testing. The reason for selecting Korean parents as evaluators was the participants of this study were three Korean children aged 5-7 and their mothers. Daily caregivers of the children were parents. It was critical to examine perceptions of other parents from same ethnic group regarding the challenging behavior.

The evaluators were grouped and watched 2-minute video sections. One group consisted of 3 to 8 evaluators and three video sections were presented per group. All the questions and directions used by Carr and colleagues (1999) were translated to Korean.

The first step was reading the direction on the top of the figure 2 before presenting a video section. After watching a video section, the evaluators were asked to answer three questions with 7-point ratings. The questions were regarding challenging behavior. The same procedures, watching a section and completing the three rating scales, were repeated 2 more times.

Video sections were selected following specific procedures from videotapes of each child. One 2- minute section was randomly selected from the last day of baseline and one more 2- minute section from the last day of FCT intervention. Therefore, the total number of selected sections was six. Faces of the child and mother on video sections were blurred prior to displaying the video sections in order to protect their confidentiality. Six 2- minute video sections were transferred to a Mac computer and edited to blur up

Figure 2. The rating scale provided to the parents who report social validity ratings. (Carr, Levin, McConnachie, Carlson, Kemp, Smith, & McLaughlin, 1999)

You will be viewing a videotaped section approximately 2 minutes in length. Please watch the section carefully. Afterward you will be asked to respond to the questions below, which will be read aloud for your convenience. Please consider each section separately and answer the questions based solely on the section you have just viewed. Imagine that the videotaped section you have just seen represents this person's typical daily behavior. To what extent do you agree or disagree with the following statements? Please circle the number that most clearly reflects your response.

1. This person's challenging behavior is severe.

Agree	7	6	5	4	3	2	1	Disagree
Strongly								Strongly

2. This person is a danger to him- or herself or others.

Agree	7	6	5	4	3	2	1	Disagree
Strongly								Strongly

3. This person is likely to require physical restraint at least occasionally.

Agree	7	6	5	4	3	2	1	Disagree
Strongly								Strongly

faces of the participants using Final Pro Cut software. The edited video sections were saved to a CD and played with Quicktime Player on a laptop to evaluators.

Three sections were randomly selected among the edited six video sections and presented to one group of evaluators. Opportunity for selecting each section was equivalent across all groups of evaluators. For example, the first group of evaluators watched a 2-minute baseline section for Peter, a 2-minute baseline section for Dustin, and a 2-minute intervention section for Hans. The second group of evaluators viewed a 2-minute intervention section for Peter, a 2-minute intervention section for Dustin, and a 2-minute baseline section for Hans. Order of presenting video sections of the 3 children was randomly arranged and details were described in Table 11.

Table 11

The Order of Presenting the Video Sections of the Three Children

Parents group	# of parents	Order of presenting the sections
1 st	5	Baseline of Peter, Baseline of Dustin, Intervention of Hans
2 nd	5	Intervention of Peter, Intervention of Dustin, Baseline of Hans
3 rd	4	Intervention of Dustin, Baseline of Hans, Baseline of Peter
4 th	5	Baseline of Dustin, Intervention of Hans, Intervention of Peter
5 th	5	Baseline of Hans, Intervention of Peter, Baseline of Dustin
6 th	8	Intervention of Hans, Baseline of Peter, Intervention of Dustin

CHAPTER FOUR

Results

Observation, Interview, & Record Review

The results of the observation, interview, and record review which were conducted before functional analysis and FCT were presented in Table 12. The details of challenging behavior for all children were described in following paragraphs.

According to Peter's mother, he frequently engaged in challenging behavior when he wanted a tangible item or activity but it was not immediately available to him. For example, Peter often demonstrated challenging behavior when he had to wait for his turn until his brother finished playing a computer game or other game device. He engaged in challenging behavior with aggression, tantrum, and destruction. Peter's aggression included hitting, scratching, pinching, hair pulling, chin pulling, and biting. Peter's mother heard from his teacher that he often hit teachers and classmates in school. He also engaged in tantrums through crying and whining. Lastly, Peter's destruction occurred in the topography of throwing objects such as food, toys, and books.

Dustin's challenging behavior included tantrum, snatching, grinding teeth, self-injury, and stereotypical behavior. The topography of his tantrums included crying, screaming, stamping his feet, and lying on the floor. Another notable behavior was snatching an object; he often snatched objects out of his mother's hand with speed and forcible grabbing. Even though his mother always asked him to speak a word "cookie" when he wanted one, he did not try saying the word and simply took the cookie from his mother's hand. Furthermore, he illustrated his snatching behavior elsewhere too; his

Table 12

Summary of the Observation, Interview, & Record review

	Challenging behavior				Health	Communication	Preferred
	Topography	Routine/ activity	Setting	People	condition		reinforcement
Peter	Aggression, tantrum, destruction	Bath time, Computer game	All places at home, classroom	Brother & father, classmates & teachers	Seizures	One-word utterances, sign, pointing, leading, grabs, moves close,	Food, video, game devices, toy
Dustin	Tantrum, snatching, grinding, self-injury, stereotypical behavior	Snack time, play time	Inside spaces	Grandparents, assistant teacher	Atopic dermatitis, nosebleeding	Vocalizing, pointing, leading, grabs, moves close, sign	Food, circle- shaped objects
Hans	Self-injury, aggression, leaving the seat, elopement, stereotypical behavior	Academic activity	Study room, fitness center, restaurant	Mother	None	Two-word utterances, leading, grabs, moves away	Food, thin & long piece of paper

mother reported that his teachers and his classmates complained about his snatching. Dustin demonstrated grinding his teeth when he was angry. For the self-injury, he frequently engaged head banging and scratched his own body. For the stereotypical behavior, he engaged in spinning object and rocking his body.

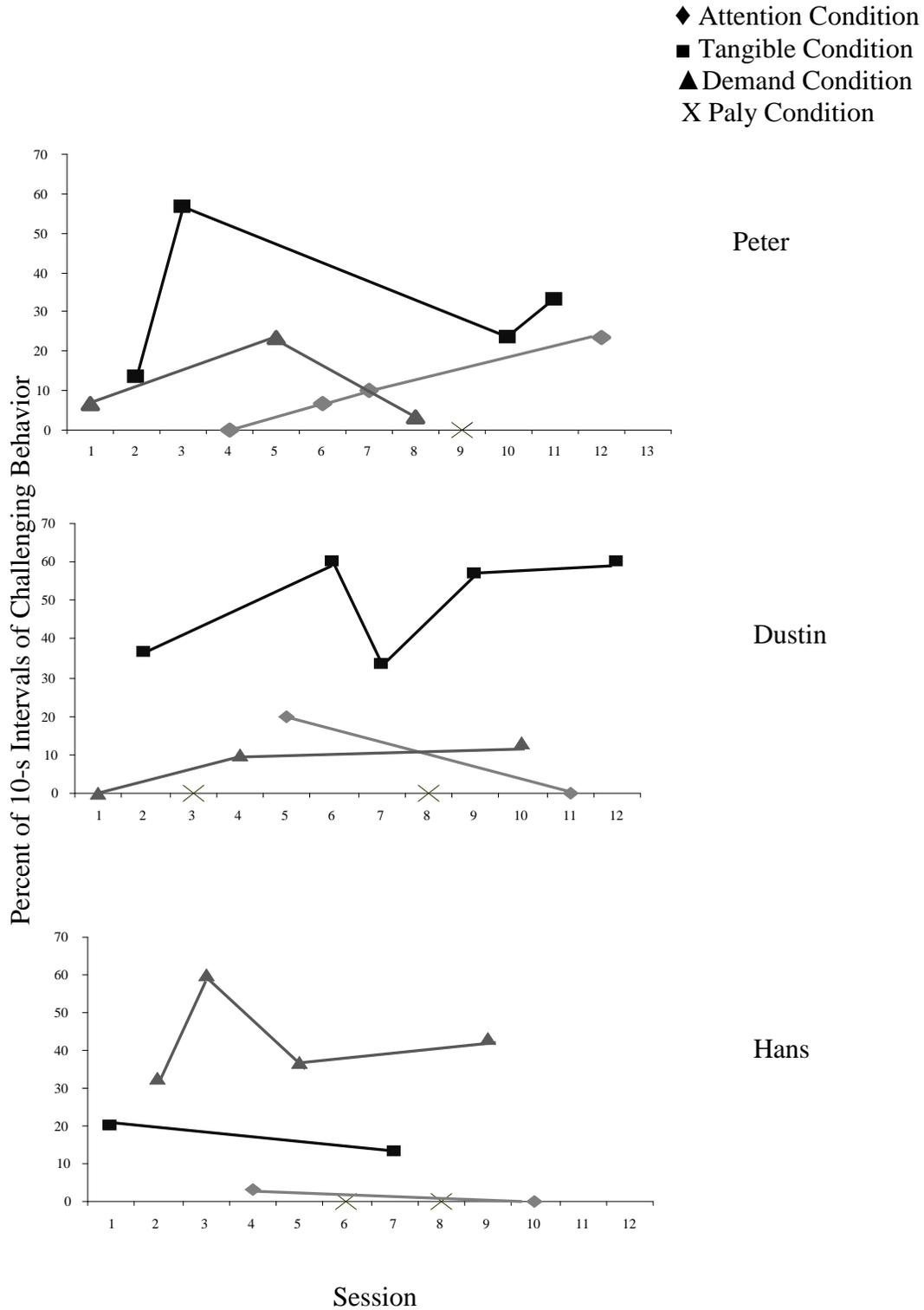
Hans engaged in challenging behavior including self-injury, aggression, leaving the seat, elopement, and stereotypical behavior. His self-injury consisted of head banging, hand biting, eye poking, and hitting his own body. He frequently had sores on his palm due to his hand biting, which worried his mother. His aggression included hitting, scratching, pinching, and kicking. In addition, Hans frequently tried to be out of seat and did not follow directions when his mother asked him to do a task such as puzzle, picking up word cards, and writing letters or numbers. His mother complained that she wanted to help him to develop basic academic skills but his academic activities at home were interrupted by his out-of seat behavior. He often eloped by running away or running around the backyard whenever an entrance door was open. His stereotypical behavior was hand flapping and flapping a thin and long piece of paper.

Functional Analysis

The results of the functional analyses for all three children are presented in Figure 3. Following paragraphs explain the details of the analyses.

Peter's aggressive behavior and whining were maintained by positive reinforcement in the form of giving a tangible item. He engaged in high percentages of 10- second intervals of challenging behavior when toys or food items were limited. The mean percentage of intervals of challenging behavior for Peter was 31.65% in the

Figure 3. The percentages of the intervals of the challenging behavior in the functional analysis for each participant.



tangible conditions; the range of the intervals was from 13.3% to 56.7%. His challenging behavior occurred at 0% to 23.3% of intervals in other conditions.

Dustin's tantrum and snatching were also maintained by positive reinforcement in the form of giving a tangible item. The mean percentage of intervals of challenging behavior for Dustin was 49.34% during five tangible conditions with limited access to the food item. Dustin's challenging behavior was displayed at 0% to 20% of intervals in other conditions. There were no overlapping data points between the tangible conditions and other conditions.

The results of the functional analysis for Hans revealed that his self-injury, aggression, and out of seating were maintained by negative reinforcement in the form of escape from some demand. He engaged in challenging behavior as often as 43.12% (range = 32.5–60%) of the mean percentage of intervals across all four demand conditions when task demands were provided to him. His challenging behavior was displayed at 0% to 20% of intervals in other conditions. There were no overlapping data points between the demand conditions and other conditions.

Functional Communication Training

The results of baseline, FCT, and follow-up for all participants were presented in Figure 4 and Figure 5. All three children engaged in high percentages of intervals of challenging behavior and did not use some communication response in baseline. After implementing the FCT intervention, they gradually increased percentages of intervals of communication response and challenging behavior simultaneously decreased. All the

Figure 4. The percentages of the intervals of the mothers' mand prompt in the intervention and follow-up.

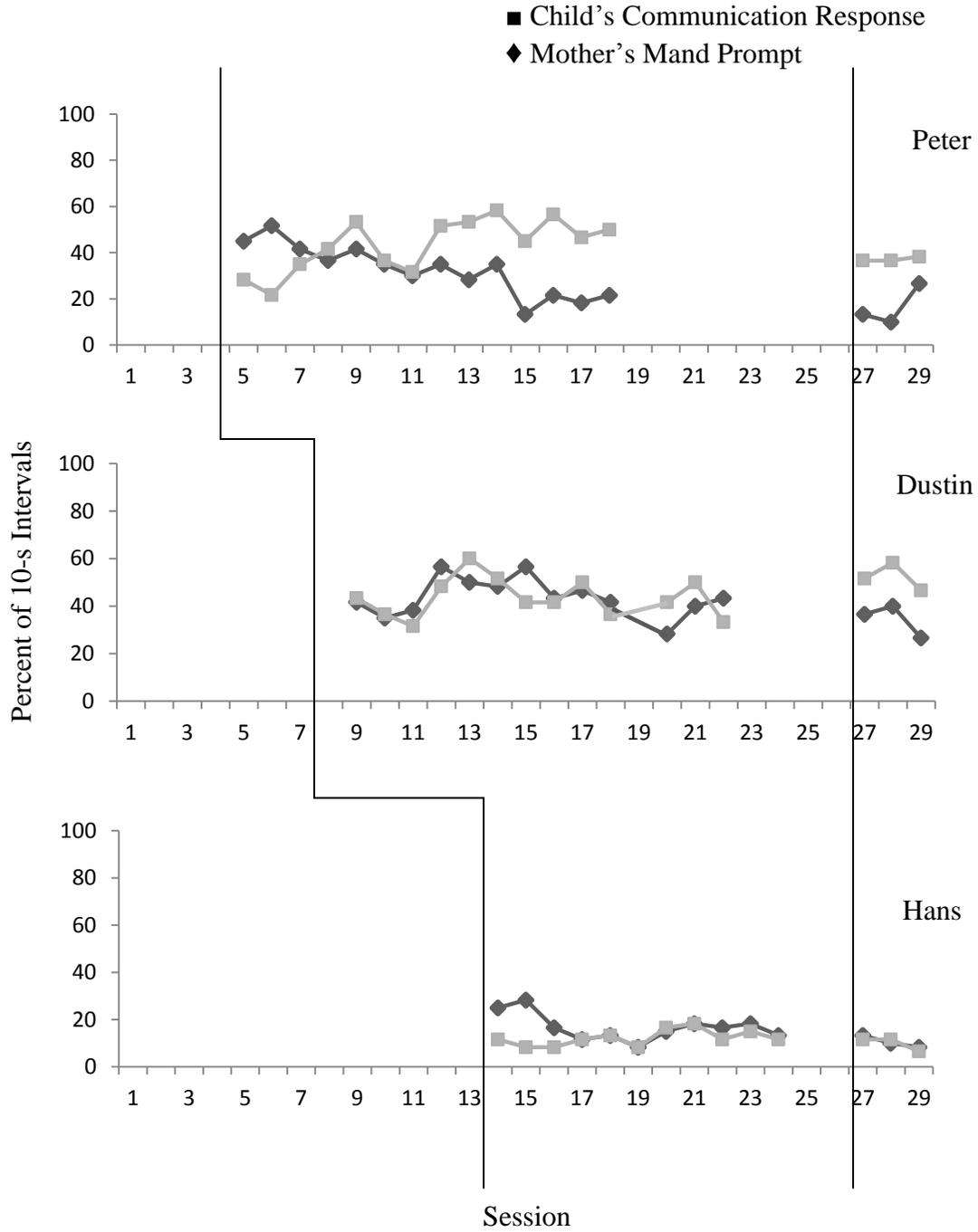
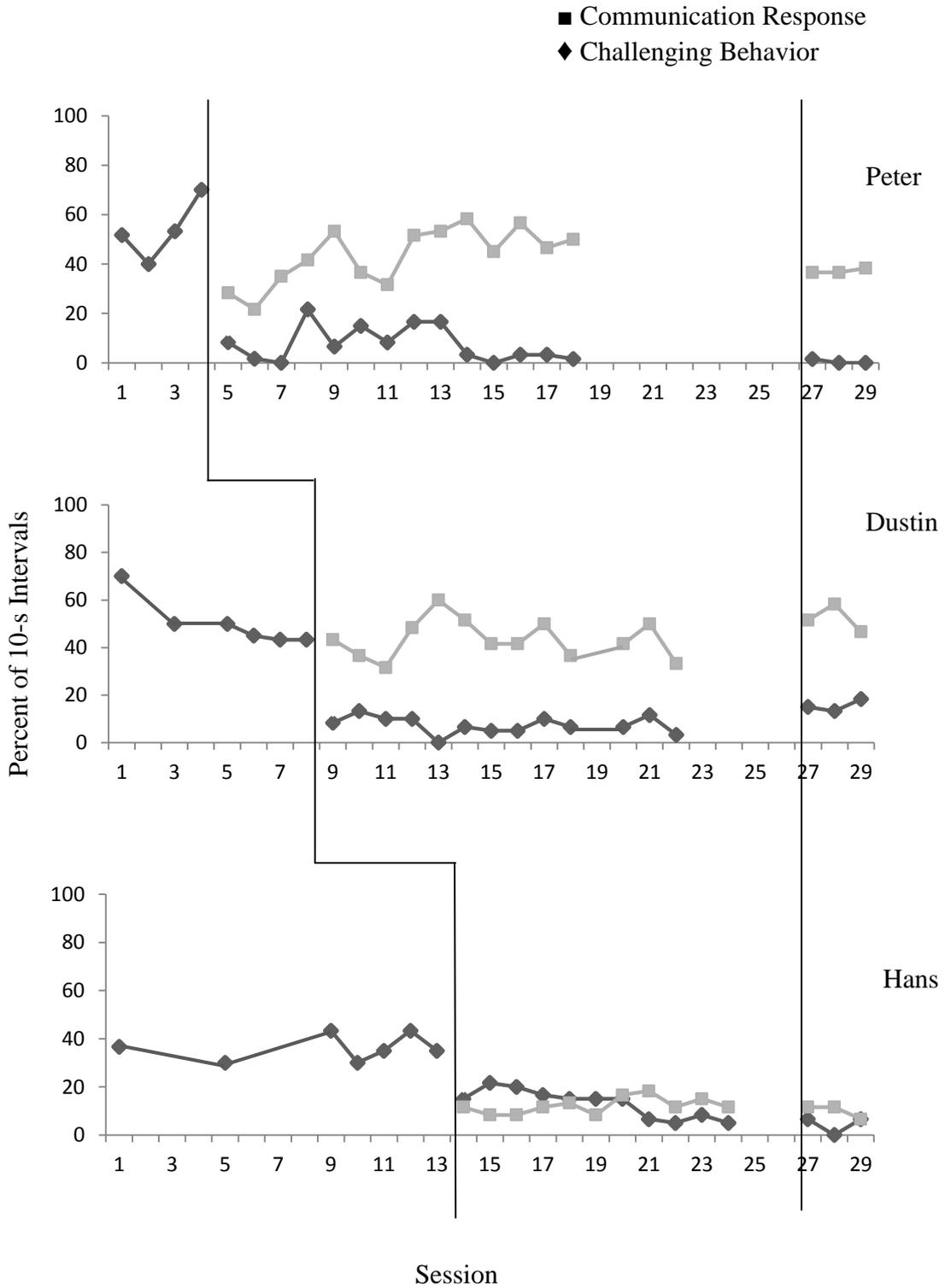


Figure 5. The percentages of the intervals of the challenging behavior and the communication response for each participant in the baseline, intervention, and follow-up.



children maintained communication responses learned in the FCT and decrease in challenging behavior in follow-up.

Peter engaged in high percentages of 10- second intervals of challenging behavior – mean of 53.75% and range of 40–70% – in baseline. His mother did not provide any mand prompt and he did not use communication response in baseline. During FCT intervention, his mother delivered mand prompts – mean of 32.47% and range of 13.3–51.7% – and Peter used communication response at 43.54% of the mean of intervals that ranged from 21.7% to 58.3%. After Peter increased using communication response, the mother faded mand prompts. He decreased challenging behavior along with increase of communication response. The mean percentage of intervals of challenging behavior in the FCT for Peter was 7.59% and the range was 0% to 21.6%. The mean percentage reduction of intervals of challenge behavior between baseline and FCT intervention for Peter was 85.89%. Data of challenging behavior in the last three sessions of FCT intervention were additionally analyzed to identify effects of FCT intervention on challenging behavior. The mean percentage of intervals of challenging behavior during the last three sessions of FCT intervention for Peter was 2.73% and the range was 1.6 % to 3.3%. The mean percentage reduction of intervals of challenge behavior between baseline and last three FCT sessions for Peter was 94.91%. In the follow-up, Peter's challenging behavior decreased to zero and near zero percentage of intervals and he also maintained communication response. Communication response performed by Peter in the follow-up averaged 37.17% of intervals, which ranged from 36.6% to 38.3%. It was slightly lower than the mean percentage of intervals of communication response in the

FCT intervention; mean was 43.54% and the range was 21.7% to 58.3%. However, he independently used communication response without mand prompts more often in the follow-up than he did in the FCT.

Dustin did not show any communication response and often demonstrated challenging behavior in baseline. The mean percentage of intervals of challenging behavior in baseline for Dustin was 50.27% and the range was 43.3% to 70%. His mother provided mand prompts and he used communication response in the FCT intervention. The mean percentage of intervals of communication response in the FCT for Dustin was 43.55% and the range was 31.6% to 60%. Dustin sometimes made a request using communication response without any mand prompt. However, most of his communication responses were performed following his mother's mand prompt in the FCT intervention. Mand prompts delivered to Dustin averaged 43.81% of intervals and ranged from 28.3% to 56.6%. Dustin decreased challenging behavior once FCT intervention began and he started using the selected communication response. The mean percentage of intervals of challenging behavior in the FCT was 7.41% and the range was 0% to 13.3%. The mean percentage reduction of intervals of challenge behavior between baseline and FCT intervention for Dustin was 85.26%. Similar levels of decrease in challenging behavior were observed throughout the FCT sessions. The mean percentage of intervals of challenging behavior during the last three sessions of FCT intervention for Dustin was 7.17% and the range was 3.3% to 11.6%. The mean percentage reduction of intervals of challenge behavior between baseline and last three FCT sessions for Dustin was 85.74%. Dustin slightly increased challenging behavior from FCT intervention to the

follow-up. The mean percentage of intervals of challenging behavior in the follow-up for Dustin was 15.53% and the range was 13.3% to 18.3%; it was lower than the mean of intervals of challenging behavior in baseline. Dustin maintained and increased using communication response. The mean percentage of intervals of communication response in the follow-up for Dustin was 52.17% and the range was 46.6% to 58.3%; it was higher than the mean of intervals of communication response in the FCT. In addition, he frequently performed communication response without his mother's mand prompt in the follow-up than he did in the FCT intervention.

Hans frequently showed challenging behavior in baseline. The mean percentage of intervals of challenging behavior in baseline was 36.17% and the range was 30 % to 43.3%. He did not use the selected communication response in baseline. During the FCT intervention, the mother of Hans provided mand prompts – mean of 16.78% and range of 8.3 % to 28.3% – and Hans slowly increased using communication response. The mean percentage of intervals of communication response in the FCT for Hans was 12.23% and the range was 8.3% to 18.3%. He decreased challenging behavior after the FCT intervention began. The mean percentage of intervals of challenging behavior in the FCT for Hans was 13.01% and the range was 5% to 21.6%. The mean percentage reduction of intervals of challenge behavior between baseline and the FCT intervention was 64.03%. In addition, Hans decreased challenging behavior in the latter half of the FCT intervention. The mean percentage of intervals of challenging behavior during the last three sessions of the FCT intervention for Hans was 6.10% and the range was 5.0% to 8.3%. The mean percentage reduction of intervals of challenge behavior between baseline

and last three FCT sessions for Hans was 83.14%. In the follow-up, Hans maintained communication response. However, his communication response mostly occurred following his mother’s mand prompt. He also maintained decrease in challenging behavior.

All of participant mothers delivered reinforcement to their child within 5 seconds after the child used communication response. Reinforcement was provided following most communication responses.

Table 13

Mean Percentage & Percentage Reduction of Intervals of Challenging Behavior

Participant	Baseline	FCT		Last 3 FCT sessions	
		Mean	% reductions	Mean	% reductions
Peter	53.75	7.59	85.89	2.73	94.91
Dustin	50.27	7.41	85.26	7.17	85.74
Hans	36.17	13.01	64.03	6.10	83.14

Generalization

All children generalized their communication response learned in the FCT intervention to another home setting or activity. Reduction in challenging behavior was also observed in generalization across the three children. The results of generalization sessions for all participants were presented in Figure 6.

Peter used the same communication response in generalization sessions; the mean was 41.79% and the range was 31.6% to 56.7%. His mother also delivered mand prompts

with mean of 22.75% that ranged from 5.0% to 56.7% and faded them like she did in FCT intervention. Peter increased independent use of communication response in the last several generalization sessions. He frequently made signs for 'please give me' before the mother provided mand prompts. In addition, he gradually decreased challenging behavior along with increase in communication response during the generalization sessions. His challenging behavior averaged 48.33% and ranged from 36.7% to 60% in baseline and averaged 15.11% and ranged from 1.6% to 30% in the FCT intervention. The mean percentage reduction of intervals of challenge behavior between baseline and the FCT intervention for Peter was 68.74% in generalization.

Dustin generalized using communication response, mean of 41.40% and range of 18.3% to 55%, to another routine in a different home place. However, his using communication response was dependent on mand prompt provided by his mother. Dustin sometimes made communication response without any mand prompt but generally presented communication response following the mother's mand prompts with mean of 42.59% that ranged from 20.0% to 66.6% in generalization. For that reason, a percentage of intervals of communication response was approximately same to a percentage of intervals of mother's mand prompt in 4 sessions among entire 7 generalization sessions. He frequently used communication response when his mother provided many mand prompts and he decreased using communication response when the mother delivered not many mand prompts. His challenging behavior decreased from baseline with mean of 53.32% that ranged from 48.3% to 73.3% to the FCT intervention with mean of 13.04% that ranged from 6.6% to 21.6%. The mean percentage reduction of intervals of challenge

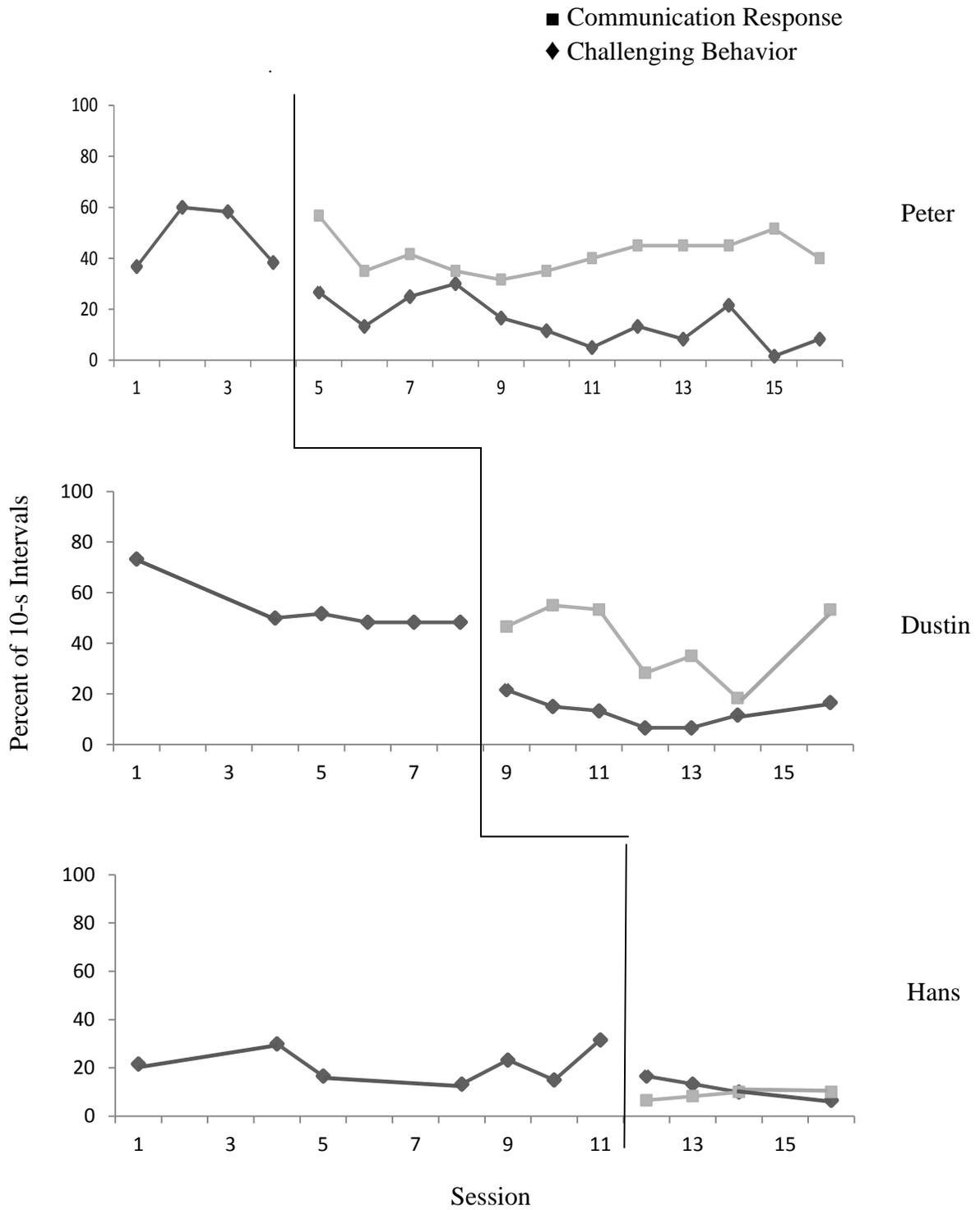
behavior between baseline and the FCT intervention for Dustin was 75.54% in generalization.

Hans generalized communication response to another activity in a different home setting. His mother provided mand prompts – mean 16.20% and range of 10.0% to 21.6% – like she did in the FCT intervention. Hans gradually increased using communication response; mean of 8.73% that ranged from 6.6% to 10.0%. Hans' decrease in challenging behavior was also observed in the generalization. His challenging behavior averaged 24% and ranged from 13.3% to 31.6% in baseline and averaged 11.63% and ranged from 6.6% to 16.6% in the FCT intervention. The mean percentage reduction of intervals of challenge behavior between baseline and the FCT intervention for Hans was 51.56% in the generalization.

Interobserver Agreement

Total interobserver agreement was 95.3% (range = 81.7 – 100%). Average agreement for challenging behavior was 94.7% (range = 85 – 100%). Average agreement for communication response was 95.6% (range = 81.7 – 100%). Average agreement for mand prompt was 95.6% (range = 90 – 100%). Average agreement for reinforcement was 95.3% (range = 85 – 100%).

Figure 6. The percentages of the intervals of the challenging behavior and the communication response for each participant in the generalization.



Social Validity

BIRS

The participant mothers reported their perspectives on the FCT by completing the BIRS before and after the FCT intervention. Their scores represented their ratings of acceptability and effectiveness of the FCT intervention provided to their children. All the mothers reported that the FCT intervention was acceptable in both ratings. The average of rating scales on acceptability reported before the FCT intervention was 5.42. However, the mothers reported lower scores on acceptability after the FCT intervention than they did before the FCT intervention. The mothers' rating scales on acceptability averaged 4.35 following implementation of the FCT intervention to their children. In addition, all the mothers rated the FCT intervention as effective with challenging behavior. Rating scales on effectiveness reported before the FCT intervention averaged 5.29. The three mothers reported lower scores on effectiveness following the completion of the FCT intervention and those scores averaged 4.48. The means and ranges of acceptability and effectiveness ratings were presented in Table 14. Details of BIRS ratings were also described in Table 15.

Table 14

Mean and Range of the Korean Mothers' Behavior Intervention Rating Scales

	First testing mean rating	First testing range	Second testing mean rating	Second testing range
Acceptability	5.42	2-6	4.35	2-6
Effectiveness	5.29	4-6	4.48	3-6

Table 15

Mean and Range of the Behavior Intervention Rating Scale Items

	First testing mean rating	First testing range	Second testing mean rating	Second testing range
1. The intervention would quickly improve the child’s behavior.	5.0	5	4.33	4-5
2. Soon after using the intervention, the parents would notice a positive change in the problem behavior.	5.0	5	4.33	4-5
3. Most parents would find this intervention appropriate for behavior problems in addition to the one described.	5.0	5	4.33	4-5
4. The intervention was a good way to handle this child’s behavior problem.	5.33	5-6	4.33	4-5
5. I would suggest the use of this intervention to other parents.	5.67	5-6	4.33	4-5
6. The intervention would produce a lasting improvement in the child’s behavior.	5.67	5-6	4.33	4-5
7. Most parents would find this intervention suitable for the behavior problem described.	5.67	5-6	4.33	4-5
8. Using the intervention should not only improve the child’s behavior at home, but also in other settings (e.g., classroom, community).	6.0	6	4.67	4-5
9. The intervention would <i>not</i> result in negative side effects for the child.	5.67	5-6	5.67	5-6
10. The intervention was a fair way to handle the child’s problem behavior.	5.67	5-6	4.33	4-5
11. When comparing this child with a well behaved peer before and after use of the intervention, the child’s and the peer’s behavior would be more alike after using the intervention.	4.33	2-6	3.67	2-5

Table 15 (continued)

Mean and Range of the Behavior Intervention Rating Scale Items

	First testing mean rating	First testing range	Second testing mean rating	Second testing range
12. I like the procedures used in the intervention.	5.67	5-6	4.33	4-5
13. Overall, the intervention would be beneficial for the child.	5.67	5-6	4.33	4-5
14. The intervention would improve the child's behavior to the point that it would not noticeably deviate from other peers' behavior.	5.67	5-6	4.33	4-5
15. The intervention would be appropriate intervention for a variety of children.	5.33	4-6	3.67	2-5
16. The child's behavior will remain at an improved level even after the intervention is discontinued.	5.67	5-6	4.33	4-5
17. The intervention should prove effective in changing the child's problem behavior.	5.67	5-6	4.33	4-5
18. The intervention is reasonable for the behavior problem described.	5.67	5-6	4.67	4-5
19. Other behaviors related to the problem behavior also are likely to be improved by the intervention.	5.33	5-6	4.33	4-5
20. The child's behavior problem is severe enough to warrant use of this intervention.	4.33	4-5	4.0	3-5
21. This would be an acceptable intervention for the child's problem behavior.	5.0	4-6	4.33	4-5
22. The intervention should produce enough improvement in the child's behavior so the behavior no longer is a problem at home.	5.0	4-6	4.33	3-6
23. The intervention is consistent with those I have used at home.	5.33	5-6	5.33	4-6
24. I would be willing to use this at home.	5.67	5-6	4.67	4-6

Social Validity Video Observations

Thirty two Korean parents independently reviewed three video sections of all the children. Three video sections were randomly selected from the three baseline sections and the three intervention sections. They completed the Likert type rating scales after watching each video section. The rating scales consisted of three sentences asking about behavior's severity, danger, and requirement for restraint. The Korean evaluators reported higher means of rating scales for the video sections selected from the baseline than they did on means of rating scales for the video sections selected from the FCT intervention. Details of means and ranges of the rating scales were presented in Table 16. The Korean evaluators considered that challenging behavior in the FCT intervention – mean was 2.2 and mean range was 1.82 to 2.62 – was less severe and less dangerous and required less restraint than challenging behavior in the baseline, which averaged 4.38 and ranged from 3.96 to 4.85. They also reported a wide range of scores on all video sections. They rated 1 to 7 on both the video sections from baseline and video sections from FCT intervention.

Table 16

Social Validity Ratings of the Korean Evaluators

	Video for baseline (n=46)		Video for FCT (n=50)	
	Mean rating	Range	Mean rating	Range
Q 1: This person's challenging behavior is severe.	4.85	7-2	2.62	7-1
Q 2: This person is a danger to him- or herself or others.	4.35	7-1	2.16	5-1
Q 3: This person is likely to require physical restraint at least occasionally.	3.96	7-1	1.82	4-1

CHAPTER FIVE

Discussion

General Results

This study aimed to extend the literature on FCT by focusing on a group from the rapidly growing population of culturally and linguistically diverse children in the U.S., specifically Korean immigrant children with disabilities. The ethnicity of participants is an essential factor for any understanding of participants' behaviors and relationships with family members, yet most of the FCT studies thus far conducted with children have not reported participants' ethnicity, as has been shown in chapter 2. As a result, differences and similarities across ethnicities have not been addressed in FCT studies. The first purpose of the present study was to determine whether FCT would be effective for Korean immigrant children with developmental disabilities in reducing challenging behaviors and increasing communication responses in home settings.

Maintenance of the effectiveness of FCT was also examined over time. Several probes were conducted after completion of FCT to determine whether the Korean children with disabilities would remain able to perform the communication responses that they had learned in FCT, and reductions in challenging behavior were found to persist. Maintenance is a necessary component of educating children with disabilities. Most parents and teachers hope that children with disabilities will be able to maintain behaviors learned in an intervention. Once this persistence of performance is confirmed, teachers or parents can begin new interventions to teach other skills or behaviors. Children with disabilities can achieve development by accumulating behaviors acquired

via various teaching practices and interventions. Although parents or teachers may not always be able to provide reinforcement to children with disabilities, maintenance must be obtained in order to provide a consistently effective intervention for children with disabilities.

This study also examined whether similar outcomes of FCT would occur during different home routines and activities. Generalization probes were implemented concurrently with the FCT intervention to determine whether the Korean children with developmental disabilities would be able to perform the communication responses learned during FCT and decrease their challenging behaviors when presented with different materials in a new home setting. Training children with disabilities in various conditions increases the possibility of children's generalizing newly learned behaviors in situations without training. Generalization should be emphasized in any discussion of the effectiveness of intervention for children with disabilities.

This study also examined perspectives of the participants' mothers on FCT. The mothers were asked to complete the same rating scales twice, before and after implementing FCT; the scores on the two ratings were compared. The mothers rated FCT as an acceptable intervention for their children. It was important to consider these mothers' opinions about the FCT procedures and their outcomes. If the mothers were not satisfied with FCT, they might not use FCT procedures again or recommend FCT to other parents. The social validity of FCT procedures and outcomes must be well established for FCT to be an effective and widely used intervention. Some FCT studies have reported social validity for FCT, but parents from diverse ethnic groups have rarely been involved

in FCT studies. This failure to obtain the perceptions of more diversified participants could reduce the social validity of FCT.

The final purpose of this study was to investigate perceptions of other Korean immigrant parents regarding FCT. Korean immigrant adults with at least one child who were unfamiliar with FCT were recruited as evaluators. They viewed selections from video tapes of participants and rated the challenging behavior's severity, danger, and necessity of restraint. Their baseline ratings and ratings of participants' behaviors following FCT were then compared. Although parents' and teachers' perceptions of FCT have been investigated in many studies, only a few studies have examined community members' perceptions of FCT and challenging behaviors. Children with disabilities and their families live and interact with others in the community. Thus, community members' perceptions of challenging behaviors of children with disabilities must be included as a critical research topic within the field of FCT. Due to the increasing populations of culturally diverse people in the U.S., including these diverse groups in research on the social validity of FCT is critical.

Question One: Effectiveness of FCT

Participating mothers implemented functional analyses and FCT interventions in home settings. The interventions reduced rates of challenging behaviors and increased communicative responses among all the participating children. These results were similar to those of previous FCT studies in which parents implemented FTC with their children in home settings (Andorfer et al., 1994; Brown et al., 2000; Derby et al. 1997; Dunlap et al., 2006; Moes & Frea, 2000, 2002).

All of the children increased their use of newly learned communication responses and concurrently decreased their challenging behaviors during FCT. For example, Peter continued to increase performing communication responses to gain a tangible item even though his mother faded her mand prompts once he was able to make communication responses without any prompt. His challenging behavior decreased to near zero in the last part of FCT. Dustin and Hans also increased using communication responses and decreased their challenging behaviors, but their communication responses depended on their mother's mand prompts. They generally used communication responses following their mothers' mand prompts. Especially for Hans, an increase in communication responses and decrease in challenging behaviors gradually occurred during FCT.

The reason for these gradual effects of FCT for Hans is not clear, but it must be carefully considered. Hans's behavior may be compared with the behaviors of children in other FCT studies conducted with parents in home settings. In Dunlap and colleagues (2006), two toddlers immediately used communication responses instead of challenging behaviors following implementation of FCT. They rapidly increased communication responses in high percentages of intervals and reduced challenging behaviors to zero. The toddlers' special needs were less severe than those of the children with developmental disabilities in the present study. Although the expressive language abilities of the toddlers in Dunlap et al. were about one year delayed at the beginning of the study, they were able to communicate with verbal language. These toddlers might not have had any difficulty in using new communication responses or in realizing more effective ways to obtain what they wanted than performing challenging behaviors, because their disabilities were not

severe. The children in the present study, on the other hand, had autism or developmental delays. Their language abilities were seriously delayed. Peter and Dustin were older than 5 years, but they were unable to communicate verbally. Hans could speak, but he could only repeat one or two words to say what he wanted. His mother complained about his little progress in basic academic skills. Hans might have had difficulty in learning new responses due to his autism. For these reasons, the children in the present study may not have been able to produce immediate changes in their behaviors and may have needed more time to learn communication responses and use them instead of challenging behaviors in FCT.

Despite the gradual effects of FCT for Hans, the effects of FCT on children's behavior found in this study prove that similar positive outcomes of FCT can be achieved with children from cultural and linguistic groups other than those examined in previous FCT studies. A few FCT studies have been conducted with non-Caucasian children in the U.S. Dunlap and colleagues (2006) reported results similar to the present ones, such that culturally and linguistically diverse children increased communication responses and decreased their challenging behaviors during FCT conducted by their mothers in home settings. They trained two mothers of toddlers with language delays to conduct FCT procedures; one of the two families was Hispanic. The Hispanic toddler, Maria, increased her verbal skill by saying "Play," "Excuse me," and "Help me" as communication responses to get attention or tangibles, and she reduced her challenging behaviors such as hitting, verbal outbursts, throwing, and pushing. Cummings and Carr (2005) also implemented FCT along with other behavioral interventions with a Korean immigrant

boy with autism and lax joint syndrome in his home. They trained the boy to say “break” or to exchange a “break” card instead of demonstrating joint dislocations to escape from demands during FCT. The Korean child reduced joint dislocations in FCT sessions, and reductions in joint dislocation were also observed during other behavioral interventions such as noncontingent reinforcement, extinction, and curricular revision. However, Cummings and Carr did not provide data on communication responses.

Among the effects of FCT found in the present study, one more should be considered. Some of the children learned communication responses that had the same function as challenging behaviors but they used them depending on their mothers’ prompts. Dustin generally used communication responses following his mother’s prompts during FCT. He was not likely to perform independent communication responses during FCT. Dustin more often signed “please” without prompts in follow-up than he did during FCT. He may have gradually learned to sign “please” instead of demonstrating challenging behaviors to obtain tangibles by receiving mand prompts during FCT. Dustin may have become familiar with signing “please” in follow-up even when his mother did not provide any prompt. Similar results were reported by Derby and colleagues (1997). One of that report’s participants, Billy, used communication responses more often in follow-up than in FCT. Billy performed the target communication responses below 15% in FCT but increased them up to near 40% in follow-up. It is unknown whether his communication responses were independent of prompts, because Derby and colleagues did not report any data regarding parents’ prompts. Hans also performed almost all communication responses depending on prompts. His communication responses occurred

mostly following his mother's mand prompts in FCT and also in follow-up. It is uncertain why some children were unable to use communication responses without prompts even after sufficient time to learn new communication responses in FCT, or what characteristics of children are related to communication responses to prompts in FCT.

Question Two: Maintenance

The three children with developmental disabilities who participated in this study maintained communication responses learned during FCT. Decreases in challenging behavior were also observed over 5 months. In follow-up, Peter rarely engaged in challenging behaviors and continuously made a sign for "please give me" as much as he did during FCT. Dustin slightly increased challenging behaviors during follow-up. However, he did not frequently engage in challenging behaviors in follow-up relative to his challenging behaviors at baseline. Dustin utilized the sign for "please" more often in follow-up than in FCT. He especially increased using the sign for "please" independently. He more often made a sign of "please" without mand prompts to ask for a tangible. Hans maintained the decrease in his challenging behaviors in follow-up that he achieved in the last part of FCT. He still used the verbal response of "break" to escape from a task demand in follow-up, but most of his verbal responses occurred following his mother's verbal prompts.

In general, all participants successfully maintained their communication responses and lower levels of challenging behaviors over time. These findings support previous results of follow-up in other FCT studies (Derby et al., 1997; Koegel et al., 1998; Moes & Frea, 2002). All these researchers conducted follow-up 2 to 6 months after FCT was

completed. They reported that children maintained both reductions in challenging behaviors and increased use of communication responses. Derby and colleagues examined long-term effects of FCT and found that the effects on challenging behaviors and communication responses were maintained over 1 or 2 years.

Maintaining skills learned through interventions is important for an independent life. Without looking at long-term effects, it is difficult to consider some interventions as beneficial treatments for improving children's abilities at self-help. Children with disabilities need to accumulate the skills acquired in interventions with long-lasting effects. Despite the importance of maintaining interventions' effects, few researchers have examined whether the effects of FCT can be found in children with disabilities over time following FCT. Mancil (2006), who reviewed FCT studies conducted with children with autism, has stated that not a single researcher conducted follow-up tests to examine maintenance of FCT effects on challenging behaviors and communication responses. The literature review in the present study shows that only 17 out of 51 children (33.3%) were included in follow-up tests on FCT.

Question Three: Generalization

All children in the present study generalized reductions in challenging behaviors to another setting or activity, but the reductions in challenging behaviors were smaller than those observed in the FCT sessions. These changes in challenging behaviors occurred gradually during the generalization test.

The three children in the present study also generalized communication responses acquired in FCT to another home routine or activity. Specifically, Peter performed the

targeted communication responses independently of his mother's prompts in the later part of generalization, but Dustin and Hans generalized communication responses depending on mand prompts by their mothers. Peter used the sign for "please give me" in generalization. He gradually increased his use of the sign for "please give me" and concurrently decreased his challenging behaviors in the generalization setting. He frequently used a sign even when his mother faded prompting in the last four sessions of generalization. Dustin sometimes made the sign for "please" without a mand prompt, but most of his communication responses were performed following his mother's mand prompts. Hans gradually increased saying "break" in generalization. He rarely said "break" without a mand prompt.

It is assumed here that the reason why the reduction in challenging behaviors and communication responses depending on prompts was gradual might be that the children had difficulty generalizing their behaviors in a different situation because the FCT procedures were conducted within one setting and mostly with one implementer. The children may have actively generalized their behaviors across various settings, people, and activities when they experienced multiple stimuli during the FCT. This assumption is supported by Moes and Frea (2002). They examined two kinds of FCT for children with autism and their families in home settings. One was the traditional FCT that has been implemented by many other researchers and the other was contextualized FCT, individualized to fit the children's and families' needs. The children generalized reduction in challenging behaviors and also increased communication responses during the contextualized FCT conducted within multiple routines by multiple implementers

more often than during the traditional FCT implemented within one setting by only the mothers.

On the other hand, another unplanned generalization of reduction in challenging behavior was observed. After the study had been completed, the mothers of Peter and Dustin heard from their children's teachers that the two boys were engaging less often in challenging behaviors in classrooms. Dustin's mother alone informed Dustin's teacher of his involvement in functional analysis and FCT. However, they did not discuss on the interventions conducted at home and at school. Due to her limited English proficiency, Peter's mother kept private her involvement in the study. She had often received notes from the teacher asking her to give special attention to Peter's aggressive behaviors. After completing FCT, however, she received notes informing her that Peter no longer hit his classmates and teacher.

As in this study, generalizations of challenging behaviors and communication responses have been reported in some FCT studies conducted with children. Durand (1999) implemented FCT with children in a classroom and examined generalization of children's behaviors across settings and implementers. They revealed that the children generalized increases in unprompted communication responses and reductions in challenging behaviors. Durand and Carr (1991) conducted FCT with children in a treatment room and observed increases in communication responses relative to baseline in generalization. Their data included only unprompted communication responses in generalization. Northup and colleagues (1994) examined generalization in 4 out of 5

children across different activities in school; they reported that the 4 children generalized decreases in challenging behaviors and increases in communication responses.

However, generalization of children's behaviors across variables is not a promising result of FCT. Berg and colleagues (2007) examined generalization of children's behaviors across settings, people, and tasks. They observed reductions in challenging behaviors across most generalization sets but also found that challenging behaviors were not decreased in some generalization sets. In addition, Berg and colleagues reported that the children rarely used communication responses in the generalization sessions, because only unprompted communication responses were counted. Berg and colleagues excluded prompted communication response data from the children's communication behaviors and did not provide any data on prompted communication responses in generalization. This result is helpful for explaining the dependent use of communication responses by Dustin and Hans in the present study. These two children used communication responses mostly following prompts and rarely performed unprompted communication responses in generalization. Similarly, Berg and colleagues' (2007) finding of near zero in communication responses would have been reported for Dustin and Hans in generalization if only unprompted communication responses had been counted in this study. This is different from the results of Durand (1999) and Durand and Carr (1991), who reported that children generalized increases in unprompted communication responses. However, those FCT studies were conducted in a classroom or treatment room, whereas Berg and colleagues examined generalization of the FCT effects in the home setting. It is not clear whether some children with disabilities

need more time to generalize their communication responses trained in FCT across other stimuli without prompts or whether only particular children are able to use communication responses independently in generalization. More research will be necessary to reveal variables related to generalization in children's behaviors in FCT.

Despite the need for and importance of generalization tests in FCT studies, researchers have not often examined generalization of the FCT effects on children's behaviors, as has been discussed in the literature review. Moreover, many FCT studies including generalization tests were conducted in classrooms or treatment rooms rather than in the home settings that are considered a natural environment for children. One more reason why FCT studies with generalization tests are uncommon is that some researchers have implemented FCT with other interventions when they examined whether the FCT effects on children's behaviors were generalized. For example, Cummings and Carr (2005) found that a Korean boy with autism generalized reduction of joint dislocation, his challenging behavior, at a lower level than did different people in different settings. However, this result was not a true generalization of the FCT effect because the generalization was assessed when FCT was conducted along with other treatments such as noncontingent reinforcement, extinction, and curricular revision. More research is needed to assess the separate generalization of FCT effects across various settings, people, and other stimuli.

Question Four: Social Validity of FCT Reported by Participants' Mothers

The social validity of FCT was examined in this study. The participants' mothers were asked to answer the BIRS rating scales, in order to evaluate their perspectives on the

effectiveness and acceptability of the FCT. They answered the BIRS questions twice, first before implementing the FCT and then after completing the FCT. These Korean mothers considered the FCT to be effective in increasing communication skills and in reducing challenging behaviors. They said that the FCT procedures were acceptable for their children.

However, the Korean mothers gave lower ratings on both effectiveness and acceptability after completing the FCT than they did before beginning the FCT. One hypothesis for this finding relates to the mothers' high expectations for the FCT before implementing the procedure. Prior to this study, they had rarely been involved in services for children with disabilities such as intervention, therapy, or consultation at home. The FCT in the present study was their first intervention in a home setting. Their children were receiving special education only in public school. None of the children participated in any therapy or private special education program due to limited family finances, insufficient coverage of health insurance, lack of information on special education programs from local communities, and so forth. According to Jegatheesan (2009), many Asian immigrant mothers of children with developmental disabilities report difficulties in receiving services related to their children's special needs. They lack sufficient knowledge about available services and their legal right to access those services. Some did find accessible services but failed to contact them due to limited English proficiency. The mothers in the present study may have had the same difficulties in accessing services. Having never experienced any intervention for their children, they may have had high expectations of FCT before beginning. The mothers may have imagined miraculous

changes in their children's challenging behaviors and communication skills. This may be why the mothers gave lower scores for FCT effectiveness and acceptability in the second rating as opposed to first rating even though they observed positive changes in their children's challenging behaviors and communication skills during FCT and generalization. The mothers may not have been satisfied with the effects of the FCT on their children.

There is one more possible explanation for the mothers' social validity scores. The mothers focused on one or two specific challenging behaviors within limited home settings during FCT. The targeted challenging behaviors and settings did not represent all of the behaviors within their family lives. Mothers might not experience the effects of FCT in their daily lives unless the FCT strategies are generalized to other challenging behaviors of their children within various home settings.

Not many researchers have evaluated parents', families', or teachers' feelings, opinions, perspectives regarding FCT. Only a few of the reviewed FCT studies with young children included examination of the social validity of FCT. Most studies used a parental questionnaire to assess the acceptability of FCT (Dunlap et al., 2006; Harding et al., 2009; Moes & Frea, 2000, 2002). Those parents reported that the FCT procedures fit their family contexts (Dunlap et al., 2006; Moes & Frea, 2000, 2002) or were satisfied with FCT (Harding et al., 2009).

Although various questionnaires have been used to document parents' perspectives on FCT, the BIRS has rarely been provided to parents in FCT studies with children even though the BIRS has been applied to examine the social validity of

behavioral interventions in many other studies (Cowan & Sheridan, 2003; Finn & Sladeczek, 2001). The reason for this may be that the BIRS was originally developed to investigate teachers' perspectives on acceptability and effectiveness of interventions implemented in classrooms (Elliott & Treuting, 1991). In Gibson et al. (2010), teachers who completed a revised version of the BIRS gave high scores, with an overall mean score of 5.7; this indicated that the teachers considered the FCT to be an effective, acceptable intervention.

The teachers in Gibson et al. (2010) gave higher scores on the BIRS than did the mothers in the present study. The teachers may have experienced other interventions or treatments for dealing with challenging behaviors and thus expressed their perspectives on the FCT in comparison with other behavioral interventions, whereas the mothers in the present study had no experience with other behavioral interventions. In addition, the teachers may have given high scores on the BIRS because obvious reductions in challenging behaviors occurred immediately in the FCT and they were therefore satisfied with the results. The changes in the children's challenging behaviors in the present study were not as great as those in Gibson et al. (2010).

Question Five: Social Validity of FCT Reported by Other Korean Parents

Thirty-two Korean parents who had not experienced FCT intervention were recruited as evaluators for the social validity of FCT and watched selections from video tapes of the participants at baseline and during FCT. They completed three rating scales for each video selection. The rating scales asked about the severity, danger, and need for restraint with respect to challenging behaviors shown in each video selection. The

evaluators gave lower scores on challenging behaviors in FCT than at baseline.

According to the data from watching video selections, the Korean evaluators considered that challenging behaviors were less severe, less dangerous, and less in need of restraint in FCT than at baseline. Also FCT was effective for managing challenging behaviors.

The Korean parents recruited as evaluators also gave a wide range of scores from 1 through 7 on behavior in same video sessions. One possible explanation for this finding is that Korean parents are likely to consider that challenging behaviors are acceptable and allowable in childhood because children are young and developing and they naturally demonstrate challenging behaviors such as crying, tantrums, and aggression. This is supported by a Korean research study (Kwon, 2003). According to Kwon, Korean parents were uncertain about identifying emotional and behavioral problems in children, and their rating scores on those problems ranged widely from 1 to 5. The author suggested that Korean parents did not have clear ideas about such behaviors and that they were not strict about children's challenging behaviors. Another possible explanation for the wide range of the Korean evaluators' scores is that Korean parents are likely to have various perspectives on children's behaviors due to different acculturation styles. In the present study, some Korean evaluators considered challenging behaviors to be natural childhood behaviors, but others regarded challenging behaviors to be negative and dangerous behaviors, requiring training by parents and teachers. Farver and Lee-Shin (2000) pointed out that cultural differences exist among Korean immigrant parents because their acculturation occurs in many ways. These researchers also found that Korean immigrant mothers changed their parenting attitudes and play behaviors depending on their

acculturation styles. It is therefore possible that the Korean evaluators in the present study had different acculturation styles simply because they were Korean immigrants in the U.S. The Korean evaluators may have based their ratings of children's videotaped behaviors on the various beliefs about parenting and play behaviors derived from their acculturation styles.

On the other hand, the social validity of behavioral intervention is important for children with challenging behaviors because they interact with others throughout their daily lives. It is essential to find how others in their neighborhood and society perceive challenging behaviors and whether they consider such challenging behaviors to be acceptable behaviors following treatment in behavioral interventions. Despite the importance of social validity in conducting interventions with children, researchers studying FCT for children have rarely investigated the social validity of FCT in parents or in other adults not directly participating in the FCT study. Only a few researchers have examined the social validity of FCT in persons lacking knowledge of FCT; in these studies, the evaluators considered children's behaviors or feelings in FCT to be more positive than in baseline (Dunlap et al., 2006; Koegel et al., 1998).

First, as in this study, the social validity of FCT was investigated in another mother who was not familiar with FCT (Dunlap et al., 2006). Dunlap and colleagues recruited a mother who had a child with challenging behaviors and did not know about FCT. The researchers investigated the social validity of FCT using methods similar to those of the present study and achieved similar results. Like the 32 Korean parents in the present study, the mother perceived that challenging behaviors in FCT were less intensive

and less frequent than at baseline and that communication responses were more frequent in FCT than at baseline.

Second, researchers examined the social validity of FCT via the rating of a person not related to the children in FCT (Koegel et al., 1998). An undergraduate student in psychology who did not know the children or the purpose of the intervention viewed the 2 children's video tapes selected from baseline, FCT, and follow-up sessions. The observer rated the children's happiness, parents' happiness, and stranger's comfort using Likert rating scales. The scores suggested that the children and parents seemed happier and that the stranger's comfort was higher for FCT and follow-up than for baseline. One might think that the perspectives of an ordinary person in the community thus represented the real social validity of FCT. However, in another study, social validity was investigated in a professional who had knowledge about children with disabilities and behavioral intervention (Mancil, Conroy, & Haydon, 2009). The authors viewed children's videos along with a professional in autism and evaluated the professional's perspectives on their interventions. Their study cannot be compared to the FCT study of Koegel and colleagues because Mancil and colleagues implemented an intervention that combined FCT and milieu teaching. However, the authors did demonstrate another way to examine the social validity of FCT.

Both Dunlap and colleagues (2006) and Koegel and colleagues (1998) examined only one person's perspectives on FCT. Their results regarding the social validity of FCT cannot be generalized to other FCT studies because data from one individual are not enough to establish external validity. It is important to collect diverse perspectives from

multiple individuals in examining the social validity of an intervention. Carr and colleagues (1999), for example, implemented an intervention consisting of FCT and other strategies and examined the social validity of the intervention in a group of 100 home staff. The evaluators showed positive perspectives on the intervention. This result regarding the social validity of the intervention is valuable because of the various perspectives of many people. Likewise, in the present study the diverse perspectives of Korean immigrant parents on challenging behaviors were examined. The present study thus provides important data on the social validity of FCT measured in other people not involved in FCT.

Conducting Functional Analysis

The mothers were able to conduct functional analysis, receiving coaching from the author. Each mother and the author discussed how to design the details of four functional analysis conditions: attention, tangible, demand, and free play. The mothers were able to follow the authors' directions. The author provided verbal reminders and prompts on site. The function of challenging behaviors for each child was clearly revealed through functional analysis. The results of the functional analysis were similar to those obtained with the Functional Assessment Interview (O'Neil et al., 1997).

While the mothers in this study conducted functional analysis in home settings and properly identified the function of their children's challenging behaviors, there are several issues to consider in deciding whether functional analysis is appropriate for young children. First, it is questionable whether parents are able to conduct a functional analysis in home settings when coaching or support of a professional in behavior analysis is not

available. During functional analysis, parents manipulate the children's environment, such as by delivering attention, providing a tangible, and demanding a task. After the manipulation, the analysis examines the effect on the child's behaviors. Parents must conduct four or five types of conditions repeatedly; in each condition the child's environment is manipulated differently. In addition, functional analysis procedures are conducted according to a single-subject research design. Parents must have knowledge about such designs if they are to conduct a functional analysis successfully. Most parents are untrained in functional analysis or applied behavior analysis. They may find it difficult to understand single-subject research designs and functional analysis procedures without any support, due to their limited knowledge and experience.

Second, a relatively long period is required to conduct functional analysis procedures as opposed to other assessment methods of identifying the function of challenging behaviors, such as Antecedent-Behavior-Consequence (A-B-C) observation, the Functional Assessment Interview (O'Neil et al., 1997), or administration of the Motivation Assessment Scale (Durand & Crimmins, 1988). The mothers in the present study conducted ten or twelve 5-minute sessions, and within 4 to 6 weeks they had to complete functional analysis procedures within their ordinary home routines. In addition, although the mothers manipulated environmental variables in their home settings in order to set up specific functional analysis conditions, these were frequently interrupted by other family members or other unexpected occurrences. This is a barrier to parents' conducting a functional analysis for their children in home settings. Durand and Merges (2001) have shown that certain variables can influence children's behaviors but cannot be

manipulated for functional analysis. When a child is sick or has an abnormal chromosome and the family routines are disrupted, it is difficult to manipulate these variables and assess their influences on the child's challenging behaviors. In such cases, other functional assessment methods would be more effective for identifying the function of challenging behaviors than functional analysis would.

Third, there is an ethical issue to consider before conducting a functional analysis. Some challenging behaviors such as self-injury can be dangerous and hurt the child or others. Functional analysis must be applied carefully to severe challenging behaviors of young children. Durand and Merges (2001) have argued that ethics must be taken into account if there is any intentional attempt to increase severely challenging behaviors for the purpose of functional analysis, such as by reinforcing challenging behaviors. They do not recommend such modifications in functional analysis. In the present study, there was no intentional modification that increased the children's challenging behaviors. Nonetheless, Peter's mother told the author that she felt stressed as she watched his challenging behaviors, even though the seriousness of his whining and aggressive behaviors in some of the functional analysis conditions were usual for him. At the same time, she wanted to complete functional analysis procedures in order to determine the function of his challenging behaviors. The effects on the child and the child's family must be considered carefully when one applies functional analysis to a young child.

On the other hand, parents may be able to conduct a brief form of functional analysis to verify the function of challenging behaviors identified through other assessment methods. In some studies, parents have done this. They conducted only two or

three conditions to validate hypotheses developed from interviews and observations or they implemented all four conditions but completed the functional analysis within five to eight 5-min sessions (Derby et al., 1997; Moes & Frea, 2002).

Due to the issues related to functional analysis, some researchers recommend other functional assessment techniques for young children instead. According to Arndorfer and colleagues (1994), Dunlap and Fox (1996), and Weigle (2000), young children's behaviors are relatively uncomplicated and their learning experiences are not long. These researchers have suggested that full functional analysis procedures are often unnecessary for young children. They recommend other functional assessment methods such as a combination of interviews and observations. Arndorfer and colleagues suggested conducting both A-B-C observation and a behavioral interview as a sufficient behavioral assessment method for children, based on the results of their study. They compared the results of the interview, observation, and MAS. Arndorfer and colleagues found that only the interviews and observations identified the same function for each child's challenging behaviors. The functions were confirmed by a brief functional analysis. Moreover, in the study by Dunlap et al. (2006), the functions of the toddlers' behaviors were identified by the Functional Assessment Interview (O'Neill et al., 1997) with some modifications and direct observation according to A-B-C data collection procedures.

Implications

The results of the present study have several implications for educating and supporting children with developmental disabilities and their families.

1. Korean immigrant children and families present a population group for achieving positive outcomes of FCT in children's behaviors and communications. Since Carr and Durand (1985) introduced FCT, numerous FCT studies have reported optimistic results for the participants' behaviors and communications (Mirenda, 1997). Positive results have been achieved in children in FCT studies when most of the children were from the Caucasian majority in the U.S. (Kim & Olive, 2012; Mancil, 2006). More FCT studies need to be applied to immigrant children to extend the literature of FCT to diverse population groups.

It is critical to provide effective behavioral interventions such as FCT to support immigrant families with children with challenging behaviors. The number of immigrant families in the U.S. is growing and U.S. immigrants are increasingly diverse. They inhabit different cultures, speak different languages, and possess different values, so they continuously experience conflicts with social systems such as education, health care, and the social security services, which have been developed by a single majority culture (Washington & Andrews, 1998; Perreira, Chapman, & Stein, 2006). Immigrant families with young children experience these challenges daily. For instance, immigrant families who have a child with disabilities and/or behavioral problems may find it difficult to meet their child's special needs. The mothers in this study referenced difficulty in communication with school teachers and in accessing information on interventions and services for their children. They had not experienced any interventions for managing their children's challenging behaviors at home. Teachers, researchers, and other professionals

interacting with culturally and linguistically diverse families must recognize their difficulties in order to improve interventions and supports for them.

On the other hand, cultural differences should be considered in implementing functional analysis and FCT. As with the results of the Korean immigrants in this study, children and families from other immigrant groups may report positive outcomes of FCT. However, some responses, feedback, and outcomes from immigrant families will differ from those reported in the existing FCT studies. Researchers should focus, when conducting functional analysis and FCT, on the distinct attitudes and manners of people from each immigrant group. More research is also needed to develop appropriate approaches of functional analysis and FCT for culturally and linguistically diverse children and families.

2. The mothers in this study were able to implement FA and FCT following the instructions of the author. Some studies on FCT already show that parents can actively participate as main implementers in conducting experimental assessment and intervention procedures (Brown et al., 2000; Derby et al., 1997; Harding et al., 2005; Koegel et al., 1998; Moes & Frea, 2000, 2002).

The role of parents of a child with disabilities must be considered carefully in conducting interventions. In the outcomes of early interventions, the strongest effects are observed in interventions implemented to support and improve parents' behaviors and children's development (Shonkoff & Phillips, 2000). Parents are the primary caregivers and educate their children throughout their lives. They have more opportunities to observe their children's behaviors and they understand their children's special needs

better than do teachers, therapists, and other professionals. Parents' involvement in planning, conducting, and monitoring is essential to achieve positive outcomes of interventions. Parents and family members should therefore be involved in functional analysis and FCT, and appropriate training programs need to be developed for them.

Korean immigrant mothers actively participated in the study as implementers of functional analysis and FCT. Following instructions provided by the author, they conducted all the procedures and achieved positive outcomes with their children's behaviors. They reported that FCT was effective and acceptable to use with their children. Notwithstanding their positive reports, the mothers struggled implementing functional analysis and FCT with their children in their homes. First, the tantrums and aggressive behaviors (brought on by certain conditions of functional analysis) distressed the Korean immigrant mothers. Consequently, they would want, in those moments, to discontinue the functional analysis. The author, obliging their requests, would continue the procedures of functional analysis on another day. Second, in the baseline, the Korean immigrant mothers struggled with not teaching new communication responses. They wanted to teach immediately the selected communication responses to their children. For the purposes of the study, however, they were supposed to respond in the usual manner to their children's challenging behavior in the baseline and introduce the communication responses later in the FCT sessions. The mothers felt passive when remaining, without active teaching, in such situations. Third, the mother of Hans had difficulty discontinuing an academic activity so as to provide a break as reinforcement of the communication response—the saying of “break.” The mother considered academic activities important for Hans. After

all, owing to his insufficient academic skills, he had been placed in a special education classroom for children with moderate disabilities. The mother naturally wanted him moved to a mild special education classroom. The author coached the mother to provide a break when Hans said, "Break." She was hesitant to do so, wanting to continue with whatever academic activity was underway, e.g., an alphabet puzzle or word card game.

Several issues should be considered when parents are trained as implementers of functional analysis and FCT. Most parents have not received any training in FCT or applied behavior analysis. Parents who have participated in FCT have received limited training, such as reading written information, on-site coaching, and reviewing videotapes to implement functional analysis and FCT, whereas teachers, researchers, and therapists are involved in professional training in FCT or behavior analysis. Parents may lack sufficient background knowledge of applied behavior analysis and have difficulty understanding the specific procedures of functional analysis and FCT. Appropriate training methods and uncomplicated manuals for parents should be developed so that they can implement functional analysis and FCT at home and achieve successful outcomes for their children. Also, given the results of this study, it is possible that some immigrant parents have high expectations about behavioral interventions, due to their limited information and experience with respect to interventions for children with disabilities. Professionals in special education should help immigrant parents recognize the possible achievements of their children in FCT before they decide to participate in an intervention. Finally, family members such as siblings and grandparents should be considered as possible implementers of FCT for young children. They too regularly

interact with the children at home and participate in rearing. However, researchers have rarely involved family members other than parents in FCT. Moes and Frea (2002) have shown that siblings are able to participate successfully in FCT procedures. It is important to develop training programs for FCT that all family members can easily follow at home.

3. The results of this study show that FCT was effective in reducing challenging behaviors and in increasing communication responses and that these effects were maintained after 5 months. Moreover, the mothers reported that FCT was an effective and acceptable intervention for their children with developmental disabilities, who often engaged in challenging behaviors. FCT is sufficient to be recommended to parents and teachers who need an appropriate treatment for their children's challenging behaviors.

FCT is an effective intervention not only to reduce challenging behaviors but also to promote communicative behaviors. Many children with autism or other developmental disabilities have a significant deficit in communication. It is important to achieve age appropriate communication development in childhood. In addition, difficulty in communication development may result in increases in challenging behaviors (Sigafos, 2000). Therefore, it is critical to provide children who have developmental disabilities with an intervention that is effective in enhancing communication development. However, apart from FCT, many of the interventions implemented to treat challenging behaviors do not provide any opportunity to learn or enhance appropriate communication behaviors. In some studies, effects of FCT have been compared with those of other interventions such as noncontingent reinforcement (Hanley et al., 1997), time-out from positive reinforcement (Durand & Carr, 1992), and so forth. In the other interventions, positive

outcomes in communication behaviors were not observed. As revealed in this study, FCT is effective in reducing challenging behaviors, and children, even those who are nonverbal, also learn new communication skills through FCT.

4. The effects of FCT on challenging behaviors and communication responses were maintained in the present study, whereas in other studies the effects of other behavioral interventions such as noncontingent reinforcement (Hanley et al., 1997) or time-out from positive reinforcement (Durand & Carr, 1992) on challenging behaviors were not maintained. Those interventions were initially effective in reducing challenging behaviors, but high rates of challenging behaviors across many participants occurred again after several months. On the contrary, maintenance of FCT outcomes has been found in many FCT studies (Derby et al., 1997; Durand & Carr, 1992; Koegel et al., 1998; Moes & Frea, 2002). Derby and colleagues found that reduction in challenging behaviors and increases in communication responses were maintained over 1 or 2 years and that positive effects on social behaviors and play behaviors were also maintained. It is recommended that FCT rather than other behavioral interventions should be implemented due to the long-lasting effects of FCT on children's behaviors.

5. The children in this study generalized their communication responses to another home setting, but the generalization occurred differently across the children. Dustin and Hans rarely initiated communication responses in generalization before any prompts were provided. Most of their communication responses were performed following prompts, whereas Peter increased unprompted communication responses in generalization. Children with special needs may not immediately generalize unprompted

communication responses, but rather begin to generalize them after a sufficient time or training. Mancil and colleagues (2009) examined generalization of communication responses from a home setting to a school, where the teachers did not provide any prompt in generalization. They observed that generalization of the communication responses did not immediately occur. The children rarely used unprompted communication responses at school even when they performed the communication responses without prompts more frequently than the prompted communication responses at home. The children began to use their unprompted communication responses in the classroom over time. One of the children generalized communication responses after a relatively long time (Mancil et al., 2009). Olive (1999) has argued that children with disabilities need training to generalize communication responses to another setting because they may not be able to figure out how to generalize communication responses independently.

Parents, teachers, and researchers should consider that children with special needs may generalize their new communication responses to another setting in various ways. Some children may need prompts for a long time in order to generalize communication responses to new situations, but others may immediately generalize without prompts. A sufficient time for generalization and a specific manner of providing prompts should be individually planned for each child.

6. The practical application of functional assessment in home settings should be considered in order to support parents who have a child with challenging behaviors. Parents need to be encouraged to select appropriate assessment techniques to determine the functions of their children's challenging behaviors within their family circumstances,

which include the available time and place, the seriousness of challenging behaviors, the parents' background knowledge of functional assessment, and so forth. More research on functional assessment for young children is necessary in order to obtain valid and useful assessment methods that parents can apply within the home. Especially in early interventions, functional analysis is one of the most frequently conducted assessment methods (Kurtz et al., 2011; Mancil, 2006), but some researchers recommend a combination of interviews and observations for the functional assessment for young children with challenging behaviors (Arndorfer et al., 1994; Dunlap et al., 2006). There is controversy regarding the necessity of functional analysis for assessing young children's challenging behaviors due to the several barriers related to functional analysis for children in home settings discussed above. More research studies are needed to discover practical ways to identify the function of challenging behaviors in natural settings like the home. Guidelines for parents to embed functional analysis in home routines should be developed to enhance functional analysis for young children in home environments, rather than in controlled clinic settings.

7. Perspectives on challenging behaviors were very different across the Korean immigrant parents. For example, one evaluator rated the children's behaviors as dangerous but another perceived the behaviors to be usual for a child. Each evaluator reported very different perspectives on challenging behaviors, but this result was based on responses of a small group of Korean immigrant parents from a particular area. Teachers and practitioners in special education need to consider individual differences in perceptions of challenging behaviors as well as cultural differences when providing

behavioral interventions or training to immigrant parents even when they share the same origin or are from the same nation.

Limitations

The results of this study should be considered as having certain limitations.

First, external validity was limited due to the small number of participants. FCT was conducted with only 3 children by the mothers in this study. Such a sample size is not unusual; there are many single-subject research studies. However, the small sample size does limit external validity (Kazdin, 1982).

Second, the results of this study would not extend to children with other characteristics. FCT in this study was implemented with only 3 young Korean children who had developmental disabilities. The results of this study cannot be generalized to various groups of children due to the small sample size. The findings cannot be directly applied to older children, children with other disabilities, children from other ethnic groups, or children with challenging behaviors reinforced by another function such as attention.

Third, the results obtained from the video evaluators cannot be extended to other immigrant parent groups. The video evaluators were recruited from Korean immigrant communities within a large city in the southeast U.S. The findings of this study would not extend to other immigrant parents in the U.S.

Fourth, the effects of FCT were examined only for challenging behaviors and communication responses. Implementing FCT might have elicited changes in other behaviors of the children, but data on other behaviors were not collected across baseline,

FCT, follow-up, and generalization. The results do not describe all aspects of changes in behaviors following the implementation of FCT. A few studies on FCT have investigated the impacts of FCT on various behaviors of children. Derby et al. (1997) examined the effects of FCT on challenging behaviors, mands, social behaviors, and toy play behaviors of 4 young children. They found that the children's toy play and positive social behaviors increased in FCT and that the effects were observed for 2 years. Berg et al. (2007) reported data for challenging behavior, communication responses, task completion, and social interaction across baseline, FCT, and generalization before and after FCT. They found that the young children increased task completion rather than communication responses in generalization after FCT. Positive social interactions also increased in generalization following FCT across all children.

Fifth, this study did not examine the fidelity of mothers' implementing FCT procedures during intervention, follow-up, and generalization sessions. There are no data to ensure that FCT procedures were implemented consistently across all sessions even though the author supervised the mothers' implementation of FCT procedures by coaching them.

Contributions to the Literature

This study contributes to the literature in several ways despite the limitations discussed above.

First, this study extended the FCT literature to culturally and linguistically diverse children with disabilities and their mothers. Korean immigrant mothers implemented FCT for their children with developmental disabilities and observed that the children

generally reduced their challenging behaviors and increased their communication responses. These outcomes are the same as those for FCT implemented with Caucasian children. The literature review shows that very few researchers of FCT have reported the ethnic background information of participants and that FCT has been implemented rarely with children from diverse ethnic groups. Only two FCT studies have included Hispanic or Spanish speaking children and families (Dalmau et al., 2011; Dunlap et al., 2006). In those two studies, the researchers reported that FCT effectively decreased challenging behaviors and increased communication responses. Children and families from other ethnic groups have rarely participated in FCT studies. It was therefore uncertain whether the same positive outcomes could be observed from culturally and linguistically diverse children when implementing FCT interventions.

Second, this study added more data on effects of FCT on behaviors of children with disabilities. According to the literature reviews of FCT (Mancil, 2006; Kurtz et al., 2011) and chapter two of this study, many children with disabilities have participated in FCT studies. However, FCT studies with children were conducted relatively more often in non-natural environments such as clinics and therapy rooms than in homes and schools. In the present study, data from children aged 5 to 7 were collected in FCT interventions within home settings: data for changes in their challenging behaviors and communication responses during FCT, follow-up, and generalization. These data may be helpful for understanding effects of FCT on behavior of children with disabilities in natural environments.

Third, this study revealed that Korean immigrant mothers were able to implement FA and FCT procedures and showed positive perspectives on the effects of FCT. Mothers who participated in the study rated the social validity of FCT. The mothers' ratings were important for examining the effects of FCT intervention on children's behaviors within their overall ordinary home routines as opposed to a selected home routine or activity. It is possible that mothers perceived the effects of FCT intervention on their children's challenging behaviors differently from the results of direct observation, presented as a percentage of intervals of challenging behaviors.

Fourth, Korean immigrant parent evaluators who had typically developing children perceived that FCT was effective for challenging behaviors. Most FCT interventions have been implemented with Caucasian children. There are fewer data on how FCT is perceived and accepted in other cultures. According to the results of this study, many Korean immigrant parents in the U.S. may have positive perspectives on FCT. There is some possibility that more Korean immigrant children and families would be willing to experience FCT.

Suggestions for Future Research

According to the results of this study, suggestions for future research can be made despite the study's limitations.

First, the results of this study should be examined again with a larger group of Korean immigrant children with disabilities. The FCT in this study was implemented by the mothers of only 3 Korean immigrant children with developmental disabilities, and the participants were recruited from a limited location. FCT studies applied to many Korean

immigrant children may provide practical data on what characteristics of Korean immigrant children relate to more positive outcomes of FCT, if the studies are conducted with consideration of characteristics of the children such as cognitive development, social ability, language level, age, diagnoses, and so forth. For instance, children who often present social reactions to others may achieve better results from FCT even if they have delays in communication development.

Second, the findings of this study should be replicated with children having special needs from another immigrant group. Researchers could implement FCT with culturally and linguistically diverse children in order to examine how they respond to FCT. They might want to identify whether similar results would be observed or differences would be found when FCT is implemented with children from diverse backgrounds. In addition, researchers could examine whether parents from diverse ethnic groups are able to conduct FCT procedures with their children following training in FCT. They should investigate effective ways to train parents, given their cultural values and perspectives on behaviors.

Third, further analysis is needed in order to examine the intensity and time of FCT necessary to achieve effects on communication responses and challenging behaviors. Each child responded differently to FCT in this study. Peter and Dustin demonstrated immediate increases in communication responses and decreases in challenging behaviors in the beginning of the FCT intervention. However, Hans required more time to learn new communication responses and to reduce challenging behaviors during FCT in comparison with Peter and Dustin. He increased communication responses and decreased

challenging behaviors gradually. In addition, Peter began to use communication responses without prompts after several FCT sessions but Dustin and Hans performed most of their communication responses following prompts throughout all FCT intervention sessions. Dustin and Hans may have needed more time to use communication responses independently. Researchers should explore how intensive and how long FCT intervention should be in order to achieve positive outcomes for challenging behaviors and communication responses of children. This may vary across children, but data should be collected in order to generate practical guidelines for parents, teachers, and professionals.

Fourth, more research is required in order to explore what variables are related to generalization of children's behaviors trained with FCT. Generalization of the FCT effects has not often been examined in FCT studies but has been tested across different variables such as settings, people, tasks, and so on. Children do not always generalize the behaviors learned in FCT. It is unclear what variables are associated with generalization of children's behaviors in FCT.

Fifth, various implementers should be involved in FCT studies. Researchers may consider training fathers, siblings, teachers, peers, or community members to participate in conducting FCT. They should examine whether fathers, siblings, teachers, peers, and community members can understand and implement FCT procedures and whether similar effects on children's behaviors would be observed with these implementers. Children may generalize their newly learned communication skills to different circumstances more

if other family members and community people are involved in FCT within various home or community settings.

Sixth, additional research is needed on the roles and time of training and coaching provided to parents. Researchers may want to find the best way to support parents implementing FCT with their children. Parents may need training on FCT procedures that differs from that for teachers or professionals because most parents are not familiar with FCT or behavior analysis. Researchers should examine how specific methods of training affect parents' skills in performing FCT. They also need to investigate the time required to train parents to maintain a certain level of integrity in implementing FCT procedures.

Seventh, effects of FCT should be examined more in natural environments for young children such as the home, the school, and community settings. Many FCT studies for children have been conducted in clinic settings or controlled and separated therapy rooms, which are not natural environments in childhood (Kurtz et al., 2011; Mancil, 2006). Home settings are important environments for interventions with children, and some FCT studies have been implemented in children's homes within family routines (Derby et al., 1997; Harding et al., 2005; Koegel et al., 1998; Mildon et al., 2004; Moes & Frea, 2000, 2002). In addition, researchers have recently begun to focus on school as a context for FCT. Several FCT studies have been implemented in preschool classrooms (Frea et al., 2001; Gibson, et al., 2010; Hines & Simonsen, 2008; Peterson et al., 2005; Schindler & Horner, 2005). However, researchers have rarely conducted FCT in community environments. In Durand (1999), teachers implemented FCT in community settings such as stores, malls, movie theaters, and libraries following FCT in classrooms.

Those studies did not determine whether similar effects of FCT were achieved in homes, schools, and communities. More studies should be conducted to examine effects of FCT for children in home, educational, and community settings.

Eighth, in the present study, effects of FCT were examined only for challenging behaviors and communication responses. However, investigating the impact of FCT on children's other behaviors such as completing tasks or engaging in appropriate social behaviors would be necessary to provide useful information for parents and teachers to help them choose among various behavioral interventions.

Appendix A.
Article Coding Form

Participant	Gender	Male	Female	Age	0-2	3-5	Disability	DD	MR	Autism	Cerebral	Blind/vision	Seizure	Others:	
	Preintervention Exp. Com. Mode				Nonverbal / No formal / Ges. / Sign / 1 word / Sym. / Imit. / No data / Speech / Others:										
	Target challenging behavior				Self-injury Aggression Tantrum Disruption Noncompliance Destruction Others:										
Assessment	Procedure				FA Interview Observation Record MAS No data										
	Setting				Class Hospital Home Treat. No data					Implementer		Researcher Family Teacher			
	Results (Function of Behavior)				Escape Attention Tangible Others:										
Intervention	Interobserver agreement				No Yes: average ___ % rage __ %-__%					Social validity		No Yes: outcomes _____			
	Experimental Design				Exp. Control? Y N Alt.tx. MBL MP Reversal AB										
	Setting				Class Hospital Home Treat. No data					Implementer		Researcher Family Teacher			
	Communication Response				Signs Gestures Pictures/symbols VOCAs Verbal Words Others:										
	Outcomes				CB Increase ___% Decrease ___% Level +/- Trend <u>dec/inc/stab</u> Variability <u>vari/stab</u> Comm. Increase ___% Decrease ___% Level +/- Trend <u>dec/inc/stab</u> Variab. <u>vari/stab</u>										
	Follow-up and generalization				FU No Maintain? Y/N other___ Ge No Generalize? Y To who/what _____ N _____										
	Consequence with FCT				Extinction Time-out Guidance Redirect Block No data Other										

Appendix B.

Coding Form

Child name _____ Recording date _____

FA _____ Baseline _____ Tx _____

Coder _____ Re-coder _____ Coding date _____

Dependent variables

Independent variables

Targeted CB – T

Reinforcement – R

Communication response – C

Mand prompt – P

	1-10 sec	11-20	21-30	31-40	41-50	51-60
1min						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Total targeted CB: T _____ /60 X 100 = _____

Total communication response: C _____ /60 X 100 = _____

Total reinforcement: R _____ /60 X 100 = _____

Total mand prompt: P _____ /60 X 100 = _____

References

- Arndorfer, R. E., Miltenberger, R. G., Woster, S. H., Rortvedt, A. K., & Gaffaney, (1994). Home-based descriptive and experimental analysis of problem behaviors in children. *Topics in Early Childhood Special Education, 14*, 64-87.
- Baker, D. L., Miller, E., Dang, M. T., Chiem-Seng, Y., & Hansen, R. L. (2010). Developing culturally responsive approaches with Southeast Asian American families experiencing developmental disabilities. *Pediatrics, 126*, 146-150.
- Barrera, I. (1993). Effective and appropriate instruction for all children: The challenge of cultural/linguistic diversity and young children with special needs. *Topics in Early Childhood Special Education, 13*, 461-487.
- Berg, W. K., Wacker, D. P., Harding, J. W., Ganzer, J. & Barretto, A. (2007). An evaluation of multiple dependent variables across distinct classes of antecedent stimuli pre and post functional communication training. *Journal of Early and Intensive Behavior Intervention, 3*, 305-333.
- Bowman, B. T. (1992). Who is at risk for what and why. *Journal of Early Intervention, 16*, 101-108.
- Brown, K. A., Wacker, D. P., Derby, K. M., Peck, S. M., Richman, D. M., Sasso, G. M., Knutson, C. L., & Harding, J. W. (2000). Evaluating the effects of functional communication training in the presence and absence of establishing operations. *Journal of Applied Behavior Analysis, 33*, 53-71.
- Camarota, S. (2000). Our new immigration predicament. *American Enterprise, 11*, 26-29.

- Campbell, J. M. (2000). *Efficacy of behavior interventions to reduce problematic behaviors in persons with autism: A quantitative synthesis of single-subject research*. An unpublished doctoral dissertation, University of Memphis, Memphis, TN.
- Campbell, S. H. (1995). Behavior problems in preschool children: A review of recent research. *Journal of Child Psychology and Psychiatry*, 36, 113-149.
- Campbell, R. V., & Lutzker, J. R. (1993). Using functional equivalence training to reduce severe challenging behavior: A case study. *Journal of Development and Physical Disabilities*, 5, 203-216.
- Carr, E. G. & Durand, M. V. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis*, 18, 111-126.
- Carr, E. G., & Kemp, D. C. (1989). Functional equivalence of autistic leading and communicative pointing: Analysis and treatment. *Journal of Autism and Developmental Disorders*, 19, 561-578.
- Carr, E. G., Levin, L., McConnachie, G., Carlson, J. I., Kemp, D. C., Smith, C. E., & McLaughlin, D. M. (1999). Comprehensive multisituational intervention for problem behavior in the community: Long-term maintenance and social validation. *Journal of Positive Behavior Interventions*, 1, 5-25.
- Charlop-Christy, M. H., Carpenter, M., Le, L., LeBlanc, L. A., & Kellet, K. (2002). Using the picture exchange communication system (PECS) with children with autism: Assessment of PECS acquisition, speech, social-communicative behavior, and problem behavior. *Journal of Applied Behavior Analysis*, 35, 213-231.

- Chiang, L. H. (2000). Teaching Asian American students. *The Teacher Educator*, 36, 58-69.
- Cho, S., Singer, G. H., & Brenner, B. (2003). A comparison of adaptation to childhood disability in Korean immigrant and Korean mothers. *Focus on Autism and Other Developmental Disabilities*, 18, 9-19.
- Cooper, H. (1998). *Synthesizing research: A guide for literature reviews* (3rd Ed.). Thousand Oaks: Sage Publications.
- Conroy, M. A., Dunlap, G., Clarke, S., & Alter, P. J. (2005). A descriptive analysis of positive behavioral intervention research with young children with challenging behavior. *Topics in Early Childhood Special Education*, 25, 157-166.
- Conway Madding, C. (2000). Maintaining focus on cultural competence in early intervention services to linguistically and culturally diverse families. *Infant-Toddler Intervention*, 10, 9-18.
- Cowan, R. J. & Sheridan, S. M. (2003). Investigating the acceptability of behavioral interventions in applied conjoint behavior consultations: Moving from analog conditions to naturalistic settings. *School Psychology Quarterly*, 18, 1-21.
- Cummings, A. R. & Carr, J. E. (2005). Functional analysis and treatment of joint dislocation associated with hypermobility syndrome: A single-case analysis. *Journal of Developmental and Physical Disabilities*, 17, 225-236.
- Dalmau, Y. C. P., Wacker, D. P., Harding, J. W., Berg, W. K., Schieltz, K. M., Lee, J. F., Breznican, G. P., & Kramer, A. R. (2011). A preliminary evaluation of functional

- communication training effectiveness and language preference when Spanish and English are manipulated. *Journal of Behavioral Education*, 20, 233-251.
- Derby, K. M., Wacker, D. P., Berg, W., DeRaad, A., Ulrich, S., Asmus, J., Harding, J., Prouty, A., Laffey, P., & Stoner, E. A. (1997). The long-term effects of functional communication training in home settings. *Journal of Applied Behavior Analysis*, 30, 507-531.
- Diken, I. H. (2006). An overview of parental perceptions in cross-cultural groups on disability. *Childhood Education*, 82, 236-240.
- Dirks, T. & Hadders-Algra, M. (2011). The role of the family in intervention of infants at high risk of cerebral palsy: A systematic analysis. *Developmental Medicine & Child Neurology*, 53, 62-67.
- Dooley, P., Wilczenski, F. L., & Torem, C. (2001). Using an activity schedule to smooth school transitions. *Journal of Positive Behavior Interventions*, 3, 57-61.
- Dragow, E., Halle, J. W., & Ostrosky, M. M. (1998). Effects of differential reinforcement on the generalization of a replacement mand in three children with severe language delays. *Journal of Applied Behavior Analysis*, 31, 357-374.
- Dunlap, G., & Fox, L. (1996). Early intervention and serious problem behaviors: A comprehensive approach. In L. K. Koegel, R. L. Koegel, & G. Dunlap (Eds.). *Positive behavioral support: Including people with difficult behavior in the community* (pp. 31-50). Baltimore: Brooks.
- Dunlap, G., Ester, T., Langhans, S., & Fox, L. (2006). Functional communication training with toddlers in home environments. *Journal of Early Intervention*, 28, 81-96.

- Durand, V. M. (1990). *Severe behavior problems: A functional communication training approach*. New York: Guilford Press.
- Durand, V. M. (1993). Functional communication training using assistive devices: Effects on challenging behavior and affect. *Augmentative & Alternative Communication, 9*, 168-176.
- Durand, V. M. (1999). Functional communication training using assistive devices: Recruiting natural communities of reinforcement. *Journal of Applied Behavior Analysis, 32*, 247-267.
- Durand, V. M., & Carr, E. G. (1991). Functional communication training to reduce challenging behavior: Maintenance and application in new settings. *Journal of Applied Behavior Analysis, 24*, 251-264.
- Durand, V. M., & Carr, E. G. (1992). An analysis of maintenance following functional communication training. *Journal of Applied Behavior Analysis, 25*, 777-794.
- Durand, V. M., & Crimmins, D. (1988). Identifying the variables maintaining self-injurious behavior. *Journal of Autism and Developmental Disorders, 18*, 99-117.
- Durand, V. M., & Merges, E. (2001). Functional communication training: A contemporary behavior analytic intervention for problem behaviors. *Focus on Autism and Other Developmental Disabilities, 16*, 110-119.
- Emde, R. N. (2006). Culture, diagnostic assessment, and identity: Defining concepts. *Infant Mental Health Journal, 27*, 606-611.
- Elliott, S. N., & Treuting, M. V. (1991). The behavior intervention rating scale: Development and validation of a pretreatment acceptability and effectiveness measure. *Journal of School Psychology, 29*, 43-51.

- Falcomata, T. S., Roane, H. S., Feeney, B. J., & Stephenson, K. M. (2010). Assessment and treatment of elopement maintained by access to stereotypy. *Journal of Applied Behavior Analysis, 43*, 513-517.
- Farver, J. A. M. & Lee-Shin, Y. (2000). Acculturation and Korean-American children's social and play behavior. *Social Development, 9*, 316-336.
- Finn, C. A., & Sladeczek, I. E. (2001). Assessing the social validity of behavioral interventions: A review of treatment acceptability measures. *School Psychology Quarterly, 16*, 176-206.
- Fisher, W. W., Thompson, R. H., Hagopian, L. P., Bowman, L. G., & Krug, A. (2000). Facilitating tolerance of delayed reinforcement during functional communication training. *Behavior Modification, 24*, 3-29.
- Florian, L., Hollenweger, J., & Simeonsson, R. J. (2006). Cross-cultural perspectives on the classification of children with disabilities: Part I. issues in the classification of children with disabilities. *Journal of Special Education, 40*, 36-45.
- Fox, L., Dunlap, G., & Powell, D. (2002). Young children with challenging behavior: Issues and considerations for behavior support. *Journal of Positive Behavior Interventions, 4*, 208-217.
- Frea, W. D., Arnold, C. L., & Vittimberga, G. L. (2001). A demonstration of the effects of augmentative communication on the extreme aggressive behavior of a child with autism within an integrated preschool setting. *Journal of Positive Behavior Interventions, 3*, 194-199.

- Garrett, J. E. & Holcomb, S. (2005). Meeting the needs of immigrant students with limited English ability. *International Education, 35*, 49-62.
- Gibson, J. L., Pennington, R. C., Stenhoff, D. M., & Hopper, J. S. (2010). Using desktop videoconferencing to deliver interventions to a preschool student with autism. *Topics in Early Childhood Special Education, 29*, 214-225.
- Hagopian, L. P., Fisher, W. W., Sullivan, M. T., Acquisto, J., LeBlanc, A. L. (1998). Effectiveness of functional communication training with and without extinction and punishment: A summary of 21 inpatient cases. *Journal of Applied Behavior Analysis, 31*, 211-235.
- Hagopian, L. P., Kuhn, S. A. C., Long, E. S., & Rush, K. S. (2005). Schedule thinning following communication training: Using competing stimuli to enhance tolerance to decrements in reinforcer density. *Journal of Applied Behavior Analysis, 38*, 177-193.
- Hanley, G. P., Piazza, C. C., Fisher, W. W., Contrucci, S. A., & Maglieri, K. A. (1997). Evaluation of client preference for function-based treatment packages. *Journal of Applied Behavior Analysis, 30*, 459-473.
- Harding, J., Wacker, D. P., Berg, W. K., Barretto, A., & Ringdahl, J. (2005). Evaluation of relations between specific antecedent stimuli and self-injury during functional analysis conditions. *American Journal on Mental Retardation, 110*, 205-215.
- Harding, J. W., Wacker, D. P., Berg, W. K., Winborn-Kemmerer, L., Lee, J. F., & Ibrahimovic, M. (2009). Analysis of multiple manding topographies during

- functional communication training. *Education and Treatment of Children*, 32, 21-36.
- Harrower, J. K., Fox, L., Dunlap, G., & Kincaid, D. (2000). Functional assessment and comprehensive early Intervention. *Exceptionality*, 8, 189-204.
- Harry, B. (2008). Collaboration with culturally and linguistically diverse families: Ideal versus reality. *Exceptional Children*, 74, 372-388.
- Hernandez, D. J., Denton, N. A. & MaCartney, S. (2009). School-age children in immigrant families: Challenges and opportunities for America's schools. *Teachers College Record*, 111, 616-658.
- Hines, E. & Simonsen, B. (2008). The effects of picture icons on behavior for a young student with autism. *Beyond Behavior*, 18, 9-17.
- Horn, E. & Kang, J. (2012). Supporting young children with multiple disabilities: What do we know and what do we still need to learn? *Topics in Early Childhood Special Education*, 31, 241-248.
- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*, 71, 165-179.
- Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1982). Toward a functional analysis of self-injury. *Analysis and Intervention in Developmental Disabilities*, 2, 3-20.

- 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.
- Jegatheesan, B. (2009). Cross-cultural issues in parent-professional interactions: A qualitative study of perceptions of Asian American mothers of children with developmental disabilities. *Research & Practice for Persons with Severe Disabilities*, 34, 123-136.
- Jegatheesan, B., Fowler, S., & Miller, P. J. (2010). From symptom recognition to services: How South Asian Muslim immigrant families navigate autism. *Disability & Society*, 25, 797-811.
- Jung, W. S. & Stinnett, T. A. (2005). Comparing judgments of social, behavioral, emotional and school adjustment functioning for Korean, Korean American and Caucasian American children. *School Psychology International*, 26, 317-329.
- Jung, K. & Honig, A. S. (2000). Intergenerational comparisons of paternal Korean childrearing practices and attitudes. *Early Child Development and Care*, 165, 59-84.
- Kahng, S., Iwata, B. A., & Lewin, A. B. (2002). Behavioral treatment of self-injury, 1964 to 2000. *American Journal on Mental Retardation*, 107, 212-221.
- Kaiser, A. R., Hancock, T. B., Cai, X., Foster, E. M., & Hester, P. P. (2000). Parent-reported behavioral problems and language delays in boys and girls enrolled in Head Start classrooms. *Behavioral Disorders*, 26, 26-41.

- Karoly, L. A. & Gonzalez, G. C. (2011). Early care and education for children in immigrant families. *Future of Children, 21*, 71-101.
- Kazdin, A. E. (1982). *Single-case research designs: Methods for clinical and applied settings*. New York: Oxford University Press.
- Kim, W. J., Kim, L. I. & Rue, D. S. (1997). Korean American children. In G. Johnson-Powell, J. Yamamoto, G. E. Wyatt, W. Arroyo (Ed.), *Transcultural child development: Psychological assessment and treatment* (pp.183-207). Hoboken, NJ: John Wiley & Sons Inc.
- Kim, H. M. & Olive, M. L. (2006). *A literature review of AAC strategies with young children during Functional Communication Training*. Manuscript in preparation.
- Kim, H. M. & Olive, M. L. (2012). *A literature review of Functional Communication Training for children with challenging behavior*. Manuscript in preparation.
- Koegal, L. K., Stiebel, D., & Koegel, R. L. (1998). Reducing aggression in children with autism toward infant or toddler siblings. *Journal of the Association for Persons with Severe Handicaps, 23*, 111-118.
- Kuhn, D. E., Chirighin, A. E., & Zelenka, K. (2010). Discriminated functional communication: A procedural extension of functional communication training. *Journal of Applied Behavior Analysis, 43*, 249-264.
- Kurtz, P. F., Chin, M. D., Huete, J. M., Tarbox, R. S. F., O'Connor, J. T., Paclawskyj, T. R., & Rush, K. S. (2003). Functional analysis and treatment of self-injurious behavior in young children: A summary of 30 cases. *Journal of Applied Behavior Analysis, 36*, 205-219.

- Kurtz, P. F., Boelter, E. W., Jarmolowicz, D. P., Chin, M. D., & Hagopian, L. P. (2011). An analysis of functional communication training as an empirically supported treatment for problem behavior displayed by individuals with intellectual disabilities. *Research in Developmental Disabilities, 32*, 2935-2942.
- Kwon, J. Y. (2003). Korean parents' identification of emotional and behavioral problems in kindergarten-age children. *Journal of Research in Childhood Education, 17*, 159-174.
- Lee, H., Ostrosky, M. M., Bennett, T., & Fowler, S. A. (2003). Perspectives of early intervention professionals about culturally-appropriate practices. *Journal of Early Intervention, 25*, 281-295.
- Leone, P. E. & Bartolotta, R. (2010). Community and interagency partnerships. In B. Algozzing, A. P. Daunic, S. W. Smith (Eds.). *Preventing problem behaviors: Schoolwide programs and classroom practices*. Thousand Oaks, CA.: Corwin Press.
- Lerman, D. C., Kelley, M. E., Vorndran, C. M., Kuhn, S. A. C., & LaRue, R. H. (2002). Reinforcement magnitude and responding during treatment with differential reinforcement. *Journal of Applied Behavior Analysis, 35*, 29-48.
- Mancil, G. R. (2006). Functional Communication Training: A review of the literature related to children with autism. *Education and Treatment in Developmental Disabilities, 41*, 213-224.
- Mancil, G. R., Conroy, M. A., & Haydon, T. F. (2009). Effects of a Modified Milieu Therapy Intervention on the Social Communicative Behaviors of Young Children

- with Autism Spectrum Disorders. *Journal of Autism & Developmental Disorders*, 39, 149-163.
- Marcus, B. A., & Vollmer, T. (1995). Effects of differential negative reinforcement on disruption and compliance. *Journal of Applied Behavior Analysis*, 28, 229-231
- Marquis, J. G., Horner, R. H., Carr, E. G., Turnbull, A. P., Thompson, M., Behrens, G. A., Magito-McLaughlin, D., McAtee, M. L., Smith, C. E., Ryan, K. A., & Doolabh, A. (2000). A meta-analysis of positive behavior support. In R. Gersten, E. P. Schiller, & S. Vaughn (Eds.). *Contemporary special education research: Syntheses of the knowledge base on critical instructional issues*. Mahway, NJ.: Lawrence Erlbaum Associates.
- Matson, J. L., Dixon, D. R., & Matson, M. L. (2005). Assessing and treating aggression in children and adolescents with developmental disabilities: A 20-year overview. *Educational Psychology*, 25, 151-181.
- McCollum, J. A. & McBride, S. L. (1997). Ratings of parent-infant interaction: Raising questions of cultural validity. *Topics in Early Childhood Special Education*, 17, 494-519.
- McHatton, P. A. & Correa, V. (2005). Stigma and discrimination: Perspectives from Mexican and Puerto Rican mothers of children with special needs. *Topics in Early Childhood Special Education*, 25, 131-142.
- Mildon, R. L., Moore, D. W., & Dixon, R. S. (2004). Combining noncontingent escape and functional communication training as a treatment for negatively reinforced disruptive behavior. *Journal of Positive Behavior Interventions*, 6, 92-102.

- Mirenda, P. (1997). Supporting individuals with challenging behavior through functional communication training and AAC: Research review. *AAC Augmentative and Alternative Communication, 13*, 207-225.
- Moes, D. R., & Frea, W. D. (2000). Using family context to inform intervention planning for the treatment of a child with autism. *Journal of Positive Behavior Interventions, 2*, 40-46.
- Moes, D. R., & Frea, W. D. (2002). Contextualized behavioral support in early intervention for children with autism and their families. *Journal of Autism & Developmental Disorders, 32*, 519-533.
- Moore, T. R., Gilles, E., McComas, J. J., & Symons, F. J. (2010). Functional analysis and treatment of self-injurious behavior in a young child with traumatic brain injury. *Brain Injury, 24*, 1511-1518.
- Morrier, M. J. & Gallagher, P. A. (2011). Disproportionate representation in placements of preschoolers with disabilities in five southern states. *Topics in Early Childhood Special Education, 31*, 48-57.
- Neilsen, S. L., & McEvoy, M. A. (2003). Functional behavioral assessment in early education settings. *Journal of Early Intervention, 26*, 115-131.
- Northup, J., Wacker, D. P., Berg, W. K., Kelly, L., Sasso, G., & DeRaad, A. (1994). The treatment of severe behavior problems in school settings using a technical assistance model. *Journal of Applied Behavior Analysis, 27*, 33-47.

- O'Brien, S., & Repp, A. C. (1990). Reinforcement-based reductive procedures: A review of 20 years of their use with persons with severe or profound retardation. *Journal of the Association for Persons with Severe Handicaps*, 15, 148-159.
- Olive, M. L. (1999). *Functional communication training: An assessment of stimulus and response generalization*. Unpublished doctoral dissertation, University of Minnesota, Twin Cities.
- Olive, M. L., Delacruz, C., Davis, S. & Lang, R. B. (2006). *A literature review of Functional Communication Training for people with disabilities*. Manuscript submitted for publication.
- Olive, M. L., & McEvoy, M.A. (2004). Issues, trends, and challenges in early intervention. In A. McCray Sorrells, H. J. Rieth, & P. T. Sindelar. (Eds.). *Critical issues in special education*. Allyn & Bacon.
- Olive, M. L., & Smith, B. W. (2005). Effect Size Calculations and Single Subject Designs. *Educational Psychology*, 25, 313-324.
- O'Neil, R., Horner, R., Albin, R., Sprague, J., Storey, K., & Newton, J. S. (1997). *Functional assessment and program development for problem behavior* (2nd ed.). Pacific Grove, CA: Brooks Cole Publishing Co.
- Pang, Y. (2010). Facilitating family involvement in early intervention to preschool transition. *School Community Journal*, 20, 183-198.
- Park, J., Turnbull, A. P., & Park, H. (2001). Quality of partnerships in service provision for Korean American parents of children with disabilities: A qualitative inquiry. *The Journal of the Association for Persons with Severe Handicaps*, 26, 158-170.

- Parker, R. I., & Brossart, D. F. (2003). Evaluating single-case research data: A comparison of seven statistical methods. *Behavior Therapy, 34*, 189-212.
- Peck, S. M., Wacker, D. P., Berg, W. K., Cooper, L., Brown, K. A., Richman, D., McComas, J. J., Frischmeyer, P., & Millard, T. (1996). Choice-making treatment of young children's severe behavior problems. *Journal of Applied Behavior Analysis, 29*, 263-290.
- Perreira, K. M., Chapman, M. V., & Stein, G. L. (2006). Becoming an American parent: Overcoming challenges and finding strength in a new immigrant Latino community. *Journal of Family Issues, 27*, 1383-1414.
- Peterson, S. M. P., Caniglia, C., Royster, A. J., Macfarlane, E., Plowman, K., Baird, S. J., & Wu, N. (2005). Blending functional communication training and choice making to improve task engagement and decrease problem behaviour. *Educational Psychology, 25*, 257-274.
- Poon-McBrayer, K. & Garcia, S. B. (2000). Profiles of Asian American students with LD at initial referral, assessment, and placement in special education. *Journal of Learning Disabilities, 33*, 61-71.
- Powell, D., Danlap, G., & Fox, L. (2006). Prevention and intervention for the challenging behaviors of toddlers and preschoolers. *Infants & Young Children, 19*, 25-35.
- Reeve, C. E., & Carr, E. G. (2000). Prevention of severe behavior problems in children with developmental disorders. *Journal of Positive Behavior Interventions, 2*, 144-161.

- Reichle, J., Drager, K., & Davis, C. (2002). Using request for assistance to obtain desired items and to gain release from non preferred activities: Implications for assessment and intervention. *Education and Treatment of Children, 25*, 47-66.
- Reichle, J., & Wacker, D. P. (1993). *Communicative alternatives to challenging behavior: Integrating functional assessment and intervention strategies*. (Vol. 3) Baltimore: Paul Brookes Publishing Company.
- Richards, S. B., Taylor, R. L., Ramasamy, R., & Richards, R. Y. (1999). *Single subject research: Applications in educational and clinical settings*. San Diego: Singular Publication Group.
- Richman, D. M., Wacker, D. P., & Winborn, L. (2001). Response efficiency during functional communication training: Effects of effort on response allocation. *Journal of Applied Behavior Analysis, 34*, 73-76.
- Schieltz, K. M., Wacker, D. P., Harding, J. W., Berg, W. K., Lee, J. F., Dalmau, Y. C. P., Mews, J., & Ibrahimovic, M. (2011). Indirect effects of functional communication training on non-targeted disruptive behavior. *Journal of behavioral Education, 20*, 15-32.
- Schindler, H. R., & Horner, R. H. (2005). Generalized reduction of problem behavior of young children with autism: Building trans-situational interventions. *American Journal on Mental Retardation, 110*, 36-47.
- Shonkoff, J. P. & Phillips, D. A. (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press.

- Sigafoos, J. (2000). Communication development and aberrant behaviour in children with developmental disabilities. *Education and Training in Mental Retardation*, 35, 168-176.
- Sigafoos, J., Arthur, M., & O'Reilly, M. (2003). Challenging behavior and developmental disability. London; Philadelphia: Wiley.
- Smith, B., & Fox, L. (2003). *Systems of Service Delivery: A Synthesis of Evidence Relevant to Young Children at Risk of or Who Have Challenging Behavior*. Tampa, FL: University of South Florida, Center for Evidence-Based Practice: Young Children with Challenging Behavior.
- Steege, M. W., Wacker, D. P., Cigrand, K. C., Berg, W. K., Novak, C. G., Reimers, T. M., Sasso, G. M., & DeRaad, A. (1990). Use of negative reinforcement in the treatment of self-injurious behavior. *Journal of Applied Behavior Analysis*, 23, 459-467.
- Sylva, J. A. (2005). Issues in early intervention: The impact of cultural diversity on service delivery in natural environments. *Multicultural Education*, 13, 26-29.
- Symons, F. J. (2000). Early intervention for early, aberrant repetitive behavior: Possible, plausible, probable? *Journal of Early Intervention*, 23, 20-21.
- Tait, K., Sigafoos, J., Woodyatt, G., O'Reilly, M., & Lancioni, G. (2004). Evaluating parent use of functional communication training to replace and enhance prelinguistic behaviours in six children with developmental and physical disabilities. *Disability & Rehabilitation*, 26, 1241-1254.

- Tirapelle, L., & Cipani, E. (1991). Developing functional requesting: Acquisition, durability, and generalization of effects. *Exceptional Children*, 58, 260-269.
- U.S. Census Bureau (2010). Profiles of general demographic characteristics. Retrieved April 1, 2012. <http://2010.census.gov/news/releases/operations/cb12-cn22.html>
- U.S. Department of Education (2004). *H.R.1350: Individuals with Disabilities Education Improvement Act of 2004*. Retrieved November 15, 2006. from www.ed.gov
- U.S. Department of Education (2011). *Building the legacy of IDEA 2004*. Retrieved September 13, 2011, from <http://idea.ed.gov>
- Vollmer, T. R., Marcus, B. A., & LeBlanc, L. (1994). Treatment of self-injury and hand mouthing following inconclusive functional analysis. *Journal of Applied Behavior Analysis*, 27, 331-344.
- Vollmer, T. R., Northup, J., Ringdahl, J. E., LeBlanc, L. A., & Chauvin, T. M. (1996). Functional analysis of severe tantrums displayed by children with language delays: An outclinic assessment. *Behavior Modification*, 20, 97-115.
- Wacker, D. P., Northup, J., & Cooper, L. (1992). Behavioral assessment. In D. E. Greydanus & M. L. Wolraich (Eds.), *Behavioral pediatrics*. New York: Springer-Verlag.
- Wacker, D. P., Berg, W. K., Harding, J. W., Barretto, A., Rankin, B., & Ganzer, J. (2005). Treatment effectiveness, stimulus generalization, and acceptability to parents of functional communication training. *Educational Psychology*, 25, 233-256.

- Wacker, D. P., Harding, J. W., Berg, W. K., Lee, J. F., Schieltz, K. M., Padilla, Y. C., Nevin, J. A., & Shahan, T. A. (2011). An evaluation of persistence of treatment effects during long-term treatment of destructive behavior. *Journal of the Experimental Analysis of Behavior, 96*, 261-282.
- Waldman, H. B. & Perlman, S. P. (2008). And what of children with disabilities who are immigrants?, *The exceptional Parent, 38*, 60-62.
- Washington, V. & Andrews, J. D. (1998). *Children of 2010*. Washington, DC: National Association for the Education of Young Children.
- Welterlin, A. & LaRue, R. H. (2007). Serving the needs of immigrant families of children with autism. *Disability & Society, 22*, 747-760.
- Winborn, L., Wacker, D. P., Richman, D. M., Asmus, J., & Geier, D. (2002). Assessment of mand selection for functional communication training packages. *Journal of Applied Behavior Analysis, 35*, 295-298.
- Winborn-Kemmerer, L., Wacker, D. P., Harding, J., Boelter, E., Berg, W., & Lee, J. (2010). Analysis of mand selection across different stimulus conditions. *Education and Treatment of Children, 33*, 49-64.
- Ziviani, J., Feeney, R. B., & Khan, A. (2011). Early intervention services for children with physical disability: Parents' perceptions of family-centeredness and service satisfaction. *Infants and Young Children, 24*, 364-382.