POSITIVE BEHAVIOR SUPPORT FOR DEAF CHILDREN WITH DEVELOPMENTAL DISABILITIES AND SEVERE PROBLEM BEHAVIOR

by

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ABSTRACT

A significant percentage of deaf children are diagnosed with additional disabilities, with estimates of educationally significant co-morbidities as high as 51% (Gallaudet Research Institute, 2006). Deaf children with additional disabilities are at increased risk for developing significant problem behavior, due to the severity of communication and other developmental challenges. The need for research regarding strategies to address problem behaviors in this unique group has been identified in the fields of education of the deaf and hard of hearing and applied behavior analysis (Carr, 2006; Luckner & Carter, 2001; Luckner, Muir, Howell, Sebald, & Young, 2005).

Two studies were conducted to answer questions related to staff training and behavior intervention for deaf children with additional disabilities. The first study utilized a one group pretest-posttest design to investigate the association between a train-the-trainer program and improvements in staff knowledge and skill regarding functional assessment and positive behavior support. The second study utilized a single-subject multiple baseline across settings design to investigate the effectiveness of a positive behavior support (PBS) approach to problem behavior with a deaf child diagnosed with cerebral palsy and autism.

Results for the first study showed that the training program produced a statistically significant difference between pre- and post-test scores, suggesting that the training program was associated with improved knowledge regarding behavior assessment and intervention. Results for the second study demonstrated a functional relation between a family centered PBS process and improvements in child behavior and participation in three valued routines in the home. Social validity evaluations, completed
by participating staff and parents, demonstrated that the goals, strategies, and outcomes of the interventions were acceptable, relevant, and useful. Results also demonstrated that a Deaf interventionist could effectively provide implementation support to hearing parents, under the supervision of an expert in PBS. Results are discussed in terms of findings in relation to the education of the deaf and hard of hearing and PBS literatures, unique contributions to the literature, limitations, implications for researchers and practitioners in the fields of education of the deaf and hard of hearing and PBS, and directions for future research.
PREFACE

Study 1 was approved by the Behavioral Research Ethics Board (Certificate #H07-02506). Study 2 was approved by the Behavioral Research Ethics Board (Certificate #H09-00145).
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CHAPTER 1: Introduction

Additional disabling conditions are extremely prevalent in deaf children; estimates suggest that 25 to 50% of deaf and hard of hearing children have at least one additional disability. The prevalence of deafness in individuals with neurological and developmental disorders or intellectual disabilities is greater than in the general population (Carvill, 2001; van Schrojenstein Lantman-de Valk, 1997). Many of the etiologies for hearing loss in children also are associated with developmental disabilities such as mental retardation and cerebral palsy (Gallaudet Research Institute, 2003; January, 2005; December, 2005; 2006; 2007; 2008). The effects of additional developmental disabilities in children who are deaf can be significant: these children experience even greater difficulty developing communication skills, compared to children with hearing loss alone (Heller, Allgood, Ware, Arnold, & Castelle, 1996; Heller, Allgood, Ware, & Castelle, 1996). The impact of communication impairment on the development of problem behavior in children with developmental disabilities is well documented (Carr & Durand, 1985b; Durand, 1990; Durand & Merges, 2001); it is, therefore, logical to conclude that the presence of both significant hearing loss and one or more developmental disabilities will significantly interfere with the development of communication skills, resulting in an increased likelihood of the development of problem behavior.

Deaf children with developmental disabilities often display problem behavior that interferes with their ability to successfully participate in home, school, and community-based activities. Families of these children experience difficulty engaging in typical family routines due to the presence of problem behavior (Beals, 2004; Ben & O’Leary,
Similarly, due to a lack of training and expertise in supporting deaf children with additional disabilities, educators experience difficulty including these children in educational programs for deaf children and providing support to these children and their families (Andrews & Covell, 2007; Cawthon, 2009; Luckner & Carter, 2001; Luckner & Howell, 2002; Luckner et al., 2005; Soukup & Feinstein, 2007).

With an increasing and significant number of deaf children diagnosed with additional disabilities, professionals in the field of the education of the deaf and hard of hearing need to have specific expertise in supporting these children and their families. Given that deaf children with additional disabilities frequently exhibit behavioral challenges, it is of particular importance that those working with these children have the training and skills necessary to effectively address problem behavior in home, school, and community contexts. While there is an empirically-based method for addressing problem behavior displayed by individuals with and without disability, known as Positive Behavior Support (PBS), the utility of PBS with deaf children has yet to be investigated. PBS is an applied science that combines educative methods to expand the behavior repertoire of an individual with systems change methods to redesign an individual’s living environment in order to enhance quality of life and reduce problem behavior (Carr et al., 2002). Based on empirical evidence regarding the successful use of PBS to address problem behavior in a variety of contexts, and with individuals of varying abilities and needs (Carr et al., 1999), it would appear that PBS may also be a successful intervention for deaf children who exhibit problem behavior. Providing training in PBS to educators of deaf children could potentially have an impact not only on the lives of deaf children
with developmental disabilities, but also on the field of deaf education as a whole. Providing PBS services and training to parents of deaf children with additional disabilities may further enable them to support their children with greater ease and effectiveness, resulting in improved quality of life, not only for the children, but for entire families.

**Deaf Children with Developmental Disabilities**

Deaf children with developmental disabilities comprise a unique group. They are children with a severe to profound hearing loss that prevents them from using spoken language as a means of communication. Because they are unable to hear, they are unable to access language and information that is presented through spoken language. While they require the use of the visual modality for communication, most are born to hearing parents who do not share the same need for visually-based communication. These parents are often challenged to acquire a new language (i.e., ASL) in order to communicate with their child. Because it takes a significant amount of time for hearing parents to become fluent in the use of a signed language, deaf children with developmental disabilities may spend a significant amount of time in environments where they do not have access to language and information. This lack of access to language and information can have a profound impact on overall development. As well, the presence of one or more developmental disabilities results in more complex developmental issues. Developmental disabilities can appear at any time up to 22 years of age and include a number of mental and/or physical impairments that affect language, mobility, learning, self-help, and independent living (National Center for Birth Defects and Developmental Disabilities, 2006). Developmental disabilities include a number of conditions, including autism.
spectrum disorder, Down syndrome, mental retardation, fetal alcohol spectrum disorder, and cerebral palsy.

Hearing loss is reported more frequently in persons with neurological and developmental disorders (Carvill, 2001; van Schrojenstein Lantman-de Valk, 1997). It is estimated that 25 to 51% of school-age students who are deaf or hard of hearing have at least one additional educationally significant disability, with deaf-blindness, learning disability, mental retardation, cerebral palsy, attention deficit disorder, and emotional/behavioral disorders being the most frequently reported (Andrews & Covell, 2007; Gallaudet Research Institute, 2003; January, 2005; December, 2005; 2006; 2007; 2008; Luckner & Carter, 2001, Pollack, 1997). The effects of additional developmental disabilities on the development of deaf children are not merely additive but multiplicative, in that the interaction of multiple disabling conditions typically results in varying levels of impairment across several domains, including communication, cognition, and behavior (Carvill, 2001; Carvill & Marston, 2002; Luckner & Carter, 2001).

Deaf children with developmental disabilities have historically been excluded from schools for the Deaf1, placed instead in programs for hearing children with developmental disabilities (Ewing & Jones, 2003). Although educators in these programs may be knowledgeable regarding specific developmental disabilities, they lack a “…sensitivity to deafness and the educational needs it entails” (Ewing & Jones, 2003, p. 268).

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1 The use of a capital ‘D’ Deaf represents members of the culturally Deaf community. Membership in the Deaf community is based upon use of a signed language (e.g., American Sign Language) and shared experiences (e.g., visual approach to life, common experiences of oppression) (Meadow-Orlans & Erting, 2000).
Schools for the Deaf are places where deaf children develop the linguistic and cultural competence to become members of the Deaf community, a community that is based on distinct values and, in the United States and English-speaking Canada, the use of American Sign Language (ASL) (Simms & Thumann, 2007). Although previously excluded from these environments, deaf students with developmental disabilities are increasingly being educated in schools for the Deaf. This places deaf children with developmental disabilities within a unique linguistic and cultural context that must be considered and respected when planning effective interventions. As well, the presence of deaf children with developmental disabilities in schools and programs for the D/deaf results in a need for specialized training of teachers and other support staff. No longer is traditional training in education of the deaf and hard of hearing sufficient; professionals need training to address the unique needs presented by deaf children with developmental disabilities. Such training needs to address more than just the characteristics of these students; training needs to include assessment and intervention strategies to address the communication, behavioral, learning, social, and physical challenges experienced by these individuals.

Incidence of Developmental Disabilities in Deaf Populations

A number of illnesses, injuries, and syndromes are implicated in both deafness and developmental disabilities. Pre- and perinatal injury, prematurity, cytomegalovirus, rubella, meningitis, CHARGE syndrome, ototoxic medications, and central nervous system damage or dysfunction can be implicated in both the presence of deafness and developmental disability (Fernell, et al., 1999; Schum, 2003). As such, there is an
increased risk for affected children to experience both deafness and developmental disabilities.

The Gallaudet Research Institute (GRI) conducts an Annual Survey of Deaf and Hard of Hearing Children and Youth. The 2007-2008 survey (Gallaudet Research Institute, 2008) compiled demographic data on 31,784 deaf and hard of hearing students in the United States, ages birth to 21. Thirty-nine point three percent of deaf and hard of hearing students had at least one additional disabling condition, including developmental delay (4.8%), autism (1.6%), learning disability (8.3%), attention deficit disorder (5.6%), orthopedic impairment (including cerebral palsy) (4.4%), or mental retardation (8.7%).

The incidence of many of these disabilities is greater than that of the hearing population. For example, the incidence of autism in hearing children is estimated to be .9% (Center for Disease Control and Prevention, 2006) and the incidence for mental retardation is 1.2% (Center for Disease Control and Prevention, 2005). It should be noted that the GRI compiles demographic data for children served only in programs for the deaf and hard of hearing in the United States. Deaf and hard of hearing children being educated in oral, inclusive, or other settings are not included in the GRI survey. It has been found that the GRI samples less than half of the deaf and hard of hearing children in the United States (Mitchell, 2004; Moores, 2009). Furthermore, it has been suggested that, due to the sampling issues related to the GRI survey, the population of deaf students with additional disabilities may be underestimated (Guardino, 2008). Due to these sampling issues, the GRI data regarding prevalence of additional disabilities in deaf and hard of hearing children should be viewed with caution.
Several etiologies of deafness also are linked to the occurrence of developmental disabilities. While data regarding specific etiologies were not gathered in the 2007-2008 GRI survey, the 2004-2005 survey did collect information regarding etiologies. Three conditions that are associated with developmental disabilities are particularly prevalent in deaf and hard of hearing students sampled by the GRI (2004-2005): cytomegalovirus (CMV), prematurity, and meningitis. CMV is a member of the herpes virus group; 80% to 90% of infants infected by their mothers during gestation will have complications that include hearing loss, vision impairment, and/or mental retardation (National Center for Infectious Diseases, 2005). Prematurity is associated with a number of developmental problems, including delayed growth and development and mental and/or motor retardation (MedlinePlus, 2004); meningitis is a disease with a potential after-effect of long-term mental impairment (Meningitis Research Foundation, 2002). The percentages of the GRI sample affected by each of these conditions were as follows: CMV: 1.8%, prematurity: 4.0%, and meningitis 3.6% (Gallaudet Research Institute, 2005). Therefore, 9.5% of the 2004-2005 GRI survey sample have a diagnosed disability that is correlated with mental retardation.

There are two syndromes associated with deafness in 14.3% of the GRI (2004) sample population: Down syndrome (8.7%) and CHARGE syndrome (5.6%) (Gallaudet Research Institute, 2005). Down syndrome is classified as a developmental disability that affects language and communication development, social development, and learning. CHARGE syndrome is a genetic syndrome comprised of numerous medical and physical difficulties that differ from child to child. For these children, developmental delay or disability often is a result of combined sensory impairments, medical and physical
impairments. In particular, children with CHARGE syndrome are at risk for social/emotional problems and patterns of abnormal behavior (Lewis & Lowther, 2001).

In addition to the GRI data, other studies have investigated the incidence of particular developmental disabilities in deaf and/or hard of hearing children. There is a particular interest in the literature regarding the co-morbidity of autism and hearing loss. The literature reports a wide variability in the incidence of autism and deafness. Skoff and colleagues (Skoff, Mirsky, & Turner, 1980; Skoff et al., 1986) reported that 44-63% of the children with autism whom they examined also had a hearing loss. Taylor, Rosenblatt, and Linschoten (1982) reported a similar prevalence of 44%. Gillberg, Rosenhall, and Johansson (1983) reported that 13% of their sample of children with autism also had a hearing loss. Jure, Rapin, and Tuchman (1991) investigated the incidence of autism among deaf and hard of hearing children and found that 5.3% of 1150 children diagnosed with hearing loss also had autism. Of the children with hearing loss and autism included in the study, 80% had hearing losses in the severe to profound range. A 1999 study investigating the prevalence of hearing loss in children and adolescents with autism (n=199) found that 7.9% had a mild to moderate bilateral hearing loss while 3.5% had a severe to profound bilateral hearing loss. The prevalence of severe to profound hearing loss in this sample of children and youth with autism is significantly higher than expected in a normal population, where profound hearing loss prevalence is estimated at 0.1-0.2% (Rosenhall, Nordin, Sandstrom, Ahlsen, & Gillberg, 1999).

Although not included in the GRI 2004-2005, 2006-2007, or the 2007-2008 surveys, data on functional limitations were collected in the 2002-2003 survey. Data showed that 69% (n=37,839) of deaf and hard of hearing students, both with and without
additional disabilities, demonstrated at least one functional limitation in the following areas: thinking and reasoning (34.7%), maintaining attention, (38.4%), expressive communication (52.5%), receptive communication (53.2%), and social interaction/behavior (30.5%) (Gallaudet Research Institute, 2003). This clearly demonstrates the impact of deafness on the development of critical skills for daily functioning, regardless of the presence of an additional disabling condition. It is, therefore, logical to surmise that the presence of one or more additional disabling conditions would result in increased functional limitations.

There are no similar data sets of hearing children with which to compare the GRI data. However, it is clear from the GRI data, as well as from studies addressing the co-morbidity of autism and deafness, that deaf children with additional disabilities comprise a significant proportion of the population of deaf and hard of hearing students, and that the development of functional skills necessary for independent daily functioning is significantly compromised.

**Issues in Service Provision**

Despite the increased prevalence of additional disabling conditions within the deaf population (Andrews & Covell, 2007; Gallaudet Research Institute, 2003; January, 2005; December, 2005; 2006; 2007; 2008; Luckner & Carter, 2001, Pollack, 1997), professionals working in programs serving deaf children lack the necessary training to address the myriad of problems these students present. A survey of research and training needs in the education of the deaf identified “meeting the needs of students with additional disabilities” as the sixth highest priority, based on responses from 331 professionals, parents, administrators, and university faculty (Luckner, Muir, Howell,
Sebald, & Young, 2005). Other studies and reports regarding the needs of pre-service and practicing teachers of the deaf and hard of hearing echo these findings (Andrews & Covell, 2007; Cawthon, 2009; Luckner & Carter, 2001; Luckner & Howell, 2002; Luckner et al., 2005; Soukup & Feinstein, 2007).

Whereas teachers of the deaf and staff working in other instructional or supportive capacities may not possess sufficient training to support deaf students with developmental disabilities, deaf students receiving education in programs for hearing students with disabilities also are underserved. Ewing and Jones (2003) point out that “…a sensitivity to deafness and the educational needs it entails is largely absent among special educators working with hearing students” (p. 268). Parents of deaf children with developmental disabilities also recognize the inability of the educational system to meet the unique needs of their children. Beals (2004) stated that “[n]either the ‘deaf intervention’ nor the ‘autism intervention’ systems proved perfectly sensitive to our needs” (p. 284) when reflecting upon her experience with her young deaf son, who also was diagnosed with autism. A mother (Ben & O’Leary, 2002) had this to say about her experience in trying to secure an appropriate educational placement for her son, Jesse, diagnosed with autism and profound deafness:

…Jesse’s days were split between a school for deaf students and a self-contained special education classroom within a general education public school. This split was due, in part, to the lack of behavioral expertise among the staff at the school for deaf students. I advocated for Jesse to be in school with teachers and peers who signed fluently so that his language development would not be lost, but his
behavior was difficult for the staff to handle, leading to the decision to split his time (p. 330).

Of the countless difficulties presented by deaf children with developmental disabilities, there is one that appears particularly challenging and of great concern to parents and educators alike: the presence of significant problem behavior that impedes child participation in social and learning contexts. Given the increased likelihood of emotional and behavioral disorders for deaf children in general (Carvill, 2001; Schlesinger & Meadow, 1972; Sinnott & Jones, 2005; van Eldik, 2005; van Eldik, Treffers, Veerman, & Verhulst, 2004), combined with the additional effects of the presence of one or more developmental disabilities (Carvill, 2001; Fernell et al., 1999; Madden et al., 2005; Schum, 2003), it is not surprising that problem behavior is of primary concern. Problem behavior, whether present in an individual who is deaf or hearing, with a developmental disability or not, has a negative impact on the individual and those around him or her, such as exclusion from activities and environments, lack of development of social relationships, reduced learning opportunities, and reduced quality of life (Carr, 2006).

**Positive Behavior Support**

Over the past 20 years, Positive Behavior Support (PBS) has emerged as an important evidence-based practice for addressing problem behavior in numerous populations and settings. As described by Carr et al. (2002) PBS is:

… an applied science that uses educational methods to expand an individual’s behavior repertoire and systems change methods to redesign an individual’s living
environment to first enhance the individual’s quality of life and, second, to minimize his or her problem behavior (p. 4).

The foundations of PBS include applied behavior analysis, the inclusion movement, and person-centered values. The purpose of PBS is to improve quality of life for both the individual engaging in problem behavior as well as those who live, learn, and work alongside him or her (Horner et al., 1990). Secondly, PBS strives to make problem behavior “…irrelevant, inefficient, and ineffective by helping an individual achieve his or her goals in a socially acceptable manner, thus reducing, or eliminating altogether, episodes of problem behavior” (Carr et al., 2002, p. 4). PBS follows a collaborative, team-based process of functional assessment to understand the nature of problem behavior, intervention planning to address all aspects of the problem behavior, and intervention implementation designed to empower key stakeholders to maintain and generalize PBS strategies across the lifespan (Carr et al., 2002). Core features of the approach are presented in Table 1.
Table 1. Core features of positive behavior support (PBS)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valued outcomes</td>
<td>PBS is concerned with (a) reductions in problem behavior and (b) lifestyle change. Improvements in problem behavior are not sufficient; rather, changes in learning, living, employment, and leisure are paramount. A focus on valued outcomes emphasizes the importance of including key stakeholders (e.g., family, individual, support staff) in identifying goals, rather than reliance on an expert model.</td>
</tr>
<tr>
<td>Empirically validated practices</td>
<td>PBS emphasizes the use of empirically validated procedures for intervening on problem behavior. PBS plans are comprehensive and utilize multiple strategies across five primary domains: ecological interventions, antecedent manipulations, instructions, consequences that eliminate rewards for problem behavior, and consequences that increase or enhance rewards for desired behavior.</td>
</tr>
<tr>
<td>Systems change</td>
<td>PBS focuses on the implementation of strategies within the context of supportive and nurturing systems. Regardless of whether interventions are implemented in home, school, or community settings, attention is given to ensure that there are sufficient time, resources, and expertise to ensure the accurate implementation of effective strategies.</td>
</tr>
</tbody>
</table>


**PBS in Hearing Populations**

PBS research has focused on providing support to individuals with developmental disabilities in home, school, and community settings (e.g., Dooley et al., 2001; Moes & Frea, 2002; Vaughn et al., 1997). The successful use of PBS has been empirically demonstrated with individuals diagnosed with a variety of disabilities, including...
individuals with autism spectrum disorders and/or mental retardation (Boettcher, Koegel, McNerney, & Koegel, 2003; Buschbacher & Fox, 2003; Campbell, 2003; Dunlap & Fox, 1999; Durand & Merges, 2001; Fox, Benito, & Dunlap, 2002; Horner, Carr, Strain, Todd, & Reed, 2002; Lucyshyn, Albin, & Nixon, 1997; Lucyshyn, Albin, Horner, Mann, Mann, & Wadsworth, 2007), Down syndrome (Ducharme & DiAdamo, 2005), and acquired brain injury (Feeney & Ylvisaker, 2003; Gardner, Bird, Maguire, Carreiro, & Abenaim, 2003; Ylvisaker, Jacobs, & Feeney, 2003). Twenty years of PBS research has documented the effectiveness and acceptability of the approach across the lifespan with a variety of persons with disability and in a variety of settings. (Carr et al., 1999).

**Family centered PBS.** PBS researchers also have investigated the utility of a family centered approach to PBS when implemented by parents in natural family contexts (Binnendyk & Lucyshyn, 2009; Buschbacher, Fox, & Clarke, 2004; Clarke, Dunlap, & Vaughn, 1999; Dunlap & Fox, 1999; Feldman, Condillac, Tough, Hunt, & Griffiths, 2002; Lucyshyn et al., 2007; Lucyshyn et al., 1997; Vaughn, Clarke, & Dunlap, 1997).

Table 2 provides a summary of key features of family-centered positive behavior support. Table 3 provides a summary of key studies in family-centered PBS. Taken together, these studies provide preliminary empirical support for the effectiveness and acceptability of a family-centered approach to PBS in which a behavior consultant collaborates with family members to improve child behavior and quality of life in natural family settings in the home and community.
**Table 2: Key Features of family-centered PBS**

1. Collaborative partnerships between families and professionals providing support
2. Family-centered principles and practices
3. Meaningful lifestyle outcomes for the child and family
4. Communication as a foundation for positive behavior
5. Functional assessment to understand the function of problem behavior and the variables influencing problem behavior
6. Individualized, multi-component support plans that enable families to create effective family contexts
7. Contextual fit between PBS plan and family life
8. The family activity setting as a unit of analysis
9. Implementation support that is individualized to family needs and preferences
10. Ongoing evaluation of child and family outcomes

Table 3. Summary of family-centered PBS studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Target Routines or Contexts</th>
<th>Data Collected</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaughn, Clarke, &amp; Dunlap (1997)</td>
<td>8-year-old boy with severe disabilities and his mother</td>
<td>Using the bathroom</td>
<td>Child’s disruptive behavior</td>
<td>Reductions in problem behavior at the point of intervention</td>
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<td></td>
<td></td>
<td>Dining at a fast food restaurant</td>
<td>Child’s engagement in the routines</td>
<td>Improvements in child participation at the point of intervention</td>
</tr>
<tr>
<td>Lucyshyn, Albin, &amp; Nixon (1997)</td>
<td>14-year-old girl with multiple disabilities and her parents</td>
<td>Family dinner at home</td>
<td>Rate of problem behavior</td>
<td>Reductions in problem behavior at the point of intervention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Family dinner at restaurant</td>
<td>Latency to termination (due to problem behavior) or routine completion</td>
<td>Improvements in child participation and routine completion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Home-based chore and leisure routine</td>
<td>Frequency of parent-reported indicator behaviors</td>
<td>Reductions in parent-reported indicator behaviors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grocery shopping with parents</td>
<td>Child participation</td>
<td>High parent ratings of social validity and contextual fit</td>
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<td></td>
<td></td>
<td></td>
<td>Social validity</td>
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<td></td>
<td>Contextual fit</td>
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<tr>
<td>Study</td>
<td>Participants</td>
<td>Target Routines or Contexts</td>
<td>Data Collected</td>
<td>Outcomes</td>
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<tr>
<td>Clarke, Dunlap, &amp; Vaughn (1999)</td>
<td>10-year-old boy with Asperger syndrome and his mother</td>
<td>Morning routine (getting ready for school)</td>
<td>Child’s disruptive behavior</td>
<td>Reductions in problem behavior at the point of intervention</td>
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<td></td>
<td></td>
<td></td>
<td>Child’s engagement in the routine</td>
<td>Improvements in child participation at the point of intervention</td>
</tr>
<tr>
<td>Dunlap &amp; Fox (1999)</td>
<td>6 children (ages 29 – 44 months) diagnosed with a pervasive developmental disorder and their parents</td>
<td>Play time, Meal times, Community outings and activities, Bed time, Riding in the car, Classroom time</td>
<td>Number of tantrums or percentage of intervals of problem behavior</td>
<td>Reductions in problem behavior or tantrums at the point of intervention across all children</td>
</tr>
<tr>
<td>Study</td>
<td>Participants</td>
<td>Target Routines or Contexts</td>
<td>Data Collected</td>
<td>Outcomes</td>
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<tr>
<td>Buschbacher, Fox, &amp; Clarke (2004)</td>
<td>7-year-old boy with Landau-Kleffner syndrome and autistic-like characteristics and his parents</td>
<td>Dinner, Family TV watching, Bedtime</td>
<td>Percentage of intervals of problem behavior, Child engagement in routine, Percentage of intervals of adult positive and negative interactions, Parent ratings child behavior and difficulty of implementation regarding bedtime routine, Parent ratings of social validity</td>
<td>Improvements in problem behavior at the point of intervention, Improvements in child participation at the point of intervention, Increases in parent positive interactions and decreases in parent negative interactions, Improvement in parent ratings regarding bedtime routine (e.g., child stayed in bed; strategies easy to implement), High ratings of social validity</td>
</tr>
<tr>
<td>Study</td>
<td>Participants</td>
<td>Target Routines or Contexts</td>
<td>Data Collected</td>
<td>Outcomes</td>
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<tr>
<td>Lucyshyn, Albin, Horner, Mann, Mann &amp; Wadsworth (2007)</td>
<td>Longitudinal study involved a child with autism from ages 5-15 years and her parents</td>
<td>Dinner with family, Bedtime, Meal at a fast food restaurant, Grocery shopping</td>
<td>Rate of problem behavior, Latency to termination or successful completion of routine, Frequency of parent-reported indicator behaviors, Child participation</td>
<td>Improvements problem behavior and participation maintained for 86 months, Reductions in parent-reported indicators behaviors, High parent ratings of social validity and contextual fit</td>
</tr>
<tr>
<td>Study</td>
<td>Participants</td>
<td>Target Routines or Contexts</td>
<td>Data Collected</td>
<td>Outcomes</td>
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<tr>
<td>Binnendyk &amp; Lucyshyn (2009)</td>
<td>6-year-old child with autism and his mother</td>
<td>Snack routine</td>
<td>Food consumption during training with therapist</td>
<td>Improvements in food consumption with therapist and parent</td>
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<td>Food consumption during training with parent</td>
<td>Increase in snack routine sessions successfully completed</td>
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<td></td>
<td>Latency in minutes to termination or successful completion</td>
<td>Increase in latency in minutes within optimal length of routine (i.e., 10 – 20 minutes)</td>
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<td>Routine steps completed</td>
<td>Increase in routine steps completed</td>
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<td></td>
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<td></td>
<td>Parent implementation fidelity</td>
<td>Moderate level of implementation fidelity by parent</td>
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<td></td>
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<td></td>
<td>Parent rating of social validity and contextual fit</td>
<td>High parent ratings of social validity and goodness of fit</td>
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<td></td>
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<td>Family Quality of Life</td>
<td>Improvements in family reported quality of life following implementation of the intervention</td>
</tr>
</tbody>
</table>
PBS in Deaf Populations

Although the research base for PBS is strong in terms of application to hearing individuals with a variety of disabilities, including those with developmental disabilities, few studies have addressed the potential efficacy of PBS as an intervention for deaf persons with developmental disabilities who engage in problem behavior. Some studies have demonstrated the effective use of PBS to address problem behavior in children, youth, and adults with deafblindness (Durand & Kishi, 1987; Umbreit, 1997), suggesting that PBS may be similarly effective with deaf children with developmental disabilities and problem behavior. Some studies investigating specific aspects of PBS implementation have included participants with significant hearing loss. Horner, Day, and Day (1997), for example, demonstrated the effectiveness of neutralizing routines (e.g., taking a nap) in the presence of setting events (e.g., being tired after a poor night’s sleep) as a way of preventing problem behavior in a deaf teenager diagnosed with autism and severe intellectual disability who engaged in aggressive behavior. Descriptive case studies also have detailed the success of PBS with deaf children who have additional disabilities (Ben & O’Leary, 2002; Mirenda et al., 2002). Ben and O’Leary (2002) discussed the implementation of PBS first at home and later at school for Jesse, a child diagnosed with autism and profound hearing loss. Through the implementation of PBS, improvements were reported in Jesse’s language and communication skills as well as in behavior. Similarly, Mirenda et al. (2002) discussed the use of PBS to support the third author’s twin daughters, both of whom were diagnosed with autism, in addition to being profoundly deaf. The twins were reported to have experienced significant improvements in language, communication and behavior. The families in both of these case studies
reported an improved quality of life. The families also reported that they were able to maintain improvements and generalize the use of PBS to novel problematic situations without the assistance of professionals. While the research is scant, the few empirical studies and case reports of PBS for deaf children with visual impairments or developmental disabilities indicate the potential effectiveness of PBS as an intervention that is likely to result in improvements in child behavior, communication, and quality of life.

**Future Directions in PBS Research**

PBS is an emerging, empirically validated approach to addressing problem behavior in individuals with a variety of needs and abilities in numerous contexts and settings. Experts in PBS are preparing to expand the field by investigating the effectiveness of PBS with new populations and in an expanded range of settings and cultural contexts. In a keynote address at the Annual Meeting of the Association for Positive Behavior Support, Carr (2006) discussed PBS in terms of progress and future directions. He pointed to the need for PBS research to address: (a) new populations, including deaf and hard of hearing individuals; (b) new venues, including cross-cultural settings and underserved communities; and (c) models for organizational management, including models for effective service delivery and training. In doing so, Carr has offered an outline for a comprehensive approach to investigating the effectiveness of PBS for deaf persons with developmental disabilities.

In addition to investigating the effectiveness of PBS with new populations, research needs to address issues related to service provision and staff training. This is a particularly important issue when considering the implementation of PBS within the
context of deaf educational environments. Although many deaf and hard of hearing children are educated in hearing environments, many others are educated in schools and programs for the Deaf where the cultural context is vastly different. In Deaf cultural contexts, American Sign Language (ASL) is often the primary language of communication and instruction, with many staff being Deaf themselves. It is necessary, then, that staff training and service provision take into consideration the unique cultural context in which the children are educated. While families of deaf children are primarily hearing, there are still cultural and contextual differences that have yet to be addressed in PBS research: many of these families use ASL in the home to enhance communication among family members, many include members of the Deaf community in their daily lives, and many participate in Deaf community events and activities. It is, therefore, necessary that this unique cultural context be considered when planning service delivery and staff and parent training in PBS.

Carr et al. (2002) discussed training needs as the PBS approach helps to move the PBS field from an expert to a collaborative model. The authors state that there should be a reduced focus on lecture-based PBS training and an increase in on-site training that allows parents, educators, and other stakeholders to develop their PBS knowledge and skills within real-life contexts. Jahr (1998) reviewed research related to staff training in organizations serving persons with developmental disabilities. He found that the instructional procedures frequently used for staff training – lectures, discussions, and written information – were rarely effective in teaching staff to implement effective treatment procedures. Other strategies such as role-play, modeling, feedback, and self-management had varying degrees of success. He stressed that there remain many
unknowns regarding the effectiveness of these strategies, both singularly or in combination.

One strategy designed to address staff training needs is known as a train-the-trainer or pyramidal model of training (Kuhn, Lerman, & Vorndran, 2003). In this model, a content-area expert(s) provides training to a small group of individuals from one or more organizations; these individuals then return to their settings to provide training and supervision to direct care staff and/or parents. As the trainers begin to implement the intervention to direct care staff and/or parents, the expert(s) provides initial support and supervision to facilitate successful implementation of the intervention. A train-the-trainer model is designed to make training more cost effective and facilitate collaboration within organizations. Train-the-trainer is used extensively in a variety of disciplines, including education, health, and business (Boise, Congleton, & Shannon, 2005; Coogle, 2002; Gennarow, Dugyi, Doud, & Kershbaumer, 2002; Lester, 2002; Rhyne & Hertzman, 2002; Welber, 2002).

With an increased need for more effective PBS training, researchers have investigated train the trainer models whereby organization staff are trained to work as PBS consultants. Dunlap et al. (2000) described the components of a comprehensive PBS training curriculum that includes teaching teams to work with service providers or families to (a) establish a vision and goals for intervention, (b) support the team building process, (c) conduct functional assessments, (d) design multi-component support plans that are hypothesis-driven, (e) implement comprehensive intervention plans, (f) monitor outcomes, and (g) infuse PBS across systems.
Emerging evidence suggests that train-the-trainer models may be effective in developing PBS-related knowledge and skills in direct care staff, supervisory staff, and parents because they provide comprehensive training that includes role playing, case examples, and \textit{in vivo} training in naturalistic environments (Dunlap et al., 2000; Reid et al., 2003). Researchers have provided training to direct care staff working in integrated preschool and institutional settings, and measured the ability of direct care staff to (a) implement intervention strategies themselves and (b) train other direct care staff to implement intervention strategies (Demchak & Kontos, 1992; Ducharme, Williams, Cummings, Murray, & Spencer, 2001). Others have provided training to supervisors, alone or in conjunction with direct care staff, from school and institutional settings. They then measured the ability of (a) direct care staff to implement interventions and (b) supervisors to provide additional instruction and feedback to direct care staff (Kuhn, 2003; Page, Iwata, & Reid, 1982; Reid et al., 2003; Shore, Iwata, Vollmer, Lerman, & Zarcone, 1995). Lastly, studies have investigated the effectiveness of train-the-trainer programs in teaching parents to (a) implement intervention strategies and (b) teach other family members to implement intervention strategies (Kuhn et al., 2003; Neef, 1995). These studies all document moderate to significant degrees of effectiveness in relation to (a) trainer implementation of intervention strategies; (b) trainer ability to teach other staff or parents; and (c) improvements in child or client behavior.

Table 4 summarizes key studies related to the effectiveness of a train-the-trainer model for teaching parents and professionals to improve the behavior and skills of persons with developmental disabilities.
### Table 4. Summary of train-the-trainer studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Training format and content</th>
<th>Trainer’s role following training</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jones, Fremouw, &amp; Carpes (1977)</td>
<td>3 general education teachers</td>
<td>Pyramidal training in the use of a classroom management “skill package” over 6 sessions that focused primarily on role-playing</td>
<td>Each teacher (tier 1) provided training to 3 additional teachers (tier 2)</td>
<td>Similar reductions in student disruptiveness in both tier 1 and tier 2 classrooms; Improvement in skill use in 2 tier 1 teachers after training tier 2 teachers</td>
</tr>
<tr>
<td>Page, Iwata, &amp; Reid (1982)</td>
<td>3 institutional staff supervisors</td>
<td>Pyramidal training in the use of strategies to teach new behaviors; training conducted individually with supervisors to address errors of direct care staff</td>
<td>Provide training to direct care staff regarding specific teaching behaviors (e.g., instructions, prompts, consequences)</td>
<td>Improvements in direct care staff use of strategies in targeted areas (e.g., communication); Lack of generalization of strategies to untaught areas (e.g., motor skills)</td>
</tr>
<tr>
<td>Demchak &amp; Browder (1990)</td>
<td>3 group home supervisors</td>
<td>Pyramidal training in the use of an increasing assistance prompt hierarchy and praise</td>
<td>Provide training to group home aides</td>
<td>Both supervisors and aides demonstrated an improvement in strategy use; aides demonstrated a lesser degree of improvement, compared to supervisors</td>
</tr>
<tr>
<td>Study</td>
<td>Participants</td>
<td>Training format and content</td>
<td>Trainer’s role following training</td>
<td>Outcomes</td>
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<tr>
<td>Demchak &amp; Kontos</td>
<td>3 staff from an integrated toddler and preschool program</td>
<td>Pyramidal training in the use of consequence procedures</td>
<td>Implement the procedures in the program setting and train additional staff to implement the procedures</td>
<td>Improvements in the trainers’ and staffs’ use of the procedures; staff demonstrated a lesser degree of improvement, compared to trainers</td>
</tr>
<tr>
<td>(1992)</td>
<td></td>
<td></td>
<td></td>
<td>Improvements in child behavior</td>
</tr>
<tr>
<td>Neef (1995)</td>
<td>5 parents (peer training group)</td>
<td>Compared a peer-led, pyramidal model of parent training with standard group parent training to teach parents to facilitate skill acquisition</td>
<td>Tier 1 parents trained tier 2 parents; tier 2 parents trained tier 3 parents</td>
<td>Parents in both groups (peer training and standard training) improved their use of instructional skills</td>
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<td></td>
<td>Parents who received peer training demonstrated improved generalization of skill use, whereas parents who received standard training demonstrated less generalization of skills</td>
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<td></td>
<td>Peer parent training resulted in increases in child performance overall</td>
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<tr>
<td>Study</td>
<td>Participants</td>
<td>Training format and content</td>
<td>Trainer’s role following training</td>
<td>Outcomes</td>
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<tr>
<td>Shore et al. (1995)</td>
<td>2 supervisors from a state residential facility</td>
<td>Pyramidal training to treat self injurious behavior</td>
<td>Supervisors trained to implement treatment, collect and interpret data, and provide instructions and feedback to staff</td>
<td>Improvements in direct care staff use of procedures following pyramidal training</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Reductions in client use of self-injurious behavior</td>
</tr>
<tr>
<td>Ducharme et al. (2001)</td>
<td>3 group home supervisors</td>
<td>Pyramidal training utilizing a general case training approach</td>
<td>Supervisors taught to use teaching skills across individualized skill exemplars; supervisors then trained direct care staff in the use of teaching strategies</td>
<td>Direct care staff demonstrated the ability to use the teaching skills</td>
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<td></td>
<td>Supervisors improved their ability to conduct client teaching sessions, particularly after training direct care staff</td>
</tr>
<tr>
<td>Kuhn, Lerman, &amp; Vorndran (2003)</td>
<td>3 parents</td>
<td>Pyramidal training to implement individualized treatments for problem behavior and to teach others to use the treatments</td>
<td>Each parent taught 2 additional family members to implement the treatments</td>
<td>Increase in parent use of treatments across 3 families</td>
</tr>
<tr>
<td>Study</td>
<td>Participants</td>
<td>Training format and content</td>
<td>Trainer’s role following training</td>
<td>Outcomes</td>
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<tr>
<td>Reid et al. (2003)</td>
<td>12 supervisors (pilot); 386 supervisors from a statewide residential agency</td>
<td>26-module training course in PBS</td>
<td>Supervisors implemented strategies in their employment settings; no specific direction regarding training of other staff</td>
<td>85% met mastery criteria; others repeated the training and improved their mastery levels following subsequent training</td>
</tr>
</tbody>
</table>
These studies suggest that a train-the-trainer or pyramidal model of PBS training may be effective in teaching direct care staff, supervisors, and parents to (a) implement intervention strategies and (b) teach other staff or family members to implement intervention strategies. Evidence also suggests that such training may lead to improvements in problem behavior in individuals across the lifespan and in home, school, and institutional settings.

**Statement of the Problem and Research Questions**

The incidence of additional disabling conditions in deaf populations is significant. The Gallaudet Research Institute 2007 - 2008 Annual Survey of Deaf and Hard of Hearing Children and Youth found that 39.3% of 31,784 deaf and hard of hearing students, aged birth to 21, had at least one additional disability, including developmental delay, autism, and mental retardation. A high incidence of Down syndrome and CHARGE syndrome also was reported; both of these syndromes are associated with developmental delay, intellectual impairment, and a harmful impact on communication development. It is clear from the GRI survey that a significant proportion of deaf and hard of hearing children are affected by the presence of additional developmental disabilities that affect overall development and behavioral functioning.

Deaf children with developmental disabilities have historically been excluded from schools for the Deaf, placed instead in programs for hearing children with developmental disabilities (Ewing & Jones, 2003). While special educators have knowledge and expertise in supporting children with developmental disabilities, an absence of training regarding the needs of deaf students has resulted in a lack of “…sensitivity to deafness and the educational needs it entails” (Ewing & Jones, 2003, p.
While the literature has yet to address the presence of deaf students with additional disabilities in schools and programs for the Deaf, teachers of the deaf and hard of hearing are finding themselves increasingly responsible for the education of these students. Luckner et al. (2005) conducted a survey of parents of deaf children, teachers of the deaf and hard of hearing, school administrators, and university faculty regarding training needs related to the education of the deaf and hard of hearing. Participants overall identified ‘meeting the needs of students with additional disabilities’ as the sixth highest priority while teachers of the deaf and hard of hearing rated this as the third most important issue. Other reports concur with these findings (Andrews & Covell, 2007; Cawthon, 2009; Luckner & Carter, 2001; Luckner & Howell, 2002; Soukup & Feinstein, 2007). This highlights the need for further research and improved training that specifically addresses the needs of deaf students with developmental disabilities, their families, and the professionals who support them.

Developmental disabilities in hearing children frequently result in the development of problem behavior, as evidenced in the behavior intervention literature (Carr et al., 1999). Problem behavior is regularly attributed to challenges with receptive and expressive communication, social interaction, and learning (Carr & Durand, 1985a, 1985b). Although less attention has been given to the prevalence of problem behavior in deaf populations, one can surmise that the presence of developmental disabilities in deaf populations will engender problem behaviors just as it does in hearing populations.

Teachers of the deaf and hard of hearing lack the specific training and expertise to address the myriad of challenges presented by deaf students with developmental disabilities. In particular, they lack a technology of behavior support to intervene with
students who exhibit significant problem behavior. PBS is an emerging applied science that combines educative methods to expand the behavior repertoire of an individual with systems change methods to redesign an individual’s living environment in order to enhance quality of life and reduce problem behavior (Carr et al., 2002). PBS research, however, has yet to focus specifically on the application of PBS with deaf persons, with or without developmental disabilities, who engage in problem behavior.

Training in PBS has been a focus of recent research with a primary issue being the delivery of PBS services and training in a manner that is efficient, cost effective, and successful. Train-the-trainer or pyramidal models of training have been investigated as a strategy for providing training and support that is efficient and cost effective, by training multiple members of one or more organizations concurrently, and effective in terms of the development of staff skill and improvements in client skills and/or behavior (Demchak & Kontos, 1992; Ducharme et al., 2001; Kuhn et al., 2003; Neef, 1995; Page et al., 1982; Reid et al., 2003; Shore et al., 1995).

Studies have demonstrated a positive impact of train-the-trainer models across supervisors, direct-care staff and/or parents who provide support to children or adults with disabilities. Following participation in a train-the-trainer program, supervisory staff have demonstrated improvements in training abilities (Ducharme et al., 2001; Kuhn et al., 2003) and in the use of specific intervention strategies (Demchak & Browder, 1990; Demchak & Kontos, 1992). Several improvements in direct-care staff use of treatment procedures or intervention strategies also have been reported (Demchak & Browder, 1990; Demchak & Kontos, 1992; Kuhn et al., 2003; Page et al., 1982; Shore et al., 1995). Studies also have shown the positive impact of train-the-trainer programs on the behavior
of children or adults with developmental disabilities, including reductions in problem behavior (Demchak & Kontos, 1992; Kuhn et al., 2003; Shore et al., 1995) and increases in adaptive behavior (Shore et al., 1995). Descriptive support for train-the-trainer models of PBS training also has been documented. For example, Markey, Markey, Quant, Santelli, and Turnbull (2002) reported that a train-the-trainer model was associated with an increase in contextual and cultural fit between the training program and those receiving training, as well as improvements in child behavior that included increased participation in home and community routines, increased access to educational opportunities, and increased independence.

The purpose of this research was to address the needs of deaf children and youth with developmental disabilities who engage in problem behavior and of staff who provide services to these individuals and their families. Two studies were conducted to investigate PBS training for staff working with deaf children and PBS intervention for deaf children with additional disabilities. The first study focused on a train-the-trainer model of PBS training for staff who work with deaf children and aimed to address two questions:

1. Is a train-the-trainer model of PBS training associated with improved knowledge in functional assessment and PBS plan development?

2. Is a train-the-trainer model of PBS training associated with high levels of social validity, from the perspective of staff?

The second study focused on the application of PBS with a deaf child with multiple disabilities in the home in collaboration with the child’s parents. A staff person who completed the PBS training program and is Deaf herself implemented the home-based PBS intervention. This study aimed to address two additional questions:
1. Is there a functional relationship between implementation of family-centered PBS and improvements in the behavior and participation of a deaf child with developmental disabilities in valued family routines in the home?

2. Is the use of PBS associated with high levels of social validity and contextual fit, from the perspective of parents?
CHAPTER 2: Study 1 Method

Approval for this study was obtained in February 2008 from the Behavioral Research Ethics Board of the Office of Research Services and Administration at the University of British Columbia (Appendix A).

Participants

Participants in the first study were individuals who provide support to deaf children (“staff”) in the Lower Mainland of British Columbia. To participate in the study, individuals were required to: (a) be employed by an agency that provides support to deaf children or youth; (b) provide support to deaf children or youth in their homes, an educational program (e.g., school), and/or the community; and (c) be willing to attend all instructional sessions and complete in-class activities and assessments.

Staff were recruited from agencies providing support to deaf children/youth and their families in the Lower Mainland of British Columbia. Agencies were identified through the Government of British Columbia, Provincial Services for Deaf and Hard of Hearing website, which provides a list of programs and services (http://www.mcf.gov.bc.ca/psdhh/links.htm). Letters (Appendix B) were mailed to agencies, inviting directors to contact the investigator if they were interested in obtaining study-related information for their staff. Upon initial contact, the investigator either arranged a meeting with directors to describe the study and provide them with information for staff or provided information over the telephone. Directors were given the option of informing their staff of the study or declining further involvement. In the case where directors chose to inform their staff of the study, advertisements (Appendix C) were made available to the directors for distribution to staff. Advertisements directed
interested staff to contact the investigator for further information and/or to express an interest in participating in the study. The investigator met with staff who expressed an interest in the study, and in cases where staff indicated a desire to participate, obtained informed consent (Appendix D).

Eleven individuals participated in the first study. Nine of the participants (82%) were Deaf and used ASL as their primary mode of communication. One participant (9%) was hard of hearing and used both ASL and spoken English for communication. One participant (9%) was hearing; while her first language was spoken English, she was fluent in ASL as she supervised Deaf staff and had over 20 years experience working with Deaf children. The type of employment engaged in by participants varied greatly. Two (18%) were Sign Language Specialists, providing sign language instruction in the homes of young deaf children. Two (18%) were Family and Community Resource Workers, working with deaf children and their families in home and community contexts. One (9%) was a Child Care Counselor working in a residence for school-aged Deaf children attending the local School for the Deaf. One (9%) was a Child, Family, and Community Consultant working for the Provincial Ministry of Child and Family Development, primarily responsible for coordinating support services to Deaf children and their families across the province of British Columbia. One (9%) was an Educational Assistant providing classroom-based support to Deaf children with additional disabilities at the local School for the Deaf. Three (27%) were Home and Community Support Workers providing support to Deaf youth either in group home settings or as they transitioned from living with their parents to living independently. Finally, 1 participant (9%) worked as a Program Coordinator, overseeing numerous staff who provide direct support to Deaf
and hard of hearing children and their families across the province of British Columbia.

Additional demographic information is presented in Table 5.

**Table 5. Participant demographics**

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Percentage (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-45 years</td>
<td>73% (n=8)</td>
</tr>
<tr>
<td>46-60 years</td>
<td>27% (n=3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Percentage (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>18% (n=2)</td>
</tr>
<tr>
<td>Female</td>
<td>82% (n=9)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Percentage (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>9% (n=1)</td>
</tr>
<tr>
<td>College Diploma (1-2 years)</td>
<td>36% (n=4)</td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>36% (n=4)</td>
</tr>
<tr>
<td>Currently undertaking Master’s Degree</td>
<td>18% (n=2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>First Language</th>
<th>Percentage (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Sign Language</td>
<td>55% (n=6)</td>
</tr>
<tr>
<td>Spoken English</td>
<td>45% (n=5)</td>
</tr>
</tbody>
</table>

**Settings and Materials**

Training in PBS was conducted at the office of Services for Community and Family Development (SFCD), Provincial Services for Deaf and Hard of Hearing, in Burnaby, BC. SFCD had adequate space for workshops and training activities, was in a central location, and was a familiar location to those working with deaf children and youth in the Lower Mainland. This location was selected due to its central location and familiarity to participants. In instances where the SFCD boardroom was unavailable, sessions were held nearby at the Deaf, Hard of Hearing, and DeafBlind Well Being Program boardroom. This was also a central location, familiar to the participants.
Training materials included a set of handouts provided to each participant and several paper-based activities related to the content of the training program. Handouts included copies of the Powerpoint® slides and copies of forms commonly used when conducting a functional assessment. Handouts were grouped into the following topics: (a) overview of PBS; (b) basic principles of behavior; (c) functional behavior assessment; (d) building a PBS plan; (e) setting event strategies and supports; (f) visual scheduling; (g) antecedent interventions and supports; (h) teaching desired and alternative replacement behavior; (i) consequence strategies to increase behavior; and (j) consequence strategies to decrease problem behavior and manage crises. Participants were engaged in a variety of activities throughout the training, that were designed to provide opportunities to solidify their understanding of key concepts and practice specific skills related to PBS plan development. Specifically, participants used case study worksheets to develop content-related knowledge and skill. Training was didactic in that, throughout the duration of the training program, additional materials were provided to enhance the participants’ understanding of core concepts and related skills. ‘Warm-up’ sheets were used frequently at the beginning of a training session to review concepts from the previous session. Participants worked in pairs and small groups to complete activities, and the investigator provided individual assistance and feedback throughout.

Measurement

Two dependent variables were used to assess the internal and social validity of the independent variable: Changes in staff knowledge related to functional assessment and PBS plan development, and the social validity of the train-the-trainer program.
Changes in Staff Knowledge

Changes in staff knowledge related to functional assessment and PBS plan development was assessed using a 45-item, multiple-choice pre/post test (Appendix E). The test was developed to assess knowledge of behavioral definitions and application of behavioral principles. The test was developed by adapting items from tests used in courses in Applied Behavior Analysis and Positive Behavior Support. The tests from which questions were taken were those that had been previously used to assess student learning and were believed to be reliable in assessing general understanding of the content. Several of the items were revised to describe students who were deaf and diagnosed with additional disabilities, to make the items relevant to the participants. Eighteen items were developed to assess knowledge of behavioral definitions and twenty-seven items were developed to assess application of behavioral principles. The test was not psychometrically validated prior to use in the study; rather, it was developed as a pilot test based on the face validity of test sections and individual items.

The test was administered during the first two hours of the initial training session and during the last two hours of the final training session. The pre/post test, provided in written English, was designed to assess staff knowledge regarding behavioral principles, functional assessment, and the development of PBS plans. Participants were instructed to work individually on their own test, were told that assistance could not be given, and were allowed as much time as needed to complete the test.

Social Validity

The social validity of the training program was measured by administering a questionnaire to each participant during the last two hours of the final training session.
(Appendix F). The 8-item questionnaire was used to assess the importance of the goals, procedures, and outcomes of the training program, from the perspective of the participants. The questionnaire used a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) to assess staff perceptions regarding the goals of the training program, the usefulness of the training program in developing their skills, the degree to which the training program addressed the unique needs of deaf students with developmental disabilities, and the organization and presentation of the training program and materials overall. If participants had difficulty interpreting the intention of particular questions or statements from the questionnaire, the investigator provided clarification using ASL.

For each completed questionnaire, an average social validity rating across the 8 items was computed, and this average was used as a summative rating of social validity. Across the 11 completed social validity evaluations, a grand average was calculated, which provided an overall rating of social validity across all participants. During these calculations, ratings for item 3, which had reverse scoring for acceptability and importance, were converted to reflect the same direction of acceptability and importance.

**Interobserver Agreement**

Three Board Certified Behavior Analysts with expertise in behavioral principles, functional assessment, and positive behavior support plan development, reviewed the questions on the pre/post test and developed an answer key based on consensus regarding appropriate responses. The investigator used this key to grade 100% of the pre/post tests. A research assistant graded 30% of the pre/post tests. Interobserver agreement was calculated using the following formula: number of agreements divided by number of agreements plus disagreements multiplied by 100. Three pre-tests (27%) and 3 post-tests
(27%) were marked by a research assistant to assess interrater reliability in the scoring of tests. Interrater reliability for pre-tests was 99.2%, Interrater reliability for post-tests was 99.2%

**Research Design**

This study used a one-group pretest-posttest design to assess the impact of the independent variable, the train-the-trainer program, on the dependent variable, participant knowledge in functional assessment and positive behavior support (Campbell & Stanley, 1963; Hays, 1994). The independent variable, a train-the-trainer program, was modeled on training programs and modules developed by leaders in the field of positive behavior support (Anderson, Albin, Mesaros, Dunlap, & Morelli-Robbins, 1993; Anderson, Russo, Dunlap, & Albin, 1996; Dunlap et al., 2000; Hanline, Wetherby, Woods, Fox, & Lentini, 2004; Reid et al, 2003) and addressed content areas identified in the literature as comprising best practice.

Training focused on a number of critical elements of positive behavior support. Sessions targeted knowledge and skills related to (a) basic principles of behavior, (b) the functions of behavior, (c) indirect functional assessment procedures (e.g., Functional Assessment Interview, O’Neill et al., 1997), (d) direct functional assessment procedures (e.g., Functional Assessment Observation, O’Neill et al., 1997), (e) an overview of PBS plan development, (f) setting event strategies, (g) antecedent interventions, (h) instructional strategies, (i) consequences to increase behavior, and (j) consequences to decrease behavior. Throughout the training, participants worked together on activities and case studies to develop their fluency with the content.
Procedures

The investigator implemented training in functional assessment and positive behavior support. The investigator was a certified teacher of the Deaf with 15 years of experience teaching deaf students with developmental disabilities and held a Masters Degree in Special Education. For 11 years she taught at a provincial school for the Deaf, where ASL was the language of instruction, alongside Deaf individuals (i.e., teachers, support staff). In addition to her work as a teacher of the Deaf, the investigator had provided consultation support to families of deaf children with additional disabilities throughout the province of British Columbia. She had also provided classroom consultation and workshops regarding behavioral support and educational strategies for deaf students with developmental disabilities at the California School for the Deaf in Fremont, CA and the Wisconsin School for the Deaf in Delevan, WI. These training activities included the use of spoken English when working with hearing educators and support staff and ASL when working with Deaf educators and support staff.

Training was conducted in ASL, as both the investigator and all of the participants were fluent in ASL. Forty hours of training included both instruction (lecture and videotape examples) and classroom practice (Appendix G). Four-hour sessions were conducted twice a week, for five weeks during July and August 2008. The first two hours of the first session and the last two hours of the final session were devoted to pre- and post-test measurement and social validity evaluation. Training activities were responsive to participant needs; when participants expressed or demonstrated difficulty with a particular concept or skill, the investigator developed additional activities to supplement concept development and skill acquisition. Throughout training, participants were given
the opportunity to practice and demonstrate competency in various skills related to functional assessment and positive behavior support.
CHAPTER 3: Study 1 Results

Measurement

The Kuder-Richardson Formula 20 (KR-20) statistic, an extension of Cronbach’s alpha for dichotomous items, was calculated to examine the internal consistency of the items in the pre- and post-test (Cronbach, 1941; Kuder & Richardson, 1937). Test items were categorized by the type of knowledge being assessed: behavioral definitions (18 items) or application of behavioral principles (27 items). Test responses for each trainee were entered into SPSS version 15.0 (SPSS, 2008) as either correct (1) or incorrect (0). Table 6 summarizes the results.

Table 6. Cronbach’s Alpha for Pre- and Post-Test Items

<table>
<thead>
<tr>
<th>Time</th>
<th>Behavioral Definitions</th>
<th>Application of Behavioral Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>$\alpha = .734 \ (SD \ 3.26)$</td>
<td>$\alpha = .722 \ (SD \ 4.08)$</td>
</tr>
<tr>
<td>Post-test</td>
<td>$\alpha = .786 \ (SD \ 3.26)$</td>
<td>$\alpha = .816 \ (SD \ 4.4)$</td>
</tr>
</tbody>
</table>

Nunnaly and Bernstein (1994) indicate that .70 is an acceptable reliability coefficient for both KR-230 and Cronbach’s alpha. Thus, results, with alpha levels between .734 and .816, suggest that the reliability coefficient was acceptable for both behavioral definitions and application of behavioral principles at both time points.

Changes in Staff Knowledge

A Paired Two Sample for Means t-Test was used to compare pre- and post-test scores (Hays, 1994). Results indicated a statistically significant difference between pre-test scores ($M = 23.73, SD = 7.16$) and post-test scores ($M = 34.65, SD = 6.93$), $t(10) = -7.03, p = .001$. This indicates that the training program was associated with a significant
improvement in knowledge related to behavioral principles, functional assessment, and positive behavior support plan development from pre-test to post-test. Table 7 displays the percentage of participants who responded correctly to each item on both the pre-test and post-test.
### Table 7. Percentage of Correct Responses by Participants

<table>
<thead>
<tr>
<th>Section</th>
<th>Question Number</th>
<th>Percentage of Correct Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Test</td>
<td>Post-Test</td>
</tr>
<tr>
<td>A</td>
<td>1</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>55%</td>
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<tr>
<td></td>
<td>8</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>72%</td>
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<tr>
<td></td>
<td>10</td>
<td>36%</td>
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<tr>
<td></td>
<td>11</td>
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<td></td>
<td>12</td>
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<td></td>
<td>13</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>64%</td>
</tr>
<tr>
<td>Vignette A</td>
<td>1</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>55%</td>
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<tr>
<td></td>
<td>5</td>
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<tr>
<td></td>
<td>6</td>
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<tr>
<td></td>
<td>8</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>9%</td>
</tr>
<tr>
<td>Vignette B</td>
<td>1</td>
<td>72%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>3</td>
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<td>4</td>
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<td>5</td>
<td>91%</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>36%</td>
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<tr>
<td></td>
<td>7</td>
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<td></td>
<td>8</td>
<td>91%</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>64%</td>
</tr>
</tbody>
</table>
### Social Validity

Social validity ratings for the training program were high. The average social validity score across 11 participants was 4.7 (range, 4.1 – 5.0). Individual statements from the participants included the following:

“Excellent teaching strategies – felt I retained a lot and understood the theories, concepts, etc.”

“I like the different ways of “testing” our understanding (e.g., pop quizzes, games, etc.)”

“…I believe in positive intervention and in order to do this you need to truly look at the big picture and prioritize – I felt the program recognized this.”

“I look forward to applying what I learned to the families I work with!”
CHAPTER 4: Study 2 Method

Approval for this study was obtained in March 2009 from the Behavioral Research Ethics Board of the Office of Research Services and Administration at the University of British Columbia (Appendix H).

Participants

Child and Family

One deaf child with additional disabilities and his family were recruited for participation in this study. A letter and recruitment advertisement (Appendix I) were sent to directors of agencies serving deaf children and their families in the Lower Mainland of British Columbia. Directors were requested to forward the advertisement to families they believed met the recruitment criteria. The advertisement invited families to contact the investigator to express an interest in participating in the study. Families who contacted the investigator were first screened by telephone to assess eligibility for the study. Families who (a) met the criteria for inclusion and (b) expressed a desire to participate in the study were invited to give informed consent for participation in the initial screening process (Appendix J).

To participate in the study, the child needed to meet the following criteria: (a) be between the ages of 4 and 15 years, (b) have a diagnosis of a severe to profound bilateral hearing loss, (c) have a diagnosis of an additional developmental disability (e.g., autism spectrum disorder, mental retardation, cerebral palsy), and (d) engage in significant problem behavior in home-based routines (e.g., dressing, independent play, completion of a hygiene task or chore). One family met the criteria for inclusion and completed the
informed consent process (Appendix K). The mother and her son served as the primary participants throughout the research and family support process.

Kieran (pseudonym) was 8 years, 11 months of age upon entering the study and was diagnosed with the following conditions: (a) severe to profound bilateral hearing loss associated with auditory neuropathy; (b) autism spectrum disorder; and (c) cerebral palsy, spastic diplegia. Kieran was born at 26 weeks gestation. He lived at home with his mother and father and was the youngest child in a blended family. He was a day student at a provincial school for the deaf. His mother was a stay-at-home parent and his father worked in computer sales and repair. He had older half-siblings, some of whom resided in the home on a part-time basis. Results from a psycho-educational assessment revealed that Kieran had a variable pattern of abilities and that his participation in standardized assessment was limited by his communication difficulties, motor impairments, rigid patterns of behavior, and difficulty with turn taking. On non-verbal measures of intelligence, Kieran demonstrated abilities that were within the average range compared to other children his age. Adaptive functioning skills, however, were reported as being in the low range (1st percentile). An initial screening assessment indicated that Kieran engaged in significant problem behavior in the home with family members. These behaviors included: (a) non-compliance; (b) physical interference with parent assistance; (c) negative vocalizations; (d) physical resistance; and (e) food refusal.

**Staff**

Upon completion of the training program, staff participants were given the opportunity to indicate whether they were interested in participating in a future study that would involve them in conducting a functional assessment and implementing positive
behavior support for a deaf child with additional disabilities in a home setting. Ten of the 11 participants indicated interest. Staff who obtained a score of 80% or higher on the training program post-test, worked with families of deaf children in the Lower Mainland of BC, and were able to devote 5 to 10 hours per week to study-related activities were considered for participation in the second study. An attempt was made to select a staff participant based on the following criteria: (a) prior contact with the child and/or family in a professional capacity; and (b) employment-supervisor support. Because the investigator was unable to provide a salary to the staff participant, attempts were made to select a staff person who could provide family-centered PBS as part of his or her regular work duties.

One staff person, Alicia, was invited to participate in the study as an interventionist. During the training portion of the study, Alicia: (a) achieved a score of 91% on the training post-test; (b) indicated an interest in participating in the second study; and (c) worked with families of deaf children in the Lower Mainland of BC. She had the support of her employment supervisor, who adjusted work-related tasks to ensure she would have sufficient time to devote to the study and that time devoted to the study would be included as part of her regular working hours. Alicia was Deaf and, although she had used Signed English in a Total Communication environment (i.e., sign supported speech) during grade school, she used ASL as her primary form of communication at the time of the study. Therefore, Alicia would be considered a bilingual-bicultural individual who moved fluidly between Deaf and hearing cultures. At the same time, she identified as a member of the Deaf community. Alicia had a Bachelor of Education degree in elementary education and worked as a family literacy specialist. In her role as a family
literacy specialist, Alicia had prior contact with Kieran and his family during centre-based, group literacy activities involving parents and their deaf children.

**Settings**

The study was conducted within multiple settings. Child and family support activities were conducted within the family home while supervision meetings between Alicia and the investigator were conducted at Alicia’s place of work. The settings are described below.

**Child and Family Support**

Child and family support was conducted in the family’s home, in three family activity settings or routines. Family activity settings were selected and defined in close collaboration with the family. Specific criteria for the selection of a routine included: (a) the routine was typical and valued by the family, and (b) the routine was consistently unsuccessful due to child problem behavior. Kieran’s parents chose the following routines for intervention: (a) transition to the bath, (b) transition from the computer, and (c) dinner. The two transition routines were selected because of the extreme difficulty the family experienced in supporting Kieran to transition from a preferred to less preferred activity. Requests to transition from one activity to another frequently resulted in Kieran ignoring requests, yelling and/or screaming, and the parents needing to physically carry Kieran from one area of the house to another. One major goal for Kieran’s parents was to have Kieran cooperatively transition from one activity to the next with increasing independence. The dinner routine was selected because of Kieran’s severe food refusal behavior. Another major goal for Kieran’s parents was to have Kieran eat the same dinner foods as the rest of the family and consume a well-balanced, nutritious diet.
In addition, prior to in vivo training with the child and family in the dinner routine, a training setting involving the child and interventionists was used in which initial stimulus control of Kieran’s eating behavior was established. Both the investigator and Alicia provided intensive intervention in order to provide sufficient intervention sessions per week (i.e., 5 to 7 sessions), dependent on child and family availability. The training setting also occurred in the home but not within the defined meal routine. Specific criteria for selection of the intensive training setting included: (a) discriminative stimuli that have in the past occasioned food refusal behavior were not present (e.g., parents) and (b) the setting was free of stimuli that might interfere with the interventionist acquiring stimulus control over Kieran’s eating behavior (e.g., television on). Training occurred at the dining room table.

**Interventionist Supervision**

Supervision meetings involving the investigator and Alicia were held at Alicia’s place of work, the Provincial Services for the Deaf and Hard of Hearing office. Meetings were held, on average, weekly at a time convenient to the interventionist. Sessions averaged 30 to 60 minutes in length. During supervision meetings, the investigator provided guidance in (a) conducting a functional assessment, (b) developing routine-specific positive behavior support plans, (c) conducting parent training activities, and (d) responding to challenges in parent implementation of the support plans. The investigator and Alicia also communicated regularly via email and text messaging. These communications revolved around the provision of feedback regarding the development of written PBS plans and the provision of feedback regarding in vivo training sessions with the parent and child.
Measurement

The study used multiple measurement procedures to monitor the dependent variables. These measurement procedures are described below.

Direct Videotaped Observation Sessions and Procedures

The investigator used a digital video camera to observe and record child behavior during the three target routines. Observation probes were conducted during baseline, intervention, and maintenance phases. Observations were conducted at regular intervals until stable behavioral patterns were evidenced (e.g., stable, high percentage of problem behaviors during baseline; stable, low percentage of problem behaviors during intervention). A total of 40 observations were completed across three routines over a 11-month period. Observations lasted from approximately 5 minutes to 1 hour, depending on the routine. Observations occurred at the naturally occurring time of the routine, and were scheduled on a day that was convenient for the family. To ensure parent and child safety during the observations, a definition of dangerous behavior that would require immediate termination of the observation session was established. For Kieran, the dangerous behavior was physical aggression, defined as engaging in behaviors directed at others that may potentially cause the person injury (e.g., hitting, kicking, throwing items).

Immediately prior to an observation session, the investigator requested that the parent(s) review the written operational definition of the envisioned routine and ensured that materials, resources, and the general structure of the routine were present. The parent(s) were reminded that they could end an observation by raising their hand or saying “stop.” The investigator then asked the parent(s) to try and do the routine. The observation session continued for 3 to 5 minutes or until the routine was completed.
Coding Videotaped Observation Sessions

The investigator coded all observation sessions. Digital video data were downloaded into a folder on the hard drive of the computer and given a media file suffix (.mp4). When coding an observation session, the investigator opened the video file in Quicktime™ and coded child behavior directly from a viewing box on the computer screen. Data sheets and pencil were used to record the occurrence and/or non-occurrence of child behavior.

Dependent Variables

Four dependent variables were used to assess the internal and social validity of the family centered PBS approach: (a) percentage of intervals of child problem behavior, (b) percentage of steps successfully completed, (c) parent accurate use of behavior support strategies; and (c) social validity of the behavior change process from the parents’ perspectives.

Percentage of Intervals of Child Problem Behavior

Problem behavior included the following 9 categories: (a) physical aggression; (b) disruptive, destructive, or dangerous behavior; (c) inappropriate physical interference or restraint; (d) leaving assigned area; (e) verbal and/or non-verbal food refusal behavior; (f) negative vocalizations; (g) physical resistance; (h) non-compliance; and (i) inappropriate requests or demands. Physical aggression included hitting or slapping directed at another person. Disruptive, destructive, or dangerous behavior included throwing or dropping items onto the floor or across the table and using fingers to pick up food off of plate. Inappropriate physical interference or restraint included pushing a parent’s hand away, covering the computer screen with his hand, and moving or pulling materials away from
parent. Leaving assigned area included leaving his seat at the dinner table or going to a room other than where he was directed. Verbal and non-verbal food refusal behavior included pushing utensils or cup away, pushing plate or bowl away, turning away from food or drink, spitting out food or drink, and signing “no food”, “no eat” or similar statements. Negative vocalizations included screaming, crying, yelling, or whining in response to parent requests. Because Kieran was a deaf child who also used vocalizations to communicate excitement and to gain the attention of his hearing parents, only negative vocalizations that occurred in response to parent requests were coded as problematic. Physical resistance included pulling or pushing to get away from a parent while the parent was attempting to provide physical assistance, stiffening his body to make it difficult for the parent to provide physical assistance, and squirming to get away from the parent. Non-compliance included ignoring parent requests or demands by continuing with current activity or turning away from parent, covering his face with his hands so as not to see the parent use sign language to make a request, and changing the topic to distract the parent from making a request. Inappropriate requests or demands included requesting to be carried and demanding foods other than those provided at dinner.

Problem behavior was measured as the percentage of intervals of occurrence during the target routine. A partial interval recording system was used with an observation interval of 10 seconds (Richard, Taylor, Ramasamy, & Richards, 1999). An occurrence was scored if a target behavior occurred at any point during the interval. The percentage of intervals of problem behavior was calculated by dividing the number of intervals of problem behavior by the total number of intervals and then multiplying that figure by 100.
**Percentage of Steps Completed**

The definition of steps successfully completed was developed individually for each routine in collaboration with Kieran’s parents. First, the investigator and the parents identified and defined the steps in the routine (Table 8). For steps that had a criterion level of performance (e.g., amount of food consumed) a criterion was defined in collaboration with the parents (e.g., at least half of the food served). For steps that could occur one or more times (e.g., use a napkin, engage in conversation) the step was defined in terms of the number of occurrences that would be needed to deem the step successful (e.g., uses napkin once, responds to one question). Finally, the level of problem behavior that must occur to render that step unsuccessful was determined in collaboration with the parents. Problem behaviors ranged from minor (e.g., non-compliance, crying) to major (e.g., physical aggression) and were defined by the parent. Depending on the step, if a minor behavior occurred three to five times during a step, then the step was scored as unsuccessful; if one to three major behaviors occurred during a step, then the step was scored as unsuccessful. Given Kieran’s multiple disabilities, if he cooperatively completed the step with verbal, gestural, or physical support, the step was scored as successful.

Using a checklist of the steps and a definition of criterion levels of problem behavior, the investigator recorded whether a step was successfully completed, not completed, or an opportunity to engage in the step was not provided (e.g., the parent did not prompt Kieran to use a napkin). Steps completed were measured as the percentage of steps completed during a routine. The percentage of steps completed was calculated by
dividing the number of steps completed by the total number of steps in the routine then multiplied by 100.
Table 8. Steps completed in routines

<table>
<thead>
<tr>
<th>Transition to Bath</th>
<th>Computer Transition</th>
<th>Dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Steps</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Stop engaging in current activity when requested</td>
<td>1. Close the program he is using</td>
<td>1. Move from current location to his chair at the dining room table</td>
</tr>
<tr>
<td>2. Crawl from current location (where request was made) down hallway</td>
<td>2. Shut down the computer</td>
<td>2. Assist in climbing into the chair and/or cooperate with parent as parent lifts him into chair</td>
</tr>
<tr>
<td>3. Enter bathroom</td>
<td>3. Wait for the computer to power off</td>
<td>3. Pray with family (clasp hands and remain quiet)</td>
</tr>
<tr>
<td>4. Close the laptop after the computer has powered off or when requested</td>
<td>4. Close the laptop after the computer has powered off or when requested</td>
<td>4. Eat at least half of food presented, using utensils as best he can and/or accept assistance</td>
</tr>
<tr>
<td>5. Wait quietly while mother takes laptop and brings materials for next activity or move to next activity (as appropriate)</td>
<td>5. Drink from sippy cup or cup with lid and straw</td>
<td>5. Drink from sippy cup or cup with lid and straw</td>
</tr>
<tr>
<td></td>
<td>6. Use a napkin to wipe his face (independently or as prompted)</td>
<td>6. Use a napkin to wipe his face (independently or as prompted)</td>
</tr>
<tr>
<td></td>
<td>7. Engage in conversation (e.g., respond to at least one question or comment or initiate at least one interaction)</td>
<td>7. Engage in conversation (e.g., respond to at least one question or comment or initiate at least one interaction)</td>
</tr>
<tr>
<td></td>
<td>8. Sign “thank you,” “finished,” or “excuse me” when finished and/or request more food</td>
<td>8. Sign “thank you,” “finished,” or “excuse me” when finished and/or request more food</td>
</tr>
<tr>
<td></td>
<td>9. Leave the table when excused, with assistance getting off the chair as needed</td>
<td>9. Leave the table when excused, with assistance getting off the chair as needed</td>
</tr>
</tbody>
</table>
**Parent Accurate Use of Behavior Support Strategies**

The degree to which an independent variable is implemented as intended is known as treatment integrity (Peterson, Homer, Wunderlich, 1982). The independent variable in this study was a family centered PBS approach in which Kiernan’s mother was taught to implement positive behavior support procedures with her son in three target home routines. Parent treatment integrity was determined by measuring the extent to which the parent implemented PBS plan procedures accurately across a random sample of observation sessions during the intervention phase in the three routines.

Treatment integrity was defined as parent accurate use of the following 10 PBS plan procedures: (a) use visual schedule and/or visual contingency map; (b) use visual supports (e.g., a visual checklist of the steps to shut down the computer); (c) use positive contingency statement(s); (d) use a visual timer; (e) provide an adapted plate and utensils; (f) offer choices; (g) use direct instruction proactively (e.g., teach Kieran to make choices, to read a visual timer, to shut down the computer, to use utensils, etc.); (h) provide contingent praise and tangible reinforcement for positive behavior; (i) ignore and redirect minor problem behavior; and (j) use escape extinction procedures for major problem behavior (e.g., use a non-removal of spoon strategy in response to food refusal behavior, continuing to deliver a request in response to problem behavior). These strategies constituted the core components of the PBS plans that Kieran’s mother implemented in the three target routines. Treatment integrity was scored for 20% of intervention phase sessions, balanced across routines. A 30 second, partial-interval recording system was used. A 30 second interval was used because it ensured that the observer was able to record, within an interval, the parent’s full use of procedures that
took more time to implement, such as consequence strategies for problem behavior. During each 30-second interval, the parent’s accurate implementation of one or more strategies was scored as an “occurrence.” If the parent engaged in an error in the implementation of one or more strategies during an interval, the interval was scored as an “occurrence-error” interval. If parent use of one or more strategies did not occur during an interval, the interval was marked as a “non-occurrence.” The percentage of intervals of parent accurate use of procedures was calculated by dividing the number of intervals the parent exhibited accurate use of the support strategies by the total number of intervals and then multiplying by 100.

**Social Validity**

The social validity of the intervention approach for each target routine was measured by administering a questionnaire to the mother at the end of initial training and support in each target routine. The social validity questionnaire was administered only to the mother as she was the primary interventionist for all three target routines and, due to the father’s work schedule, was often the only parent home during the initial parent training and maintenance sessions. The 10-item questionnaire (Appendix L) was designed to elicit perceptions regarding the acceptability and importance of the behavior support process. The questionnaire used a 5-point Likert scale (1 = disagree; 5 = agree) to assess perceptions regarding the acceptability and importance of intervention goals, procedures, and outcomes. For each completed questionnaire, an average social validity rating across 10 items was computed, and this average was used as a formative index of social validity for a given PBS plan addressing a target routine. Across three evaluations, a grand average was calculated, which provided a summative rating of social validity. During
these calculations, ratings for items 3 and 7, which had reverse scoring for acceptability and importance, were converted to reflect the same direction of acceptability and importance.

**Goodness of Fit**

An 18-item goodness of fit assessment questionnaire (Albin, Lucyshyn, Horner, & Flannery, 1996) was used to assess how well the behavior support plans fit the ecology of the family (Appendix M). The items address five parameters relevant to goodness of fit: (a) goals and expectations (e.g., Does the plan address your highest priority goals?); (b) congruence to lifestyle (e.g., Does the plan disrupt the time of day to the point that stress and hardship will be created?); (c) implementation effort (e.g., All things considered, how difficult will it be for you to implement the plan?); and (d) sustainability (e.g., Do you believe you can continue to use the strategies for a long time?). The mother rated each item using a 5-point Likert scale (e.g., 1 = little; 5 = a lot). The questionnaire was administered at the beginning of the intervention phase and at the end of the intervention phase for each routine. For each administration, an average rating across the 18 items was calculated and used as a formative index of goodness of fit. A grand average was calculated across all evaluations and served as a summative index of goodness of fit. During these calculations, ratings for items 12 and 16, which had reverse scoring for goodness of fit, were converted to reflect the same interpretation as the other 16 items.

**Observer Agreement**

Two coders (the investigator and a research assistant) participated in approximately 6 hours of training in the coding of data linked to the single-subject design.
(e.g., percentage of intervals of child problem behavior and percentage of routine steps completed) and parent treatment integrity (e.g., percentage of intervals of parent accurate use of support plan procedures). Training included a verbal explanation of coding procedures and practice sessions. A criterion of 85% agreement on two consecutive training observations was required before coding began. During an interobserver agreement session, the coders independently observed and coded the videotaped session at different times.

**Problem Behavior.** Agreement for percentage of intervals of problem behavior was calculated using the following formula: the total number of agreements divided by the number of agreements plus disagreements, multiplied by 100. An agreement was considered when two coders recorded the occurrence of a target behavior(s), during the same 10-second interval. Observer agreement for problem behavior was 94%, (range, 83 - 100%).

**Steps Completed.** Agreement for percentage of routine steps completed was calculated using the following formula: the total number of agreements divided by the number of agreements plus disagreements, multiplied by 100. An agreement was considered when two independent coders recorded the same step successfully completed, not completed, or as having no opportunity, during the same trial. Observer agreement for steps completed was 97% (range, 80 - 100%).

**Parent Treatment Integrity.** Agreement for percentage of intervals of accurate parent use of support plan procedures was calculated using the following formula: the total number of agreements divided by the number of agreements plus disagreements, multiplied by 100. An agreement was considered when two independent coders recorded
in the same interval, for each support plan procedure listed, accurate parent use of the procedure, inaccurate parent use of the procedure, or absence of parent use of the procedure. Observer agreement for parent treatment integrity was 91% (range, 88 – 94%).

**Research Design**

A single-subject, experimental research design was used to evaluate the efficacy of the ecological behavioral intervention approach for improving child behavior in valued routines. The study employed a multiple baseline design across three activity settings (routines) using a multiple probe strategy (Barlow & Hersen, 1988; Harvey, May, & Kennedy, 2004; Horner & Baer, 1978; Kennedy, 2005). The multiple baseline design had three phases: (a) baseline, (b) intervention, and (c) maintenance. Intervention was lagged across target routines, following guidelines for multiple baseline designs. Once stable patterns of data had been established across all three routines in baseline, intervention began on the first routine (bath transition) while the other two routines (computer transition and dinner) remained in baseline. Once stable improvements had been documented in the first routine, intervention began in the second routine. Finally, when stable improvements had been documented in the second routine, intervention began on the third routine. In this way, experimental control could be demonstrated.

**Research and Intervention Procedures**

The independent variable for the second study was a family-centered positive behavior support approach that aimed to improve child behavior and participation in valued family routines (Binnendyk & Lucyshyn, 2009; Buschbacher et al., 2004; Clarke et al., 1999; Lucyshyn et al., 2007; Lucyshyn et al., 1997). Research and intervention procedures involved three steps: (a) preliminary screening assessment; (b) baseline; and
(c) intervention. Intervention involved four components: (a) comprehensive assessment; (b) PBS plan development; (c) implementation plan development; and (d) implementation support. Procedural steps and components are described below.

**Preliminary Screening Assessment**

Preliminary screening assessment activities were conducted to determine whether the child’s problematic behavior warranted the need for intervention, to identify and define activity settings (routines) for intervention, and to reduce potential reactivity to observation on the part of the child. The investigator began by engaging the family in a family routine assessment to identify behaviors of concern and valued routines in which the child engaged in problem behavior. The assessment occurred in the family home and was conducted over two meetings, each lasting approximately 60 minutes. The parents described Kieran’s daily and weekly routines in the home with family members and identified routines they valued but found difficult to engage in due to Kieran’s problem behavior. The investigator, in collaboration with the parents, selected and prioritized three valued yet problematic routines for intervention: transition to the bath, transition from the computer to another activity, and dinner. For each routine, the following information was gathered: (a) time of day/day of week during which the routine occurred, (b) type of routine, (c) behaviors of concern, and (d) extent to which the routine was typical and valued. Definitions of envisioned routines were guided by the concept of an activity setting and its six elements (Gallimore, Goldenberg, & Weisner, 1993). Elements of routine definitions included (a) time/place, (b) people involved, (c) resources to be used, (d) child and parent tasks, (e) goals for the child and family, and (f) values reflected in the routine (Gallimore et al., 1993).
The envisioned routines that emerged from this process were summarized into one-page operational definitions. The parents reviewed the definitions, evaluated the definitions for accuracy, and, if necessary, suggested adjustments or corrections. The finalized definitions were then used to structure the family’s implementation of the target routines during baseline and intervention phases. Defining the routines prior to baseline procedures ensure the comparability of observation sessions across phases (Davis, Turner, Rolider, & Cartwright, 1994; Lucyshyn et al., 1997). The parents’ vision of each target routine is summarized in Table 9.

Following definition of the envisioned routines, the investigator completed a brief functional assessment in the family home to confirm the family’s eligibility for the study. This involved (a) conducting functional assessment observations to confirm the presence of problem behavior in selected routines, and (b) ensuring that family participation in the routines did not place the parents or child at excessive risk. When the presence of problem behavior was confirmed across the three routines, the family was invited to complete the informed consent process (Appendix K) for participation in the study. Information from the preliminary screening assessment was then incorporated into the subsequent comprehensive assessment.
Table 9. Family’s vision of successful routines

<table>
<thead>
<tr>
<th></th>
<th>Transition to Bath</th>
<th>Computer Transition</th>
<th>Dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time/Setting/Length/Persons/Present</strong></td>
<td>Between 7:30 and 8:00 pm</td>
<td>Afternoon or evening</td>
<td>Around 6:00 pm (with adjustments made to accommodate father’s work schedule when possible)</td>
</tr>
<tr>
<td></td>
<td>Living room to bedroom to bathroom</td>
<td>Living room</td>
<td>Approximately 30 minutes</td>
</tr>
<tr>
<td></td>
<td>5 to 10 minutes</td>
<td>5 minutes</td>
<td>Mother</td>
</tr>
<tr>
<td></td>
<td>Mother</td>
<td>Mother</td>
<td>Mother, father (when possible)</td>
</tr>
<tr>
<td><strong>Resources</strong></td>
<td>None</td>
<td>Laptop computer</td>
<td>Sibling(s) may occasionally be present</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tableware, utensils, and napkins</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Serving bowls</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>One meal that everyone eats (fresh, homemade foods such as chicken potatoes, vegetables, pasta dishes, etc.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sippy cup and specialized seating for Kieran to meet his motor needs</td>
</tr>
<tr>
<td>Child Tasks</td>
<td>Transition to Bath</td>
<td>Computer Transition</td>
<td>Dinner</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Stop engaging in current activity when requested by mother</td>
<td>Stop using the computer when requested</td>
<td>Come to the table when requested</td>
<td>Sit in his chair (with assistance)</td>
</tr>
<tr>
<td>Crawl from living room to bedroom (to change) and from bedroom to bathroom</td>
<td>Close the program he is using</td>
<td>Pray with family</td>
<td>Eat at least half of the food provided</td>
</tr>
<tr>
<td></td>
<td>Shut down the computer</td>
<td>Use utensils the best he can and/or accept assistance when needed</td>
<td>Use a napkin to wipe his face (independently or when prompted)</td>
</tr>
<tr>
<td></td>
<td>Close the computer</td>
<td>Drink from a sippy cup</td>
<td>Engage in conversation (respond to questions from family members and/or initiate interactions)</td>
</tr>
<tr>
<td></td>
<td>Move towards the next activity or wait while parent brings materials for the next activity</td>
<td>Use a napkin to wipe his face (independently or when prompted)</td>
<td>Sign “thank you” or “finished” or “excuse me” when finished eating</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leave the table (with assistance) when excused</td>
<td></td>
</tr>
<tr>
<td>Transition to Bath</td>
<td>Computer Transition</td>
<td>Dinner</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td><strong>Parent Tasks</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Tell Kieran that it is time for a bath</td>
<td>▪ Inform Kieran that computer time is finished</td>
<td>▪ Set the table and prepare food on Kieran’s plate</td>
<td></td>
</tr>
<tr>
<td>▪ Direct Kieran to go to his bedroom to change</td>
<td>▪ Ask Kieran to close program(s) and shut down the computer</td>
<td>▪ Ask Kieran to come to the table</td>
<td></td>
</tr>
<tr>
<td>▪ Assist Kieran in changing</td>
<td>▪ Provide assistance or direction as necessary</td>
<td>▪ Assist Kieran in getting in his chair</td>
<td></td>
</tr>
<tr>
<td>▪ Direct Kieran to go to the bathroom</td>
<td>▪ Direct Kieran to the next activity</td>
<td>▪ Pray and serve self</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Eat and engage in conversation with family</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Provide assistance to Kieran</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Request Kieran to eat, use utensils, and use his napkin as needed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Excuse Kieran from the table</td>
<td></td>
</tr>
<tr>
<td>Child and Family Goals</td>
<td>Transition to Bath</td>
<td>Computer Transition</td>
<td>Dinner</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------</td>
<td>---------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Improve Kieran’s ability to cooperate with parent requests</td>
<td>For Kieran to learn that activities end on a time schedule that may not always be under his control</td>
<td>For Kieran to eat nutritious, balanced meals with sufficient calories and be sufficiently full so as not to require a bed time snack</td>
<td></td>
</tr>
<tr>
<td>Improve Kieran’s strength and mobility within the home</td>
<td>To improve Kieran’s ability to follow directions</td>
<td>For Kieran to avoid the use of juice and cheese as ‘fillers’ and eat the same food as the rest of his family</td>
<td></td>
</tr>
<tr>
<td>Reduce the need to carry Kieran to the bathroom, thus preventing back injury</td>
<td>To increase Kieran’s independence in shutting down the computer</td>
<td>For Kieran to improve his utensil used and self sufficiency at the table; to improve his ability to self regulate a seated posture</td>
<td></td>
</tr>
<tr>
<td>Create a positive transition to bath time</td>
<td>To reduce the degree of directiveness when requesting Kieran to shut down the computer</td>
<td>For Kieran to improve his participation in a social routine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To reduce negative interactions between Kieran and his mother</td>
<td>For the family to enjoy sharing a meal together</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To reduce the amount of effort required to transition Kieran from the computer to another activity</td>
<td>To increase social interactions among family members</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>For the family to enjoy nutritious, balanced meals</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>To decrease the preparation of special or different foods for Kieran</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>To decrease parental concerns regarding Kieran’s health in terms of nutrition and weight</td>
<td></td>
</tr>
<tr>
<td>Patterns of Interaction</td>
<td>Transition to Bath</td>
<td>Computer Transition</td>
<td>Dinner</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------</td>
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<td>--------</td>
</tr>
<tr>
<td></td>
<td>Mother making task-related requests of Kieran</td>
<td>Mother making request for Kieran to shut down the computer</td>
<td>Parent(s) making request of Kieran (to come to the table, to eat, to use utensils, etc.) and Kieran complying with directions</td>
</tr>
<tr>
<td></td>
<td>Kieran complying with parental requests</td>
<td>Kieran complying with parental requests</td>
<td>Parents directing conversation to Kieran and Kieran responding with language</td>
</tr>
</tbody>
</table>
Baseline

During the baseline phase, all child-related dependent variables were measured across the three target routines before comprehensive assessment and plan design procedures were initiated. Videotaped observations occurred in the three target routines in conformance with the multiple baseline design. During an observation probe, the parent(s) were asked to read a one-page operational definition of each envisioned routine. The parent(s) were then asked to implement the envisioned routine with Kieran.

Intervention

During the intervention phase, the interventionist fully implemented the independent variable, which included (a) a comprehensive assessment, (b) PBS plan development, (c) implementation plan development, and (d) implementation support. Each component of the intervention process is described below.

Comprehensive assessment. The interventionist completed assessment procedures that were initiated during preliminary assessment with the family. First a full functional assessment interview (FAI) was completed using the form developed by O’Neill and colleagues (1997). The functional assessment interview took place in the family’s home and was completed over two sessions, each lasting approximately 90 minutes. An IBM laptop computer loaded with Dragon Naturally Speaking™ software was used to facilitate communication between the interventionist, who was Deaf and used ASL to communicate, and the parents, who were hearing and had only rudimentary ASL skills. The interventionist prepared for the interview by typing questions into the computer prior to the interview. During the interview, the interventionist directed the parents to each question in turn. The parents then spoke their answers into a microphone.
attached to the computer. Speech was translated into text via Dragon Naturally Speaking™, allowing the interventionist to read the parents’ responses. The parents monitored the speech-to-text translation and, in cases where the software didn’t accurately translate speech, the parents typed their answers into the computer. The interventionist responded to parent statements using gestures, basic ASL, and by typing additional statements or questions into the computer for the parents to read. The result of the interview yielded summary hypotheses statements about the structure and function of problem behavior in each of the target routines.

For Kieran, several ecological conditions were identified as contributing to his use of problem behavior. A lack of predictability regarding expectations and transitions along with a lack of choice regarding daily activities appeared to contribute to the likelihood that Kieran would engage in problem behavior. Kieran reportedly slept poorly, evidenced by regular night-time wakening, was picked up by the school bus early in the morning (around 7:30 am) and did not return home from school until 4 to 4:30 pm. This left Kieran tired and contributed to the likelihood that he would engage in problem behavior. Kieran also expended a great deal of physical energy throughout the day (crawling, pushing his wheelchair, etc.). It was hypothesized that this fatigue, along with poor nutrition due to food refusal behavior, also set the stage for Kieran’s use of problem behavior.

Across all three routines, parent requests or demands served as the primary antecedent trigger for problem behavior. For the transition to bath and computer transition routines, a parent request for Kieran to stop engaging in the current activity and
transition to another activity resulted in problem behavior. For the dinner routine, a parent request to eat the food served at dinner resulted in problem behavior.

For all routines, the parents responded to problem behavior by allowing Kieran to continue engaging in the current (preferred) activity, by reducing or removing task demands (e.g., carrying him to the bathtub, allowing him to ‘skip’ a bath, or removing demands to eat unpreferred foods). For all target routines, the primary function of Kieran’s problem behavior was escape.

A functional analysis was not conducted to confirm the results of the functional assessment. There were three reasons for this decision. First, functional assessment observations confirmed the function of child problem behavior identified during the functional assessment interview, and the interventionist and investigator were both confident in the accuracy of these results. Second, the interventionist was new to functional assessment procedures and thus would have required a significant amount of training to conduct an experimental functional analysis. This was not an expectation that was communicated to her when she agreed to serve as an interventionist. Third, although the investigator had the experience and skills necessary to conduct a functional analysis, she chose to minimize her involvement in assessment and intervention activities as much as reasonably possible, so as to preserve the features of a train-the-trainer model in which a trainer has little to no direct involvement in assessment and intervention activities.

Following the functional assessment interview, the interventionist conducted a broad assessment of family ecology (Appendix N). Parents were asked to describe their family’s goals, strengths, resources and social supports, and sources of stress. As with the functional assessment interview, the interventionist prepared the questions in advance,
typing them into an IBM laptop computer. Parents read the questions and spoke their responses into a microphone attached to the computer. Dragon Naturally Speaking™ software translated the parents’ spoken responses into text, which could then be read by the interventionist. The interventionist responded with gestures, basic ASL, and by typing additional questions or responses into the computer. Table 10 summarizes information gathered from the family ecology interview. Results from the functional assessment, family ecology assessment, and routine assessment were used to develop technically sound and contextually appropriate behavior support plans for each target routine.
**Table 10. Results from the family ecology interview**

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
</table>
| Child’s positive contributions | - Bright, with a good ability to communicate his knowledge and needs help when it is offered  
- Quick sense of humor; creates situations to make people laugh  
- Has taught parents the importance of routine and the need to accept help when it is offered  
- Has put parents in the position of learning to be good advocates |
| Family strengths  | - Reliability and persistence  
- Creativity in problem solving  
- Ability to listen to each other and respect differences |
| Resources         | - Two older daughters capable of caring for Kieran; one is able to use basic ASL to communicate and the other is able to communicate by writing messages to Kieran (see note below).  
- Respite funds available for use but no one at present with the skills and availability to provide respite care  
- Good support team at school and through provincial organization serving deaf children and their families |
| Social supports   | - Mother has a few good friends to talk over problems with  
- Mother recently joined an adult dance class which provides a break from caring for Kieran and an enjoyable activity  
- Dad is involved in a prominent orchestra which provides social contacts and a break from work and caring for Kieran |
| Stressors         | - Kieran’s behavior, which can be very frustrating and tiresome  
- Kieran’s physical needs (diaper changes throughout the day, stretching program, etc.)  
- Variety of appointments related to Kieran’s needs which require juggling work and vehicle schedules  
- Limited finances which impact the ability to engage in family activities |
| Goals             | - For Kieran to be a self-sufficient, contributing member of society  
- For Kieran to continue to develop language and communication skills  
- For the school to recognize Kieran’s abilities and capitalize on those abilities  
- For Kieran to develop the ability to use his laptop computer to communicate with a variety of individuals, including those who don’t know ASL |

*Note.* Kieran is able to read, with comprehension, single words and basic sentences; messages regarding expectations can be written for Kieran to read. In addition, Kieran is able to fingerspell to express his wants and needs; his sister can write the letters of the alphabet as Kieran spells, to ensure mutual understanding of his message.
Positive behavioral support plan development. In collaboration with the family, the interventionist developed individualized behavior support plans for each of the target routines, under the supervision of the investigator. Support plans for each routine were developed in step-wise (i.e., lagged) fashion in conformance with the multiple baseline design. Three steps were followed to develop routine-specific PBS plans. The first step was to build a summary statement and competing behavior pathways diagram for a given routine. The diagram outlined the setting events, antecedent triggers, problem behaviors, and maintaining consequences (i.e., function) operating for a given routine. The diagram also identified desired behavior(s) and maintaining consequences for that routine, as well as acceptable replacement behavior(s) that served the same function that the problem behavior served (Horner, Sugai, Todd, & Lewis-Palmer, 2000; Lucyshyn, Kayser et al., 2002). The competing behavior pathways diagram guided the development of a technically sound plan designed to: (a) render problem behaviors irrelevant, ineffective and inefficient at achieving their purpose; and (b) teach new behaviors that result in improved child behavior during a given routine.

Following the development of a competing pathways diagram, strategies that were logically linked to features of the problem were identified. For each feature of the problem in the competing behavior pathways diagram (e.g., setting events, antecedent triggers, problem behavior, maintaining consequences), a logically linked behavior support strategy was developed. Strategies were designed to make problem behavior no longer functional and positive behaviors highly functional. For each routine, positive behavior supports were selected from a broad class of empirically validated interventions (Koegel, Koegel, & Dunlap, 1996; Luiselli & Cameron, 1998; Repp & Horner, 1999).
While no PBS plan was exactly the same, each plan shared a common research-based structure for understanding problem behaviors and selecting behavior support strategies (Horner et al., 2000; Lucyshyn, Horner et al., 2002). Four categories of intervention strategies were included in PBS plans: setting event strategies, preventative strategies, instructional strategies, and consequence strategies. Decisions regarding specific strategies were based on the specific behavioral mechanism operating to occasion or maintain problem behavior.

To build contextually appropriate PBS plans, the interventionist referred to information from the family ecology assessment. This ensured that proposed strategies reflected the parents’ goals for Kieran, built upon child and family strengths, and did not result in additional stress for the family by creating undue hardship. She then reviewed the proposed strategies with the family and, if necessary, made adjustments based on parental input. For example, she included the mother’s goal that Kieran move independently about the house which served to prevent the mother from experiencing a back injury due to lifting and carrying him. She also included visual supports (i.e., picture and written) (Appendix O) to enhance the mother’s ability to communicate expectations. PBS plans developed in this manner have been shown to be effective and acceptable across a wide range of children and families (Binnendyk & Lucyshyn, 2009; Clarke et al., 1999; Duda, Clarke, Fox, & Dunlap, 2008; Lucyshyn et al., 2007; Moes & Frea, 2000).

Finally, the interventionist distilled the support strategies into a one- to two-page implementation checklist to be used during the intervention phase. The finalized behavior support plan for each routine is summarized in Table 11.
<table>
<thead>
<tr>
<th>Setting Event Strategies</th>
<th>Antecedent Strategies</th>
<th>Teaching Strategies</th>
<th>Consequence Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transition to Bath</strong></td>
<td>Use a visual schedule</td>
<td>Use of visually mediated positive contingency statements</td>
<td>Teach K to request more time with a preferred activity</td>
</tr>
<tr>
<td></td>
<td>Embed choice</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Ensure K is neither hungry nor tired before beginning routine (allow snack and rest time)</td>
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<tr>
<td><strong>Computer Transition</strong></td>
<td><strong>Setting Event Strategies</strong></td>
<td><strong>Antecedent Strategies</strong></td>
<td><strong>Teaching Strategies</strong></td>
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</tr>
<tr>
<td></td>
<td>Use a visual schedule</td>
<td>Use visually mediated positive contingency statements</td>
<td>Teach K to refer to the visual timer to anticipate when the transition will begin</td>
</tr>
<tr>
<td></td>
<td>Embed choice</td>
<td></td>
<td>Teach K the steps in shutting down the computer</td>
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<tr>
<td></td>
<td>Use a visual timer to indicate when the transition will begin</td>
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<tr>
<td>Setting Event Strategies</td>
<td>Antecedent Strategies</td>
<td>Teaching Strategies</td>
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<tr>
<td>------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dinner</td>
<td>▪ Use a visual schedule</td>
<td>▪ Teach K to use adapted utensils</td>
<td>▪ Praise contingent on consumption of foods presented</td>
</tr>
<tr>
<td></td>
<td>▪ Provide adapted utensils, an adapted plate, and adapted seating (Tripp Trapp chair)</td>
<td>▪ Teach K to request assistance</td>
<td>▪ Provide highly preferred activity of K’s choosing contingent on consumption of foods presented</td>
</tr>
<tr>
<td></td>
<td>▪ No access to snacks for 3–4 hours before meal time</td>
<td>▪ Teach K to request a break</td>
<td>▪ Ignore and redirect minor problem behaviors</td>
</tr>
<tr>
<td></td>
<td>▪ Restrict access to highly preferred treats (cheezies, popcorn, etc.); use these items to reinforce consumption of meal</td>
<td>▪ Teach K to engage in conversation at the dinner table</td>
<td>▪ Utilize escape/extinction procedures in response to food refusal behaviors (non-removal of spoon)</td>
</tr>
<tr>
<td></td>
<td>▪ Allow K to choose preferred treat that he may access after consumption of meal</td>
<td>▪ Teach K to sign “thank you” when meal is finished</td>
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<tr>
<td></td>
<td>▪ Begin intervention with interventionist (5 to 7 sessions per week; 30 to 60 minutes per session) to establish stimulus control</td>
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</tr>
<tr>
<td></td>
<td>▪ Use stimulus fading to introduce target foods</td>
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<tr>
<td></td>
<td>▪ Use visually mediated positive contingency statements</td>
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<td>▪ Praise contingent on consumption of foods presented</td>
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</table>
Implementation plan development. For each routine, an implementation plan was developed collaboratively between the investigator, the interventionist, and the family. The implementation plan defined (a) training materials and support activities that were used to support family members in implementing behavior support strategies, (b) roles and responsibilities, and (c) a timeline for completing the support process. The investigator developed the initial implementation plan to provide guidance to the interventionist. The interventionist then reviewed the implementation plan with the family. The timeline was adjusted as needed to respond to parental availability and the child’s response to intervention strategies.

Implementation support. For the transition to bath routine and the computer transition routine, two phases of implementation were sequentially introduced: (a) initial parent training and support and (b) maintenance support. For the dinner routine, there were three phases of implementation support: (a) intensive training with the interventionist, (b) initial parent training and support, and (c) maintenance support.

Materials and activities for parent training included (a) written plans, (b) self-monitoring and self-management procedures, (c) modeling and coaching in routines, (d) behavioral rehearsal, and (e) problem solving discussions (Briesmeister & Schaefer, 1998). During the parent training phase, training activities occurred in-vivo during weekly or bi-weekly sessions. During maintenance support, the staff-interventionist met with the mother on a weekly to bi-monthly basis, outside of the context of the routine, to discuss progress, review implementation checklists, and address any ongoing or new problems.
The first routine intervened on was the transition to bath routine. Initial parent training and support for the bath transition routine involved 11 sessions across 9 weeks for a total of 10.5 hours. Parent training began with the interventionist reviewing the PBS plan with the mother. During parent training sessions, the interventionist implemented a flexible but common set of activities. These activities included modeling of strategies, coaching the mother in the use of the strategies, problem solving discussions, role-play, and review of implementation checklists completed by the parent. During early parent training sessions, the interventionist directly implemented the support strategies with Kieran and modeled the use of key ASL vocabulary and phrases related to the routine while the mother observed. The mother then implemented the strategies with Kieran while the interventionist observed and coached the mother (i.e., provided suggestions, modeled, gave feedback) in accurate use of the strategies. Throughout the initial parent training and support process, the interventionist engaged the mother in discussions that focused on Kieran’s progress, the mother’s successful use of intervention strategies, and review of common errors. Discussion also allowed for the interventionist to provide ASL instruction related to the routine. In particular, instruction was provided regarding the delivery of praise, ensuring that the mother displayed facial expressions that matched the statements she was signing, and the delivery of succinct, routine-related ASL phrases. As the mother became proficient in her use of the strategies, the interventionist began to fade training and support activities. The interventionist observed the mother’s use of the strategies during the bath transition and afterward engaged the mother in reflection on her use of the strategies, using the implementation checklist as a guide. The interventionist used Socratic questioning (i.e., “How would you implement the strategies if Kieran was
not feeling well?) to assist the mother in reflecting on the routine and solving potential problems on her own. In addition, the interventionist posed questions regarding potential challenges for the mother to reflect on and address. In this way, the interventionist began preparing the mother for the long-term maintenance of improvements in child behaviors and parenting practices.

After stable and meaningful improvement in child behavior and routine participation were observed, the bath routine entered a maintenance support phase. During the maintenance support phase, the interventionist focused on empowering the parent to become self-sufficient in using behavior support strategies and to prevent a relapse of problem behavior. The parent also was encouraged to teach other family members to implement the strategies within the context of the bath transition routine. Maintenance support for the bath transition routine involved a total of 6 sessions across 18 weeks for a total of 3 hours.

The second routine intervened on was the computer transition routine. Initial parent training and support for the computer transition routine involved 18 sessions across 12 weeks for a total of 18 hours. Parent training in the computer transition routine followed the same structure as the bath transition routine, with the interventionist modeling, coaching, role-playing, and engaging the parent in problem solving discussions. After stable and meaningful improvement in child behavior and routine participation were observed, the computer transition routine entered a maintenance support phase. As with the bath transition routine, maintenance support focused on empowering the parent to become self-sufficient in her use of the strategies and to
prevent a relapse of problem behavior. Maintenance support for the computer transition routine involved a total of 4 sessions across 6 weeks for a total of 2 hours.

The third routine intervened on was the dinner routine. Intervention in this routine involved an additional phase: intensive training with the interventionist. The purpose of intensive training with the interventionist was to establish initial stimulus control and set the stage for a transfer of stimulus control to the parent in the natural setting of the dinner routine. Both the investigator and the interventionist conducted intensive training. The investigator provided direct support with intensive training for two reasons. First, intervention on food refusal behavior is a complex process and thus requires a deeper understanding of behavioral principles and intervention procedures. Because the interventionist was a novice in behavioral intervention, the investigator provided direct, \textit{in vivo} training in the treatment of Kieran’s food refusal behavior to the interventionist. Second, the investigator provided direct support during intensive training in order to increase the number of intervention sessions per week. The investigator and the interventionist each provided, on average, three to four intensive intervention sessions per week, to ensure a total of six to seven intervention sessions per week. The investigator provided modeling and coaching to the interventionist for two (13\%) of the intensive training sessions and provided intensive training to Kieran for an additional eight (53\%) sessions. The interventionist provided intensive training for six (40\%) of the sessions.

Prior to the introduction of intensive intervention, the investigator and interventionist met with the parent to construct a list of target dinner foods. A total of 12 foods were selected, balanced across meats, vegetables, side dishes, and casseroles. Intensive intervention focused on introducing each of these 12 food items to Kieran.
Visual supports were used to: (a) show Kieran which foods he would be expected to eat during a session, (b) provide Kieran with choices regarding treats that could be accessed contingent on acceptance of target foods, and (c) show Kieran the number of bites of target foods he would need to consume before being able to access a treat. Stimulus fading procedures were utilized throughout intensive intervention. Initially, Kieran was presented with very small bites of target foods (e.g., 1 cm square) and was required to eat only one bite before accessing a treat. Over the course of each session, both the size of bites and the number of bites Kieran was required to eat before accessing a treat were gradually increased. A total of 15 intensive intervention sessions, averaging 45 to 60 minutes in length, were conducted before parent training in the dinner routine began. The initial 5 intensive training sessions occurred without the parent(s) present. Beginning with the sixth intensive intervention session, the mother or father (whoever was present at the time) sat at the table and provided praise when Kieran accepted target foods.

Once Kieran was consistently consuming full-sized bites of the twelve target foods during intensive training sessions, with minimal problem behavior, initial parent training and support in the dinner routine began. Parent training for the dinner routine involved 7 sessions across 3 weeks for a total of 10 hours. Parent training in the dinner routine followed the same structure as the bath transition and computer transition routines, with the interventionist modeling, coaching, role-playing, and engaging the parent in problem solving discussions. The first three parent training and support sessions occurred on consecutive days. This allowed for a shift of stimulus control from the interventionist to the parent and also supported the development of behavioral momentum. These sessions occurred during the natural mealtime and lasted, on average,
60 minutes. As the parent demonstrated the ability to effectively implement the strategies within the context of the dinner routine, parent training sessions were reduced to two times per week. During these final parent training sessions, the interventionist began to fade direct support during the meal. Instead, she observed the meal and engaged the mother in a discussion following the meal. Post-meal discussions focused on child behavior improvements, successful parent use of strategies, and guidance regarding areas needing further improvement. Near the end of the initial parent training and support sub-phase, the interventionist began meeting with the parent outside the context of the meal routine to review implementation checklists and engage in problem solving discussions. During these meetings, the interventionist focused on the mother’s use of strategies to set the stage for success. In particular, she focused on teaching the mother to regulate Kieran’s serving size to an appropriate amount for a child his age and to provide physical assistance for foods that were difficult for Kieran to eat independently due to his physical limitations (e.g., rice, spaghetti).

After stable and meaningful improvements in the dinner routine were documented, the routine entered a maintenance support phase. As with the first two routines, the focus during the maintenance support phase was to further empower the parent in her use of the support strategies and to prevent a relapse of problem behavior. Maintenance support also focused on teaching the parent key ASL phrases that could be used to engage Kieran in conversations during dinner and to teach the parent to recognize and understand ASL phrases that Kieran used but his parents didn’t understand. Maintenance support for the dinner routine involved 6 sessions across 5 weeks for a total of 7 hours. During the maintenance sub-phase, data showed a slight regression in
behavior. While Kieran did successfully consume all of the food presented and completed all of the steps of the routine, he did so with some low-level problem behavior, such as non-compliance and verbal food refusal (e.g., “no”). The mother, to her credit, was able to persevere but it was clearly a tiring process for her. As a result, the investigator led a maintenance support session with the parent to focus on the use of key preventative strategies (e.g., use of positive contingency statements) before collecting the final maintenance sub-phase data point.

**Data Analysis and Interpretation**

**Visual Analysis of Single Subject Design Data**

Percentage of intervals of problem behavior and percentage of steps completed were analyzed using visual analysis procedures (Parsonson & Baer, 1978). For each routine, percentage of intervals of problem behavior and percentage of steps completed were graphed and visually analyzed. Criteria for a multiple baseline design were used to evaluate whether a functional relationship existed between the intervention and changes in child behavior and routine participation. The investigator visually examined the number of data points, variability of the data, level of the behavior, direction and degree of slope, and the immediacy of change in the level when a phase change occurred.
CHAPTER 5: Study 2 Results

Results of the implementation of PBS across the three target routines are presented in this section. The second study sought to determine: (a) whether a functional relation existed between the implementation of a family-centered PBS approach within a train-the-trainer model and improvements in the behavior and participation of a deaf child with developmental disabilities in valued family routines in the home; and (b) if the use of the family-centered PBS approach delivered within a train-the-trainer model was associated with high levels of social validity and contextual fit, from the perspective of the child’s parents.

Five dependent variables were used to evaluate the impact of implementation of PBS: (a) percentage of intervals of problem behavior; (b) percentage of routine steps completed; (c) parent use of support plan procedures; (d) average rating of the social validity of the support process; and (e) average index of the support plan’s ‘goodness of fit’ with the family’s ecology. Results for these variables are summarized below.

**Problem Behavior**

Figure 5.1 shows the percentage of intervals of problem behavior across the three family routines. These data represent multiple probe measurement within a multiple baseline design. Overall, when comparing baseline to intervention phases, the data reveal moderate-to-high and stable levels of problem behavior during baseline, and marked improvements in problem behavior at the point of intervention across the three routines. During baseline, problem behavior averaged 61% of intervals (range 22-94%) across the three routines. This decreased to an average of 4% (range 0-23%) during the initial parent
training and support phase and 4% (range 2 - 5%) during the maintenance sub-phase of intervention. A summary of problem behavior data for each routine is presented below.

**Figure 1. Percentage of intervals of problem behavior**

**Transition to Bath Routine**

During baseline, problem behavior data were high and stable at an average of 65% of intervals (range 50 – 72%). The onset of intervention evidenced a marked improvement in problem behavior. During the initial parent training and support sub-phase, the percentage of intervals of problem behavior decreased to an average of 8%
During baseline, problem behaviors were initially high and stable at an average of 74% of intervals (range 72 - 78%) for the first three data points. From the fourth to seventh data points, there was a decreasing trend in problem behavior that occurred concurrent with intervention in the transition to bath routine, suggesting a possible loss of experimental control. The mother, however, reported that Kieran would engage in problem behavior outside of the observation sessions, when asked to stop using the computer. She also reported that on days when an observation session was conducted, Kieran would resume problem behavior as soon as the investigator left the home. This suggested that Kieran was possibly reacting to either the video camera or the presence of the investigator. The investigator arranged to bring the video camera to the home during the day, when Kieran was at school. The mother was instructed to place the video camera on a tripod in a somewhat obscure location but where Kieran’s behavior could be captured. She was asked to read the envisioned routine, turn on the video camera, and attempt to do the routine with Kieran. An immediate return to initial baseline levels of problem behavior was established through the use of this procedure. Data points 8 – 10 evidenced high and stable problem behavior with an average percentage of intervals of 80% (range 67 – 94%). Overall, the average percentage of intervals of problem behavior during baseline was 64% (range 22 – 94%). During the initial parent training and support sub-phase, the percentage of intervals of problem behavior fell dramatically to 3% (range 0 – 23%).
During the maintenance phase, the average percentage of intervals of problem behavior remained low and stable at 5% (range 4 – 6%).

**Dinner Routine**

During baseline, problem behavior evidenced an increasing trend with an average of 53% of intervals (range 44 – 83%). During the initial parent training and support sub-phase, the percentage of intervals of problem behavior decreased precipitously to an average of 1% (range 0 – 2%). During the maintenance sub-phase, improvements maintained at 2% (range 0 - 5%).

**Steps Successfully Completed**

Figure 5.2 shows the percentage of steps successfully completed across the three routines. Overall the data show low and stable levels of percentage of steps completed during baseline and significant improvement at the point of intervention for each routine. During baseline, the percentage of steps completed averaged 16% (range 0-44%) across the three routines. This increased to an average of 90% (range 33 - 100%) during the initial parent training and support sub-phase and 94% (range 44 -100%) during the maintenance sub-phase of intervention. A summary of steps completed data for each routine is presented below.
Transition to bath routine

During baseline, the percentage of steps completed was stable and low at 0% across all probes. During the initial parent training and support sub-phase of intervention, steps completed data evidenced an immediate and significant improvement that remained stable across four of five probes, with an average of 87% (range 33 – 100%). During the
maintenance sub-phase, further improvement was evidenced, with an average steps completed of 100% across four observation probes.

**Computer transition routine**

During baseline, the percentage of steps completed was initially stable and low at 0% steps completed (no range) across the first three observation probes. As a result of reactivity to the observer’s presence during an observation session, Kieran began to complete some of the steps within the routine; however, these improvements were not stable. With the removal of the observer from the observation sessions, percentage of steps completed returned to low and stable levels with an average of 0% across the final three baseline observation probes. The overall average percentage of steps completed during baseline was 14% (range 0 – 80%). During the initial parent training and support sub-phase of intervention, steps completed data evidenced immediate and increasing levels of improvement with an average of 87% steps completed (range 80 – 100%). During the maintenance sub-phase, further improvement was evidenced, with an average steps completed of 100% across 2 observations.

**Dinner routine**

During baseline, the percentage of steps completed was low and stable at an average of 33% steps completed (range 22 – 44%). During the initial parent training and support sub-phase, a marked improvement was evidenced with an average of 96% of steps completed (range 89 – 100%). During the maintenance phase, further improvement was evidenced, with an average steps completed of 81% across 3 observations.
Parent Use of Support Plan Procedures

Parent treatment integrity data was gathered for four randomly selected observations sessions across the three routines during initial training and maintenance support sessions. These data showed an overall average level of treatment integrity of 73.75% (range 56 - 86% of intervals). In particular, the mother evidenced the use of: (a) visual support strategies (e.g., visual schedule) to communicate expectations; (b) positive contingency statements (e.g., “first eat your dinner, then you can have the computer”), which were communicated both through visual supports and through ASL; (c) direct instruction to teach Kieran to perform specific tasks (e.g., using an adapted utensil to eat); and (d) descriptive praise contingent on compliance to parental requests and other positive, routine-related behavior.

Social Validity Ratings

The social validity questionnaire was administered to the mother only for the bath and computer transition routines. For the bath and computer transition routines, social validity evaluations were completed at the end of the initial parent training and support phase and upon completion of the study. Both parents completed social validity evaluations for the dinner routine. For the dinner routine, social validity evaluations were completed at the end of the maintenance support sub-phase. The overall rating of social validity across three routines was 4.9 (range 4.6 – 5.0), showing that the intervention goals, procedures, and outcomes were perceived to be acceptable and important.

For the transition to bath routine, social validity evaluations were completed by the mother at the end of the initial parent training and support sub-phase and upon completion of the study. The average social validity rating (1 = disagree; 5 = agree)
across two evaluations was 4.8 (range 4.6 – 5.0). Across the evaluations, the mother rated the goals, procedures, and outcomes as beneficial to her son and family, and provided the following comments: “My child’s behavior has greatly improved since implementing the strategies and procedures. Improved communication and a clear plan has helped him understand the routine and expectations.” and “Seeing the success of the routine and the consequent development of independence in Kieran provides a positive sense of hope for his future.”

For the computer transition routine, social validity ratings were completed by the mother at the end of the initial parent training and support sub-phase and upon completion of the study. The average social validity rating across two evaluations was 5.0 (no range). Across the evaluations, the mother rated the goals, procedures, and outcomes as beneficial to her son and family, and provided the following comments: “The tools provided and implemented have given us clear guidelines to follow for stress-free transitions off of the computer.” and “I have taught the techniques to others and everyone feels a sense of pride and success with the smooth transitions that occur.”

For the dinner routine, both the mother and father provided social validity ratings. They completed social validity evaluations at the end of the maintenance support sub-phase. The average social validity rating across two evaluations (one per parent) was 5.0 (no range). Across the evaluations, the parents rated the goals, procedures, and outcomes as beneficial to their son and family. The mother, who was responsible for implementing the intervention, made the following comments: “We have gone from having a child with incredibly limited foods to a child that will eat whatever I prepare! Depending on the foods presented I am able to adapt the strategies and enjoy success with every meal,” “He
is eating well, gaining weight, and willing to try new foods,” and “We were excited yet skeptical at the outset of this support effort. Now that we have learned the necessary skills and have the tools we are looking forward to enjoying family dinner times that are stress free and fun!”

**Goodness of Fit Ratings**

The goodness of fit questionnaire was administered to the mother only for the bath and computer transition routines. For the bath and computer transition routines, goodness of fit evaluations were completed prior to and upon completion of the initial parent training and support sub-phase and upon completion of the study. Both parents completed social validity evaluations for the dinner routine. For the dinner routine, social validity evaluations were completed prior to initial parent training and support sub-phase and upon completion of the maintenance support sub-phase. Overall, the parents reported that the support plans fit well with the family’s ecology. The overall rating of goodness of fit across three routines was 4.4 (range 3.18 – 5.0).

For the transition to bath routine, goodness of fit ratings were provided by the mother. She completed goodness of fit evaluations at both the beginning and end of the initial parent training and support sub-phase as well as upon completion of the study. The average contextual fit index (1 = poor fit, 5 = good fit) across three evaluations was 4.2 (range 3.5 – 4.8). At the completion of the study, the mother provided the following comment on her goodness of fit evaluation for the bath routine: “I am very happy using this support plan. This support plan addressed two issues. The first issue was that Kieran would not cooperate with bath time with me; the second was having Kieran move through the house without being carried. Addressing the first issue reduces the stress of
relying on Dad for bath time. Addressing the second issue has long-term benefits for my personal health and increases Kieran’s level of independence.”

For the computer transition routine, goodness of fit ratings were provided by the mother. She completed goodness of fit evaluations at both the beginning and end of the initial parent training and support sub-phase as well as upon completion of the study. The average contextual fit index (1 = poor fit, 5 = good fit) across three evaluations was 4.8 (range 4.7 – 5.0). Upon completion of the study, the mother reported the following on her goodness of fit evaluation: “The computer routine has been very helpful in reducing the stress around transitioning off of the computer. I find it very adaptable to use with other situations when we need to end an activity and move on to other areas of interest or necessity.”

For the dinner routine, goodness of fit ratings were provided by the mother and father. They completed goodness of fit evaluations at both the beginning and end of the initial parent training and support sub-phase. The average contextual fit index (1 = poor fit, 5 = good fit) across two evaluations was 4.1 (range 3.7 – 5.0). The mother, who was primarily responsible for implementation, provided the following comment: “I am very pleased and excited to have learned these strategies to use with Kieran for meal times. The skills carry over to all eating ‘opportunities’ and Kieran’s food repertoire has expanded substantially. He has gained approximately 10 pounds since we began using these techniques to introduce new foods. Although tedious at times, meal times have become fun and interactive.”
CHAPTER 6: DISCUSSION

Summary of the Results

Two studies addressed one quasi-experimental, one experimental, and two descriptive questions about the efficacy and acceptability of: (a) a train-the-trainer model of PBS training to improve staff knowledge related to functional assessment and PBS plan development; and (b) a family-centered PBS approach for improving behavior and participation in a deaf child with developmental disabilities in home-based family routines. The multiple outcomes presented in the results offer affirmative, albeit preliminary, answers to these questions.

In regard to the first study, an in-class training program consisting of 40 hours of trainer-led instruction on principles of behavior, functional assessment techniques, and positive behavior support procedures was associated with statistically significant improvements in knowledge, when comparing pre- and post test training measures. Ten of the 11 participants demonstrated improvements from pre- to post-test measurement. The average increase in the number of items correct from pre- to post-test was 10.36. This reflects a 24% improvement in scores from pre- to post-test. In addition to the measured improvements in content-based knowledge, participants provided high ratings of social validity for the training program overall. The summative social validity rating across all participants was 4.7 out of a maximum 5.0. Participants’ comments offered additional evidence of the acceptability and importance of the training program’s goals, procedures, and outcomes. In terms of goals, participants stated that the training program was “very applicable to my work” and that “the goals were appropriate because I learned skills that would benefit the whole family.” Others commented on the appropriateness of
the training procedures: “I appreciated the ‘deaf’ examples,” “I like the different ways of ‘testing’ our understanding – pop quizzes, games, etc.” and “excellent teaching strategies – felt I retained a lot and understood the theories, concepts, etc.” Other comments on the acceptability of the outcomes included “having done this training has increased my confidence working with children and their families” and “I left this course with a greater understanding. I want more!” Some individuals commented on the need for additional time to cover content, engage in activities, and determine appropriate ASL translations for PBS vocabulary and concepts. For example, one participant stated “I would suggest for next time give everyone case studies and as we go through the curriculum we apply the skills to a case study (on paper).”

In regard to the second study, following parent implementation of a multi-component positive behavior support plan across three home-based routines, Kieran’s problem behaviors decreased to zero or near-zero levels. These behavioral improvements maintained across a 1- to 4.5-month period of maintenance support with little to no regression. Kieran was able to successfully participate in transition routines with his mother and in a dinner routine with both parents that included a balance of healthy foods. In the dinner routine, in addition to eating healthier foods, Kieran also began to engage in conversations with his family. By the maintenance support sub-phase, Kieran participated successfully in 100% of the routines observed. These improvements in child behavior and routine participation, occurring only at the point of intervention across the three routines, documented a functional relation between the family-centered PBS process and improvements in child behavior and routine participation (Horner, Carr, Halle, Odom, & Wolery, 2005).
Further evidence of the efficacy of the support approach was found in (a) high ratings of social validity for behavior support plan goals, procedures, and outcomes; and (b) high indices of goodness-of-fit between the PBS plan and the family’s ecology.

A number of collateral effects also were noted both by the mother and the interventionist. The mother reported the ability to implement key strategies, such as visual schedules (i.e., a sequence of text and/or pictures to show the order of activities) and positive contingency statements (i.e., “if you clean up, then you can watch TV”) to successfully support her son during other types of transitions. For example, the mother reported the ability to use a written schedule showing activities and the times at which they would occur to support Kieran to transition from watching TV, to a meal, and then to using the computer. The mother also reported several occasions in which her son consumed non-trained foods at home and in novel settings. For example, Kieran participated in a school camping trip and staff reported back that he ate all of the food offered, without engaging in any problem behavior. Kieran also began eating food that his mother packed in his lunch, many of which were non-trained foods, and would consume food and milk purchased in restaurants. Kieran’s mother reported that she was able to provide verbal instructions to a babysitter regarding the use of the support strategies for the dinner routine and that the babysitter was successful in providing dinner to Kieran. Finally, at the completion of the study, Kieran’s mother reported that since the implementation of the dinner routine, Kieran had begun to sleep through the night. She suggested that Kieran might have been waking in the middle of the night due to hunger, and she believed that his sleep behavior improved because he was eating well.
The interventionist, Alicia, also reported collateral effects based on her observations of Kieran and his family in home- and centre-based activities. First, she noted a dramatic improvement in Kieran’s use of ASL for conversational purposes, such as initiating conversations and sharing information. She reported that he was more visually attentive when others in his environment were signing and that he expressed more interest in interacting with other children. She also noted an improvement in the mother’s ASL skills. The interventionist suggested that regular, in-home, interaction with a native ASL-user during valued family routines, had supported the mother’s improved ASL acquisition compared to participation in sign language classes alone.

Findings in Relation to the Literature

The two studies, taken together, relate to the education of the deaf and hard of hearing and positive behavior support literatures in at least four ways. First, they provide further documentation of the multiplicative effects of additional disabilities on the development and functioning of deaf children. Kieran was a child diagnosed with a severe to profound hearing loss, cerebral palsy, and autism spectrum disorder. This combination of disabilities resulted in impairment across several domains, including communication, behavior, learning, and adaptive functioning (Carvill, 2001; Carvill & Marston, 2002; Luckner & Carter, 2001). The impact of multiple disabilities on Kieran’s development and daily functioning was not simply additive; that is, he did not simply experience three separate disabilities. Rather, the impact each disability had on communication, adaptive functioning and learning was multiplied. For example, each of Kieran’s diagnoses (deafness, autism, and cerebral palsy) significantly hindered his development of communication skills. Because he was deaf, Kieran had reduced
exposure to language input, which influenced his overall development of language. Because he had autism, he experienced challenges regarding the social nature of language. Thus, Kieran tended to use language only to obtain wants or to protest. Finally, because he had cerebral palsy, Kieran experienced compromised motor skills that interfered with his ability to easily and fluidly express himself with ASL. Taken together, Kieran’s multiple disabilities resulted in significant delays in: (a) language and communication; (b) cognitive development; (c) social development; and (d) the development of socially appropriate behaviors.

The staff and parents in the current study support the notion that there is a need for training in behavior assessment and intervention for those working with deaf children and their families. One training priority reported in the literature relates to deaf and hard of hearing students with additional disabilities (Andrews & Covell, 2007; Beals, 2004; Ben & O’Leary, 2002; Cawthon, 2009; Luckner & Carter, 2001; Luckner & Howell, 2002; Luckner et al., 2005; Soukup & Feinstein, 2007). Parents of deaf children, teachers of the deaf, school administrators, and university faculty have suggested that training needs to focus on strategies for teaching deaf and hard of hearing students with developmental disabilities (Luckner et al., 2005). While the literature suggests several areas of need, one area of identified priority relates to the assessment of problem behavior and the development of effective behavior support plans. It has been well established that deaf children born to hearing parents are at an increased risk for the development of problem behavior due to challenges in communication development (Carvill, 2001). Given the communication and learning challenges that arise from the combination of hearing loss and additional disabilities (Carvill, 2001), deaf children with additional
disabilities are at an even greater risk for the development of problem behavior.

Anecdotal reports by parents also have highlighted concerns regarding interventions for deaf children with developmental disabilities who engage in problem behavior (Beals, 2004; Ben & O’Leary, 2002; Mirenda et al., 2002). Staff from the current study, along with Kieran’s parents, echo these sentiments. Staff stated: “I wish I had this information last year when I was working with a student with behavior problems,” and “I work with families who have deaf/hard of hearing children with additional needs – the tools I’ve learned will support me in supporting positive communication with these families.”

Kieran’s parents reported years of frustration in trying to find appropriate services for their son. They were unable to locate professionals who had training in both education of the deaf and autism spectrum disorders. The parents reported that, although they had access to provincial funding for behavior consultation and intervention through a provincial program designed to provide intervention services for children with autism (Province of British Columbia, 2010), they were unable to utilize these funds. In order to utilize their funding, they must hire a consultant from a provincial list of approved service providers. However, they reported that none of the service providers possessed the unique skill set (e.g., fluency in ASL, background in education of the deaf) to meet Kieran’s needs. They also reported that those with expertise in the education of deaf children lacked the ability to address the behavioral and learning challenges related to Kieran’s diagnosis of autism. Staff and parent perceptions regarding training needs in the field of education of the deaf support those reported in the literature.

Third, the second study provides additional empirical support for the effectiveness and acceptability of a family-centered, PBS approach (Lucyshyn et al., 2007; Moes &
Frea, 2002; Vaughn et al., 1997; Vaughn, Wilson, & Dunlap, 2002). A comprehensive assessment, consisting of a functional assessment and a family ecology assessment, resulted in a clear and accurate understanding of the function of Kieran’s problem behavior and led to the development of technically sound and contextually appropriate PBS plans for three target routines. The interventionist effectively implemented the PBS plans in the home by providing implementation support to the mother. This process led to marked improvements in Kieran’s behavior and participation in the three routines.

Fourth, the second study also offers additional empirical support for the usefulness of the activity setting as a unit of analysis (Lucyshyn, Kayser et al., 2002). The ecological concept of the activity setting is a component of Ecocultural Theory, an ecological theory about child development that is based on research in cross-cultural anthropology (see Gallimore, Weisner, Kaufman, & Bernherimer, 1989; Gallimore et al., 1993). Within this theory, the family activity setting is viewed as a central context in which child development occurs. Activity settings are defined as the daily and weekly routines of family life in which parent and child interaction occur. Early interventionists and behavioral researchers have considered the activity setting of family routines as a useful unit of analysis for promoting child development (Bernheimer, Gallimore, & Weisner, 1990) and positive parent-child interactions (Lucyshyn et al., 2009). During parent and child participation in daily routines in the home and community, natural opportunities for child learning and development occur (Gallimore et al., 1989). Activity settings possess a number of common elements (i.e., time and place, people, tasks, resources, goals and values, and patterns of interaction (Lucyshyn et al., 1994). When engaging in a family-centered PBS process, the activity setting can be used as a unit of
analysis to: (a) develop a deeper understanding of parental goals and values; (b) gather information regarding the desired structure of a specific routine; and (c) identify incongruencies between a parent’s vision of successful routines and the manner in which the child currently participates in those routines. This information can contribute to the design of PBS plans that are both individualized and sensitive to the family’s culture (Lucyshyn et al., 2004). In this study, by focusing on valued yet problematic activity settings, the interventionist was able to promote meaningful change in child behavior and in the mother’s parenting skills within the natural contexts of family life. The activity setting as a unit of analysis proved useful in three ways, discussed below.

First, the activity setting as a unit of analysis contributed to the collaborative development of effective and contextually appropriate PBS plans. With the activity setting of daily routines as the unit of analysis, the mother selected routines that were important to the family and in which she was highly motivated to promote improvement. Given the common elements of activity settings (i.e., time and place, people, materials, tasks, goals and values), the mother was able to create a fully articulated vision of what the routines would look like if they were successful. Using the mother’s envisioned routines as the contexts for behavior intervention and support, the interventionist was able to develop routine-specific positive behavior support plans that were both effective and contextually appropriate.

Second, the three target routines provided consistent contexts in which the mother could develop her ability to effectively implement behavior support strategies and to use ASL to communicate with her son. By intervening in one routine at a time, the mother was able to focus her efforts on small, manageable portions of the day. This helped to
ensure that the support effort was not overly demanding of her time and energy. The mother was able to practice a small set of strategies within a well-defined routine until she was proficient and comfortable. In this way, she developed a sense of self-efficacy (Bandura, 1977). In addition, the interventionist was able to focus ASL instruction within specific family contexts in which clear communication was important. In particular, during the bath and computer transition routines, the mother needed to provide instructions and information using ASL. The interventionist taught her to deliver ASL phrases clearly and succinctly, such that Kieran was able to attend to the entire message. The mother was able to practice new ASL signs and phrases that were meaningful and functional within each target routine. For example, the mother was able to communicate positive contingencies by signing “REMEMBER-GO-FAST-THEN-BEAR.” This further supported the development of her sense of self-efficacy. As evidenced by ratings and comments in the social validity evaluations, the mother found the implementation of behavior support in three valued activity settings in the home to be a positive way in which to develop her ability to use behavior support strategies and to communicate effectively with her son, using ASL.

Based on the interventionist’s observations and comments made by the mother, it is believed that embedding sign language instruction within the context of family activity settings provided a richer and more meaningful environment for both the mother to develop her ASL skills. The activity setting provided a context for identification of key ASL signs and phrases, which the mother could then use to interact with Kieran. Because the mother became more able to communicate clearly and effectively, particularly regarding items or activities that Kieran could access if he complied with parental
requests, Kieran began to visually attend to the mother’s signing. These interactions became mutually reinforcing. Kieran was able to access information that was important and meaningful. His mother was able to give an instruction and have Kieran respond with appropriate behavior. Over time, Kieran and his mother were observed engaging in interactions that involved sharing of information (e.g., discussing an upcoming birthday) and teasing (e.g., Kieran saying that his stuffed animal needed a bath, his mom replying “no”, and Kieran responding with “silly”). It is believed that improvements in the mother’s ASL skills and the communication-based interactions between Kieran and his mother were a result of ASL instruction embedded within the context of activity settings.

Third, behavioral researchers have suggested that the activity setting as a unit of analysis may contribute to the generalization of behavioral intervention to non-trained settings (Gallimore et al., 1993; Lucyshyn et al., 2004; O’Donnell & Tharp, 1990). In the current study, the promotion of change within three target activity settings appeared to contribute to the mother’s generalized use of behavior support strategies. The mother reported that she was able to generalize her use of behavior support strategies and ASL skills to non-trained settings, including other transitions and other mealtimes. She reported that she was able to see similarities between the target activity settings (i.e., transition to bath, transition from computer, dinner time) and other transition and meal routines. She added that she then was able to use similar strategies to: (a) promote Kieran’s successful transition between several activities (e.g., watching TV, playing with toys, etc.); and (b) promote acceptance of foods during other meals (e.g., breakfast) and in other settings (e.g., school).
Unique Contributions to the Literature

The study offers three unique contributions to the education of the deaf and positive behavior support literatures: (a) a train-the-trainer model of PBS training conducted in ASL, (b) the adaptation of the PBS process for a deaf child with multiple disabilities, and (c) a demonstration of successful implementation of the PBS process by a Deaf interventionist working with hearing parents.

Train-the-Trainer Approach to PBS Training Conducted in ASL

The first unique contribution is the documentation of a clear association between a train-the-trainer model of PBS training, conducted in ASL, and improved knowledge of functional assessment and positive behavior support plan design by staff who work with deaf children and youth. The pilot training program was conducted with 11 staff, of whom 10 were Deaf, who worked with children and youth in a variety of settings (i.e., home, school, and community). Training was delivered in ASL by the investigator, who had a high level of proficiency in both ASL and PBS, was a certified teacher of the Deaf who held a Masters degree in Special Education, and had several years’ experience supporting deaf children with developmental disabilities in a variety of settings. From those who successfully completed the training, a candidate for the second study was selected who had demonstrated a high level of proficiency with training content and concepts. This candidate was then mentored to implement a process of family-centered PBS in collaboration with a mother of a deaf child with multiple disabilities.

Adaptation of Family-Centered PBS for a Deaf Child

The second unique contribution is the documentation of improvements in the behavior and participation of a deaf child with multiple disabilities in three valued family
routines. This represents the first empirical study to address the efficacy of family-centered PBS as an intervention for a deaf child with developmental disabilities. Thus, the study contributes to the external validity of the approach by extending it to a new population. In addition, the study contributes to the education of the deaf literature by documenting a successful approach for intervening on problem behavior in deaf children with additional disabilities. These children comprise a significant proportion of the population (Gallaudet Research Institute, 2008), and professionals and parents have identified the need for interventions for this population as extremely important (Andrews & Covell, 2007; Cawthon, 2009; Luckner & Carter, 2001; Luckner & Howell, 2002; Luckner et al., 2005; Soukup & Feinstein, 2007). The results of the second study provide preliminary empirical evidence of the effectiveness and acceptability of a family-centered PBS approach to intervention with the mother of a deaf child with multiple disabilities as the key implementer of the intervention.

**Implementation Support by a Deaf Interventionist**

The third unique contribution to the education of the deaf and PBS literatures is the implementation of PBS by a Deaf interventionist in a family setting in which the parents were hearing. This study is the first to document that a Deaf interventionist can, with the support of a mentor, successfully implement PBS in a home setting with a deaf child with developmental disabilities and his mother. Alicia, the interventionist, was a young woman who was educated in hearing schools and used Signed English in a Total Communication (i.e., sign supported speech) format. As an adult, Alicia used ASL for communication and considered herself a member of the Deaf community. She was fluent in both ASL and written English, and had a Bachelor of Education degree. She worked as
a family literacy specialist, developing and implementing literacy activities for deaf and hard of hearing children and their families.

Alicia used a variety of communication strategies in her role as interventionist. She used a laptop computer with voice recognition software to support receptive and expressive communication between herself and Kieran’s hearing parents. She also made use of simplified ASL, gesture, and writing while providing implementation support in the family home. Her unique ability to act as a bridge between people using two different approaches of communication likely led to improvements in parent-child communication.

The use of a Deaf interventionist to provide support to Kieran and his hearing parents, particularly the mother, was believed to be advantageous for a number of reasons. First, Alicia was able to provide direct ASL instruction related to the target routines. During parent-training sessions, when the mother was learning to implement routine-based PBS strategies, Alicia was able to model and prompt the use of key ASL phrases and provide correction as needed. Second, Alicia was often able to recognize and interpret Kieran’s attempts to use ASL expressively. As a child with cerebral palsy, Kieran experienced significant fine motor challenges that interfered with his ability to form ASL signs with ease and fluidity. As a result, it was often difficult for communication partners to understand Kieran’s signs, particularly if ASL was not their primary language. Because Alicia was Deaf and used ASL as her primary language, she was more able to interpret Kieran’s attempts to form ASL signs. She could then point out Kieran’s adapted use of a particular sign to his mother, to further the mother’s ability to understand him. Finally, because parent-training sessions were conducted in ASL, Kieran’s mother had regular opportunities to practice using ASL. During parent training
sessions, Alicia would engage the mother in discussions regarding the target routine. In addition, she would engage the mother in general conversation. This allowed the mother to practice conversing in ASL in a relaxed, familiar atmosphere. It is believed that the presence of a Deaf interventionist in the home provided unique opportunities for the mother to further develop her receptive and expressive ASL skills.

Observational data provided evidence of collateral effects in regard to parent-child communication using ASL. Kieran was a deaf child with developmental disabilities who had been exposed to ASL for much of his life. He attended a preschool for deaf children and a provincial school for the deaf where staff and students used ASL. Kieran’s parents had actively participated in sign language instruction for a number of years. Most of this instruction was provided in a class-based format with other parents of deaf children. Despite their participation in ASL classes, Kieran’s parents experienced difficulty communicating with him. Videotaped data collected at the beginning of the study showed Kieran’s mother often struggling to provide simple directions. Throughout the study, the interventionist provided ASL instruction within the context of the three target activity settings. Doing so was associated with interventionist reports of improvements in the mother’s use of ASL. These improvements also were observed in videos collected near the completion of the study. This suggests that the use of a Deaf interventionist to provide PBS in home contexts may positively influence parent use of ASL.

It is important to note that Kieran’s parents were fully supportive of their son learning and using ASL to communicate. However, they experienced a number of challenges that interfered with their ability to use ASL fluently with Kieran prior to
working with the Deaf interventionist. First, Kieran was diagnosed with auditory neuropathy. For an individual with auditory neuropathy, sound enters the inner ear in a typical fashion, but transmission of signals to the brain is impaired. Individuals may be able to hear sounds but are likely to have more difficulty understanding speech. For this reason, it was unclear early in Kieran’s life whether he would be able to use his hearing sufficiently to develop language. Professionals initially suggested that Kieran might benefit from the use of a hearing aid and that this might help him develop the ability to understand speech. In addition, because of his physical limitations, it was anticipated that he would have some difficulty expressing himself easily using ASL. Based on these considerations, he was placed in a preschool program for deaf and hard of hearing children in which both sign language and speech were used for communication. Thus, early in his life, he was provided with opportunities to develop the ability to understand spoken language as well as use ASL.

Second, Kieran’s parents experienced difficulty acquiring ASL skills taught in a classroom format and using these skills with Keiran at home. They attended sign language classes for parents from the time Kieran was a preschooler. These classes, however, were de-contextualized. Parents would attend a central location and the instructor would teach vocabulary by demonstrating signs for parents to imitate. Parents also were encouraged to come to class with specific words or phrases that they wanted to learn. This proved difficult for Kieran’s parents. Kieran, who also is diagnosed with autism, was typically not motivated to engage in joint interactions with others, particularly when communication was involved. Thus, his parents found it challenging to identify words or phrases that would be useful when interacting with Kieran. At home,
Kieran was generally not interested in conversational exchanges and would maintain eye contact only briefly. As a result, his parents had few opportunities to practice their ASL skills.

**Limitations**

Although the outcomes of both the training and intervention studies are encouraging, there is need for caution when interpreting the results. Three limitations are pertinent: (a) format of the pre- and post-test; (b) validity of the pre- and post-test; (c) lack of a control group; (d) limited external validity; and (e) lack of follow-up data.

**Format of Pre- and Post-Test**

The first study utilized a written pre- and post-test to assess participants’ knowledge related to functional assessment and PBS plan development. Ten of the 11 participants were Deaf; six of those individuals reported ASL as their first language. Given that participants were assessed through written English, a second language for many of the participants, it is possible that they were challenged in reading and understanding the content. At the end of the study, when the investigator met individually with participants to review their pre- and post-test scores and debrief, the investigator asked all of the Deaf participants to share their opinions regarding the use of a written test versus a test provided in ASL. The majority of the Deaf participants stated that they believed their post-test scores would have been higher had the test been given in ASL. In the future, test items could be presented in ASL on videotape, allowing individuals to view the questions and possible answers and then mark their response on a scorecard. This could prevent individuals from responding incorrectly due to difficulties regarding assessment in a second language.
Validity of the Pre- and Post-Test

The pre- and post-test measure was developed using tests for courses in Applied Behavior Analysis and Positive Behavior Support. The pre- and post-test was developed with face validity in mind and was not validated *a priori*. The train-the-trainer program and assessment of participant knowledge served as a pilot investigation of both the training program and the measure of participant knowledge. That participant results on the post-test were used to guide the selection of an interventionist who proved to be highly competent in implementing a process of functional assessment and PBS with the family of a deaf child with multiple disabilities suggests that the test has shown a preliminary, albeit quite modest, degree of predictive validity (Allen & Yen, 1979). Further analysis of the validity of the pre- and post-test and refinement of the measure is necessary.

Lack of Control Group

The first study utilized a one-group pretest posttest design to examine the outcomes of a train-the-trainer model of PBS training for staff working with deaf children. This design is limited in its ability to demonstrate the effectiveness of an intervention due to several uncontrolled threats to internal validity (Campbell & Stanley, 1963). First, history may have played a role in improvements from pre- to post-testing. As the time between pretest and posttest is lengthened, there is a greater likelihood that events outside of the experimental setting affect participant performance. In the case of the training program, there were 5 weeks between the pre- and post-test. It could be argued that events outside of the training had an effect on participant performance on the post-test. Second, maturation may have influenced participant performance from pre- to
post-testing. Without a control group, it is impossible to know for certain whether improvements from pre- to post-testing occurred solely due to the training program; it could be argued that the development of knowledge about functional assessment and PBS plan development could have occurred as a natural part of participants’ maturation within their work as staff providing support to deaf children and youth. A third limitation of the design relates to the effect of testing. Because the pre- and post-tests were the same, it is possible that exposure to the pre-test influenced performance on the post-test. A final limitation of the design is statistical regression. That is, when individuals perform poorly on a pre-test, there is an increased likelihood that their performance will improve on subsequent evaluations, merely by chance. This can lead to inaccurate conclusions regarding changes in performance. Because of the limitations regarding a one-group pretest-posttest design (a quasi-experimental design) (Campbell & Stanley, 1963) only an association between the training program and improvements in participants’ knowledge can be inferred. In order to provide evidence of a causal relationship, a control group that matches the experimental group in terms of education, hearing status, language use, etc. would be required. The control group would need to meet, following a schedule similar to that of the experimental group, but without participating in the training program. Pre- and post-tests completed by participants from both the experimental and control groups could then be compared statistically to determine if the training program effected improvements in knowledge.

Limited External Validity

The first study focused on training staff who provided instruction and support to deaf children and youth. Of the 11 participants, none were certified teachers of the Deaf.
Therefore, findings cannot be extended to teachers of the Deaf. In addition, because only 11 staff participated, findings cannot be extended to the broader population of staff working with deaf children and youth.

The second study, which focused on the effectiveness and acceptability of PBS for deaf children and developmental disabilities, included just one child and his parents. His parents were highly motivated to access behavior support services and demonstrated an immense amount of dedication to the support process. The child, while diagnosed both with cerebral palsy and autism, was bright and had been assessed as possessing average to slightly below average cognitive abilities. This makes it difficult to generalize the results to other deaf children with developmental disabilities who may experience more significant cognitive challenges and, thus, experience more learning challenges. It also makes it difficult to generalize the results to other common demographics of families raising a deaf child, such as single-parent families, families where both parents work outside the home, or deaf children who live in a school dormitory during the week. To make conclusions regarding the external validity of the training approach and the effectiveness of PBS for deaf children with developmental disabilities, a greater number of participants are needed.

**Lack of Follow-up Data**

Because the intervention study was designed as an initial investigation of the effectiveness and acceptability of PBS as an intervention for a deaf child with a developmental disability, long-term follow-up data were not collected. Maintenance support sub-phase data for routines intervened on earlier in the support process (i.e., bath transition and computer transition) demonstrated stable improvements that maintained up
to 4.5 months after the end of the initial parent training and support sub-phase. During the maintenance support sub-phase, minimal implementation support was provided to the parent and child. Improvements in the bath transition routine were maintained for 4.5 months. Improvements in the computer transition routine were maintained for 1.5 months. Maintenance sub-phase data were collected for the final routine (dinner) over 6 weeks. While the second maintenance data probe showed an increase in Kieran’s problem behavior and a decrease in his routine participation, a third data probe, conducted after an investigator-led maintenance support session, demonstrated a return to initial improvements. However, given the absence of follow-up data, inferences about the long-term durability of the improvements in Kieran’s behavior and participation in target routines cannot be made. To make conclusions regarding the long-term effectiveness of PBS as an approach for improving the behavior and participation of deaf children with developmental disabilities in important routines of family life, the collection of follow-up data over the course of several months or years is necessary.

**Implications**

This study offers four implications for the provision of positive behavior support services to deaf children with additional disabilities and their families: (a) a training model for PBS training for those who work with deaf children and youth; (b) the use of ASL in PBS training and family centered PBS intervention; (c) a model of behavioral intervention for deaf children with developmental disabilities; and (d) a model for parent training in ASL. These implications are discussed below.
Training Model for PBS Training in Deaf Educational Contexts

The study offers a train-the-trainer model of PBS training that may be promising for service provision to deaf children with developmental disabilities in North America. Ten of the 11 participants in the group training were Deaf; one of the Deaf participants implemented a functional assessment and positive behavior support process with a deaf child diagnosed with autism and cerebral palsy, and his mother, under the supervision of the investigator. Results showed: (a) improvements in staff knowledge and skill related to functional assessment and positive behavior support; and (b) improvements in one child’s behavior and participation in three valued family routines. This suggests that this approach to training may be useful for Deaf professionals working with deaf children who have developmental disabilities. Alicia’s successful implementation of a family-centered PBS process in collaboration with a hearing parent highlights the potential for future collaboration between professionals who are Deaf and parents who are hearing.

In North America, it is becoming increasingly common for Deaf individuals to provide education and support services to deaf children in home, school, and community contexts. From the late 19th century to the 1960s, hearing individuals were primarily responsible for the education of deaf students. Since the mid-1960s, Deaf individuals have become increasingly present in educational contexts. This has occurred for a number of reasons, including: (a) an improved understanding of the critical importance of ASL in the development of deaf children; (b) a change from a pathological to a cultural perspective of deafness; (c) recognition that Deaf teachers are, in general, more adept at communicating with deaf children; (d) a belief that Deaf teachers are highly familiar with the perspective of deaf children, based on their own experiences growing up deaf; (e) a
belief that Deaf teachers are able to act as positive role models for deaf children; and (f) recognition that Deaf teachers are able to support hearing teachers of the deaf in ongoing development of ASL skills and awareness of Deaf culture (Martin & Lytle, 2000). A recent examination regarding the demographics of educators of the deaf in the United States found that, of 2,766 teachers surveyed, 22.1% were Deaf (Simms, Rusher, Andrews, & Coryell, 2008). This showed an increase in the percentage of Deaf teachers of the deaf, compared to a survey conducted in 1993 that identified 16% of teachers of the deaf as being Deaf themselves (Andrews & Jordan, 1993). In addition, Deaf individuals are commonly employed in other facets of support outside of the school setting. For example, they may provide home-based support to families; group ASL instruction for parents and family members; and group language, literacy, and social activities for deaf children (R. Storey, personal communication, July 2010).

Because Deaf individuals are increasingly responsible for educating deaf children and their families and because there is an identified need to address the challenges presented by deaf children with developmental disabilities, a train-the-trainer program in PBS that is (a) designed for staff working with deaf children and youth; and (b) delivered in ASL provides a promising avenue for increasing capacity within this population. In this study, the investigator had both the ability to communicate PBS-related content and concepts in ASL, and an understanding of the unique cultural context of the group. Therefore she was uniquely able to facilitate the learning of participants and support the interventionist in implementation of the PBS process with a hearing mother.
Language of Instruction and Support

Implications for the language of instruction and support that are used by participants are discussed in two parts: (a) PBS training within a group context; and (b) family centered PBS with parents in the home.

**PBS train-the-trainer group instruction.** Before participants were recruited for the study, it was anticipated that the majority would be hearing. Therefore, arrangements for ASL interpreters were made. However, 10 of the 11 participants in the group-training program were Deaf. During the first training session, two interpreters provided ASL interpretation while the investigator provided instruction using spoken English. When participants were engaged in small group activities, the investigator interacted with participants directly using ASL. Following the initial training session, the investigator contacted Deaf participants individually and asked them about their preference regarding the use of interpreters. Each Deaf participant stated a preference for the investigator to provide instruction directly. Participants communicated a belief that, because the investigator was proficient in both the subject matter and ASL, she was able to communicate the content in a conceptually accurate manner. As a result of this feedback, the services of the interpreters were concluded and the investigator provided instruction in ASL for the duration of the training program.

Throughout the training program, the technical language of PBS was not always easily translated into ASL. When unable to identify an ASL equivalent for specific terminology, the investigator provided a written translation of the term, along with a conceptual description of the term in ASL. The investigator and participants then engaged in a discussion of the term and developed and/or agreed upon an ASL equivalent. This
highlights the need for: (a) instruction to be delivered by an individual who is sufficiently proficient in ASL to accurately describe concepts and terminology; or (b) the use of ASL interpreters who possess sufficient knowledge of PBS terminology that allows for conceptually-accurate ASL descriptions of terminology. In addition, it suggests a need for the development of ASL vocabulary specific to PBS.

Family-centered PBS. In addition to communication issues encountered during the train-the-trainer group instruction portion of the study, there were communication challenges for the Deaf interventionist and hearing parents during the family-centered PBS process. The comprehensive assessment, which included a functional assessment interview and a family ecology interview, posed a unique obstacle. The interventionist was Deaf and used ASL as her primary mode of communication. The parents had a basic ability to communicate in ASL but their skills were not sufficiently proficient to understand ASL-posed questions or to adequately respond using ASL. While interpreters may be skilled at facilitating communication, particularly during assessment activities, this option can (a) be expensive, (b) make parents uncomfortable, and (c) interfere with the development of a therapeutic alliance.

In British Columbia, the rate for experienced freelance ASL interpreters ranges from $35 to $55 per hour (Douglas College, 2010). When added to the cost of behavioral consultation services, interpreter fees may be prohibitive to agencies and families. This could result in the use of staff who are hearing rather than Deaf. Because it has been established that educators who are Deaf provide numerous benefits to deaf children, it is important to consider alternate means of communication that are cost effective and successful.
Parents also may feel apprehensive or uncomfortable sharing personal information with an interpreter present. Even though parents may be aware of the ethical obligations of interpreters to protect confidentiality, they may be reluctant to share deeply personal information in the presence of an individual with whom they have not established a therapeutic alliance (Kanfer & Grimm, 1980). This could inhibit the information that they disclose and may result in a functional assessment or family ecology assessment that is inaccurate or incomplete. An inaccurate or incomplete assessment may result in an ineffective PBS plan or one that lacks a good contextual fit with family ecology.

Finally, the use of an interpreter, particularly during the comprehensive assessment, may interfere with the development of a therapeutic alliance between the interventionist and the parents. Parents may feel as though they are communicating with the interpreter, not the interventionist, and thus may not develop the bond of trust necessary during a process of family-centered PBS aimed at empowering parents to improve their child’s behavior and participation in family life.

To address the issues of cost, parent comfort, and rapport-building, the interventionist was provided with a laptop PC loaded with Dragon Naturally Speaking™ software. This is speech recognition software that translates spoken language into text. The interventionist prepared for the interview by typing each question into a Microsoft Word® document. At the beginning of the interview, the parents were given a microphone that was attached to the laptop PC. The interventionist would direct the parents to a question by pointing to it on the laptop screen. The parents would then read the question and verbally respond. The Dragon Naturally Speaking™ software translated their spoken responses into text that the interventionist could read. If the interventionist
wanted to probe a particular response further, she would type additional questions into
the laptop. Occasionally, the Dragon Naturally Speaking™ software did not accurately
translate the spoken responses. In those situations, the parents simply typed their response
directly into the laptop. Following the interview with the parents, the interventionist was
able to use the written transcript to complete the Functional Assessment Interview
(O’Neill et al., 1997) and the Family Ecology Assessment (Lucyshyn, Kayser, et al.,
2002).

Although the cost of a laptop PC and the Dragon Naturally Speaking™ software
is significant, it is a one-time expense and the equipment can be used repeatedly. Over the
long term, this option is more cost-effective than using interpreters. While the use of a
laptop computer and voice recognition software is one promising alternative, there are
other potential options. The use of an Augmentative and Alternative Communication
(AAC) device such as the Lightwriter®, a text-to-speech device that has a dual screen,
may be a promising alternative. This allows individuals to sit across a table and each see
the output on the screen. The device is small and lightweight, allowing individuals to pass
the device between them as messages are typed. This device does not have speech
recognition capabilities; therefore, parents would need to type their responses. It would,
however, allow parents to listen to questions and comments from the Deaf interventionist.
There are a variety of such AAC devices, at varying price points, which may be useful in
supporting effective and efficient communication.

While this process took longer than it would have with a hearing interventionist, it
resulted in sufficient information to develop a sound understanding of Kieran’s problem
behavior and the family’s ecology. While it may be argued that the use of an interpreter
would have simplified the process, the interventionist communicated that she believed conducting the interviews using a laptop with voice recognition software helped to build rapport and establish a sense of teamwork between her and the parents. At the same time, there may be instances where the use of an interpreter may be warranted or preferred. For example, during the maintenance support sub-phase of the dinner routine, there was a mild regression in Kieran’s behavior. The interventionist made several attempts to discuss the use of key support strategies with the parent but this did not result in significant improvements in the dinner routine. In the end, the investigator led a maintenance support session with the mother and the interventionist to address these issues. This maintenance support session included: (a) a review of key strategies; (b) in vivo coaching; and (c) debriefing following the meal. The investigator led the session and used sign supported speech (i.e., ASL signs in English word order) to enable both the mother and the interventionist to access the content of communication. Not only did this provide support to the mother with regard to implementation of strategies within the context of the dinner routine; it also provided a model for the interventionist related to conducting maintenance support with a parent.

The interventionist suggested that part of the challenge of maintenance support for the dinner routine was the complexity of the routine. Whereas support strategies for the bath and computer transition routines were more direct and easy to communicate about, the interventionist did not believe that she was able to engage in deep and meaningful discussions with the mother related to the dinner routine. She suggested that this might have been a situation in which an ASL interpreter could have facilitated more meaningful discussions regarding the routine between herself and the mother.
These are important implications when considering the participation of Deaf interventionists in the family centered PBS process with hearing parents. Effective and efficient strategies that support clear communication between Deaf and hearing individuals are crucial.

**PBS Intervention Models for Deaf Children**

The study and its results suggest that a PBS process may be a good fit for deaf educational contexts, in general, and for deaf children with developmental disabilities, in particular. While this study focused on training deaf education professionals to provide PBS with deaf children with developmental disabilities, it also is possible for service provision to occur within a consultation model in which PBS experts from outside the field of education of the deaf are responsible for guiding the PBS process. This situation typically arises when those working in deaf educational or support contexts do not have sufficient training or expertise to address problem behavior in deaf students with developmental disabilities (R. Storey, personal communication, 2010). This places PBS consultants in a unique linguistic and cultural context with which they are unfamiliar. For experts in PBS providing consultative support in a deaf educational setting, the use of a PBS process that is: (a) collaborative; (b) individualized; and (c) associated with high levels of contextual fit may result in effective interventions that fit the unique linguistic and cultural context in which deaf children with developmental disabilities are increasingly present.

Several features of a PBS approach lend themselves to the development of effective and contextually appropriate PBS service in deaf educational contexts. Given the unique cultural and linguistic aspect of deaf educational contexts, three features in
particular make the approach suited to adapting behavior support services to the unique requirements of this population: (a) the development of a collaborative partnership with key stakeholders that involves shared decision making; (b) the development of individualized PBS plans that are technically sound; and (c) an emphasis on the development behavior support plans that possess a good contextual fit with key implementers and with implementation settings. These three features are discussed below.

**Collaborative partnerships.** A key feature of PBS is the development of collaborative partnerships with key stakeholders in the behavior support process and shared decision making during assessment, plan development, and implementation activities (Carr et al., 2002; Lucyshyn, Horner, et al., 2002). A collaborative approach to assessment, plan development, and implementation facilitates cooperation between team members such as parents, teachers, and other professionals. This is particularly important to consider when providing services in a deaf educational context. Frequently, support teams for a deaf child with developmental disabilities are comprised of both Deaf and hearing individuals, a variety of professionals (e.g., teachers of the deaf and hard of hearing, speech-language pathologists, occupational therapists, physical therapists, psychologists, social workers, psychiatrists), and the child’s family. These individuals may come from: (a) different linguistic backgrounds (e.g., spoken English, ASL); (b) different cultural backgrounds (e.g., Deaf, hearing, other minority cultures); and (c) various professional and theoretical backgrounds (e.g., educational, behavioral, psychological, medical, psychiatric, etc.) (R. Storey, personal communication, July 2010). The process of making decisions collaboratively about problems of concern, goals
for the child and parent or teacher, PBS plan components, and implementation support activities, increase the likelihood that key stakeholders will view the emerging plan as acceptable and feasible. For example, during the PBS process with Kieran and his family, goals were selected based on the mother’s desire for Kieran to move about the home independently as opposed to her carrying him. This would prevent future back injuries and maintain the mother’s health, as well as provide opportunities for Kieran to further develop motor strength and coordination. Another example of collaborative decision making between the mother and interventionist involved the identification of target foods for the dinner routine. The mother was asked to identify food items across various food categories (i.e., meats, vegetables, starches). She then identified twelve target foods that the family ate regularly. In this way, collaboration between the interventionist and the parent ensured that target foods selected would fit within the context of the family dinner.

**Individualized behavior support plans.** A second key feature of PBS is the design of individualized, multi-component behavior support plans that are based on a functional assessment and consistent with the laws of behavior (Cooper, Heron, & Heward, 2007). The extant literature in the fields of PBS and the allied field of Applied Behavior Analysis (ABA) offers ample documentation of the effectiveness of individualized, functional assessment-based behavior interventions (Carr et al., 1999; also, see Journal of Applied Behavior Analysis, 1968 to present; see *Journal of Positive Behavior Interventions*, 1999 to present)

During a PBS process, the design of an individualized behavior support plan takes into account not only the child’s problem behavior but also the child’s strengths and interests. In addition, an implementation support plan is designed that takes into account
key implementers (e.g., parents, teachers, group home staff) goals, skills, and resources. Doing so increases the likelihood of implementer buy-in and thus contributes to implementation fidelity and plan success (Hieneman & Dunlap, 2000; Carr et al., 2002; Lucyshyn, Kayser et al., 2002).

The outcomes of the family-centered PBS intervention with Kieran and his parents are consistent with previous PBS research. The interventionist, with mentorship by the investigator, guided Kieran’s mother through a process of functional assessment and plan design that led to the design of an individualized behaviour support plan for Kieran. This included the use of key ASL phrases that were understood by Kieran and easy for the mother to produce, the use of visual support strategies that assisted Kieran in understanding expectations, and the use of items that Kieran enjoyed to motivate and reinforce appropriate behavior. In addition, an implementation support plan was developed in collaboration with the parents that was individualized to the family’s goals, skills, and resources. For example, implementation support included ASL instructional sessions between the interventionist and the mother. Visual strategies were provided not only to support Kieran’s understanding of expectations, but also to provide the mother with an easier way to communicate those expectations (i.e., when she couldn’t remember how to sign a specific statement she could point to the visuals). With this implementation support, the mother was able to successfully implement behavior support strategies across three family routines and consequently improve Kieran’s behavior and participation in these routines.

A third key feature of PBS is the importance of contextual fit (Albin et al., 1996). Contextual fit is particularly relevant when considering interventions in deaf educational
contexts. Schools for the deaf are places where deaf children develop the linguistic and cultural competence with which to become members of the Deaf community, a community that is based on distinct values and, in the United States and English-speaking Canada, the use of American Sign Language (ASL). In a medical model, deafness is viewed as a disability to be ameliorated; however, Deaf adults around the world view themselves not as disabled but as members of a linguistically-based cultural minority (Lane, 1992; Sparrow, 2005). Reports regarding the composition of programs and schools for the deaf suggest that a significant proportion of students have additional disabilities (Andrews & Covell, 2007; Gallaudet Research Institute, 2003; January, 2005; December, 2005; 2006; 2007; 2008; Luckner & Carter, 2001, Pollack, 1997). Other reports suggest that deaf education professionals are finding themselves increasingly responsible, yet unprepared, for meeting the needs of this population (Andrews & Covell, 2007; Cawthon, 2009; Luckner & Carter, 2001; Luckner & Howell, 2002; Luckner et al., 2005; Soukup & Feinstein, 2007).

For deaf children with developmental disabilities, there are two primary cultural contexts in which they may live and learn: a hearing context and a Deaf context. Their parents may be hearing or Deaf; those who support them may be hearing or Deaf. Interventionists responsible for guiding the PBS process may themselves be hearing or Deaf and may or may not share the same language or culture as the child’s family, teachers, or other support team members. For intervention to be successful, an understanding of the cultural context(s) in which the child lives and learns is necessary. While Deaf interventionists are likely to have a better understanding of hearing cultural contexts, due to daily contact with hearing members of society, it is less likely that
hearing individuals from outside the field of education of the deaf will have similar knowledge of Deaf linguistic and cultural contexts. Due to the documented lack of behavioral support expertise for use with deaf and hard of hearing children (Luckner & Carter, 2001; Luckner et al., 2005), experts in PBS from outside the field of education of the deaf may be contracted to provide services within deaf educational contexts (R. Storey, personal communication, July 2010). When this is the case, behavior consultants with expertise in PBS need to become aware of the unique nature of the Deaf linguistic and cultural context. The PBS process may help behavior consultants develop an understanding of the Deaf linguistic and cultural context surrounding a deaf child with developmental disabilities as there is an emphasis on developing a PBS plan that possesses a good contextual fit with key implementers and with implementation settings (Albin et al., 1996). Such attention to contextual fit provides PBS experts with an opportunity to develop an understanding of the Deaf linguistic and cultural context. Such an understanding may contribute to: (a) the design of behavior support plans that possess a good contextual fit with the Deaf linguistic and cultural context and (b) the provision of implementation support that is respectful of Deaf culture.

In addition, PBS interventions for deaf children with developmental disabilities may facilitate their membership in the Deaf culture. Membership in a deaf community or culture must be achieved - it is not merely based on audiological status or enrollment at a school for the Deaf. Rather, membership is attained through: (a) an identification with the deaf community; (b) a shared experience of deafness; (c) a shared language; and (d) participation in community activities (Higgins, 1980; Sparrow, 2005). In North America, a primary signal of membership in the Deaf community is fluency in ASL. For deaf
children with additional disabilities, interventions that facilitate their use of ASL may serve to assist them in achieving membership in the Deaf community. This may be particularly important for this group because they experience difficulty finding a community to which they belong. When deaf children with developmental disabilities are educated in hearing schools, they are often excluded because they are unable to access the dominant language of that hearing community (i.e., spoken English). When educated in schools for the Deaf, these same children may be rejected because they are not fluent in ASL. During the course of the second study, improvements in Kieran’s use of ASL were observed. He became more fluent and interactive in his use of ASL. Rather than simply using ASL to request or protest, Kieran was observed using ASL to set topics of conversation, request and clarify information, discuss shared experiences, and plan for the future. The use of the activity setting as a unit of analysis provided a context for Kieran to improve his use of ASL. This may have implications for Kieran’s ongoing development as a member of the Deaf community, in that the skills he gained (i.e., using ASL in a more fluent and interactive manner) may support him in the process of attaining membership in the Deaf community at his school.

In the present study, contextual fit was addressed during both the train-the-trainer group interaction and the family-centered PBS process. During the train-the-trainer group interaction, the investigator was attentive to English-to-ASL translation of key concepts and involved the participants in discussions regarding the communication of these concepts in ASL. The investigator also addressed contextual fit by including deaf children with developmental disabilities in videotaped and case study examples. During the family-centered PBS process, contextual fit was achieved through the use of the
Family Ecology Assessment Interview (Lucyshyn, Kayser, et al., 2002). During this interview, the interventionist sought to gain knowledge regarding the family’s strengths, goals, resources, and stressors. This information was utilized during PBS plan development. For example, it was important for the mother to have Kieran move independently from one location (e.g., the living room) to another location (e.g., the bathroom) on his own by crawling. This was to avoid future back injuries from carrying him. The interventionist addressed this in the PBS plan for the bath transition by including strategies to motivate Kieran to move independently and reinforce him for doing so. In addition, it was important to the mother for others (e.g., father, siblings) to be able to implement support plan strategies for the bath transition, as she participated in evening dance classes one to two nights per week. Therefore, the interventionist provided supports (e.g., an abbreviated checklist of support strategies placed on the wall) that enabled the mother to teach other family members to implement the support plan. Finally, the mother expressed a desire for Kieran to eat as independently as possible, given his physical limitations. This was addressed in the support plan by providing Kieran with an adapted chair, an adapted plate, and adapted utensils. These contextual fit considerations were associated with high parental ratings of goodness of fit between the routine specific behavior support plans and the family’s ecology.

Parent Training in ASL

Another implication is the added value of a Deaf interventionist providing implementation support to hearing parents. In this study a Deaf interventionist provided behavioral assessment and intervention support to Kieran, a deaf child with multiple disabilities, and his hearing mother. While computer-based technologies were used to
facilitate communication during comprehensive assessment activities, the interventionist relied on basic sign language, gesture, and modeling to communicate with the mother during the initial parent training and support and maintenance support sub-phases.

Ever since Kieran had been identified as deaf, his parents actively participated in sign language classes for parents. They had sign language books and videos in the home that they referred to for further instruction. Despite this, they continued to demonstrate difficulty with receptive and expressive ASL. A review of videotape data collected early during the support process showed the mother often struggling to communicate simple messages to her son (e.g., “It’s time to go to the bathroom”). In these early videos, Kieran can be observed moving his eye gaze away from his mother, thereby missing most of the message.

ASL is a language that is distinct from spoken English in a number of ways. A primary difference is that ASL is a natural language that relies on the visual-gestural modality (Drasgow, 1998). Whereas parents of hearing children can present verbal and visual information simultaneously (i.e., the child can listen to the parent while looking at an item), deaf children require that language and information be presented in a sequential-visual manner (Pizer, Shaw, & Meier, 2008). Deaf children need to shift their visual attention between the signer (i.e., parent) and key items in the environment (i.e., objects referenced by the parent). For hearing parents of deaf children, this is often a struggle because they are not accustomed to presenting information in a sequential-visual modality.

Researchers have found that Deaf parents modify their signing when interacting with their young deaf children in the following ways: (a) by manipulating objects or
touching the child to gain attention and (b) by modifying signs to increase visibility for
the child (Pizer et al., 2008). This information provides a context for understanding the
challenges Kieran’s mother experienced. Baseline observations often showed her signing
before establishing Kieran’s visual attention. As well, there were instances where
Kieran’s mother presented statements that were lengthy. At these times, Kieran typically
broke visual attention before his mother completed her message. When this occurred,
Kieran’s mother rarely stopped to re-establish visual attention. Instead, she completed her
message without Kieran’s visual attention. A lack of fluency in ASL most likely
contributed to the length of time it took for Kieran’s mother to sign a message in ASL.
Videotaped observations during the baseline phase showed her struggling to remember a
specific sign (i.e., she would verbalize a word in spoken English, pause, and produce a
sign several seconds later). Based on these observations, one may surmise that her
difficulties in communicating with Kieran were due to: (a) having a small set of ASL
signs and phrases; and (b) a lack of familiarity and comfort in using a sequential-visual
approach for communication.

To address these communication challenges, ASL instruction was provided in
vivo within the context of the target activity settings. The interventionist monitored the
mother’s use of ASL, identified specific vocabulary or phrases that were problematic for
her, and provided instruction to the mother on content-related vocabulary and phrases.
She also focused on teaching the mother to use facial expressions and body language to
match the intent of her signed messages. In addition, she developed a DVD of ASL
vocabulary related to praise so that the mother could practice on her own. She also
modeled attention-getting strategies, prompted the mother to engage in these strategies,
and taught the mother to monitor Kieran’s attention during communication-based interactions. Videotaped data collected near the completion of the study showed the mother signing more fluidly and with greater clarity. She used a more penetrating eye-gaze when signing to Kieran and was more aware of the need to gain his visual attention before signing to him. She was more attentive to Kieran’s attention during discourse and would pause her signing if Kieran needed to shift his visual attention to an object in the environment (e.g., a visual schedule or item related to the discussion). When she did this, Kieran was observed maintaining eye gaze on his mother for the duration of her message. In addition, particularly during the dinner routine, Kieran can be seen engaging his mother in conversation frequently over the course of each meal.

The interventionist believed that improvements in the mother’s use of ASL was due to the intervention process itself. She reported that, by providing instruction and modeling related to ASL within the context of valued routines in the home, the mother was able to learn to use ASL in meaningful contexts. She expressed the view that this may be a more beneficial means of providing ASL training to parents, compared to a classroom-based model.

By teaching the mother to: (a) focus on the sequential visual processing requirements of ASL; (b) ensure Kieran’s attention before and while signing a message; and (c) use specific ASL vocabulary and phrases with greater fluidity, Kieran became more engaged during communication-based interactions. As a result, conversational exchanges became mutually reinforcing. Kieran experienced improved access to language. This provided him with greater motivation to engage in communication-based interactions and increased reinforcement for attending to his mother. Kieran became a
more active participant in conversation, particularly during the dinner routine, as evidenced by increased topic setting and an increased number of conversational turns. Kieran’s increased participation during conversational exchanges reinforced the mother’s use of appropriate visual-sequential communication strategies and motivated her to continue her use of those strategies.

These improvements suggest an additional way in which the activity setting can be seen as a powerful unit of analysis. Daily, weekly and seasonal activities of family life, referred to as activity settings, provide contexts for child learning and development (Dunst, Hamby, Trivette, Raab, & Bruder, 2000). In the field of PBS, researchers have investigated the utility of the activity setting as a unit of analysis that contributes to the design of family-centered PBS plans that are ecological in scope (Binnendyk & Lucyshyn, 2009; Lucyshyn et al., 2007; Moes & Frea, 2000; 2002). In this study, improvements in the mother’s ability to use ASL to communicate with her son suggests the potential usefulness of family activity settings as contexts in which to provide parent training in ASL.

**Future Research**

The study offers four directions for future research. First, the internal validity of the train-the-trainer model of PBS training would be strengthened by the use of a pretest-posttest control group design. This would allow for conclusions to be drawn regarding the effect of the training on staff knowledge related to functional assessment and positive behavior support plan development. In addition, internal validity could be further strengthened by making comparisons between different types of participants (e.g., hearing and Deaf) and types of content delivery (e.g., instructor-signed and interpreter-
signed). Second, the external validity of both the train-the-trainer model of PBS training and the family-centered PBS process can be strengthened by conducting efficacy studies that include a larger number of interventionists who are mentored in the implementation process with a larger number of deaf children with developmental disabilities across a wider variety of settings. Future research should include: (a) interventionists who are hearing and Deaf; (b) deaf children of varying ages and differing diagnoses; (c) implementers with different roles and characteristics (e.g., parents, support staff, hearing, Deaf, etc.); and (d) a variety of implementation settings (e.g., home, school, residence settings, community). Third, research needs to be conducted regarding the translation of functional assessment and PBS-related vocabulary into ASL. This will necessitate collaboration among experts in the fields of PBS, Applied Behavior Analysis, and ASL experts. A comment recorded by one of the training participants on her social validity questionnaire clearly highlights the need for research in this area:

I do understand that it is not always easy to “on the spot” translate English to ASL and vice versa. As someone who is confident with both languages I feel it is important to involve both class/instructor with discussion of terminology rather than assuming everyone understands the same sign or the meaning/context of the English word. Through the class work, it became clear that some people who are more grassroots ASL struggled with concepts and only when we discussed these concepts in ASL or created an ASL equivalent did it become clear. However I DO want to recognize the instructor’s patience and value of those discussions when they did arise.
This comment points to the need for research to translate applied behavior analytic language into ASL to ensure clear communication of concepts in future training and intervention settings. Fourth, future research should investigate the effectiveness of providing ASL instruction in the home, using the family activity setting as a context for instruction and compare the outcomes with those for parents receiving instruction in traditional classroom settings. This could lead to a better understanding of parental needs regarding ASL instruction and result in improvements in ASL instructional models for parents of deaf children.

Conclusion

The present study evaluated a train-the-trainer approach to PBS training for staff working with deaf children and youth and the implementation of a family-centered PBS process for a deaf child with developmental disabilities and his mother. It was hypothesized that a train-the-trainer model of PBS training, adapted to the needs of Deaf participants and deaf children with developmental disabilities, would be associated with improvements in participant knowledge and high ratings of social validity. It also was hypothesized that a family-centered PBS process, implemented by a trained staff person with supervisory support, would be functionally related to improvements in child behavior and participation within three valued home routines.

Results showed that a train-the-trainer model of PBS training, delivered in ASL, was associated with improvements in staff knowledge regarding functional assessment and PBS plan development. In addition, results showed that a staff person who worked with deaf children and youth and successfully completed the training program was able to successfully implement a family-centered PBS process with one deaf child with
developmental disabilities and his mother, under the supervision of a PBS expert. The PBS process led to improvements in child behavior and participation within three valued routines in the home. These results documented a functional relation by showing marked improvements in child behavior and routine participation at the point of intervention across each of the three routines.

The findings of this investigation make several unique contributions to the literature. First, this is the only documentation of a train-the-trainer program in PBS training for staff working with deaf children and youth that was conducted in ASL. Second, it is the first documented implementation of a PBS process specifically adapted to a deaf child with multiple developmental disabilities. Third, it is the first documentation of a PBS process implemented by a Deaf interventionist with hearing parents, where a shared primary language is lacking.

This approach offers four implications for PBS training and intervention in the field of deaf education. First, it offers a training model that may be promising for those providing service to deaf children with developmental disabilities, particularly in relation to the unique linguistic and cultural context in which these students are increasingly being educated. Second, it highlights the importance of language and communication in relation to training and intervention. The field of applied behavior analysis, upon which PBS is built, utilizes specific terminology that may not readily translate into ASL. This issue is important when considering training and intervention in deaf educational and cultural contexts where professionals or parents may be Deaf. Third, the study offers an approach to behavioral intervention for deaf children with developmental disabilities who engage in problem behavior that may fit well within a deaf educational and cultural context.
Lastly, it suggests that the activity setting may provide another avenue for parent ASL training that could result in improvements in parent-child communication.
REFERENCES


APPENDIX A

The University of British Columbia
Office of Research Services
Behavioural Research Ethics Board
Suite 102, 6190 Agronomy Road,
Vancouver, B.C. V6T 1Z3

CERTIFICATE OF APPROVAL - FULL BOARD

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CO-INVESTIGATOR(S): N/A

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Social Sciences and Humanities Research Council of Canada (SSHRC) - "A Train-the-Trainer Model for providing Positive Behavior Support to deaf children with developmental disabilities and their families"

PROJECT TITLE:
A preliminary investigation of the efficacy of a Train-the-Trainer Model of PBS training for Deaf Educators

REB MEETING DATE: January 24, 2008
CERTIFICATE EXPIRY DATE: January 24, 2009

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<td>Pre- and Post-Test</td>
<td>N/A</td>
<td>January 9, 2008</td>
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<td>Social Validity Questionnaire</td>
<td>N/A</td>
<td>January 29, 2008</td>
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<td><strong>Letter of Initial Contact:</strong></td>
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<td>Letter of Initial Contact with Agency Directors</td>
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<td>Letter of Support - WBP</td>
<td>N/A</td>
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<td>Letter of Support - PSDHH</td>
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The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

*Approval is issued on behalf of the Behavioural Research Ethics Board and signed electronically by one of the following:*

- Dr. M. Judith Lynam, Chair
- Dr. Ken Craig, Chair
- Dr. Jim Rupert, Associate Chair
- Dr. Laurie Ford, Associate Chair
- Dr. Daniel Salhani, Associate Chair
- Dr. Anita Ho, Associate Chair
Letter of Initial Contact

Dear ______________________,

I am writing to inform you of an upcoming research project which may be of interest to you and your staff. I am a doctoral candidate in special education at the University of British Columbia and will be conducting the study. I was a teacher at the BC School for the Deaf from 1992 to 2003 and continue to provide support services to deaf children with developmental disabilities and their families. This research project will partially fulfill requirements for a Doctorate of Philosophy degree; I will be working under the supervision of Dr. Joseph Lucyshyn, a faculty member with extensive experience in Positive Behavior Support, staff training, and family support.

This research project will investigate the impact of a train the trainer model of training in Positive Behavior Support on staff that support deaf children and/or deaf children with developmental disabilities.

Train the trainer is a model of training whereby a content-area expert provides training to professionals working within a specified field. The trainers then return to their worksites with additional knowledge and skills that can be used in their own work as well as for training others, such as co-workers or parents.

Positive Behavior Support (PBS) is an empirically-validated method for understanding the nature of problem behavior and developing interventions that are educative and proactive. PBS has been demonstrated as effective in reducing problem behavior and increasing adaptive behavior in home, school, and community contexts, with both children and adults who have been diagnosed with a variety of disabilities.

Staff that choose to participate in this study will receive 40 hours of classroom-based instruction in PBS. Instruction will take place at the office of Services for Family and Community Development, Provincial Services for Deaf and Hard of Hearing, in Burnaby, BC. ASL interpretation will be provided, so both deaf and hearing staff are invited to participate.

I would welcome the opportunity to meet individually with you to discuss the details of the project and, if you are interested, leave you with staff recruitment letters. You may reach me at by telephone at xxx-xxx-xxxx or email at xxx@xxx.xxx

Thank you for taking the time to read this letter; I look forward to the opportunity to meet with you.

Sincerely,
Brenda Fossett
APPENDIX C

UBC Faculty of Education
2125 Main Mall
Vancouver, BC, Canada V6T 1Z4
Tel: 604.822.3131 Fax: 604.822.2684

Advertisement to Recruit Participants

TRAINING IN POSITIVE BEHAVIOR SUPPORT (PBS)

✓ Do you work with deaf children who have problem behavior?
✓ Are you sometimes unsuccessful in dealing with problem behavior?
✓ Do you work with families who have difficulty managing their child's behavior?

There will be a research study to investigate a train the trainer model of training in PBS for staff who work with deaf children.

- The train the trainer model focuses on teaching a group of professionals, who then bring new skills and knowledge back to their workplace.
- PBS is a method for understanding problem behavior and developing effective, pro-active, and educative interventions that result in a reduction of problem behavior and an increase in positive and adaptive behavior.
- The training will be held at the office of Services for Community and Family Development, Provincial Services for Deaf and Hard of Hearing, in Burnaby.
- Training will consist of 40 hours of classroom instruction; ASL interpreters will be provided – hearing and deaf are welcome!

If you choose to participate in the study, you will be asked to:

- Come to every class
- Complete in-class activities and assessments

At the end of the study, you will get information about how well you learned the information. It will be your choice to share this with your employer or not.

This study is being conducted by Brenda Fossett to partially fulfill requirements for a Ph.D. She is being supervised by Dr. Joseph Lucyszyn, a faculty member with extensive experience in PBS, staff training, and family support.

If you would like to know more about the study, please contact Brenda Fossett at xxx-xxx-xxxx (voice) or at xxx@xxx.xx. She will arrange to meet you at a place and time of your convenience to discuss the study and give you more information.
APPENDIX D

UBC Faculty of Education
2125 Main Mall
Vancouver, BC, Canada V6T 1Z4
Tel: 604.822.3131 Fax: 604.822.2684

Consent Form
A preliminary investigation of the efficacy of a Train-the-Trainer Model of PBS Training for Deaf Educators

Principal Investigator: Dr. Joseph Lucyshyn, Dept. of Educational and Counseling Psychology and Special Education, 604-822-1904
Co-Investigator(s): Brenda Fossett, Dept. of Educational and Counseling Psychology and Special Education
This research is for a Doctorate of Philosophy degree and is part of a thesis. Information from this study will be presented in a thesis and may also be presented as a published journal article or a conference presentation.

Sponsor: This study is sponsored by the Social Sciences and Human Research Council of Canada.

Purpose: You are being invited to participate in this study because you work with deaf children and/or deaf children with developmental disabilities. The purpose of this study is to examine the effectiveness of a train the trainer model of training in Positive Behavior Support (PBS) on staff knowledge and skills in PBS.

Study Procedures:
If you participate in the study, you will be expected to:

- Attend instructional sessions held at the office of Services for Family and Community Development, Provincial Services for Deaf and Hard of Hearing, located at 4334 Victory Street, Burnaby, BC

- Attend all instructional sessions, totaling 40 hours

- Participate in classroom-based learning activities conducted over a period of two months

- Participate in individual, classroom-based assessment activities designed to measure your knowledge and skill development in the form of a pre- and post-test; assessment activities will occur once at the beginning of the training program and again at the end of the two month training period

- Complete a pre/post test (a test that will be given once before any training is conducted and again after training has been completed)
- Complete a questionnaire at the end of the training program that asks your opinion regarding the acceptability of the training program

**Potential Risks:**
There are two potential risks. First, by participating in a classroom-based program, other participants will know who you are. Second, you may experience some psychological discomfort (anxiety, worry, stress) related to completing assessment activities and/or when receiving the results of your assessment.

**Potential Benefits:**
Potential benefits include an improved understanding of problem behavior in children, knowledge and skills related to assessing problem behavior in children, and knowledge and skills related to developing effective interventions for problem behavior. These benefits may impact your ability to perform work-related tasks and may also impact the children and families you support.

**Confidentiality:**
You will not be identified on any assessments that you complete; you will have a number-code. Only the principal investigator (Dr. Joseph Lucyshyn) and the co-investigator (Brenda Fossett) will have access to the key linking names with number-codes. This information will be stored on a password protected computer. Paper copies of your assessments will be kept in a locked filing cabinet until the training program has ended; at that time, the assessments will be discussed with you and returned to you. Results of assessments will be kept on a password locked computer. Only the principal investigator (Dr. Joseph Lucyshyn) and the co-investigator (Brenda Fossett) will have access to this information. You will not be identified by name in any reports of the completed study.

Because the study involves classroom-based instruction, there will be other participants who know you. While we are unable to control what other participants do with information discussed during class, we will encourage all participants to refrain from discussions of other participants outside the classroom.

**Remuneration/Compensation:**
Upon completion of the training program, each participant will meet individually with the co-investigator to review the outcomes of their assessments. Each participant will be provided with a copy of their own assessment information which, should he/she choose, can be shared with his/her employer as documentation of successful completion of the training program.
Contact for information about the study:
If you have any questions or desire further information with respect to this study, you may contact the principal investigator, Dr. Joseph Lucyshyn, at 604-822-1904 (voice) or at joe.lucyshyn@ubc.ca. Alternatively, you may contact Brenda Fossett at xxx-xxx-xxxx or at xxx@xxx.xx.

Contact for concerns about the rights of research subjects:
If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598 or if long distance e-mail to RSIL@ors.ubc.ca.

Consent:
Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without jeopardy to your employment.

Your signature below indicates that you have received a copy of this consent form for your own records.

Your signature indicates that you consent to participate in this study.

______________________________________________________________________________
Participant Signature                         Date

______________________________________________________________________________
Printed Name of the Participant signing above
APPENDIX E

Pre/Post Test

Staff Number: ________

Date: ________________

Part 1: Behavioral Principles

1. Directly observable behaviors include:
   ○ A. To know, to walk, to identify in writing
   ○ B. To underline, to draw, to discriminate
   ○ C. To see, to put on, to connect
   ○ D. To remove, to count orally, to circle

2. To the behaviorist, punishment occurs only when:
   ○ A. The preceding behavior decreases
   ○ B. The preceding behavior increases
   ○ C. Both A and B
   ○ D. None of the above

3. An antecedent stimulus is:
   ○ A. an event occurring before the behavior is performed
   ○ B. an event occurring after the behavior is performed
   ○ C. A and B
   ○ D. None of the above

4. When a pleasant consequence to a behavior results in an increase in the behavior’s rate of occurrence, what behavioral principle is being used?
   ○ A. Negative reinforcement
   ○ B. Positive reinforcement
   ○ C. Punishment
   ○ D. Stimulus control

5. Reinforcement of successive approximations of a desired behavior is known as:
   ○ A. Operant conditioning
   ○ B. Modeling
   ○ C. Shaping
   ○ D. Respondent conditioning
6. When students escape from a task or environment by performing an inappropriate behavior, that behavior is likely to be maintained by:
   ○ A. Positive reinforcement
   ○ B. Negative reinforcement
   ○ C. Extinction
   ○ D. Punishment

7. Primary reinforcers include all of the following EXCEPT:
   ○ A. Juice
   ○ B. Stickers
   ○ C. Raisins
   ○ D. Cookies

8. At the initiation of an extinction procedure one should expect the behavior will:
   ○ A. Decrease
   ○ B. Increase
   ○ C. Remain stable
   ○ D. Disappear

9. If a reinforcer is presented at a particular time, irrespective of the preceding behavior, we say that the reinforcer is:
   ○ A. Noncontingent
   ○ B. Contingent
   ○ C. Direct-acting
   ○ D. Indirect-acting

10. When a behavior must occur before a reinforcer will be presented, we say that the reinforcer is ___________________ upon that behavior.
    ○ A. Noncontingent
    ○ B. Contingent
    ○ C. Direct-acting
    ○ D. Indirect-acting

11. In a given situation, an individual emits a previously reinforced response which is not followed by the usual reinforcing consequences. That person:
    ○ A. Is less likely to do the same thing again in that situation
    ○ B. Will stop emitting that behavior immediately in that situation
    ○ C. Is more likely to do the same thing again in that situation
    ○ D. Will become very aggressive in that situation
12. An event which, when presented immediately following a behavior, causes the behavior to decrease in frequency, is referred to as a:

- A. Discriminative stimulus
- B. Punisher
- C. Primary reinforcer
- D. Natural reinforcer

13. Which of the following are most likely to be setting events?

- A. A teaching assistant approaches
- B. Did not get medication before leaving for school
- C. A reprimand
- D. Little choice available throughout the day
- E. A fight in the hallway before class
- F. Difficult writing task
- G. Limited social network/no friends
- H. Having ADHD

14. When parents or teachers react to inappropriate behavior by offering a child various items or activities until the inappropriate behavior stops, they risk maintaining the inappropriate behavior with:

- A. Positive reinforcement
- B. Negative reinforcement
- C. Extinction
- D. Punishment

15. Every time the mother is talking on the phone, the child jumps up and down and yells loudly. To get him to stop this behavior, the mother hangs up the phone, directs the child to some toys, and sits with him. The probability of the child jumping up and down and yelling loudly the next time the mother is on the phone is:

- A. Increased
- B. Decreased
- C. Not likely
- D. A or B
Part 2: Functional Assessment and Positive Behavior Support Plan Development

Vignette A

Alex is 4 years old, has a profound hearing loss, and is diagnosed with autism. He was identified as deaf at 12 months of age and diagnosed with autism at 3 years of age. Since he was 12 months old, his parents have taken ASL courses and had weekly visits from a Deaf community member. Alex has also been participating in a preschool program for deaf children since he was 3 years old.

Despite early sign language exposure and instruction, Alex still does not use ASL to communicate. Instead he pulls and pushes people to things that he wants. Recently, Alex has also been engaging in a number of problem behaviors that are of concern to both his parents and the preschool staff.

Whenever Alex’s parents or preschool staff try to direct him to an activity, Alex has a ‘tantrum.’ Alex’s tantrums include Alex falling to the floor, screaming, and kicking. Alex doesn’t hurt himself when he does these behaviors, but sometimes his parents or daycare staff are kicked. Luckily, because Alex is small, he can’t kick hard enough to hurt anyone. This happens even if Alex’s parents or the preschool staff are trying to direct him to an activity that he likes. It can take from 5 minutes to half an hour to get Alex to the new activity and can happen up to 20 times each day. Alex’s parents and staff report that they often will just leave Alex alone if he starts to have a tantrum because it’s easier than struggling with him. Alex’s parents and preschool staff are not sure why this is happening; they have noticed, however, that Alex seems to have more tantrums on days when he’s had a poor sleep, is ill, or is playing with one of his favorite toys (playdoh or lego) when they try to direct him to a new activity.

Alex’s parents and daycare staff don’t understand why Alex is having tantrums, especially when they are often trying to direct him to something that he likes to do. They always tell him, using ASL, what they want him to do, but he still won’t cooperate. They are worried because Alex is supposed to start kindergarten in the fall and they worry that his behavior will interfere with his participation in the class.

Based on the above case study, answer the following questions:

1. “Alex’s tantrums include Alex falling to the floor, screaming, and kicking.” This is an example of:
   - A. Duration
   - B. Intensity
   - C. Topography
   - D. Frequency
2. Identify a setting event for Alex’s problem behavior:
   - A. Being asked to begin a new activity
   - B. Having autism
   - C. Being left alone
   - D. Feeling tired

3. What is the function of Alex’s problem behavior?
   - A. Tangible
   - B. Escape
   - C. Sensory
   - D. Attention

4. Select the correct summary statement for the Alex’s case study?
   - A. When a parent or teacher directs Alex to a new activity, Alex falls to the floor, kicks and screams, to avoid moving to the new activity. This is more likely to occur when Alex is tired, ill, or busy playing with a favorite toy.
   - B. When a parent or teacher directs Alex to a new activity, Alex falls to the floor, kicks and screams, to get attention from his parent or teacher. This is more likely to occur when Alex is tired, ill, or busy playing with a favorite toy.
   - C. When a parent or teacher directs Alex to a new activity, Alex behaves badly to avoid moving to a new activity. This is more likely to occur when Alex is tired, ill, or busy playing with a favorite toy.
   - D. When a parent or teacher directs Alex to a new activity, Alex has a tantrum to avoid moving to the new activity. This is more likely when he is asked to do something that he doesn’t like.

5. What would be an appropriate alternative replacement behavior for this situation?
   - A. For Alex to say “no” when parents or staff try to direct him to a new activity.
   - B. For Alex to say “5 more minutes” when parents or staff try to direct him to a new activity.
   - C. For Alex to request a desired activity.
   - D. For Alex to ask for help.
6. What would be an appropriate desired behavior for this situation?
   - A. For Alex to request a desired activity
   - For Alex to play quietly
   - For Alex to say “no, thank you”
   - For Alex to transition to the new activity when directed

7. Which of the following would be appropriate setting event interventions for this situation?
   - A. Use a visual schedule to increase predictability, don’t direct Alex to a new activity when he’s playing with his favorite toys
   - B. Provide more reinforcement (praise, preferred items and activities) when Alex is tired or ill, don’t direct Alex to a new activity when he’s playing with his favorite toys
   - C. Don’t direct Alex to a new activity when he is tired or ill, don’t allow him to play with his preferred toys
   - D. Use a visual schedule to increase predictability, provide more reinforcement (praise, preferred items and activities) when Alex is tired or ill

8. Which of the following would be appropriate antecedent interventions for this situation?
   - A. Ask Alex to follow some simple requests (“give me five, touch your nose”) before directing him to a new activity, use a visual support to show Alex that he will get a treat when he moves to the new activity, give Alex a 5 minute warning before directing him to the new activity
   - B. Ask Alex to do follow some simple requests (“give me five, touch your nose”) before directing him to a new activity, give Alex a 5 minute warning before directing him to the new activity, tell Alex that he will have fun doing the new activity
   - C. Use a visual support to show Alex that he will get a treat when he moves to the new activity, give Alex a 5 minute warning before directing him to the new activity, take away the toys he is playing with before directing him to the new activity
   - D. Give Alex a 5 minute warning before directing him to the new activity, ask Alex to follow some simple requests (“give me five, touch your nose”) before directing him to a new activity, hold out a treat so that Alex will follow you to the new activity
9. Which would be the most appropriate strategy to use to teach an alternative replacement behavior to Alex?
   ○ A. Backward chaining
   ○ B. Shaping
   ○ C. Functional communication training
   ○ D. Prompting

10. Which consequence would be appropriate for instances where Alex successfully transitions to the new activity?
    ○ A. Leave him to enjoy the new activity
    ○ B. Give him a preferred toy to hold during the new activity
    ○ C. Praise Alex and perhaps give him a small treat that he likes
    ○ D. Praise Alex
**Vignette B**

Brianne is a 7 year old deaf child with Down syndrome. Her parents knew that she would have Down syndrome before she was born and she was identified with a profound hearing loss when she was 6 months old. Brianne’s parents have been very active in obtaining early intervention for their daughter. They started ASL classes even before Brianne was diagnosed as deaf, because they read that many children with Down syndrome benefit from using sign language. Once Brianne was diagnosed as deaf, Brianne’s parents hired a Deaf teenager to provide childcare assistance in the home two to three times per week. When Brianne was 3, her parents enrolled her in a preschool program for deaf children. As well, Brianne’s parents have been active in attending Deaf community events with Brianne so that she is exposed to good ASL models.

Brianne is able to produce 3 to 4 sign phrases to ask for items, activities, and people. She is able to exchange greetings. Brianne is able to print her name, count to 10, and is learning to read some words. She attends the school for the deaf in her province, traveling daily between her home and school.

At a recent IEP meeting, Brianne’s parents were discussing some behavior problems that they are dealing with at home. Whenever Brianne’s mom is talking on the phone or when Brianne’s parents are talking together, Brianne begins engaging in a variety of behaviors. First, she’ll start bothering her younger brother by poking him, then she’ll dump out toys and games onto the play room floor, then she’ll stand near her parent(s) and yell. She will continue to engage in these behaviors until one of her parents, usually her mother, comes to her and engages her in an activity. As long as either her mom or dad plays with her, Brianne behaves well. As soon as she is left alone, however, Brianne goes back to engaging in problem behaviors. While these behaviors happen regularly every day, Brianne’s parents notice that it is worse on days when Brianne has been at school and has had less interaction with her parents.

Based on the above case study, answer the following questions:

1. Brianne’s parents report that a single episode of problem behavior can last for several hours. This is an example of:
   - A. Duration
   - B. Intensity
   - C. Topography
   - D. Frequency
2. Identify an antecedent for Brianne’s problem behavior:
   - A. Being left alone
   - B. Having Down syndrome
   - C. Days when she has had less interaction with her parents
   - D. Feeling tired

3. What is the function of Brianne’s problem behavior?
   - A. Tangible
   - B. Escape
   - C. Sensory
   - D. Attention

4. Select the correct summary statement for the Brianne’s case study?
   - A. When Brianne is left alone to occupy herself, she has a tantrum to get things that she likes. This is more likely when her mom is on the phone.
   - B. When Brianne is left alone to occupy herself, she pokes her brother, dumps out toys, and yells to get the things that she likes. This is more likely when she’s had less interaction with her parents.
   - C. When Brianne sees other people talking, she pokes her brother, dumps out toys, and yells to get attention from her parents. This is more likely when she’s had less interaction with her parents.
   - D. When Brianne is left alone to occupy herself, she pokes her brother, dumps out toys, and yells to get attention from her parents. This is more likely when she’s had less interaction with her parents.

5. What would be an appropriate alternative replacement behavior for this situation?
   - A. For Brianne to ask for a break
   - B. For Brianne to ask for help
   - C. For Brianne to ask her parents to play with her
   - D. For Brianne to say hello

6. What would be an appropriate desired behavior for this situation?
   - A. For Brianne to play by herself or with her brother
   - B. For Brianne to sit and talk with her parents
   - C. For Brianne to ask her parents to play with her
   - D. For Brianne to watch TV
7. Which of the following would be an appropriate setting event intervention for this situation?
   ○ A. The parents should wait to talk on the phone/talk with each other until Brianne is in bed
   ○ B. The parents should give Brianne lots of individual attention when Brianne comes home from school and/or before the parents talk on the phone/talk with each other
   ○ C. The parents should remind Brianne to play by herself while they talk.
   ○ D. The parents should talk while playing with Brianne.

8. Which of the following would be an appropriate antecedent intervention for this situation?
   ○ A. The parents should not talk on the phone or with each other when Brianne is around
   ○ B. The parents should give Brianne lots of toys that she likes before they talk on the phone or talk together
   ○ C. The parents should say to Brianne “remember, if you need me, come tap me on the shoulder” before talking on the phone or with each other
   ○ D. The parents should say to Brianne “remember, don’t bother your brother, dump your toys, or yell – that is wrong”

9. Which would be the most appropriate strategy to use to teach a desired behavior to Brianne?
   ○ A. Backward chaining
   ○ B. Shaping
   ○ C. Functional communication training
   ○ D. Prompting

10. Which consequence would be appropriate for instances where Brianne plays appropriately by herself or with her brother while her parents are on the phone or talking with each other?
    ○ Leave Brianne alone to play by herself; don’t disturb her or she will start behaving badly again
    ○ Give Brianne a cookie to reward her for playing by herself
    ○ Praise Brianne
    ○ Praise Brianne and spend time playing with her
Chris is 12 years old. He was born with cerebral palsy and has difficulty controlling leg, arm, and hand movements. When Chris was 2 years old, he was also diagnosed as having a profound hearing loss. Chris lives with his mother and an older sister who, upon realizing that Chris was deaf, began taking ASL classes. Chris went to a preschool program for deaf children, but did not learn to sign there as he has difficulty making the hand and finger movements necessary. Since he was 4, Chris has used a wheelchair, pushed by others, to move around.

Since kindergarten, Chris has attended a nearby school for the deaf. His home is 30 minutes away and his mother drives him to and from school each day. Chris has always had difficulty learning; assessments have shown that he has a significant intellectual disability. Chris continues to have difficulty communicating because he is not able to sign clearly; he tries to sign, but because of his physical disability, most people cannot understand his signing. Chris understands some basic signs, but his understanding of language is well below that of most 12 years olds.

Chris’ family and school staff are very concerned about problem behavior that Chris demonstrates whenever he wants something. He screams, kicks, and waves his arms around. Sometimes his movements are so drastic that he hits himself against his wheelchair and causes bruising. Whenever Chris behaves this way, his mother, older sister, or staff begin showing him items that he might want. Chris continues this behavior until he is given the thing that he wants. Sometimes, these episodes are over quickly, if others can figure out what Chris wants right away. Other times, Chris may continue the behavior for several hours. There have been some instances where the behavior has started at school and continued at home, with Chris stopping only when he it too exhausted to continue. This situation happens frequently every day, at least 5 times per day. Chris’ family and school staff have noticed that episodes are more frequent and intense if Chris has been unable to get what he wants earlier in the day.

Based on the above case study, answer the following questions:

1. Sometimes his movements are so drastic that he hits himself against his wheelchair and causes bruising. This is an example of:
   - A. Duration
   - B. Intensity
   - C. Topography
   - D. Frequency
2. Identify the maintaining consequence for Chris’ problem behavior:
   ○ A. Getting attention from family members or staff
   ○ B. Avoiding things he doesn’t want to do
   ○ C. Getting things that he wants
   ○ D. Getting attention and items

3. What is the function of Chris’ problem behavior?
   ○ A. Tangible
   ○ B. Escape
   ○ C. Sensory
   ○ D. Attention

4. Select the correct summary statement for Chris’ case study?
   ○ A. When Chris sees an item he would like, he behaves badly to get what he wants. This is more likely if he didn’t get what he wanted earlier in the day.

   ○ B. When Chris sees an item he would like, he screams, kicks, and waves his arms to get the item he wants. This is more likely when he’s left alone.

   ○ C. When Chris sees an item he would like, he screams, kicks, and waves his arms to get attention and to get the item. This is more likely if he didn’t get what he wanted earlier in the day.

   ○ D. When Chris sees an item he would like, he screams, kicks, and waves his arms to get the item he wants. This is more likely if he didn’t get what he wanted earlier in the day.

5. What would be an appropriate desired behavior for this situation?
   ○ A. For Chris to wait calmly until he is given what he wants
   ○ B. For Chris to point to a picture of what he wants.
   ○ C. For Chris to clearly sign for what he wants
   ○ D. For Chris to wait until something is offered to him
6. Which of the following would be an appropriate antecedent intervention for this situation?
   - A. Provide a communication board with photographs of items that Chris can ask for and/or likes
   - B. Remind Chris not to scream, kick, or wave his arms
   - C. Remind Chris to use signs to ask for things
   - D. Ignore Chris when he engages in problem behavior

7. Which would be the most appropriate strategy to use to teach a desired behavior to Chris?
   - A. Backward chaining
   - B. Shaping
   - C. Functional communication training
   - D. Prompting

8. What should Chris’ family or school staff do if they notice Chris beginning to engage in problem behavior?
   - A. Immediately start offering items to Chris to prevent the behavior from escalating
   - B. Ignore the problem behavior
   - C. Move Chris into the hallway until he is quiet and calm
   - D. Ignore the problem behavior while redirecting Chris to his communication board

9. Which consequence would be appropriate for instances where Chris points to his communication board to ask for items?
   - A. Model the appropriate sign and request that Chris copy the sign before giving him the item
   - B. Praise Chris for using his communication board
   - C. Give Chris what he asked for
   - D. Tell Chris that you’ll give him the item in a minute
10. Which consequence would be appropriate for instances where Chris’ problem behavior escalates to severe kicking/arm waving and loud screaming?

- A. Move Chris to a calm, safe area and prevent him from harming himself; do not offer him items
- B. Quickly offer items to Chris until he calms down so that he does not hurt himself
- C. Move Chris’ chair into the hallway and leave him there until he is calm
- Move Chris to a calm, safe area and prevent him from harming himself; show him his communication board and ask him what he wants
APPENDIX F

Social Validity Evaluation of Staff Training Program in Functional Assessment and Positive Behavior Support

Staff Number: _______________________
Date: _______________________

The purpose of this questionnaire is to obtain information that will aid in the evaluation of the training program. Please circle the number that best describes your agreement or disagreement with each statement (1 = disagree, 5 = agree). You also have space to write comments or suggestions for change or improvement.

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The goals of the training program are appropriate for my needs. Comments:</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. The goals of the training program are consistent with my beliefs about service provision needs for families of deaf children with developmental disabilities. Comments:</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. The strategies used to teach me to do functional assessments were difficult and ineffective. Comments:</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. The strategies used to teach me to develop positive behavior support plans were clear and effective. Comments:</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
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<tr>
<td>5. The training program considered the unique needs of deaf students with developmental disabilities and their families. Comments:</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Training activities were well organized and helped in the development of my skills. Comments:</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Training materials were useful and helpful. Comments:</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>8. I believe that the training program will enable me to provide effective support to deaf children with developmental disabilities who exhibit problem behavior. Comments:</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
APPENDIX G

Training Topics

• Overview of Positive Behavior Support
• Basic Principles of Behavior
• Functional Behavior Assessment
  o Functional Assessment Interview
  o Functional Assessment Observation
  o Additional Functional Assessment Interview and Observation Tools
• Building PBS Plans
• Setting Event Strategies
  o Visual Scheduling
• Antecedent Interventions
• Teaching Alternative Replacement Behavior
• Consequences to Increase Behavior
• Consequences to Decrease Behavior
CERTIFICATE OF APPROVAL - FULL BOARD

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<th>INSTITUTION / DEPARTMENT:</th>
<th>UBC BREB NUMBER:</th>
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<td>UBC/Education/Educational &amp; Counselling Psychology, and Special Education</td>
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INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT:

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<tbody>
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Other locations where the research will be conducted:
Subjects' home: assessment and intervention activities related to problem behavior in home contexts will be conducted within the family's home. UBC Lab in Faculty of Education: In my lab at UBC (Rm 2417, Faculty of Education) videotaped data will be downloaded onto a computer and observed and coded using a computer monitor.

CO-INVESTIGATOR(S):
N/A

SPONSORING AGENCIES:
N/A

PROJECT TITLE:
Positive Behavior Support for Deaf Children with Developmental Disabilities and Severe Problem Behavior

REB MEETING DATE: Certificate Expiry Date:
March 12, 2009 March 12, 2010

DOCUMENTS INCLUDED IN THIS APPROVAL:

<table>
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<tr>
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<td>Protocol:</td>
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<td>Research Proposal</td>
<td>2</td>
<td>March 21, 2009</td>
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<td>Consent Forms:</td>
<td></td>
<td></td>
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<tr>
<td>Letter of Consent for Screening Process</td>
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<td>March 31, 2009</td>
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<td>Letter of Consent for Staff</td>
<td>March 31, 2009</td>
<td></td>
</tr>
<tr>
<td>Letter of Consent for Parents</td>
<td>March 31, 2009</td>
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**Advertisements:**

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<td>Add to Recruit Staff Participants</td>
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**Questionnaire, Questionnaire Cover Letter, Tests:**

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**Letter of Initial Contact:**

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<tr>
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<tbody>
<tr>
<td>Letter of Initial Contact</td>
<td>N/A</td>
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</table>

The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

*Approval is issued on behalf of the Behavioural Research Ethics Board and signed electronically by one of the following:*

- Dr. M. Judith Lynam, Chair
- Dr. Ken Craig, Chair
- Dr. Jim Rupert, Associate Chair
- Dr. Laurie Ford, Associate Chair
- Dr. Anita Ho, Associate Chair
CERTIFICATE OF APPROVAL- MINIMAL RISK RENEWAL

<table>
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CO-INVESTIGATOR(S): N/A

SPONSORING AGENCIES: N/A

PROJECT TITLE:
Positive Behavior Support for Deaf Children with Developmental Disabilities and Severe Problem Behavior

EXPIRY DATE OF THIS APPROVAL: February 17, 2011

APPROVAL DATE: February 17, 2010

The Annual Renewal for Study have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.
Approval is issued on behalf of the Behavioural Research Ethics Board

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
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<td>Chair</td>
</tr>
<tr>
<td>Dr. Ken Craig</td>
<td>Chair</td>
</tr>
<tr>
<td>Dr. Jim Rupert</td>
<td>Associate Chair</td>
</tr>
<tr>
<td>Dr. Laurie Ford</td>
<td>Associate Chair</td>
</tr>
<tr>
<td>Dr. Anita Ho</td>
<td>Associate Chair</td>
</tr>
</tbody>
</table>
APPENDIX I

Letter of Initial Contact and Parent Advertisement

Dear ______________________,

I am writing to inform you of an upcoming research project which may be of interest to the families that you serve. I am a doctoral candidate in special education at the University of British Columbia and will be conducting the study. I was a teacher at the BC School for the Deaf from 1992 to 2003 and continue to provide support services to deaf children with developmental disabilities and their families. This research project will partially fulfill requirements for a Doctorate of Philosophy degree; I will be working under the supervision of Dr. Joseph Lucyshyn, a faculty member with extensive experience in Positive Behavior Support, staff training, and family support.

This research project will investigate the effectiveness of Positive Behavior Support as an intervention for deaf children with developmental disabilities who engage in problem behavior. Positive Behavior Support (PBS) is an empirically-validated method for understanding the nature of problem behavior and developing interventions that are educative and pro-active. PBS has been demonstrated as effective in reducing problem behavior and increasing adaptive behavior in home, school, and community contexts, with both children and adults who have been diagnosed with a variety of disabilities.

An interventionist that has completed 40 hours of PBS training will be implementing the intervention and will be directly supervised by myself. The interventionist will be an individual who currently works with deaf children and their families in the Lower Mainland of BC.

I am looking to recruit one family that had a deaf child with a diagnosed developmental disability and problem behavior. Following is a list of specific criteria for inclusion: (a) the child must be between the ages of 4 and 15, (b) the child must have a diagnosis of a severe to profound hearing loss, (c) the child must have a diagnosis of a developmental disability (e.g., autism spectrum disorder, mental retardation, cerebral palsy), and (d) the child must engage in significant problem behavior in home-based routines (e.g., dressing, independent play, completion of a hygiene task or chore). In addition, the family must reside in the Lower Mainland of BC and must not be receiving PBS services from another agency or consultant.

I would greatly appreciate your assistance in recruiting a family for this study. Attached is an advertisement for participation. I am hoping that you might be willing to forward the advertisement to families who meet the criteria outlined above. Should you have any

UBC Faculty of Education
2125 Main Mall
Vancouver, BC, Canada V6T 1Z4
Tel: 604.822.3131 Fax: 604.822.2684
questions, I would be happy to speak with you further. You may reach me by telephone at xxx-xxx-xxxx or email at xxx@xxx.xx.

Thank you for taking the time to read this letter and for your assistance in recruiting a family to participate in this study. It is my desire not only to provide assistance to the family enrolled in the study, but to use the knowledge gained from this study to provide information regarding interventions for this unique population of children and their families.

Sincerely,

Brenda Fossett, MA, BCBA
Dear Parent/Guardian:

The purpose of this letter is to inform you of an opportunity to participate in a research study. The purpose of this study is to help families of deaf children with developmental disabilities who engage in problem behavior in the home. I am a doctoral candidate in the Faculty of Education at the University of British Columbia. I am a trained teacher of the deaf and taught at the BC Provincial School for the Deaf from 1993-2003, where I taught deaf children with developmental disabilities. I am working under the supervision of Dr. Joseph Lucyshyn, an Assistant Professor in the Faculty of Education at the University of British Columbia.

The purpose of the study is to examine the acceptability and effectiveness of a comprehensive, ecological approach to behavior support with families of deaf children with developmental disabilities and problem behavior. The approach is based on best practice in positive behavior support with families of children with developmental disabilities. The approach emphasizes the development of a collaborative partnership with family members and the design of positive behavior supports that are both effective and a good fit with family life. The study will evaluate the extent to which the approach:

1) improves child behavior in three valued home routines, such as dressing, playing independently while the parent is busy, completing a hygiene task, cleaning up, etc.
2) promotes the child's successful participation in routines
3) is acceptable to parents

Participation in the study would involve you and your family collaborating with myself and an interventionist, trained in positive behavior support. The interventionist working with your family would be an individual who is currently employed by an agency that provides support to deaf children and their families (e.g., Provincial Services for the Deaf and Hard of Hearing, Services for Family and Community Development, the Deaf Children's Society, etc.). The interventionist will be an individual who recently completed 40 hours of training in positive behavior support. The interventionist will be receiving direct supervision and support from me.

Participation in the study would involve the following:

1) comprehensive assessment of child problem behavior and family ecology
2) collaborative development of positive behavior support plans for three valued but problematic, home-based routines
3) implementation support to teach you and your family to use the behavior supports in the target routines

Research activities include:

1) preliminary assessment to identify routines and to confirm child problem behavior
2) videotaped observations in three family routines before, during, and after intervention
3) assessment of acceptability of the intervention approach

Because this is the first study to investigate the effectiveness of a positive behavior support approach to address problem behavior in deaf children with developmental disabilities, I will be selecting one family to participate. If proven effective and acceptable, this study may set the stage for future, more intensive investigations. It is anticipated that participation in the study will involve working with the interventionist for 6 to 12 months. Participation will involve 1 to 2 meetings per week. All meetings will be scheduled on a day and at a time that is convenient for you; meetings will be held in your home. Meetings will include the following activities: assessment by interview and observation, collaborative development of positive behavior support plans, and implementation of positive behavior support plans. When implementing the positive behavior support plans, the interventionist will work with you to teach you specific strategies and tools to improve your child's problem behavior and participation in the target routines. The interventionist will use a variety of techniques, such as discussion, modeling, and role play, to assist you in learning to use the strategies. As well, the interventionist will monitor progress and provide feedback to you.

The participating family may experience the following benefits. First, the child's problem behavior may decrease to near zero levels in the three routines. Second, the child may develop new behaviors and skills that help him or her participate in the routines. Third, family members may enhance their parenting skills. Finally, a potential fourth benefit is that other families who have deaf children with developmental disabilities may be helped through the sharing of knowledge gained in this study.

If you are interested in participating in this study, or learning more about the study, please contact me. You may reach me by telephone at xxx-xxx-xxxx (voice) or by email at xxx@xxx.xx. Thank you for your time and consideration.

Sincerely,

Brenda Fossett, MA, BCBA
APPENDIX J

UBC Faculty of Education
2125 Main Mall
Vancouver, BC, Canada V6T 1Z4
Tel: 604.822.3131  Fax: 604.822.2684

Consent Form for Screening Process
Positive Behavior Support for Deaf Children with Developmental Disabilities and Severe Problem Behavior

Principal Investigator: Dr. Joseph Lucyshyn, Dept. of Educational and Counseling Psychology and Special Education, 604-822-1904
Co-Investigator(s): Brenda Fossett, Dept. of Educational and Counseling Psychology and Special Education, xxx-xxx-xxxx

This research is for a Doctorate of Philosophy degree and is part of a thesis. Information from this study will be presented in a thesis and may also be presented as a published journal article or a conference presentation.

Dear Parent/Guardian:

The purpose of this form is to request consent for your, for your child with a disability, and for other family members’ (i.e., focus child’s sibling(s)) participation in a research study. The study will be conducted in the Faculty of Education of the University of British Columbia. The study will partially fulfill the requirements for a doctoral degree being completed by Brenda Fossett (the co-investigator). I am inviting your participation because you have a deaf child with a developmental disability who engages in problem behavior in valued, home-based routines.

PURPOSE OF THE STUDY

The purpose of the study is to examine the acceptability and effectiveness of a comprehensive, ecological approach to behavior support with families of deaf children with developmental disabilities and problem behavior. The approach is based on best practice in positive behavior support with families of children with developmental disabilities. The approach emphasizes the development of a collaborative partnership with family members and the design of positive behavior supports that are both effective and a good fit with family life. The study will evaluate the extent to which the approach:

- improves child behavior in three valued home routines, such as dressing, playing independently while the parent is busy, completing a hygiene task, cleaning up, etc.
- promotes the child's successful participation in routines
- is acceptable to parents
FAMILY SUPPORT AND RESEARCH ACTIVITIES

Participation in the study would involve you and your family collaborating with myself and an interventionist, trained in positive behavior support. The interventionist working with your family would be an individual who is currently employed by an agency that provides support to deaf children and their families (e.g., Provincial Services for the Deaf and Hard of Hearing, Services for Family and Community Development, the Deaf Children's Society, etc.). The interventionist will be an individual who recently completed 40 hours of training in positive behavior support. The interventionist will be receiving direct supervision and support from me.

Participation in the study would involve the following:

4) comprehensive assessment of child problem behavior and family ecology
5) collaborative development of positive behavior support plans for three valued but problematic, home-based routines
6) implementation support to teach you and your family to use the behavior supports in the target routines

Research activities include:

4) preliminary assessment to identify routines and to confirm child problem behavior
5) videotaped observations in three family routines before, during, and after intervention
6) assessment of acceptability of the intervention approach

It is anticipated that participation in the study will involve working with the interventionist for 6 to 12 months. Participation will involve 1 to 2 meetings per week. All meetings will be scheduled on a day and at a time that is convenient for you; meetings will be held in your home. Meetings will include the following activities: assessment by interview and observation, collaborative development of positive behavior support plans, and implementation of positive behavior support plans. When implementing the positive behavior support plans, the interventionist will work with you to teach you specific strategies and tools to improve your child's problem behavior and participation in the target routines. The interventionist will use a variety of techniques, such as discussion, modeling, and role play, to assist you in learning to use the strategies. As well, the interventionist will monitor progress and provide feedback to you.
Following is a description of research and family support activities:

**Preliminary Assessment** Preliminary assessment activities will involve two interviews with you and other family members at a time and place of your convenience. These interviews will last 1 to 2 hours. The purpose of the interviews is to identify valued routines in the home and community in which problem behavior occurs, and to develop a preliminary understanding about problem behavior. Following interviews, we will conduct four to six pilot observations in the identified routines. The purpose of these observations will be to verify the occurrence and purpose of problem behavior. Each observation will last 10 to 20 minutes.

**Comprehensive Assessment** Following confirmation of problem behavior, a functional assessment of problem behavior will be completed. This will involve one meeting of 1 to 2 hours in length. This assessment will help to develop a comprehensive understanding of the conditions that predict problem behavior and positive behavior. This information will help us develop an effective support plan. Second, we will complete a family ecology assessment. This will involve one meeting of 1 to 2 hours in length in which we will learn about your family’s strengths, social supports and resources, stressors, and goals for your child and family. This information will help us develop a plan that fits your family.

**Positive Behavior Support Plan Design** Following assessment activities, we will collaborate with you to build a positive behavior support plan for each problematic routine. This will be done one routine at a time through a series of three meetings. Each meeting will last 1 to 2 hours. During a planning meeting, family members and the interventionist will review assessment information for a routine and build a support plan that fits well with the routine. The plan will include several positive behavior support strategies. It will be designed to improve child behavior and the success of the routine.

**Implementation Support** Training and support to help you and other family members implement the support plan in routines will occur approximately 1 to 2 times per week and involve 1 to 2 hours per session. During these meetings, the interventionist will teach you and other family members how to implement support strategies for your child. Activities may include discussion of written instructions, modeling of strategies, role play of strategies, and coaching in the routine. Implementation support will occur one routine at a time. After you have succeeded in improving child behavior in the first routine, you will receive help in the second routine. This process will continue until implementation support has been provided for all three routines.

**Videotaped Observations in Home Routines** Videotaped observations in routines will occur during three experimental phases of the study. These phases are baseline, intervention, and follow-up. Observation sessions will not occur on the same day as an implementation support meetings. During observation sessions, the interventionist will videotape your child and family’s participation in the selected routines. Each observation session will last between 30 minutes and 1 hour. Approximately 15 baseline, 15
intervention, and 15 maintenance observations will be completed over the course of the study.

SCREENING PROCESS

We have developed a screening process to find out if your child and family are eligible to participate in the study. The specific steps in the process are described below.

1. Preliminary interview. We will first meet with you in your home or a place that is more convenient for you and conduct a preliminary interview. The interview is focused on understanding your child’s problem behaviors in the home and community. The interview will take approximately one hour.

2. Preliminary observations. If the interview indicates that your child is a good fit for the study, then we will request permission to conduct observations in the home. With your permission, I will observe you and your child during the home routines in which problem behaviors regularly occur. During the observation, I will use an observation form to gather data about child problem behaviors. A minimum of 2 to 4 observations will be conducted. Each observation will last between 3 and 15 minutes.

3. Informed consent for study participation. If the observations confirm the presence of durable problem behaviors in three family routines in the home, then we will invite you to participate in the study. At that time, we will ask you to read and sign an informed consent letter for participation.

POTENTIAL RISKS AND SAFEGUARDS

If you agree to participate and permit your child and family to participate, you will need to consider four potential risks: (1) physical, (2) psychological, (3) legal, and (4) loss of confidentiality.
1. **Physical Risk** Because your child engages in problem behavior, there is more than a minimal risk that you, your child, or another family member may experience a physical injury during the study. Every precaution will be taken to minimize this risk:

   a. The co-investigator has extensive experience working with children who engage in problem behavior and will be providing direct, ongoing supervision to the interventionist
   
   b. Behavior support strategies will focus on preventing behavior problems and on teaching positive behaviors that are designed to replace problem behaviors
   
   c. Observation sessions and training and support activities will be terminated if your child begins to engage in medium or high intensity behavior.
   
   d. As needed, the interventionist will be available to assist you, your child, and other family members during observation sessions, and during training and support activities.

2. **Psychological Risk** Because your family will be observed during home routines and will participate in training and support activities, you, your child, or other family members may experience psychological risk. That is, you, your child, or other family members may feel some discomfort or stress during these activities. Several steps will be taken to guard against this risk:

   a. You or other family members can terminate an observation session at any time.
   
   b. ‘Family friendly’ features of the family support process should help to reduce stress associated with the study. Interviews will be conducted at a time and place that is convenient for you and your family. Support plans will be developed collaboratively with you and your family to ensure that plans fit well with your goals and routines.

3. **Legal Risk** A potential but minimal risk relates to the legal requirements around reporting abuse if it is witnessed. If members of the research team witness any abuse of the focus person by any person, they will have to report it to the appropriate provincial authorities. This risk will be guarded against in the following ways:

   a. The study focuses on providing family members with positive, non-punitive ways to prevent and manage child problem behavior. Family members who develop these skills are unlikely to engage in child maltreatment.
   
   b. If abuse is observed, you will be informed and invited to participate in reporting the incident.

4. **Loss of Confidentiality** There is a risk that you, your child, or another family member may experience a loss of confidentiality. To guard against this risk we will:

   a. Change the names of all persons described in the study
   
   b. Use generic terms such as ‘mom’, ‘dad’, ‘child’ and ‘sibling’ on all assessment forms and support plans
   
   c. Allow access to information only to members of the research team
d. Keep all data, notes, and videotapes in a locked file cabinet or password protected computer

e. Destroy all data, collected solely for the study, 5 years after the study is completed

POTENTIAL BENEFITS

By participating in the study, you, your child with a disability, and other family members may experience the following direct and indirect benefits:

1. Your child’s problem behaviors may decrease to near zero levels in targeted routines
2. Your child may develop new skills that help him or her participate in targeted routines
3. Your knowledge and skills in supporting your child may be enhanced
4. Through your participation, other families who have deaf children with developmental disabilities may also benefit. This will occur by describing project results in journals and at conferences.

However, because behavioral and quality of life improvements cannot be assured, it is possible that you and your family may not experience all of the benefits listed above.

RIGHTS AS A RESEARCH PARTICIPANT

Your participation and that of your child and other family members is voluntary. Your decision whether or not to participate and to allow your child and other family members to participate will not have any effect on your child’s education, provision of support from a community agency, or future opportunities for behavioral consultation and support. If you agree to participate and allow your child and other family members to participate, you are free to withdraw consent and refuse to continue your participation and that of your child and family. You may do so at any time without penalty or loss of benefits to which you, your child, or other family members are otherwise entitled. By signing the consent form, you do not waive any of your legal rights. If you have any questions, please contact Dr. Joseph Lucyshyn, Faculty of Education, University of British Columbia, 2125 Main Mall, Vancouver, BC, V6T 1Z4, (604)822-1904. If you have any concerns about your rights or treatment as a research participant, you may contact the Research Subject Information Line in the UBC Office of Research Services at (604) 822-8598. Your signature below indicates that you have received a copy of this consent form for your records.
Your signature indicates that you consent to your, your child with a disability, and other family members (i.e., siblings) participation in the study.

Sincerely,

Brenda Fossett, MA, BCBA
CONSENT FORM FOR PARTICIPATION IN SCREENING PROCESS

Study Title: Positive Behavior Support for Deaf Children with Developmental Disabilities and Severe Problem Behavior

Principal Investigator: Joseph Lucyshyn, Ph.D., Faculty of Education, University of British Columbia

Co-Investigator: Brenda Fossett, M.A., Faculty of Education, University of British Columbia

Consent: I have read and received a copy of this consent form and have had an opportunity to ask questions about the research project and the screening process. I have received an adequate description of the purpose, goals, and procedures of the screening process, and I consent to participate in the screening process. I understand that all information will be kept confidential, that my participation is voluntary, and that I may withdraw consent at any time and discontinue participation at any time without penalty or loss of benefits to which I am otherwise entitled, and that I am not waiving any legal claims, rights, or remedies. By signing below, I agree to participate in the screening process of the research study Positive Behavior Support for Deaf Children with Developmental Disabilities and Severe Problem Behavior.

_____ YES, I consent to participate and give permission for my child with a disability and other family members (i.e., focus child’s siblings) to participate.

Focus Child’s Name: ____________________________

Sibling’s Name: ____________________________

Sibling’s Name: ____________________________

Parent/Guardian Signature: ____________________________ Date: ________________

Parent/Guardian Signature: ____________________________ Date: ________________

PLEASE RETURN THIS PAGE TO:

Brenda Fossett
Faculty of Education
University of British Columbia
2125 Main Mall
Vancouver, BC, V6T 1Z4
APPENDIX K

UBC Faculty of Education
2125 Main Mall
Vancouver, BC, Canada V6T 1Z4
Tel: 604.822.3131  Fax: 604.822.2684

Consent Form
Positive Behavior Support for Deaf Children with Developmental Disabilities and Severe Problem Behavior

Principal Investigator: Dr. Joseph Lucyshyn, Dept. of Educational and Counseling Psychology and Special Education, 604-822-1904
Co-Investigator(s): Brenda Fossett, Dept. of Educational and Counseling Psychology and Special Education

This research is for a Doctorate of Philosophy degree and is part of a thesis. Information from this study will be presented in a thesis and may also be presented as a published journal article or a conference presentation.

Dear Parent/Guardian:

The purpose of this form is to request consent for your, for your child with a disability, and for other family members’ (i.e., focus child’s sibling(s)) participation in a research study. The study will be conducted in the Faculty of Education of the University of British Columbia. The study will partially fulfill the requirements for a doctoral degree being completed by Brenda Fossett (the co-investigator). I am inviting your participation because you have a deaf child with a developmental disability who engages in problem behavior in valued, home-based routines.

PURPOSE OF THE STUDY

The purpose of the study is to examine the acceptability and effectiveness of a comprehensive, ecological approach to behavior support with families of deaf children with developmental disabilities and problem behavior. The approach is based on best practice in positive behavior support with families of children with developmental disabilities. The approach emphasizes the development of a collaborative partnership with family members and the design of positive behavior supports that are both effective and a good fit with family life. The study will evaluate the extent to which the approach:

- improves child behavior in three valued home routines, such as dressing, playing independently while the parent is busy, completing a hygiene task, cleaning up, etc.
- promotes the child's successful participation in routines
- is acceptable to parents
FAMILY SUPPORT AND RESEARCH ACTIVITIES

Participation in the study would involve you and your family collaborating with myself and an interventionist, trained in positive behavior support. The interventionist working with your family would be an individual who is currently employed by an agency that provides support to deaf children and their families (e.g., Provincial Services for the Deaf and Hard of Hearing, Services for Family and Community Development, the Deaf Children's Society, etc.). The interventionist will be an individual who recently completed 40 hours of training in positive behavior support. The interventionist will be receiving direct supervision and support from me.

Participation in the study would involve the following:

1) comprehensive assessment of child problem behavior and family ecology
2) collaborative development of positive behavior support plans for three valued but problematic, home-based routines
3) implementation support to teach you and your family to use the behavior supports in the target routines

Research activities include:

1) preliminary assessment to identify routines and to confirm child problem behavior
2) videotaped observations in three family routines before, during, and after intervention
3) assessment of acceptability of the intervention approach

It is anticipated that participation in the study will involve working with the interventionist for 6 to 12 months. Participation will involve 1 to 2 meetings per week. All meetings will be scheduled on a day and at a time that is convenient for you; meetings will be held in your home. Meetings will include the following activities: assessment by interview and observation, collaborative development of positive behavior support plans, and implementation of positive behavior support plans. When implementing the positive behavior support plans, the interventionist will work with you to teach you specific strategies and tools to improve your child's problem behavior and participation in the target routines. The interventionist will use a variety of techniques, such as discussion, modeling, and role play, to assist you in learning to use the strategies. As well, the interventionist will monitor progress and provide feedback to you.

Following is a description of research and family support activities:

Preliminary Assessment Preliminary assessment activities will involve two interviews with you and other family members at a time and place of your convenience. These interviews will last 1 to 2 hours. The purpose of the interviews is to identify valued routines in the home and community in which problem behavior occurs, and to develop a
preliminary understanding about problem behavior. Following interviews, we will conduct four to six pilot observations in the identified routines. The purpose of these observations will be to verify the occurrence and purpose of problem behavior. Each observation will last 10 to 20 minutes.

Comprehensive Assessment Following confirmation of problem behavior, a functional assessment of problem behavior will be completed. This will involve one meeting of 1 to 2 hours in length. This assessment will help to develop a comprehensive understanding of the conditions that predict problem behavior and positive behavior. This information will help us develop an effective support plan. Second, we will complete a family ecology assessment. This will involve one meeting of 1 to 2 hours in length in which we will learn about your family’s strengths, social supports and resources, stressors, and goals for your child and family. This information will help us develop a plan that fits your family.

Positive Behavior Support Plan Design Following assessment activities, we will collaborate with you to build a positive behavior support plan for each problematic routine. This will be done one routine at a time through a series of three meetings. Each meeting will last 1 to 2 hours. During a planning meeting, family members and the interventionist will review assessment information for a routine and build a support plan that fits well with the routine. The plan will include several positive behavior support strategies. It will be designed to improve child behavior and the success of the routine.

Implementation Support Training and support to help you and other family members implement the support plan in routines will occur approximately 1 to 2 times per week and involve 1 to 2 hours per session. During these meetings, the interventionist will teach you and other family members how to implement support strategies for your child. Activities may include discussion of written instructions, modeling of strategies, role play of strategies, and coaching in the routine. Implementation support will occur one routine at a time. After you have succeeded in improving child behavior in the first routine, you will receive help in the second routine. This process will continue until implementation support has been provided for all three routines.

Videotaped Observations in Home Routines Videotaped observations in routines will occur during three experimental phases of the study. These phases are baseline, intervention, and follow-up. Observation sessions will not occur on the same day as an implementation support meeting. During observation sessions, the interventionist will videotape your child and family’s participation in the selected routines. Each observation session will last between 30 minutes and 1 hour. Approximately 15 baseline, 15 intervention, and 15 maintenance observations will be completed over the course of the study.

POTENTIAL RISKS AND SAFEGUARDS

If you agree to participate and permit your child and family to participate, you will need to consider four potential risks: (1) physical, (2) psychological, (3) legal, and (4) loss of confidentiality.
1. **Physical Risk** Because your child engages in problem behavior, there is more than a minimal risk that you, your child, or another family member may experience a physical injury during the study. Every precaution will be taken to minimize this risk:
   a. The co-investigator has extensive experience working with children who engage in problem behavior and will be providing direct, ongoing supervision to the interventionist
   b. Behavior support strategies will focus on preventing behavior problems and on teaching positive behaviors that are designed to replace problem behaviors
   c. Observation sessions and training and support activities will be terminated if your child begins to engage in medium or high intensity behavior.
   d. As needed, the interventionist will be available to assist you, your child, and other family members during observation sessions, and during training and support activities.

2. **Psychological Risk** Because your family will be observed during home routines and will participate in training and support activities, you, your child, or other family members may experience psychological risk. That is, you, your child, or other family members may feel some discomfort or stress during these activities. Several steps will be taken to guard against this risk:
   a. You or other family members can terminate an observation session at any time.
   b. ‘Family friendly’ features of the family support process should help to reduce stress associated with the study. Interviews will be conducted at a time and place that is convenient for you and your family. Support plans will be developed collaboratively with you and your family to ensure that plans fit well with your goals and routines.

3. **Legal Risk** A potential but minimal risk relates to the legal requirements around reporting abuse if it is witnessed. If members of the research team witness any abuse of the focus person by any person, they will have to report it to the appropriate provincial authorities. This risk will be guarded against in the following ways:
   a. The study focuses on providing family members with positive, non-punitive ways to prevent and manage child problem behavior. Family members who develop these skills are unlikely to engage in child maltreatment.
   b. If abuse is observed, you will be informed and invited to participate in reporting the incident.

4. **Loss of Confidentiality** There is a risk that you, your child, or another family member may experience a loss of confidentiality. To guard against this risk we will:
   a. Change the names of all persons described in the study
   b. Use generic terms such as ‘mom’, ‘dad’, ‘child’ and ‘sibling’ on all assessment forms and support plans
   c. Allow access to information only to members of the research team
d. Keep all data, notes, and videotapes in a locked file cabinet or password protected computer
e. Destroy all data, collected solely for the study, 5 years after the study is completed

POTENTIAL BENEFITS

By participating in the study, you, your child with a disability, and other family members may experience the following direct and indirect benefits:

1. Your child’s problem behaviors may decrease to near zero levels in targeted routines
2. Your child may develop new skills that help him or her participate in targeted routines
3. Your knowledge and skills in supporting your child may be enhanced
4. Through your participation, other families who have deaf children with developmental disabilities may also benefit. This will occur by describing project results in journals and at conferences.

However, because behavioral and quality of life improvements cannot be assured, it is possible that you and your family may not experience all of the benefits listed above.

RIGHTS AS A RESEARCH PARTICIPANT

Your participation and that of your child and other family members is voluntary. Your decision whether or not to participate and to allow your child and other family members to participate will not have any effect on your child’s education, provision of support from a community agency, or future opportunities for behavioral consultation and support. If you agree to participate and allow your child and other family members to participate, you are free to withdraw consent and refuse to continue your participation and that of your child and family. You may do so at any time without penalty or loss of benefits to which you, your child, or other family members are otherwise entitled. By signing the consent form, you do not waive any of your legal rights. If you have any questions, please contact Dr. Joseph Lucyszyn, Faculty of Education, University of British Columbia, 2125 Main Mall, Vancouver, BC, V6T 1Z4, (604)822-1904. If you have any concerns about your rights or treatment as a research participant, you may contact the Research Subject Information Line in the UBC Office of Research Services at (604) 822-8598. Your signature below indicates that you have received a copy of this consent form for your records.

Your signature indicates that you consent to your, your child with a disability, and other family members (i.e., siblings) participation in the study.

Sincerely,

Brenda Fossett, MA, BCBA
CONSENT FORM FOR PARTICIPATION IN STUDY

Study Title: Positive Behavior Support for Deaf Children with Developmental Disabilities and Severe Problem Behavior

Principal Investigator: Joseph Lucyshyn, Ph.D., Faculty of Education, University of British Columbia

Co-Investigator: Brenda Fossett, M.A., Faculty of Education, University of British Columbia

Consent: I have read and understood the attached letter of request to participate in the study entitled “Positive Behavior Support for Deaf Children with Developmental Disabilities and Severe Problem Behavior.” I also consent to and authorize the release of information from biographical records to document birth date and diagnostic information. I understand that all information will be kept confidential and that my participation and that of my child and other family members (i.e., focus child’s siblings) is entirely voluntary and that I, my child, or other family members may withdraw consent and refuse to participate at any time without any penalty or loss of benefits to which my family is otherwise entitled, and that I am not waiving any legal claims, rights, or remedies. I also understand that I will receive a copy of this letter of request for consent for my own records. My decision regarding my participation, that of my child with a disability, and that of other family members is indicated below.

_____ YES, I consent to participate and give permission for my child with a disability and other family members (i.e., focus child’s siblings) to participate.

Focus Child’s Name: __________________________

Sibling’s Name: __________________________

Sibling’s Name: __________________________

Parent/Guardian Signature __________________________ Date: __________

Parent/Guardian Signature __________________________ Date: __________

PLEASE RETURN THIS PAGE TO:

Brenda Fossett
Faculty of Education
University of British Columbia
2125 Main Mall
Vancouver, BC, V6T 1Z4
VIDEOTAPING CONSENT FORM

Study Title: Positive Behavior Support for Deaf Children with Developmental Disabilities and Severe Problem Behavior
Principal Investigator: Joseph Lucyshyn, Ph.D., Faculty of Education, University of British Columbia
Co-Investigator: Brenda Fossett, M.A., Faculty of Education, University of British Columbia

Consent: I understand that my participation in this study will involve videotaping of me, my child with a disability, and other family members in our home. I also understand that I may request that he researchers sop the videotaping at any time if I, or a member of my family, does not want to be videotaped. I also understand that all videotaped materials will be kept in a secure and locked location, and that only the researchers will have access to this material, unless I give my specific permission for it to be viewed by any other person.

My consent regarding the videotaping of my child’s participation and that of my family in this study is indicated below. I understand that I will receive a copy of this consent for my personal records.

_____ YES, I consent to the videotaping of my child and family

Focus Child’s Name: __________________________
Sibling’s Name: __________________________
Sibling’s Name: __________________________
Parent/Guardian Signature __________________________ Date: ____________
Parent/Guardian Signature __________________________ Date: ____________

If I have questions or concerns about videotaping of my child or family, I may contact:
Joseph Lucyshyn
Faculty of Education, UBC
2125 Main Mall
Vancouver, BC, V6T 1Z4
604-822-1904
joe.lucyshyn@ubc.ca

Brenda Fossett
Faculty of Education, UBC
2125 Main Mall
Vancouver, BC, V6T 1Z4
604-728-5891
bfossett@shaw.ca
APPENDIX L

Social Validity Evaluation of Positive Behavior Support Process with Families

Date:

Family member completing evaluation: ______________________

The purpose of this questionnaire is to obtain information that will aid in: a) the selection and improvement of behavioral support strategies implemented in the home by family members; and b) the improvement of our process for providing families with behavioral consultation and support. Please circle the number that best describes your agreement or disagreement with each statement (1 = disagree, 5 = agree). You also have space to write comments or suggestions for change or improvement.

<table>
<thead>
<tr>
<th></th>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The goals of the behavioral support plan are appropriate for my child.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>The goals of the plan are consistent with my family's goals, values, and beliefs.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>The strategies and procedures used are difficult to carry out in the home.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>The strategies and procedures used are effective in improving my child's behavior.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Statement</td>
<td>Disagree</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>5</td>
<td>The outcomes of the support effort are beneficial for my child.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>The outcomes of the support effort are beneficial to my family as a whole.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>The support effort has caused some unanticipated problems in our family.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Training activities have been well organized, clear, and helpful.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>The person(s) providing technical assistance has shown respect for our family's values and beliefs.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Overall, this behavioral support effort has strengthened our family.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Comments:</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX M

**Goodness of Fit Survey for Behavior Support Plans Used by Families**

**Name of Family:**
**Family Member(s) completing checklist:**
**Date:**
**Focus Routine:**

**Introduction:** Research and practical experience show that the success of a support plan depends greatly on whether the plan “fits” with the values and lifestyle of the family. The purpose of this survey is to understand the extent to which you believe the support plan developed for your son/daughter is good for your family. Your responses will help us (a) improve the quality of the plan and (b) understand better how to build support plans that are most helpful. For the routine identified, please rate each question on a scale of one (1 = not at all) to five (5 = very well/much).

<table>
<thead>
<tr>
<th>Questions</th>
<th>Not at All</th>
<th>Not Much</th>
<th>Can’t Tell</th>
<th>Well/ (Much)</th>
<th>Very Well/ Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you believe the research team understands your child’s needs in this routine?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Do you believe the plan is based on an understanding of the reasons for problem behavior (i.e., escape or attention)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Does the plan really address your highest priority goals for your child and family in this routine?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Do you understand what you are expected to do as part of this plan?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Do you understand what is expected of other family members?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Are you comfortable with what you and others are expected to do?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Does the plan recognize and support your needs as a mother or father?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. Does the plan recognize and support the needs of other family members living in the home (e.g., siblings)?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Overall, how well does the support plan fit with your family’s needs within this routine?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Overall, how well does the plan fit with your values and beliefs about raising your child with a disability and creating a meaningful family life together?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. To what extent does the plan build off of successful strategies you were using?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. Will the plan, in the long run, disrupt family routines in the home or community to a point that stress and hardship will be created?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
13. Does the plan recognize and build on your child’s and your family’s strengths?  

14. Does the plan make use of resources (e.g., help from your spouse, respite care, etc.) available to you and your family?  

15. To what extent would you like to see the use of available resources incorporated to a greater extent in your plan?  

16. Does the plan include needs you may have for long-term social emotional support (e.g., someone with whom you discuss problems, someone with whom you do enjoyable activities)?  

17. To what extent would you like to see long-term social emotional supports incorporated to a greater extent in the plan?  

18. All things considered, how difficult will it be or is it for you to use this support plan (e.g., time involved, coordination of tasks, etc.)?  

19. To what extent do you believe the support plan will be or is effective?  

20. Do you believe you can keep using the support strategies for a long time (e.g., over one year) even if there is reduced contact with members of the research team?  

**Comments:**
APPENDIX N

Family Ecology Interview

1. What would you characterize as your child’s positive contributions to the family?

2. What would you characterize as your family’s strengths?

3. What formal and informal resources have you used (or are available) to help improve your child’s development, and the quality of family life (e.g., help with child care from a family member, respite care from a local agency)?

4. What are your sources of social support (e.g., someone with whom you discuss and solve problems, someone with whom you participate in leisure activities)?

5. What are sources of stress?
   a. What are the effects of your child’s problem behaviors on you as a parent?

   b. What are the effects of your child’s problem behavior on your family as a whole?

   c. Are there other sources of stress in the family that might affect your ability to implement a support plan or that affect your family’s quality of life?

6. What are your goals for your child and for your family?

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Dinner

pray  eat  drink milk  wipe face  say "thank you"

Remember:  get food  bite  fork down