

A FAMILY CENTERED, POSITIVE BEHAVIOUR SUPPORT APPROACH TO  
FOOD REFUSAL BEHAVIOUR

by

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## Abstract

Many parents of children with autism spectrum disorder (ASD) commonly report a struggle to cope with their child's food refusal behaviour. Numerous studies have demonstrated the effectiveness of interventions based on applied behaviour analysis for increasing food acceptance and decreasing mealtime problem behaviour among children with developmental disabilities; however, these studies also revealed several limitations that may affect the acceptability, meaningfulness, and durability of outcomes. These limitations have been addressed by an approach to problem behaviour closely allied with applied behaviour analysis. This approach is called Positive Behaviour Support (PBS). The purpose of this study is to evaluate the effectiveness of a parent-implemented, positive behaviour support plan that is based on a functional assessment and feeding assessment, for improving eating behaviour for a child with ASD during a home-based snack routine. The study employed a quasi-experimental, case study design with one eating routine, using a multiple probe strategy. Results showed improvements in child eating behaviour and participation within the snack routine following training and support activities. These improvements maintained six weeks after the termination of implementation support. Implementation of the positive behaviour support approach also was associated with generalization of the child's eating behaviour to new foods and to the child's father's successful implementation the snack routine. The results are discussed with reference to previous research, contributions, future directions, and implications for practitioners and researchers who are involved in behavioural feeding interventions.

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## CHAPTER 1

### Introduction

This chapter will begin with an outline of the prevalence, characteristics, and gender ratio of Autism Spectrum Disorders (ASD). Although there are a number of core deficits associated with autistic disorder, food refusal behaviour and its relationship to ASD will be emphasized and discussed. Following this discussion, there will be a review and critical analysis of the empirical research that employ behavioural interventions to treat food refusal behaviour, highlighting the strengths and weaknesses of assessment and intervention. The concept of family-centered, positive behaviour support (PBS) and its relationship to food refusal behaviour also will be addressed. This chapter will then conclude with a proposal for a food refusal intervention to assist a child with ASD who also exhibits persistent feeding difficulties.

### *Autism Spectrum Disorders*

At present, the terms autism spectrum disorder (ASD) and Pervasive Developmental Disorder (PDD) are used synonymously to represent a wide spectrum of neurodevelopmental disorders that have three core features: qualitative impairments in reciprocal social interactions, qualitative impairments in communication skills and markedly restrictive repertoire of activities, and interests (APA, 1994; Wetherby & Prizant, 2000). Major advancements made in the field that began in the early 1980s have subsequently led to not only a more refined description of autism but also the extension of this concept to a spectrum disorder (Lord & Risi, 2000). Autism is now viewed as being the prototype of ASD and all other disorders with in the spectrum extend from this

prototype in decreasing severity (i.e., displaying fewer symptoms within one area) and in decreasing areas affected (Lord & Risi, 2000). As a result, it is the essential features of the autistic disorder that make up the diagnostic criteria in the American Psychological Association's (APA) Diagnostic and Statistical Manual 4<sup>th</sup> edition (DSM-IV). These essential features are listed below:

1. Impairments in reciprocal social interaction manifested by impairments in the multiple use of nonverbal behaviours, impairments in spontaneous sharing, lack of social-emotional reciprocity and failure to develop peer relationships.
2. Impairments in communication manifested by a delay or failure to develop spoken language, inability to initiate or sustain conversations, stereotyped or repetitive use of idiosyncratic language, and lack of pretend play.
3. Restricted, repetitive, and stereotyped patterns of behaviour, interests or activities manifested by a preoccupation with restricted patterns of interest, repetitive motor movements (e.g., hand flapping, finger flicking), rigid adherence to routines, and persistent preoccupation with parts of objects.

The prevalence of the autistic disorder is estimated to affect 7.5 per 10,000 people (Fombonne, 1999). As well, across the spectrum, males are reportedly affected four to five times more often than females (APA, 1994). Individuals display the social, communicative and ritualistic behaviours associated with ASD in very diverse ways, including level of severity. Impairment in all core areas ranges from mild to severe. In most cases as well, individuals have some degree of mental retardation and therefore display abnormal cognitive development (APA, 1994; Quill, 2001). The DSM IV details a range of behavioural symptoms that also are associated with ASD including behaviours

such as impulsivity, hyperactivity, abnormal responses to sensory stimuli and atypical feeding patterns (e.g., pica, food refusal) (APA, 1994). In the following section, food refusal behaviour in children with ASD will be examined more closely.

### *Food Refusal Behaviour*

Persistent feeding difficulties such as food refusal and food selectivity are reported to occur frequently in young children with profound or severe disabilities (Babbitt, Hoch, Coe, Cataldo, Stackhouse, & Perman, 1994; O'Brien, Repp, Williams, & Christopherson, 1991). Studies have reported prevalence figures ranging from 33% (Babbitt et al.) to as high as 80% (Shore, Babbitt, Williams, Coe, & Snyder, 1998). Importantly, 45% of typically developing children also experience a variety of mealtime problems during their childhood (Bentovim, 1970), however, these feeding problems are often intermittent and transitory, and thus do not usually require extensive support from professionals (O'Brien et al., 1991).

Individuals who exhibit food refusal behaviour consume a limited range of foods, may display an aversion to specific textures, or may select food on the basis of taste (Kedesdy & Budd, 1998). Additionally, food refusal is often accompanied by socially stigmatizing mealtime problems such as crying, spitting out food, aggression, and self-injury (Babbitt et al., 1994). This clinically significant feeding problem has received much attention in the literature due the negative consequences it has on health, development and socialization (Kedesdy & Budd, 1998).

### *ASD and Food Refusal Behaviour*

Atypical feeding behaviour was once included as part of the diagnostic criteria for autism (Ritvo & Freeman, 1978). Today, as mentioned previously, atypical feeding

behaviour is included in the DSM-IV as an associative feature to ASD but not a clinical marker. Nonetheless, many parents' of children with ASD commonly report a struggle to cope with their child's idiosyncratic eating preferences and routines (DeMeyer, 1979; Legge, 2002). The occurrence of idiosyncratic eating habits, specific food or food preparation preferences, and complete refusal of other foods in children with ASD has also been reported in the literature (Freeman & Piazza, 1998; Ho, Eaves, & Peabody, 1997; Ives, Harris, & Wolchik, 1978; Kern & Marder, 1996; Siegel, 1996)

To date, only one study exists that systematically and objectively assessed the prevalence of aberrant feeding patterns exhibited by children with ASD (Ahearn, Castine, Nault, & Green, 2001). Using the protocol developed by Munk and Repp (1994), the authors measured each child's food acceptance of three regularly textured food items from each of four food groups (fruit, vegetable, starch, and protein). All feeding sessions were conducted by professionals and occurred at school in an area arranged specifically for the study. The results indicated that of the 30 participants involved in the study, more than half of them exhibited aberrant patterns of food acceptance. However, the authors recognized three factors that affected the robustness of the assessment procedures. First, because there was no control group, the authors were unable to determine if children with ASD are more susceptible to food selectivity as compared to typically developing children. Second, during the assessment, food was presented to the children in a manner that may have been unfamiliar to them. The authors noted that children are more likely to reject food if it presented in a novel manner. Third, because the feeders were unfamiliar, some of the children may have rejected foods they normally would have eaten if they have been presented by a familiar caregiver.

Importantly, there are conflicting views on the impact these difficulties have on the nutritional status of children with ASD. Ho and her associates (1997) investigated the incidence of obesity in children with autism, and the relationship among cognitive abilities, severity of autism, and eating habits. The nutritional intake of 54 children (under the age of 13) was assessed using 3- day food diaries completed by the child's parents. The food diaries were analyzed for energy, minerals, vitamins, protein, carbohydrates, and fat content and then compared to the recommended nutrient intake for Canadians (RNI). Results showed that 42.6% of the children were obese. The authors attributed this finding to many different factors. They include: idiosyncratic eating habits; intensive behavioural style of teaching as it inadvertently reinforces a preference for snack food; parents' attitudes and knowledge toward food and nutrition; and sedentary activities like watching television and playing computer (two highly favourable activities for most children with autism). In a pilot nutrition-screening project conducted by the Nutrition Adjustment Center (NAC) (Torisky, Torisky, Kaplan, & Speicher, 1993), the nutritional status of 88 children with autism and other developmental disabilities was evaluated. Results indicated that children with ASD selected relatively fewer food items in their diets than did other diagnostic groups. Moreover, the food that was chosen contained significantly higher amounts of fat, cholesterol and salt, suggesting a diet less than optimal in promoting cardiovascular health (Torisky et al., 1993). In contrast, Raiten and Massaro (1986) investigated the nutritional profile of children with ASD by comparing the dietary intake of a group of children with ASD to a control group of children. Parents were asked to record their child's dietary intake for 7 days. Based on the results, Raiten and Massaro (1986) concluded that, although certain feeding habits and idiosyncrasies

characterize this population, these factors had little impact on the quality of the child's diet.

### *Etiology of Food Refusal Behaviour in ASD*

At present, experts in the field of autism spectrum disorders are unclear as to why there exists a high prevalence of feeding problems in this particular population. This is not surprising considering that the evaluation process for diagnosis and intervention planning is daunting, due to high variability in abilities and in the behavioural characteristics of children with autism spectrum disorders (Alhage, Kientz & Dunn, 1996). Despite this dearth of knowledge, many theories exist in the feeding literature on how feeding problems develop and are maintained in children with developmental disabilities. In an effort to find a middle ground between causal classification systems that are too global and systems that are too specific, Kedesdy and Budd (1998) organized their classification system into eight conceptually and clinically derived causal variables for severe feeding problems. They are: (1) physical competence (oral motor dysfunction); (2) child constitution; (3) interaction/management; (4) diet; (5) appetite; (6) illness; (7) systemic factors; and (8) caregiver competence. In any given case, not all eight factors need to be present in order for a child to be classified as having a feeding problem—one case may be the result of a single factor, a combination of factors or all factors (Kedesdy & Budd, 1998). The following sections describe in detail, the factors that apply to ASD.

*Physical competence.* Kedesdy and Budd (1998) define 'physical competence' as being physically able to consume textured food. This involves oral motor planning, a skill deficit found commonly in individuals with autism (Anzalone & Williamson, 2000; Kedesdy & Budd, 1998). "When a child is incapable of processing these textures, or

when eating textured food induces fatigue or discomfort, the child may become texture selective” (Kedesdy & Budd, 1998, p. 177-78). Moreover, texture selectivity becomes reinforced, as parents remove these unpleasant textures from their child’s diet.

Assumptions also have been made that when selectivity occurs in the absence of any oral motor dysfunction, it is the result of an abnormal oversensitivity to sensory stimuli (Kedesdy et al., 1998). Talay-Ongan and Wood (2000) used a Sensory Sensitivity Questionnaire-Revised (SSQ-R) to investigate the prevalence and possible significance of sensory modulation impairments in autism. Their results indicated that the autistic group displayed a significantly greater degree of hyper/hypo sensitivities when compared to the non-autistic group. More important was the prominence of gustatory sensitivities in the parent’s anecdotal reports. From a behavioural standpoint, resisting certain stimuli becomes a learned response as eating is now associated with negative experiences. This is evident as all the parents in this study claimed that their children have limited diets because they were resistant to certain food textures and unwilling to try new foods.

Similarly, Ermer and Dunn (1998) used the Sensory Profile (Dunn & Westman, 1995) to determine what factors best discriminate children with ASD from children with attention deficit hyperactivity disorder (ADHD) and from children who are typically developing. The Sensory Profile is a 125-item assessment on which parents record the frequency of their child’s response to commonly occurring sensory experiences. These items are divided into eight categories: auditory, visual, taste/smell, movement, body position, touch, activity level and emotional/social. Results from a discriminant analysis indicated that children with ASD differed most from the other two groups by a number of factors including a high frequency of oral sensitivities.

*Child constitution.* According to Kedesdy and Budd (1998), specific characteristics of the child such as temperament or developmental functioning also can contribute to the development of maladaptive feeding patterns. Although research is limited, studies have assessed the impact ASD has on the child's ability to maintain an adequate diet (Ho et al., 1997; Raiten & Massaro, 1986). Conceptually, it makes sense that specific characteristics of ASD such as, "erratic modulation in activity and insistence on 'sameness'" (Raiten et al., 1986, p. 133) would not only interfere with cognitive and social learning but also interfere with other aspects of learning such as the development of normal eating patterns. In fact, this need for sameness is likely to occur most often during mealtimes, where children with ASD are liable to resist even the most seemingly insignificant change – for example, food is only eaten if presented on a certain plate, or served in a particular way (Howlin, Baron-Cohen, & Hadwin, 1999).

Some theorists postulate the reason for this atypical behaviour is that when a child with ASD first notices an object, a fixed template is formed as to how that object should fit with the rest of the world (Siegel, 1996). Unfortunately, these templates do not always "fit" in a functional manner. For example, Siegel (1996) described a little boy who only drank apple juice if it was presented to him in a blue bottle. If juice was given in any other bottle or cup, the outcome was complete liquid refusal. In this case, what constituted the act of drinking water was not the sensation of thirst or the taste of the juice; rather it was the specific features of the bottle – that is, the colour and material (Siegel, 1996). Like so many other children with autism, the main perceptual characteristic that caught the boy's attention and caused him to subsequently assign meaning to his feeding environment was largely irrelevant (Siegel, 1996). Other



researchers in the field refer to this phenomenon as “stimulus overselectivity”, meaning the individual is only able to attend to restricted portion of stimuli (most often irrelevant) in their environment (Lovaas, Koegel, & Schreibman, 1979). Moreover, overselectivity is more likely to occur when the competing stimuli are multiple, transient, and abstract (Schuler, 1995). For instance, a mealtime with all family members present is especially difficult, as the child with autism is not only required to eat independently, but also to participate in the social aspects of the meal; that is, to respond to ever changing, multiple, abstract social cues, such as words, facial expressions, tone of voice, and body language (Schuler, 1995).

*Interaction/management.* This factor has received much attention in the literature, as parent-child interactions and behaviour management both play integral roles in the development and maintenance of food refusal (Budd & Kedesdy, 1998; Sanders, Patel, Grice, & Shepherd, 1993; Secritz-Mertz, Brotherson, Oakland, Litchfield, 1997). The interaction between a parent and child is often viewed as a simple interchange lasting no longer than a few minutes. Conversely, feeding times involve a complex set of reciprocal interactions, including the mealtime schedule, accurate interpretation of the cues related to satiety and hunger, pacing of feeding, and adaptation of a parent’s behaviour in response to a child’s temperament (e.g., fussiness) (Budd, Chugh, & Berry, 1998). Secritz- Mertz and his colleagues (1997) developed an integrated model to address feeding and nutrition problems of children with various disabilities, including autism. The model describes an interaction between three elements: physical aspects, parent-child interactions, and child behaviours associated with eating. Results from this study indicated that feeding difficulties had a negative impact on family functioning, as there

was an increase in parental stress due to the quality of interaction between parent and child. More specifically, the more time it took each day to feed the child, the more maladaptive the situation became, and the less time parents had to attend to other family needs and duties.

Social interactional processes surrounding eating within the family were also addressed in a study by Sanders, Patel, Le Grice, and Shepherd (1993), in which the authors compared eating behaviours of problem and non-problem feeders. Through observing parent feeding practices and their child's problematic eating behaviour, it was corroborated that parents were involved in a "coercive power struggle" in attempt to make their child eat (p. 71). By using coercion, that is the contingent presentation of unpleasant events, parents tried to gain control of their child's eating behaviour. Coercive control strategies included vague negative instructions, specific negative instructions, and negative prompts/physical contact (Sanders et al., 1993). The authors also noted that this coercive struggle was self-perpetuating in that parent's negative behaviour was intermittently reinforced by consumption of food by the child. Both studies (Sanders et al., 1993; Secretz-Mertz et al., 1997) also investigated the impact that contextual variables had on the child's problematic eating. Secretz-Mertz et al. (1997) found a negative correlation between parental stress and level of social support. In most cases mothers had sole responsibility for making sure the child's nutritional needs were being met. One can assume that this highly demanding task may lead to an aversive situation if support remains nonexistent. As a result, lack of support also contributed to the self-perpetuating cycle, as the mother's aversive interactional style also was a predictor of disruptive feeding behaviour (Secritz-Mertz et al., 1997).

Many investigators have suggested that environmental factors such as behavioral mismanagement during mealtimes frequently contribute to the onset and maintenance of food refusal behavior (Galensky, Miltenberger, Stricker, & Garlinghouse, 2001; Hoch, Babbitt, Coe, Krell, & Hackbert, 1994; Kedesdy et al, 1998; Werle, Murphy & Budd, 1993). Caregivers' maladaptive feeding practices inadvertently strengthen the child's inappropriate feeding patterns. Examples of maladaptive feeding practices include disorganized environments, insufficient use of prompts, providing social attention contingent upon food refusal, permitting the child to leave the table contingent on problematic feeding behaviour, pleading and bargaining with the child, and failing to attend positively to appropriate feeding behavior (Budd & Chugh, 1998; Sanders et al., 1993).

#### *Review of Studies Utilizing Behavioral Interventions*

The most common research to date on the treatment of food refusal behaviour has consisted of clinical case studies or experimental single-subject research studies that use behavioural strategies (Werle, Murphy, & Budd, 1993). Applied behaviour analysis in the treatment of food refusal emerged in the early 1970s and since then has gained a growing body of encouraging data. Numerous studies have demonstrated the effectiveness of behavioural interventions in increasing food acceptance and decreasing mealtime problem behaviour among children with and without developmental disabilities (Galensky et al., 2001). This section will summarize the evolution of food refusal literature in terms of existing behavioural research, highlighting assessment procedures, intervention strategies and results.

### *Positive Reinforcement Intervention*

The intervention that has been employed most frequently is positive reinforcement (Levin & Carr, 2001). This procedure also was among the first to be described in the behaviour literature to address food refusal (Bernal, 1972). Positive reinforcement procedures typically involve providing a child with social praise, access to preferred food or toys, or access to a preferred event (e.g., tickling, singing) contingent on the child's consumption of the target (non-preferred) food, resulting in an increase in the desired behaviour (i.e., consumption). In a quasi-experimental design, Bernal (1972) demonstrated that positive reinforcement might be an effective strategy for the amelioration of food refusal behaviour for a young four-year-old girl with a congenital heart defect. The mother was taught to provide reinforcement for responses of the target feeding behaviour that were closer and closer to the performance criterion—that is, the girl would feed herself and eat a variety of table foods. Reinforcement was first delivered in the form of social praise, and then later combined with access to a preferred activity (i.e., watch a show on television) or access to preferred foods. All problem behaviours were ignored. Feeding sessions took place initially in an outpatient clinic and then at home via phone consultations with the author. At the end of the study the author reported that the young girl had fed herself 50 different foods.

Similarly, Palmer, Thompson and Linscheid (1975) utilized a positive reinforcement procedure to increase food acceptance for a developmentally delayed, six-year old boy who refused solid foods. Positive reinforcement involved the delivery of a preferred food, paired with social praise contingent on the consumption of a non-preferred solid food. The therapist ignored inappropriate behaviour by turning away from

the boy until he ceased the inappropriate behaviour. All feeding sessions took place in an inpatient unit with graduate students or the first author acting as the feeding therapist. In addition, the mother observed all sessions from a monitor and attempted to implement the procedures at home. A quasi-experimental, single subject design was employed to evaluate outcomes. Results suggested that implementing a positive reinforcement procedure increased acceptance of solid foods. During treatment, the boy progressed from eating entirely pureed food to a combination of pureed, minced and solid foods. As well, treatment gains were sustained at 4 month follow-up. However, there were limitations to this study not identified by the authors. First, change in eating behaviour occurred slowly. The boy did not consume his first bite of solid food until very close to the end of the study. Second, the length of treatment sessions ranged from 60 minutes to 210 minutes.

#### *Force-feeding Intervention*

Despite the successes in the aforementioned studies, many researchers encountered some limitations in using positive reinforcement procedures to ameliorate food refusal behaviour. Children with total food refusal displayed the targeted behaviour (e.g., accepting or consuming food) so infrequently (or not at all), that there was little opportunity for the reinforcer contingency to have an effect (Palmer, Thompson, & Linscheid, 1975). Importantly, continuous reinforcement was needed initially to produce high and continual response rates (Iwata et al., 1982). As well, “competing behaviours may be unintentionally reinforced by therapist responses” (Hoch, Babbitt, Coe, Krell, & Hackbert, 1994, p.107). For instance, permitting escape, contingent on the resistance to food consumption, may serve to strengthen the food refusal behaviour. As a result, other

treatment procedures were needed for food refusal that was unresponsive to change by positive reinforcement (Ives, Harris & Wolchik, 1978).

The next leading intervention procedure described in the literature was a forced-feeding procedure coupled with positive reinforcement. Iwata et al. (1982) described forced feeding combined with positive reinforcement as being an educative physical prompting procedure, as it guaranteed the child's behaviour (i.e., food acceptance) would receive the positive reinforcement contingency, and it removed the escape or avoidance components of the inappropriate behaviour (i.e., food refusal). Ives, Harris, and Wolchik (1978) increased food acceptance for a 5 year-old boy with autism in his home and school environment by employing a forced-feeding procedure. Components of this procedure included, physically prompting the boy to accept and chew food presented to him while he lay on his back, with the therapist straddling him. Two fingers were also placed over the boy's mouth to prevent any expulsions. Consumption of food was then immediately reinforced with social praise and hugs. Despite the successes, the authors noted that forced-feeding was unpleasant for the boy, and thus was only warranted when other, more positive strategies failed to produce change in feeding behaviour.

Although this type of intervention is sometimes effective, it has also been well documented that there are many problems with applying aversive interventions to an already stressful and unwilling situation (Munk & Repp, 1994). First, punishment based procedures like forced-feeding may suppress behaviour but not necessarily eliminate it. If a punishment program ends without achieving complete and extended suppression, an increase in the behaviour may result (Newsome, Favell, & Rincover, 1983). Such was the case in the Ives et al. (1978) study – the authors noted that food acceptance declined

during a few days when the boy was left in the care of an adult who was not trained to implement the forced-feeding procedures. Second, some authors believe that forced-feeding if used haphazardly, will develop or worsen food refusal behaviour by creating more anxiety for the child around mealtimes (Palmer, Thompson & Linscheid, 1975). Third, careless use of these procedures may lead to physical and emotional abuse (Newsome et al., 1983). Fourth, punishment procedures such as forced-feeding do not necessarily address the function of the behaviour and thus do not teach a more appropriate behaviour that achieves the same function (Durand and Carr, 1991). Fifth, parents may disapprove of physically prompting their child to eat (Hoch, Babbitt, Coe, Krell & Hackbert, 1994).

#### *Escape Extinction Intervention*

Due to the problems associated with using aversive techniques such as forced-feeding, alternative escape extinction procedures were developed that, “would address behavioural processes maintaining the feeding problem, bring infrequently occurring target behaviours into frequent contact with positive reinforcement contingencies, involve minimal physical contact, and be rated as acceptable by caregivers of children with whom the procedure is used” (Hoch, Babbitt, Coe, Krell, & Hackbert, 1994, p. 108). These procedures were described in the literature as non-removal of the spoon (Hoch et al., 1994) and physical guidance (Ahearn et al., 1994; 2001). Both procedures were often included in a treatment package with a positive reinforcement component.

Hoch et al. (1994) demonstrated that an escape extinction procedure called “contingency contacting”, effectively increased acceptance and consumption of non-preferred foods for two non-feeding children with food refusal behaviour. Contingency

contacting (also known as non-removal of the spoon) involved continued contact of the spoonful of food to the child's lip until the child accepted the bite of food. Acceptance of a spoonful of food resulted in positive reinforcement in the form of praise or tangibles. All inappropriate behaviours were either ignored or blocked. All feeding sessions took place in an inpatient unit, with trained therapists implementing the treatment plan. A withdrawal design counterbalanced across participants documented a functional relationship between contingency contacting and improvements in child eating behaviour. In addition, negative behaviours such as interruptions and negative vocalizations decreased significantly during the contingency contacting phases. Follow-up data concluded that improvements in food acceptance continued to occur 3 months later for one child and nine months later for the other child; both children were reported to have gained weight and to be receiving all of their nutrition orally. Despite these successes, the authors noted that the contingency contacting procedure had some limitations. For example, in the beginning, the therapist would sometimes have to wait up to twenty minutes before the child would accept a spoonful of food. Moreover, the average length of the contingency contacting sessions was approximately 120 minutes.

Ahearn, Kerwin, Eicher, Shantz and Swearingin (1996), were concerned that escape extinction procedures might also intensify an aversive eating experience by causing the development of disruptive behaviour. In an inpatient unit, trained therapists implemented an alternating treatment design of two interventions to determine the relative effectiveness of the interventions and measure "the corollary (problem) behaviour encountered with each intervention" (p.321). Non-removal of the spoon and physical guidance were the two treatment designs that were alternated. According to the



results, both escape extinction procedures increased food acceptance for all participants; however for 2 of the 3 participants, physical guidance produced a steeper acquisition curve for food acceptance and fewer problem behaviors. Moreover, when parents were asked which treatment they would prefer to receive training on, the majority chose physical guidance procedures; it took the child less time to eat and avoided a “stand off” from occurring between the parent and child. Parents were then trained to successfully implement their intervention of choice two weeks prior to discharge from the hospital. Data collected during follow-up indicated that treatment gains for two of three participants were maintained one month after discharge. The authors however, cautioned that multiple treatment interference may have may have improved treatment effectiveness.

Due to reported limitations, Ahearn, Kerwin, Eicher, and Taylor Lukens (2001) replicated the Ahearn et al. (1996) study to determine the relative efficacy of non-removal of the spoon and physical guidance and to measure the occurrence of corollary problematic behaviour produced by each treatment strategy. Functional control was demonstrated by using an ABAC within subject withdrawal design that was counterbalanced across two participants with multiple disabilities. Results showed that both physical guidance and non-removal of the spoon increased food acceptance for both participants, repeating the results of Ahearn et al. (1996). Percentage occurrence of corollary behaviour also decreased in frequency during each treatment condition, with the second exposure to treatment producing the lowest levels of problematic behaviour. Caregivers selected the treatment package that was implemented second, regardless of what the strategy involved. This differed from the Ahearn et al. (1996) wherein all

caregivers chose physical guidance as the treatment to be trained in to feed their child. Finally, nine monthly outpatient follow-up appointments reported 100% acceptance of presented bites for each participant. Importantly, the authors mentioned (post hoc) that food refusal behaviour might have been maintained by negative reinforcement; however this hypothesis was not assessed. Recommendations were made for further research to focus on empirically determining the function of a child's food refusal, as it "may help to better establish the appropriate course of intervention for that child" (Ahearn et al., 2001, p. 400).

Kern and Marder (1996) compared the differential effects on intervention efficacy of providing escape extinction with either simultaneous or delayed reinforcement during the treatment of chronic food selectivity in a boy with Pervasive Developmental Disorder (PDD). Implementation of the study took place in an inpatient hospital unit, with therapists as initial change agents. Although both interventions increased food consumption by the child, simultaneous reinforcement (e.g., corn chip with piece of fruit) was more effective in that it led to a more rapid increase in food acceptance. As well, there were fewer occurrences of self-injurious behaviour during the simultaneous reinforcement procedure than during the delayed procedure.

#### *Antecedent Intervention*

Luiselli (2001) has commented that the problematic behaviours (corollary behaviours) monitored by Ahearn et al. (1996, 2001) are not unexpected when the primary intervention is physical prompting or non-removal of the spoon. Although these procedures may be less aversive than traditional forced-feeding procedures, "clinical experience suggests that many children with food refusal and self-feeding deficits resist

efforts to prompt them physically” (Luiselli, 2001, p. 349). In addition, mealtime sessions are typically longer when a non-removal of the spoon procedure is employed; and, the longer the meals, the more likely the child will engage in challenging behaviour (Ahearn et al., 2001). As a result, in addition to interventions that addressed the escape-and avoidance function of food refusal behaviour, antecedent interventions that set the occasion for food acceptance emerged in the literature. Many experts have argued that the best time to intervene on a problem behaviour is when the behaviour is not occurring (Carr et al., 2002). Moreover, the development of antecedent interventions has led to an increase in multicomponent intervention plans to address the antecedent and consequence variables associated with food refusal behaviour (Hoch et al., 2002).

Munk and Repp (1994) manipulated antecedent variables (type and texture of food) to investigate the relationship between food characteristics and problem behaviour in four individuals with mental retardation. The authors assessed each individual's preference to various textures and types of foods. Results were then categorized into one of four categories. The authors aimed to differentiate between individuals who refused all foods, only accepted foods of a certain type, only accepted foods of a certain texture, or displayed both type and texture sensitivity. It was determined that each individual in the study fit into one of the four categories. Based on their findings, Munk and Repp (1994) then implemented an intervention plan with one subject who had both type and texture sensitivity. The plan involved reinforcing the individual with two bites of preferred food (indicated by the assessment) contingent upon two bites of non-preferred food (different type of food). Also new textures in the food were gradually introduced in 10%

increments. Results from the intervention indicated that the individual increased consumption of new foods as well as exhibited a decrease in negative behaviours.

Similarly, Shore, Babbitt, Williams, Coe and Snyder (1998) utilized a texture fading procedure in order to establish higher texture consumption in children with various disabilities. Texture fading occurs when, “stimulus control over one behaviour is transferred to another behaviour by gradually changing antecedent stimuli” (p.621). In addition, fading procedures were accompanied by positive reinforcement and escape extinction. The children were provided with a favorite activity contingent upon food acceptance and swallowing. The escape extinction procedure involved holding the spoon up to lips until food was accepted. Results showed an increase in consumption of more highly textured foods in all four children; however, no long-term data were provided and generalizability to a home setting was unclear as all four children were assessed and treated in a clinical setting. Furthermore, the authors indicated it was unclear to what extent behavioural mismanagement, skill-based deficits, or conditioned aversion contributed to the development of food selectivity. Thus, the authors proposed that further analysis of behavioural functions was necessary to improve overall effectiveness of treatment.

In a study by Freeman and Piazza (1998), stimulus fading, escape extinction and negative reinforcement (i.e., the termination of an unpleasant stimulus contingent on a response) also were used to treat food refusal in a young girl with autism and severe behaviour disorder. This study differed from Shore et al. (1998), in that the relevant feature of the stimuli was food type (e.g., fruit, vegetables, protein) rather than textures. The escape extinction procedure involved physically prompting the child to accept the

food if there was still noncompliance five seconds after the verbal prompt, “take a bite.” In the negative reinforcement procedure, trained staff were instructed to terminate the meal contingent on the participant’s consumption of a specific amount of the selected food. A multielement design documented a functional relationship between implementation of the treatment package and increased consumption of targeted foods. The extent to which treatment gains generalized to the participants’ home environment, however, was not determined.

#### *Parent Implemented Intervention*

The efficacy of an intervention plan can be measured by the degree to which generalization occurs beyond the treatment phase (Stokes & Baer, 1977). One of the major criticisms of conducting treatment in a clinical setting with professionals as therapists is that generalization of positive outcomes to other natural contexts is questionable (Freeman & Piazza, 1998; Kern & Marder, 1996; Shore et al., 1998). If treatment occurs initially in relevant contexts where behaviour naturally occurs, it is more likely that most extraneous variables associated with problematic eating will be identified and subsequently result in a more effective, and durable treatment plan (Werle, Murphy, & Budd, 1993). Recently, the systematic application of antecedent and escape extinction strategies in the family context has begun to emerge (Anderson & MacMillan, 2001; Luiselli, 2001; Werle et al., 1993). One of the central features of working in the family context is the role of parents as treatment agents. Studies related to feeding problems have increasingly demonstrated that parents have the capacity to become skilled in the use of specific behavioural support strategies (Anderson & McMillan, 2001; Galensky et al., 2001; Luiselli, 2001; Werle, Murphy, & Budd, 1993).

Anderson and McMillan (2001) evaluated the effects of a parent implemented behavioral treatment program for a child with PDD and severe mental retardation who also exhibited food selectivity behavior. Prior to intervention, an interdisciplinary team assessed the child to rule out any physiological or organic causes for his food selectivity. The researchers used written procedures, modeling and videotaped feedback procedures to train the child's parents to use escape extinction and positive reinforcement procedures. Escape extinction involved holding a spoonful of food (fruit) up to the child's mouth until he accepted, and ignoring any interruptions by the child. Positive reinforcement involved praising the child and providing him with a preferred food contingent on acceptance of the target food. Observations gathered within the context of a reversal design indicated that the parents were successful in implementing the aforementioned behavioural strategies. Additionally, the child's consumption of non-preferred food increased dramatically. By the end of the study, he was consuming age-appropriate portions of food.

#### *Functional Assessment Procedures*

Although the interventions described previously have been effective, these interventions were not based on a functional analysis of the factors that occasion and maintain food refusal and related mealtime problem behaviours. In the past two decades, research has placed more emphasis on the use of functional assessment procedures to address problem behaviour in children and adults with disabilities (e.g., Clark, Dunlap, & Vaughn, 1999; Lucyshyn, Albin, & Nixon, 1997; Moes & Frea, 2000). Functional assessment is a process that involves gathering information to understand the function or purpose of problem behaviour. Interviews and observations are used to identify the

environmental variables that set up, trigger and maintain the problem behaviour. The ultimate purpose of a functional assessment is to gather information that will improve the effectiveness and efficiency of an intervention plan (Horner, Albin, Sprague, & Todd, 1999). To date, only a few studies in the food refusal literature have mentioned the use of functional assessment procedures to guide intervention planning.

Werle and colleagues (Werle, Murphy, & Budd, 1993) conducted a study in which chronic food refusal in young children was functionally assessed and treated in the home setting with mothers trained as therapists. A descriptive functional analysis was conducted of each child's home-based mealtime routine. Hypotheses generated from these functional analyses showed that the children engaged in food refusal behaviour to gain access to toys (tangible-motivated) or to avoid eating the non-preferred food (escape-motivated). Following the functional analysis, each mother was taught to implement a series of behaviour change strategies. Specific strategies included the use of clear direct prompts, ignoring disruptive behaviour, and the appropriate delivery of positive attention in the form of social praise and tangibles. A concurrent multiple baseline design was implemented to evaluate outcomes. Results showed a definite improvement in two out of three children's acceptance of targeted foods, and other positive behaviours such as eating independently. Additionally, all mothers increased their use of specific prompts, and their presentation of previously rejected food. Two mothers increased their use of positive attention. However, long-term follow-up data were not collected and so the long-term impact of the home-based treatment package was not determined.

Luiselli (2001) extended the research on functional assessment-based, multicomponent interventions in natural family contexts by investigating the effects of a parent implemented behavior treatment package for a young child with a congenital disorder and chronic food refusal. Descriptive (observations, parent interview) functional assessment procedures conducted during a home-based mealtime routine identified the environmental antecedents and consequences that controlled aberrant feeding behaviour. The author suggested that the child engaged in food refusal behaviour to avoid the demand to self-feed and to gain social attention from his parents. This information guided the development of a multicomponent treatment plan that included two antecedent strategies, visual cuing and demand fading, and a consequence strategy, positive reinforcement. Visual cuing involved the employment of number cards to visually represent the criterion number of self-feeding responses required in each meal before the participant was able to obtain reinforcement. Demand fading strategy entailed a gradual increase in the imposed criterion. Positive reinforcement was provided in the form of social praise, and 'reward time' (i.e., access to a highly preferred toy for thirty minutes). All treatment sessions took place in the home setting with both parents present. Periodically the child's siblings also were present for meals. A changing criterion design clearly documented a functional relationship between parent implementation of the antecedent interventions and a step-wise increase in self-feeding. Follow-up data concluded that improvements continued to occur one year later; the child was reported to have gained 5.5 pounds and to be consuming a wider variety of food textures.

Girolami and Scotti (2001) were the first to demonstrate the utility and feasibility of conducting an *experimental* functional analysis of food refusal and related mealtime



problem behaviour in the home environment where meals typically occur. The authors also demonstrated a high level of concurrent validity between analog conditions and other functional assessment methods (parent interview, parent questionnaires, descriptive observations). First, parental interviews and questionnaires were conducted to identify targeted problematic mealtime behaviours and alternative behaviours. Observations of three separate mealtimes provided the authors with information regarding special circumstances that occurred during mealtimes (e.g., seating arrangement, mealtime schedule, portion size). The authors then set up conditions similar to the natural mealtime routine to systematically examine the variables maintaining disruptive behaviour for three young children. Prior to the analog conditions, the setting was freed of any potential distractions such as toys, siblings and pets. Results indicated that the experimental analysis in the home setting was effective in determining the function of food refusal behaviour. In addition there was a high level of agreement between the various methods of assessing the function of food refusal. For two children, escape from food presentation and other mealtime demands were the primary function. In contrast, the function of the third child's problematic mealtime behaviour was less distinguishable; the authors suggested several functions, including seeking attention and seeking a tangible (i.e., toys).

Levin and Carr (2001) investigated the question of whether or not an intervention focused primarily on manipulation of contextual variables would be effective in increasing targeted food consumption for four children with autism who displayed extreme food selectivity. Specifically, the authors examined the differential effects of four different feeding conditions to determine what condition was the most efficacious in

reducing this aberrant feeding behavior. The four conditions were: (a) access to preferred foods prior to the training meal and no positive reinforcement contingency during intervention; (b) no access to preferred foods prior to the training meal and no positive reinforcement contingency during intervention; (c) access to preferred foods prior to the training meal and use of a positive reinforcement contingency during intervention; and (d) no access to preferred during the training meal and use of a positive reinforcement contingency during intervention. Functional analyses were first performed to evaluate the relationship between problem behaviour and the presentation of preferred versus non-preferred food items in the typical school lunchtime routine. Results from the functional analyses showed that significantly more problem behaviour occurred when non-preferred foods were presented than when preferred foods were presented. Moreover, because the non-preferred food was removed contingent on problem behaviour, the authors suggested that the problem behaviour was maintained by negative reinforcement – that is, the withdrawal of the non-preferred food item. The four treatment conditions were then introduced sequentially in a multiple baseline design across participants. Results for each participant showed that consumption of the largest quantity of targeted food (i.e., non-preferred food) occurred during the condition in which access to preferred foods prior to intervention was denied and a positive reinforcement contingency was implemented.

Galensky, Miltenberger, Stricker and Garlinghouse (2001) extended the functional assessment literature by developing functional assessment procedures that directly related to the problematic mealtime routine. According to the feeding literature, additional behavioural feeding assessments are deemed necessary in order to obtain a thorough picture of a child's past and current feeding patterns, and parents' perspective on how

feeding problems are developed and current behaviours of concern (Kedesdy & Budd, 1998). The purpose of the Galensky et al. study was to investigate whether direct functional assessment methods were more effective than indirect functional assessment methods in determining the function of food refusal behaviour for three young typically developing children. Direct functional assessment methods involved direct observations of the antecedents and consequences that controlled problematic mealtime behaviour. Indirect functional assessment procedures included a functional assessment questionnaire specifically related to mealtime problem behaviour, and a functional assessment interview. Following the completion of each assessment method, the first author determined the function of food refusal and then rated her confidence in the hypothesis on a 7-point scale. Additionally, interobserver agreement on the function of food refusal was gathered by having two experimenters independently review the questionnaire, an audiotape of the interview, a videotape of the meals, and record their hypotheses. Hypotheses developed from direct observations yielded the highest confidence ratings and the highest interobserver agreement. As a result, these hypotheses were used to develop for each child a functional treatment package composed of stimulus fading, reinforcement and extinction procedures. Caregivers were then trained to implement the interventions in the natural mealtime setting, with the entire family present. A multiple baseline across families documented the intervention's effectiveness in improving food acceptance for two of the three children. In addition, food expulsions decreased significantly for one child. A social validity measure also indicated that on the whole, the interventions were acceptable for two of the three caregivers. The authors recognized three variables that affected the robustness of the intervention plan. First, high treatment

integrity was not achieved. The authors postulated that, in their absence, the caregivers were not consistent in implementing the recommended interventions. Second, the caregivers did not appear to agree with a targeted behaviour (i.e., food play) and thus did not implement with diligence the treatment package associated with this behaviour. Third, when developing and implementing the functional treatment plan, the authors did not consider the contextual variables of the natural mealtime routine. Specifically, the authors reported that conducting the study in the natural environment made it more difficult to control extraneous variables such as distractions from siblings.

### *Strengths and Weaknesses of Food Refusal Research*

Collectively, these studies offer empirical evidence of the effectiveness of behavioural strategies in the amelioration of food refusal in children with and without developmental disabilities. Many of these studies also offer initial evidence of key features of a model intervention approach for food refusal and related mealtime behaviour—that is, an approach that leads to meaningful and durable outcomes for both child and family. These key features are: 1) assessment and intervention in typical home settings with family members as interventionists (Anderson & MacMillan, 2001; Galensky et al., 2001; Luiselli, 2000; & Werle et al., 1993); 2) use of functional assessment procedures to guide intervention planning (Levin & Carr, 2001; Galensky et al., 2001; Girolami & Scotti, 2001; Luiselli, 2000; Werle et al., 1993); 3) use of additional assessment procedures focused specifically on aspects of the feeding disorder (Galensky et al., 2001); and 4) multicomponent treatment packages that include antecedent and consequence procedures (Freeman & Piazza, 1998; Munk & Repp, 1994; Shore et al., 1998).

In contrast, these studies also revealed several limitations in the current behavioural literature on food refusal behaviour that may affect the acceptability, meaningfulness, and durability of outcomes. These include: (a) a paucity of research that utilizes all of these key features; (b) limited involvement of parents in assessment and treatment planning; (c) lack of multiple measures of treatment outcomes (d) absence of long-term follow-up data; and (e) little to no attention to the assessment of natural family contexts in which eating problems occur. The following section addresses each of these limitations.

#### *Paucity of Research That Utilizes These Key Features*

To date, only one study has utilized all of the key features listed above. Galensky et al. (2001) functionally assessed and treated food refusal behaviour in the child's natural eating environment with the parent as the primary therapist. In addition, the authors supplemented the functional assessment procedures with a questionnaire specifically related to mealtime problem behaviour. Intervention plans were multicomponent, incorporating both antecedent-based (stimulus fading) and consequence-based (reinforcement, escape extinction) procedures. Other food refusal studies have used two or three of the four key features. For example, Werle et al. (1993) employed a home-based functional assessment that evaluated caregivers' ability to use both antecedent (clear direct prompts) and consequence (positive attention, ignoring behaviour) strategies with their child. This study however, differed from the Galensky et al. study in that the authors did not use additional feeding-related assessment procedures. Luiselli (2000) utilized functional assessment procedures to evaluate the parents' ability to implement a multicomponent treatment package in a home-based mealtime routine.

The routine targeted for treatment, however, was artificially contrived, as the siblings were only present periodically and did not participate in the intervention program. In contrast, Anderson and McMillan (2001) trained the parents to implement multicomponent behaviour support plan in the family's natural mealtime routine. However, there was no mention of the use of functional assessment procedures to guide intervention planning. To conclude, research that addresses problem behaviour in children and persons with developmental disabilities suggest that all four features are important and necessary if the objective is to produce effective, meaningful, and durable outcomes (Carr et al., 1999; Kedesdy & Budd, 1998).

#### *Limited Involvement of Parents in Assessment and Treatment Planning*

In the last twenty years, the significance of parent involvement in the design and implementation of behavioural interventions has gained considerable recognition (Dawson & Osterling, 1997; Koegel, Koegel, Kellegrew, & Mullen, 1996). First, parents are consistently accessible in their children's everyday lives and thus exert a major source of influence social and emotional development (Kedesdy & Budd, 1998). Second, parents are a valuable source of knowledge about their child's strengths, interests, and needs. Third, parents have unique insight regarding their family culture and ecology, such as family goals, values, daily and weekly routines, social supports, and stressors (Lucyshyn et al., 2002).

Recent feeding studies have emphasized the importance of systematically training parents to implement the behavioural strategies in a home-based mealtime routine. Of the studies reviewed, several clearly showed that parents implemented the support plan with accuracy (Anderson & MacMillan, 2001; Bernal, 1972; Galensky et al., 2001; Luiselli,

2000; Werle et al., 1993). However, involvement of parents beyond training them to implement a prescribed treatment plan is rarely mentioned in the literature. Only one study previously reviewed included parents as active participants in the development of the treatment plan (Anderson & McMillan, 2001). The authors took into account parents' preference associated with type of food targeted for intervention and responded to parental concerns by modifying the treatment package. Given these considerations, the authors reported that the parents were able to produce significant changes in their child's consumption of targeted food. At the end of treatment the child was consuming 100% of bites of fruit (the targeted food). In contrast, another study did not consider parents' input related to problem behaviour. This was associated with moderate treatment outcomes (Galensky et al., 2001).

The larger problem behaviour literature has increasingly recognized that effective and durable change for a child with a disability and for the family as a whole is likely to be achieved within the context of a truly collaborative partnership (Lucyshyn, Horner, Dunlap, Albin & Ben, 2002; Moes & Frea, 1999; Vaughn, Dunlap, Fox, Clarke, & Bucy, 1997). In clinical practice this partnership with family members is defined as,

...the establishment of a truly respectful, trusting, caring, and reciprocal relationship in which interventionists and family members believe in each other's ability to make important contributions to the support process; share their knowledge and expertise; and mutually influence the selection of goals, the design the behaviour support plans, and the quality of the family –practitioner interactions (Lucyshyn et al., 2002, p. 12).

During the assessment phase, gaining in-depth knowledge about the child and family is necessary to develop effective and contextually appropriate intervention plans (Lucyshyn et al., 2002). This process is more likely to occur when the interventionist openly listens to parents' experiences and ideas, and attempts to understand as well as

analyze (Webster-Stratton & Hancock, 1998). During plan development, the reciprocity inherent in collaborative partnerships enables the interventionist and parent to mutually exchange ideas, suggestions and concerns. Consequently, soliciting parental input during the development of the plan increases parents' engagement in the intervention (Webster-Stratton et al., 1998). During implementation, the partnership empowers parents to adopt new parenting practices. It also makes it easier for interventionist to modify support strategies that are deemed unacceptable or ineffective.

Traditional single-subject research however, faces a number of barriers in meeting the clinical goal of establishing such a partnership between professionals and family members. First, experimental control is maximized when the researcher is in control of the entire research process (Fawcett, 1991). Second, it is customary for professional researchers who are trained in the professional expert model to be sole decision makers regarding the research agenda (Albin, Dunlap, & Lucyshyn, 2002). As a result, this "colonial relationship" with research participants minimizes parents' influence on the research agenda and their subsequent involvement in the clinical aspects of treatment (Fawcett, 1991, p. 623).

Recently, however, collaborative methods of single-subject research have been developed that have transformed the role of families from passive research subjects to active decision makers in the research process. Common features of this type of research include the participation of parents in defining the research goals and methods, designing the interventions, collecting data, and disseminating the findings (Albin et al., 2002). Users of this approach have noted that collaborative research resulted in data and outcomes that were immediately useful and relevant to consumers (i.e., family members,



other community members). Thus, the external and social validity of research is improved through research partnerships, as research is conducted in environments or settings that are typical to actual practices (Albin et al., 2002).

A number of concerns also arise from collaborative research with families. First, as research moves from more controlled settings such as clinics to less controlled, more natural settings such as a family's home, it has become apparent that researchers need to adopt more flexibility in their scientific practices (Carr et al., 2002). According to Carr and colleagues (2002), researchers must adopt a less stringent attitude towards what constitutes acceptable data and adequate research designs. In particular, acceptable data must extend beyond the parameters of direct observation to include, qualitative data, ratings, questionnaires, interviews, logs, and self-report (Carr, et al., 2002). Likewise, traditional experimental research designs must no longer be considered the "gold standard" for research methodology (p. 9). Other designs such as correlational analyses, naturalistic observations, and case studies may also produce constructive and significant information.

Another major concern related to collaborative research with families is the potential threat to internal validity (Albin et al., 2002). In particular, as co-researchers, family members may be privy to many aspects of the research process. As Albin and colleagues (2002) described, "a concern about sharing information is that family members may act in a biased manner or may purposely control their behaviour to affect results in ways that are consistent with the researchers' hypotheses or expectations" (p. 384). Therefore, researchers must maintain a balance with family members between

disclosure and blindness to research design procedures and expectations for change across research conditions (e.g., baseline, intervention).

Despite these concerns, a number of studies have shown that it is possible to make the leap from collaborating with parents at a clinical level to collaborating with families within the context of research (Fox, Clarke, Dunlap, & Bucy, 1997; Lucyshyn, Albin, & Nixon, 1997; Moes & Frea, 2000; Moes & Frea, 2002; Vaughn, Dunlap, Fox, Clarke, Bucy, 1997). For example, Vaughn and colleagues (1997) developed a research partnership with the mother of a 9-year old boy with Cornelia de Lange syndrome who engaged in challenging behaviour in three valued family routines: 1) a drive-through bank; 2) a grocery store; and 3) a fast-food restaurant. The mother collaborated with the researchers during the functional assessment of the problem behaviour, the verification of the hypotheses generated from the functional assessment, and the development of the positive behaviour support plan. In addition, the mother's reluctance to remove an effective intervention strategy resulted in the researchers changing their research design from a single subject withdrawal design to a quasi-experimental design. Results suggested that implementation of the behavioural support strategies in each routine were effective in reducing problem behaviour to near zero levels and increasing the child's adaptive behaviours. As well, a social validity measure indicated that the treatment plan was acceptable and useful. In a companion study, Fox et al. (1997) qualitatively analyzed the family's experience during the 10-month process of PBS. Two themes emerged from the data. They included the negative impact problem behaviour had on family functioning and the positive impact the behavioural support strategies had on the family's quality of life.

Moes and Frea (2002) conducted an experimental analysis of the efficacy of parent-professional collaboration in the design and implementation of functional communication training (FCT) procedures with three families of young children with autism. Two phases of FCT treatment were compared using a multiple baseline design across participants. They were: (1) standardized FCT treatment procedures; and (2) contextualized FCT treatment procedures. Following functional assessment procedures with each family, the authors taught each mother to implement a standardized FCT treatment package with their child. Then, through a series of family interviews the authors individualized the manner in which FCT treatment procedures were taught and implemented so that each plan was contextually relevant. Topics discussed during the interview process included caregiver demands, family support, and social interactions. Results indicated that standardized FCT improved problem behaviour and functional communication for each child. Furthermore, adapting the FCT treatment package to fit within each family's environment did not compromise the effectiveness of the standardized approach, and may have contributed to the sustainability and stability of the reductions in problem behaviour for each child. Results from a 20-item self-report questionnaire administered to parents indicated that there was an increase in both mothers' and fathers' ratings of sustainability of the FCT treatment packages following modifications made during the contextualized FCT phase.

#### *Lack of Multiple Measures of Treatment Outcomes*

If meaningful and durable outcomes represent the overarching goal of food refusal intervention, than outcome measures need to extend beyond a focus on levels of child problem and adaptive behaviour. Outcome measures also should assess (a)

improvements in parents' skills in supporting adaptive child behaviour during mealtimes; (b) the social validity and contextual fit of treatment plans; and (3) changes in family quality of life that may be associated with intervention (Lucyshyn, Horner, Dunlap, Albin, & Ben, 2002). Measurement of parents' use of effective support strategies (i.e., treatment integrity) during mealtimes is essential due to the role parent-child interaction patterns play in the development and maintenance of food refusal behaviour.

Measurement of family member perceptions of the acceptability and importance of intervention goals, procedures and effects (i.e., social validity) can ensure that the intervention and its outcomes are meaningful to the family. Measurement of the goodness-of-fit of the interventions with the ecology of family routines may provide an advanced indicator of the extent to which treatment integrity and long-term maintenance of effects will be achieved. Such measurement prior to plan implementation may help to improve the fit between plan strategies and the ecology of each family routine.

Measurement of family quality of life can provide some indication of the extent to which intervention in specific family contexts such as valued mealtimes has additional impact on aspects of a family's quality of life as perceived by the child's parents. By broadening outcome measures, it is more likely that interventionists will gather the formative and summative information necessary for evaluating progress and for improving the effectiveness, acceptability and contextual fit of behavioural interventions and implementation support strategies (Lucyshyn et al., 2002).

Across the food refusal studies cited, the outcomes that were most often measured were child food refusal and food acceptance behaviours. In addition, a few studies measured parents' accuracy of implementation of the behaviour support strategies

(Anderson & McMillan 2001; Galensky et al., 2001; Werle et al., 1993). Parent treatment integrity was measured by scoring, from videotaped mealtime sessions, parents accurate use of specific treatment components. Galensky et al. (2001) further extended their evaluation of outcomes by assessing the family's perceptions of the social validity of the treatment plan. Family members completed a questionnaire composed of nine items and a 5-point Likert-type scale (1 = disagree; 5 = agree). However, of the food refusal studies cited, only a few extended their measurement strategies beyond levels of problematic feeding behaviour.

In summary, multiple measures pertinent to the child and family offer a richer and more comprehensive picture of relevant child and family outcomes. Such comprehensive information provides data that can evaluate, as well as help to improve, the meaningfulness, acceptability, effectiveness, and durability of child and family outcomes.

#### *Lack of Long-term Follow-up Data*

Consumers of behavioural interventions are concerned with problem behaviour for extended lengths of time (Carr et al., 1999). Indeed, a major characteristic of food refusal is that feeding problems persist over long periods of time (Hoch et al., 1994). As a mother of a child with ASD reported, "Harry's diet is much better than it was a few years ago and I'm proud of all the progress he's made, but there still is a long way to go" (Legge, 2002, p. 194). As a result, consumers are no longer satisfied with short-term demonstrations of treatment efficacy. Instead, long-term follow-up measurement is necessary to assess the durability of the treatment plan. Specifically, in the problem behaviour literature, it is recommended that outcomes continue to be measured for at least six months. Of the studies reviewed, only three measured long-term outcomes

beyond six months (Carr et al., 1999). Ahearn et al. (2001) collected follow-up data for both participants once per month for nine months post-intervention. Each follow-up measurement session consisted of the parent feeding the child one meal while the first author or feeding therapist recorded eating behaviour. Hoch et al. (1994) collected follow-up data nine months post-intervention via a telephone interview with a parent of one participant. The parent was asked to report changes in the child's weight as well as eating behaviour. Similarly, Luiselli et al. (2001) contacted the parents one year later and asked them to document the types of food their child was eating consistently at mealtimes. Other studies also gathered follow-up data; however, data were collected for shorter periods of time—typically, one to three months after the final intervention phase (Ahearn, Kerwin, Eicher, Shantz, & Swearingin, 1996; Palmer, Thompson, & Linscheid, 1975). To conclude, long-term follow-up measures of child and family outcomes are essential to determine the durability of an intervention plan. In addition, data that are gathered intermittently post-intervention (e.g., once every 1-2 months) enables interventionists to reassess or redesign supports in response to the different challenges the child or family may encounter during different stages of life (Turnbull & Turnbull, 2001).

*Little to No Attention to the Assessment of Natural Family Contexts in Which Eating Problems Occur*

Although functional assessment procedures assist in the development of technically sound behaviour support strategies that are a good “fit” for the targeted child, these assessment procedures may not sufficiently assess the contexts in which problem behaviour occurs. Behaviour support plans that are technically well grounded are likely to fail if they do not take into account features of natural settings that may support or

impede the implementation of the behavioural interventions (Albin, Lucyshyn, Horner, & Flannery, 1996). Hence, experimenters also must be concerned with designing plans that are a good fit with family life. More specifically, “the term *contextual fit* or *contextually appropriate* refers to behaviour support plans that are congruent with child, implementer and setting variables...” (Lucyshyn et al., 2002, p. 23). Relevant child variables are identified during the functional assessment process and focused on during plan development. Specific variables include setting events that set the stage for or increase the likelihood of problem behaviour, immediate antecedent events or interactions that trigger the problem behaviour, and the maintaining consequences for problem behaviour. In addition, if performed accurately, a functional assessment can illuminate the child’s strengths, abilities, and preferences. The variables relevant to family members implementing the support plan include the goals and values of the family, the strengths and skills of family members, available resources and social supports for the family and sources of stress that may interfere with plan implementation. The congruity among the goals and values of the plan and those of the family members implementing it is paramount to a plan’s success. It is important for a plan to build on and emphasize current strengths of family members, to incorporate resources and social supports and to diminish stressors. Finally, relevant setting variables include the features of everyday routines and activities in which the support plan is implemented. Support plans that fit well within existing routines or activities are more likely to be sustained over time (Albin et al., 1996).

Recent research on problem behaviour suggests that attention to contextual variables is associated with better treatment outcomes. When a behaviour support plan

possesses good contextual fit, families are more likely to: (1) view the support plan as functional and acceptable; (2) implement the strategies with fidelity; (3) continue to use the plan for protracted lengths of time (Clarke, Dunlap, Vaughn, 1999; Lucyshyn, Albin, Nixon, 1997; Moes & Frea, 2000).

Within this new, contextual view of problem behaviour, the activity setting is viewed as a unit of analysis that offers useful information about the context (e.g., activity or routine) in which problem behaviour occurs. This construct, grounded in the field of cross-cultural anthropology, provides information about family contexts that extend beyond information gathered in a functional assessment. Activity settings are everyday routines that provide the child with opportunities to learn and develop (Galimore, Goldenberg, & Weisner, 1993). Such of routines include for example, getting ready for school in the morning, going grocery shopping, eating lunch at home, or playing with a sibling after supper. Families proactively strive to construct activity settings that reflect child characteristics; the family's goals and values; and the constraints, pressures, and resources in the environment (Berheimer & Keogh, 1995). Activity settings may be analyzed in terms of six components: 1) time and place, 2) people present, 3) resources, 4) tasks and their organization, 5) goals and values, and 6) child-parent interactions (Lucyshyn et al., 2002). There are several benefits to assessing problem behaviour within the context of a valued but problematic activity setting. First, activity settings are a mix of objective reality and the social construction of the family (e.g., people, tasks, goals and values), and therefore provide an appropriate environment for designing contextually appropriate support plans. Second, plan implementation becomes focused and simplified when a behaviour support plan is implemented within one or two routines at a time.



Third, embedding behavioural strategies within an existing problematic family routine can help parents better support their child with problem behaviour in the midst of other family tasks or activities. Of the food refusal studies cited, a few assessed and implemented treatment plans in the child's natural eating environment with parents as initial therapists (Anderson & McMillan, 2001; Galensky et al., 2001; Werle et al., 1993). None of these studies, however, addressed the contextual variables in which the problematic feeding behaviour occurred. In fact, Galensky et al. (2001) reported in their discussion that one of the major weakness of their study was that they did not consider the contextual variables of the natural mealtime routine. They suggested that this made it more difficult to control extraneous factors, such as sibling interactions.

#### *Positive Behavior Supports with Families*

As mentioned previously, there are several limitations of current behavioural intervention research in the area of food refusal among children with developmental disabilities. These limitations may constrain the meaningfulness, acceptability, and durability of outcomes for children and their families. These limitations however, have been addressed by an approach to problem behaviour that is closely allied with applied behaviour analysis. This approach is called Positive Behaviour Support (PBS). Unlike current food refusal studies, PBS has grown beyond traditional behaviour management strategies, into an approach that is guided by person-centered values and real-life problems confronted by families (Horner, Albin, Sprague, & Todd, 1999). The approach "marries values with a technology of behaviour change" (Lucyshyn, Horner, & Ben, 1996, p. 32). The primary goals of PBS, as stated by Carr and his colleagues (2002), are to assist an individual in improving his or her behaviour and lifestyle in a direction that

gives the individual and his or her family, “the opportunity to perceive and to enjoy an improved quality of life” and “to render problem behaviour irrelevant, inefficient, and ineffective” (pg. 5). Although PBS has been described in a variety of ways, there is general agreement that it has a number of critical features. Some of these features are already found within the food refusal literature and were described earlier in the literature review section. They are: (a) use of functional assessment procedures to understand problem behaviour; (b) designing multicomponent support plans; and (c) assessment and intervention in typical home settings with family members as interventionists. Four additional core features of PBS match the deficiencies in the food refusal practice and research previously discussed. These features are: (a) developing collaborative partnerships with families; (b) designing contextually appropriate support plans; (c) use of multiple measures; and (d) collecting long-term follow-up data. According to Carr and his colleagues (2002), effective, durable and meaningful outcomes are much more likely to be achieved if all of the key features of PBS are integrated into a cohesive whole. Eight key features of PBS with families supporting children with developmental disabilities are summarized in Table 1.

Table 1

*PBS With Families*

1. **Collaborative partnerships.** For the holistic, long-term goals of PBS to be achieved, the development of collaborative partnerships between family members and professionals is essential (Bailey, 1987; Singh, 1995). Family members are viewed as experts about their child, their family's culture, and their visions for the future. The expertise of educators also is acknowledged. During the support process, family knowledge is incorporated into the development and revision of support plan procedures.
2. **Family-centred support.** The broad aims of PBS with families are to strengthen the family system and empower individual family members. Central to the approach is the design of supports and services based on family defined needs (Dunst, Trivette, Starnes, Hamby, & Gordon, 1993). Desired outcomes include family members solving new problems of child behaviour and effectively mobilizing resources (Lucyshyn, & Albin, 1993; Singer & Irvin, 1989).
3. **Effective environments.** PBS is essentially about building effective environments. The focus is not on changing the child with problem behaviours but changing the features of family settings. When an effective environment is established, problem behaviours become irrelevant, ineffective, and inefficient at achieving their function (Horner, O'Neill, & Flannery, 1993).
4. **Functional assessment.** A large body of research indicates that problem behaviours serve functions such as escaping demands or getting attention (Carr et al., 1994). A functional assessment includes interviews and observations with family members to confirm hypotheses about the purposes of problem behaviours and the events that predict their occurrence (O'Neill et al., 1997). This information is used to design an effective support plan.
5. **Multi component support plans.** An effective support plan typically includes multiple components: (1) ecological interventions; (2) preventative strategies; (3) strategies to teach new behaviours and skills; (4) effective consequences; and (5) emergency procedures. Emphasis is placed on prevention and education through strategies such as building predictability and choice into daily activities and designing meaningful curricula. Support plans also include consequences that make problem behaviour ineffective but never include procedures that cause physical pain, loss of dignity, or humiliation.
6. **Communication as the foundation of positive behaviour.** Many problem behaviours occur because the child does not know a more appropriate way to communicate a want or need. Understanding the function of problem behaviours is an essential first step in identifying the language (verbal, augmented) the child needs to communicate (Reichle & Wacker, 1993). Teaching language is at the heart of an effective support plan.

Table 1 (*continued*)

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7. **Inclusive lifestyles.** A child with severe disabilities often develops problem behaviours in the context of a lifestyle with limited activities and friendships. Thus, a central aim of the approach is to create a rich, inclusive lifestyle in which the child actively participates in family, school, and community life, and develops meaningful friendships (Risley, 1996).
  8. **Contextual-fit.** PBS plans are designed to be technically accurate and a good contextual fit with the goals and values, resources, and routines of the child's family at home (Albin et al., 1996). By achieving a contextual-fit, plans are more likely to be acceptable and sustainable over time.
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Thirty years of applied research have contributed empirical data that support the value of behavioural support strategies in the amelioration of food refusal behaviour. Through replication and extensions of previous research, applied behaviour analysts have in the area of feeding problems have continued to refine their approach to dealing with persistent feeding difficulties in young children. The expanded features of PBS offer an opportunity to further refine and extend our knowledge of effective and durable treatment of feeding disorders because of its emphasis on broader concerns with family ecology and meaningful and sustainable systems of support. Thus, the merging of applied behaviour analysis research in feeding disorders with the central features of positive behavioural support may lead to an improved approach to supporting families and children with food refusal behaviour.

### *Research Problem*

Although PBS and family-centred procedures are common practices in research that addresses problem behavior, this approach has not yet been applied to children who exhibit food refusal behavior. In fact, many of the shortcomings of past studies may be avoided if a positive behavior support approach were used to support families with a child with ASD who also displays food refusal behavior. The purpose of the proposed research is to determine the efficacy of a food refusal intervention using a family-centred, positive behavior support approach. Hence the present study will address the following questions:

Is there a strong association between a family-centered, positive behaviour approach and improvements in eating behaviour for a child with ASD during a home-based, mealtime routine?

Is there a strong association between a family-centered, positive behaviour approach and generalized improvements in child eating behaviour?

Is there a strong association between a family-centered, positive behaviour approach and sustained improvements in child eating behaviour up to six weeks following termination of the implementation support?

## CHAPTER 2

### Research Methodology

#### *Participants and Setting*

One family of a 6-year-old child with Autism Spectrum Disorder (ASD) participated in this intervention project. The child, Karim, was diagnosed with having ASD at the age of 4 years and 5 months. His parents and school team described Karim as being an affectionate, energetic, and social little boy. He loved to run around outside with his brothers and the neighbourhood children, go to the playground, play videogames, and watch Mr. Bean videos. With only a few spoken words (e.g., hi, bye, no), Karim primarily communicated with others using picture symbols and contact gestures (e.g., leading others by the hand, bringing objects to the person). Receptively, Karim understood instructions best when they were familiar, short, or augmented with pictures. Karim is toilet trained, however he required support with other self-care activities such as, washing hands, brushing teeth, feeding self, and getting dressed.

For the duration of the study, in addition to a year prior to it, Karim and his family participated in a community-based early intervention program based on the principles of applied behaviour analysis. The family and Karim's school team received approximately 6 hours a month of support from a behaviour consultant. Karim's program focused on functional communication, play, and socialization. At the time of study Karim also attended Grade 1 at his community elementary school.

Karim is the second youngest child in a middle class, Canadian family of Middle Eastern descent. He lives at home with his mother Shabnam, and his father Jabbar. Karim also has two older brothers ages 11 and 9, and a younger brother, age 5, who also has a

diagnosis of autism spectrum disorder. His mother was the primary participant throughout the research and family support process. Shabnam stays at home as primary caregiver. In addition to taking care of the four boys and managing the household, she is the key implementer of both boys behavioural intervention programs (developed by the community-based behaviour support team). Jabbar works long days as a doctor and director of an Islamic community center.

Karim and his family were referred for participation in the study by the behaviour consultant providing support to Karim and his younger brother.

The experimenter met with the parents to describe to them the purpose of the study. The family expressed an interest in the study and agreed to participate in an initial screening interview and home observations. During the interview, the experimenter asked the parents a series of questions to determine whether or not Karim's problematic feeding behaviour warranted the need for an intensive intervention for food refusal. At the time of the study, Karim consistently consumed soda crackers, rice, water, donuts, and Dad's cookies®. His parents reported that Karim vehemently refused new foods. To maintain proper health and development, his parents supplemented Karim's diet by feeding him 4 cans of Pediasure® a day. Although his food refusal behaviour appeared to be chronic, earlier reports from an occupational therapist ruled out any organic causal factors (e.g., physiological abnormalities, allergies). A potential intervention setting was then identified. Two subsequent observations in the home served to confirm the presence of persistent feeding difficulties. Following these activities, the family agreed to participate in the study and completed informed consent forms (see Appendix A).

One setting in the form of a child snack routine was selected for assessment and intervention. The mother, mindful of her current stress level, felt that snack would be the simplest routine to intervene on as meal preparation was minimal, and it would require only occasional participation from her oldest boys.

All assessment activities occurred in the kitchen of Karim's home and were implemented by Karim's mother. Initial intensive training sessions occurred in Karim's bedroom and were implemented by the experimenter. The remaining training sessions occurred in the kitchen and were implemented by Karim's mother.

#### *Measurement*

This study used a multiple probe measurement procedure to monitor the dependent variables and to document implementation of the independent variable. The basic measurement procedure is described below.

#### *Equipment and Materials*

Observations during the snack routine were videotaped using a digital video camera and then later scored by the experimenter. An IBM compatible desk-top computer with a video monitor was used to collect data from each videotaped session. Data sheets and a tape player with prerecorded intervals were used to record the percentage of intervals of target behavior and to compute interobserver agreement.

#### *Observation Sessions*

Direct observation sessions occurred in one child snack routine. Two kinds of observation sessions were conducted in this home routine: (a) observation probes with parent and (b) training probes with therapist. These are briefly described below.



### *Observation Probes*

Observation probes were conducted during baseline, parent training, generalization, and follow-up phases. During observation probes, the observer videotaped child and parent participation in the snack routine until stable behavioural patterns were evidenced (e.g., stable, low percentage of consumption during baseline; stable high percentage of consumption during intervention phases). On observation probe days, training and support activities did not occur. The completion of a set of observation probes for each phase took between 2 and 3 weeks. As well, for the duration of the study, the family was asked to have no outside visitors and limit phone calls during the videotaped observation sessions.

### *Training Probes with Therapist*

Training probes only were conducted during the intensive training with therapist phase. During each training session, using a pen and notebook, the therapist collected data on Karim's trial by trial response to food presentation. The therapist collected data until stable and socially valid behaviour improvement was evidenced. Approximately 15% of training probes with the therapist were videotaped for the purpose of conducting interobserver agreement with a second, independent observer.

### *Observation Session Procedures*

Observation sessions were scheduled on a day convenient to the family. Sessions occurred during the time of day envisioned for the snack routine (e.g., between 4:00 pm and 4:15 pm). Before an observation session, several preparation tasks were completed by the family and by the observer. Karim's parents reviewed the operational definition(s) of the envisioned routine and ensured that material resources and the general structure of

the routine were present (e.g., food was prepared, table set). The observer then took a standing position in the kitchen area that maximized observation of parent and child, placed a wide-angle lens on the camera, and trained the video camera on the family.

Karim's mother initiated each snack routine by telling Karim it was snack time and prompting him to come to the table. During the observation, the observer maintained a position 3-5 feet away from Karim and his mother. The observer attempted to keep each family member in the field of vision, but if Karim stepped outside the video camera's field of view, the observer kept the camera trained on Karim. The observation session continued until the routine was complete or until a criterion level of problem behaviours was reached. Following the conclusion of an observation session, the researcher thanked the family for their effort.

#### *Observation Procedures with Therapist*

During the intensive training phase, training observations with therapist and child occurred during the time the therapist regularly worked with the child (e.g., between 3:30 pm and 4:30 pm). Prior to a training session, the therapist completed several preparation tasks. The therapist ensured all foods and materials were present for the session, and that the small table and chairs were positioned in the middle of Karim's bedroom. The therapist recorded in a notebook Karim's response after each presentation of food. Data were collected for a predetermined set of trials, approximately 10 trials per session.

During videotaped training observation sessions, the therapist completed all previous steps as well as placed a wide-angled lens on the camera and set it up on a tripod in the corner of the room approximately three feet away from the child. Once the child

was sitting in his chair, the therapist checked the camera to ensure that it was indeed trained on the child and the therapist's chair.

### *Dependent Variables*

Eight dependent variables were measured: (1) percentage of intervals of food consumption; (2) percentage of trials of food consumption; (3) latency in minutes to termination of snack routine due to problem behaviour or to successful completion of snack routine; (4) numbers of steps completed; (5) percentage of intervals of occurrence of parent's use of support plan procedures; (6) average rating of the social validity of the support effort; (7) average index of the support plan's "goodness-of-fit" with the family's ecology; and (8) average rating of the quality of family's life.

### *Food consumption during routine*

Food consumption included prompted and self-initiated consumption. *Prompted consumption* was defined as the child placing the food item in his mouth within 10 seconds after presentation of the utensil and/or physical or verbal prompt from parent, then swallowing the food item without expulsion. *Self-initiated consumption* was defined as the child independently (i.e., before a prompt from parent, or 10 seconds after the last prompt from parent) picking up food either by his fingers or with a utensil, placing the food in his mouth, and then swallowing the food item without expulsion. Prompted and self-initiated consumption were measured as the percent of intervals of occurrence during observation sessions in the snack routine. The observation interval was 30 seconds (Richard, Taylor, Ramasamy, & Richards, 1999). An occurrence was scored if the target behavior occurred at any point during the interval. The percentage of intervals of prompted or self-initiated consumption was calculated by dividing the number of

intervals the child engaged in either prompted or self-initiated consumption by the total number of intervals and then multiplying by 100.

#### *Food Consumption During Training With Therapist*

Food consumption included food refusal, acceptance, and self-eating. These dependent measures were gathered only during training sessions with the therapist. *Food refusal* included crying or protesting, physical refusals such as keeping lips tightly closed, pushing spoon away, wiping or attempting to wipe food from tongue, and spitting food off spoon or lips before it entered the mouth. *Acceptance* was defined as the child opening his mouth to accept a food item delivered by the therapist, and then swallowing that food item without expulsion. *Self-eating* was defined as the child picking up the spoon or food item presented in a dish by the therapist, placing the food item in his mouth, and then swallowing the food without expulsion. Food refusal, acceptance, and self-eating were measured as the percent of trials of occurrence during a training session with therapist. In order to transfer stimulus control to the food, the therapist faded her prompts by using a time delay procedure. The latency of the delay of the prompt increased gradually from 0 seconds (simultaneous prompting) to 2 seconds to 4 seconds and up to 25 seconds. As a result, an occurrence was scored if the target behaviour occurred between 2-25 seconds, depending on where Karim was in the fading process. The percentage of trials was calculated by dividing the number of trials the child engaged in the targeted behaviour by the total number of trials and then multiplying by 100.

#### *Latency in Minutes to Termination or to Successful Completion of Routine*

Karim's problem behaviours during eating/mealtime routines were potentially physically harmful to himself or others and discomforting to his mother. For this reason,

an observation and data recording strategy similar to one developed by Carr and Carlson (1993) was used. A criterion level of problem behaviours for terminating the observation of the snack routine was collaboratively defined with Karim's mother. The criterion balanced the parent's goal of including Karim in a valued mealtime routine with the ethical need to ensure physical safety and preserve the mother's dignity. The criterion level of problem behaviour for terminating the routine is described in Table 2.

Latency to termination of the snack routine because of a criterion level of problem behaviours was defined as the number of minutes that elapsed between the initiation of the routine and: (a) the first instance of intolerated problem behaviour; or (b) the third instance of tolerated behaviour. Latency to successful completion of the routine was defined as the time to completion of all critical task steps in the routine without the criterion level of problem behaviours occurring at any step of the routine.

The decision to terminate an observation because of problem behaviour was made by the observer videotaping or by Karim's mother. When the frequency or intensity of the behaviour matched the criterion, the observer prompted Karim's mother to stop the routine, or Karim's mother prompted the observer to stop videotaping. After the snack routine was terminated, Karim's mother provided Karim with the minimal physical assistance to prevent injury, and helped him leave the physical area (e.g., turned his chair away from the table so he could get up and run into the other room). When the observer was not certain that the criterion for terminating the session was met (e.g., wasn't sure if the food passed his lips before he expelled it) the observer continued the observation session until certain, or until prompted by Karim's mother to stop videotaping. In this event, the observer determined the latency in minutes to the criterion level of problem

behaviours by observing the videotape and evaluating the sequence of problem behaviours exhibited by Karim during the snack routine.

If the criterion for terminating due to problem behaviours did not occur, the routine continued until the mother determined that the routine was completed (i.e. until Karim's plate and bowl were empty). If the snack routine was completed successfully, the observer used the observation session's data file time mark to record the total time of the routine.

#### *Steps Completed in Snack Routine*

The mother identified and described six steps she would like her son to complete during the snack routine. These steps were defined as the following: (1) Karim comes to the table and sits and waits for his mom to give him snack; (2) Karim eats snack independently or with support from mom; (3) Karim uses napkin to wipe mouth and hands; (4) Karim stays seated throughout snack; (5) when plate/bowl is empty, Karim puts dishes in sink; and (6) Karim throws napkin in garbage. If the criterion for terminating due to problem behaviours occurred, the number of steps completed before termination of the routine was recorded. If the criterion for terminating the routine did not occur, the experimenter recorded the number of steps completed before the mother determined the snack routine was finished.

Table 2

*Criterion Level of Problem Behaviours for Terminating Routine*Untolerated Behaviours

1. Vomiting: defined as emitting contents of the esophagus or stomach, consisting of previously digested food or liquid, past the plane of the lips.
2. Aggression: defined as behaviour directed towards others that caused or had the potential to cause tissue damage (e.g., hitting, kicking, child hitting others with his fist, head or feet).
3. One high intensity self-injurious behaviour: defined as the child banging his head on objects in the environment (e.g., wall, chair, table)

Tolerated Behaviours

1. Three low intensity self-injurious behaviours: the child hitting himself in the head with his fist.
2. Screaming or tantrumming for 30 seconds
3. Three instances of throwing food: defined as the child picking up food with his hands and releasing it into the air.
4. Three instances of leaving the table: defined as anytime the child's buttocks lifts off the chair except to reach for a meal related item.
5. Three instances of spitting out food: defined as any time food that was previously in the child's mouth is spit out beyond the lip or chin area or is taken out of the mouth with fingers.

*Parent Implementation Fidelity of PBS plan*

Parent implementation fidelity (treatment integrity) was defined as accurate implementation of the following six positive behavior support strategies (see Table 3): (1) presentation of foods from a defined instructional universe of foods; (2) visual strategies; (3) positive contingency statement, (4) proactive task prompt, (5) contingent praise, and

(6) escape extinction procedure. These interventions constituted the core components of the multicomponent behaviour support plan that Karim's mother implemented in the snack routine. Approximately 1/3 of the child's intervention sessions were scored for parent's accurate use of the proposed treatment components. Parent behaviour was scored as the percentage of intervals of accurate implementation. The observation interval was one minute. The percentage of intervals of implementation fidelity 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 Validation*

Karim's mother also evaluated the social validity of the intervention approach. A 10-item instrument was used to assess the acceptability and importance of intervention goals, procedures, and outcomes. The questionnaire was adapted from a social validity instrument designed by Lucyshyn and colleagues (1997). Karim's mother rated each item on a Likert-type scale from 1 to 5 (1= disagree; 5=agree). Karim's mother completed two evaluations during the intervention phase and one during the follow-up phase. For each of the mother's evaluation an average social validity rating across 10 items was computed, and this average was used as a formative index of social validity. Across three evaluations a grand average was computed, which provided a summative index of social validity. During these computations, ratings for items 3 and 7 were converted to reflect the same direction of agreement (1=disagree; 5=agree). The social validity evaluation form is presented in Appendix B.



Table 3

*Operational Definitions of Positive Behaviour Support Plan Procedures*

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1. *Define an instructional universe of foods:* A defined instructional universe is a setting event strategy and is scored categorically. That is, the intervention is scored as present or not present during the snack routine. The instructional universe of foods is defined as the presence of a food from 2 to 3 of the groups chosen by the parent. Specifically, during the snack routine a food from two to three of the food groups need to be observed on the kitchen table, and placed in front of Karim with the expectation that he eats the food (e.g., cheese whiz and cracker, peanut butter and cracker, apple, banana, applesauce, yoghurt, pudding).
2. *Visual Strategies:* The parent uses two picture sequences with Karim during the snack routine: 1) the parent uses a picture schedule of the routine to increase Karim's knowledge and memory of expectations (e.g., snack, put plate in sink, throw napkin in garbage, finished, get game boy); 2) the parent uses a visually mediated positive contingency with Karim. The contingency differs depending on how successful Karim is at eating the targeted foods. For example, if Karim is just learning to eat a new food and is required to eat four bites, four pictures of the new food are placed on the picture schedule. Alternatively, if Karim is able to eat a nutritionally appropriate portion of food, one picture symbol of that food will be placed on the schedule. The use of visual strategies is scored only if (a) each is reviewed prior to the presentation of food, and after a step is completed, and (b) Karim's mother shows a step has been completed by removing that picture symbol off the picture sequence.
3. *Positive contingency statement:* Karim's mother tells Karim what behaviour(s) he needs to do, and the positive reinforcer he will get after engaging in the behaviour(s) (i.e., "finish your food and then you can [get reinforcer]"). The reinforcer can be a preferred item (gameboy), or activity (play outside, go to the park). A positive contingency statement is only scored when the contingency statement is made before a significant problem behaviour occurs.
  - a. Examples: "Eat banana and yoghurt and then you can go play outside"
  - b. Nonexample: "Eat your food because it tastes good"
4. *Proactive task prompt:* Karim's mother presents Karim with prompts that promote correct responses to relevant stimuli in the eating routine. These prompts are proactive because they occur before performance errors or problem behaviour occurs. There are two types of proactive prompts. Stimulus and response prompts. Stimulus prompts show Karim what to look at. Response prompts show Karim what to do. To avoid Karim becoming dependent on his mother to help him eat, prompts should be faded from verbal to gestural or physical as quickly as possible. As a result, a proactive task prompt will only be scored if a gestural or

Table 3 (continued).

- 
- physical prompt precedes a verbal prompt prior to performance errors or problem behaviour.
5. *Contingent praise*: Karim's mother delivers praise contingent on desirable behaviour (within 3 seconds). Praise may comprise of an evaluative comment and/or descriptive comment. Praise statements may include a statement of what Karim did and what he gets. Each discrete statement is scored—that is, each independent phrase or sentence of praise is scored. The category is not scored if a reinforcer is delivered after Karim engages in problem behaviours or errorful performance. Also, this category is not score if Karim is not actually engaged in the behaviour that is being descriptively praised.
    - a. Examples: "Good eating Karim! You ate all of your apple", "You are doing such a good job eating all on your own"
    - b. Nonexamples: "Good eating" after Karim has put the spoon up to his mouth but did not deposit the food into his mouth. "That's okay try again", after Karim has spit the food out onto the floor.
  6. *Escape extinction procedure*: Karim's parent continues to hold the spoon of food up to Karim's lips until the food is accepted and consumed. If Karim expels the food, his mother presents another spoonful of the same food to Karim until accepted and consumed. Karim's mother ignores Karim if he engages in minor problem behaviour (e.g., turning head, pushing spoon away, crying or screaming) and redirects him to the task (e.g., eat your food).
- 

### *Goodness-of-Fit Measure*

The "goodness-of-fit" assessment questionnaire was designed to evaluate how well the behaviour support plan fit with the ecology of the family (Albin, Lucyshyn, Horner, & Flannery, 1996). A revised questionnaire, composed of 12 items was used. The items sampled five parameters relevant to goodness-of-fit: (a) goals and expectations; (b) support roles; (c) congruence to lifestyle; (d) implementation effort and; (e) sustainability. Family members rated each item using a 5-point Likert scale (e.g, 1 = little; 5 = a lot). Karim's mother completed a "goodness-of-fit" questionnaire twice

during the intervention phase and once during follow-up. For each of the parent's evaluation, an average rating across the 12 items was calculated, and was used as a formative index of goodness-of-fit. Across three indices of goodness-of-fit, a grand average was computed and served as a summative index of goodness-of-fit. During these calculations, ratings for items 9 and 11 were converted to reflect the same interpretation as the other 12 items (e.g., 1= poor fit; 5=good fit). The goodness-of-fit survey form is presented in Appendix C.

### *Quality of Life Measure*

The family's well being was measured by administering The Beach Center Family Quality of Life Survey (Beach Center on Disability, n.d.) to Karim's parents once during the baseline phase and once at the end of the study. Karim's parents were asked to rate the importance and satisfaction on 41 questions that fall into five family quality of life domains: (a) family interaction; (b) parenting; (c) health and safety; and (d) family resources; (e) support for family member with disabilities.

### *Interobserver Agreement*

#### *Observer Training*

The experimenter trained another graduate student in the department of Special Education at UBC to conduct observations in the family's home and also to collect data using the video monitor, cassette recorder and scoring sheets. The observer received approximately 5 hours of training prior to collection of baseline data for child behaviour. Training materials included guidelines for observing the snack routine and scoring data sheets containing operational definitions, examples and non-examples of child behaviour, and a scoring protocol. Training activities included discussion and practice of: (a)

observations in the family's home; (b) criteria for terminating an observation session; (c) use of video monitor, cassette recorder, and scoring data sheets for data collection; and (d) child behavioural data coding.

Baseline data collection began after the observer achieved 90% interobserver agreement for each child behavioural category across two pilot observations in the snack routine.

Because we could not define parent's accurate implementation of support procedures before the support plan was designed, observer training for coding parent implementation fidelity began during the intervention phase of the study. After receiving detailed operational definitions of support procedures, the observer participated in approximately 2 hours of training. A sample of probe sessions from the intervention phase were used to practice coding parent implementation of procedures. Parent data for the snack routine was collected only after the observers achieved 90% agreement for each intervention across two consecutive observations of the snack routine. Observations not previously viewed by the observers were used for interobserver agreement assessment.

#### *Food Consumption During Routine and Parent Implementation Fidelity of PBS plan*

Interobserver agreement for food consumption during routine and for parent implementation fidelity 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 the two observers recorded the occurrence of a target behavior(s), during the same 30-second interval for food consumption, and the same 1-minute interval for parent implementation fidelity. Interobserver agreement checks for food consumption during the routine were completed on 33% of probe sessions.

Agreement checks were balanced across baseline, parent training, generalization and follow-up phases. The average agreement for total consumption was 97% (range, 88-100%). Mean agreement for self-initiated consumption was 100%. Interobserver agreement for parent implementation fidelity was completed on 25% of probe sessions. The average agreement across all support categories was 89%.

#### *Food Consumption With Therapist*

Interobserver agreement for food consumption with therapist 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 observers recorded the same target behaviour, during the same trial. Interobserver agreement for food consumption with therapist was completed with a second observer on 15 % of probe sessions. The average agreement across all probe sessions was 93% (range 70-100%).

#### *Latency-in-Minutes Agreement*

Interobserver agreement for latency to termination of the snack routine due to problem behaviour was measured using a checklist that described the criterion level of intolerated behaviour and tolerated behaviour that required the termination of the probe session. Interobserver agreement for the latency to successful completion of a routine was measured using a checklist that listed the steps of the routine and reserved a space to note the time that the last step of the routine was completed. Two independent observers, separated by 1 meter and a visual barrier, simultaneously observed the videotape of a probe session. If a criterion behaviour occurred, the behaviour was noted on the checklist. When the criterion level of problem behaviours occurred (e.g., the first intolerated

behaviour, the third tolerated behaviour), the behaviour and time of termination was noted on the checklist. If the criterion level of problem behaviours did not occur, the observers noted the time the routine was completed successfully. A margin of  $\pm 5$  seconds was used to assess the agreement between times noted by each observer.

Occurrence agreement for the termination of the session due to problem behaviours was calculated by dividing the number of agreements of behaviour(s)/time(s) to terminate a session by the number of occurrence agreements plus disagreements and multiplying by 100%.

Interobserver agreement for latency to successful completion of the snack routine was calculated in two ways. Nonoccurrence agreement for the criterion level of problem behaviours (i.e., two observers independently agreed that the criterion level of behaviours did not occur) was calculated by dividing nonoccurrence agreement by nonoccurrence agreement plus disagreement and multiplying by 100%. Occurrence agreement on latency to successful completion of routine (i.e., all of the critical steps in the operationally defined routine were completed) was calculated by dividing agreement (i.e., the time the steps in the routine were completed) by agreement plus disagreement and multiplying by 100%.

Interobserver agreement for latency to termination or successful completion of the routine was completed with a second observer on 33% of probe sessions. Agreement checks were balanced across phases. The average occurrence agreement across all latency to termination due to problem behaviours was 100%. The average occurrence agreement across latency to successful completion of routines was 100%.

### *Research design*

This study employed a single subject, quasi-experimental, case study design with one eating/mealtime routine, using a multiple probe strategy. The design had five phases: (a) baseline; (b) intensive training with therapist; (c) parent training; (d) generalization; and (e) follow-up. This design does not control for all threats to internal validity and as a result is unable to verify, unequivocally, a functional relationship between the independent and dependent variables. However, particular features of case studies can also rule out some specific threats to internal validity in a manner that closely resembles true experimental research (Kazdin, 1992). In this quasi-experimental design, if the data have the following properties, then as many as six of eight threats to internal validity can be ruled out. These properties are: (a) objective data; (b) continuous assessment; (c) stable levels of performance before and after intervention; and (d) an immediate and large treatment effect. With these six rival alternative hypotheses ruled out, a strong case can be made regarding the impact of intervention on the dependent variables (Kazdin, 1982). Properties of this design however are unable to, unequivocally rule out two threats to internal validity—history and maturation. Nonetheless, Kazdin (1992) argues that although case study designs are not a substitute for experimentation they are strong designs that can contribute greatly to the development of scientifically useful information when experimental procedures in clinical situations are not possible.

### *Procedures*

Research procedures and clinical family support procedures interwove and merged throughout the course of the study. The general sequence of research and clinical support procedures was as follows: (a) preliminary screening assessment; (b) baseline; (c)

comprehensive assessment; (d) positive behaviour support plan development; (e) implementation support; and (e) follow-up.

### *Preliminary Screening Assessment*

The Behavioral Feeding Assessment Parent Interview (Budd, 1992) was administered to determine whether or not the child's problematic feeding warranted the need for an intensive intervention for food refusal. The interview took place in the family's home and was approximately 60 minutes in length. Karim's mother answered semi-structured, open ended questions about Karim's past and current feeding patterns. Specifically, Karim's mother answered questions regarding feeding history, mealtime habits, current feeding problems and current feeding techniques employed by the parents. The results of the behavioural feeding assessment are summarized below.

Karim's mother reported that Karim's feeding problems began from the moment he was introduced to infant pureed foods, and have remained constant throughout his early childhood years. In order to get him to eat as a toddler, Karim's mother would sit him in a high chair and force feed him pureed food. From the age of 2 to 4, Karim's mother continued to introduce higher textured foods and although challenging at times, Karim began to develop a preference for certain foods. At the time of the study, Karim was regularly accepting soda crackers, Dad's® oatmeal cookies, water, rice, and donuts. Foods Karim had accepted at one time but was no longer accepting included macaroni and cheese, scrambled eggs and hotdog, and yoghurt. Karim also was accepting four (235ml) cans of Pediasure a day; a nutritional supplement designed to provide children with calories, vitamins, and minerals missing from their daily diet.



His mother indicated that they occasionally tried to prompt consumption of new foods, but to no avail. As a result, Karim's mother stopped trying to get Karim to try new foods and instead solely provided him with preferred foods without placing too much expectation on him to eat. Most of his eating occurred in brief bouts during the day, and he almost never sat for meals. However, because Pediasure was vitally important to Karim's health, it was force fed to Karim through a syringe while he was distracted with either the T.V. or Nintendo.

The information gathered from the screening tool was then incorporated into the comprehensive assessment. In addition, a routine analysis was performed to provide the experimenter with information about daily mealtime routines. The mother was asked to identify and prioritize an eating/mealtime routine in the home (e.g, lunch, snack; dinner time) that was valued yet problematic. This routine was collaboratively identified and defined with Karim's mother. The eating/mealtime routine selected was snack. After the mother selected a routine for intervention, the experimenter asked the mother to describe her vision of a successful snack routine. Information was gathered in regards to (a) the time and place of the routine; (b) the people who would be involved; (c) nine non-preferred foods that would part of the routine; (d) the resources needed to make the routine successful; (e) the steps and sequence of the routine; and (f) the goals and values of the family that would be reflected in the routine (Lucyshyn et al., 2002). The mother's envisioned snack routine is summarized in Table 4. The interview took approximately 60 minutes to complete. Following the interview, the experimenter conducted two to three pilot observations in the identified routine. The purpose of these observations was to

verify the occurrence and purpose of problem eating behaviour. Each observation lasted approximately 5 minutes.

### *Baseline*

The snack routine was videotaped in the kitchen area of the participant's home. During baseline, four dependent variables were measured before comprehensive assessment and plan-design procedures were initiated. Observation probes in the snack routine measured the percent of intervals of food consumption (prompted and self-initiated), the latency in minutes to termination or successful completion of the routine, and the number of steps in the routine that were completed successfully. Prior to the observation probes, the mother was asked to read a one-page summary of the operational definition of the envisioned snack routine. The mother was then asked to implement the envisioned routine with her son. If a criterion level of problem behaviour was reached, the routine was terminated. If the criterion level of problem behaviours was not met, the routine continued until it was completed, or until a time limit for the routine was reached (approximately 30 minutes). In addition, the Beach Center Quality of Life Survey (Beach Center on Disability, n.d.) was administered once during baseline to assess the family's well being prior to intervention. Once a stable baseline was established, the next phase of the study was introduced.

Table 4

*Family Vision of a Successful Snack Routine*

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Time/Place

1. Between 4:00 and 4:15pm. Routine lasts between 10 and 20 minutes.

Persons Present

1. Karim, Shabnam, and occasionally an older brother.

Material Resources

1. Snack foods from established instructional universe.
2. Tableware (plates, cups, utensils, napkins)
3. Phone book and towel for Karim to sit on.
4. Visual supports.

Karim's Tasks

1. Comes to the table and sits and waits for his mom to give him snack.
2. Eats snack independently or with support from his mom.
3. Uses napkin to wipe mouth and hands.
4. Stays seated throughout snack.
5. When plate/bowl is empty, puts dish in sink.
6. Throws napkin in garbage.
7. Finishes snack within 20 minutes.

Mother's Tasks

1. Prepare snack.
2. Let Karim know it's snack time.
3. Present snack to Karim.
4. While Karim is eating his snack, either: a) help him eat his snack; b) talk to the boys; c) do household chores; or d) tend to youngest son.

Goals, Values, and Beliefs

1. Karim learns to eat a wider variety of healthy foods.
2. Karim no longer depends on Pediasure® 4 times a day.
3. Karim learns to eat independently.
4. Karim learns to clean up after himself.
5. Mom is able to care for her child's needs.

Themes/Patterns of Interaction

1. Karim enjoys his snack.
  2. Praising Karim for eating new healthy foods.
-

### *Comprehensive Assessment*

Prior to plan development and implementation, the following five assessment activities were completed: (a) functional assessment; (b) family ecology assessment; (c) preference assessment for non-preferred foods; (d) edible reinforcer assessment; and (e) toy reinforcer assessment. The information from each assessment was integrated and used to develop a positive behavior support plan that would be effective, efficient, and a good contextual fit with family culture and ecology. Each assessment is described below.

*Functional assessment.* A functional assessment of the child's behavior was conducted using the functional assessment interview form (FAI) and the functional assessment observation form (FAO) developed by O'Neill, Horner, Albin, Sprague, Storey and Newton (1997). The functional assessment interview took place in the family's home, and was approximately 60 minutes in length. The parents were encouraged to answer the questions in as much detail, providing relevant examples or stories. After completion of the interview, the experimenter, in collaboration with the parents, merged information obtained from the FAI and behavioural feeding assessment to develop hypotheses regarding the function of problematic feeding behavior. Discussions were collegial in nature and aimed at reaching a consensus about the function of the behavior, the events that triggered the behavior, and the events or situations that increased the likelihood of positive behavior (Lucyshyn, Kayser, Irvin & Blumberg, 2002). After consensus had been reached, a FAO was performed to confirm hypotheses formulated from the FAI. The FAO form documented the time the behavior occurred, the antecedents and consequences of the behavior and the experimenter's perception of the function of the behavior during that event. The videotaped observation

sessions taken during baseline was used for data collection. A summary of the functional assessment is presented below.

The functional assessment indicated that Karim engaged in five categories of problem behaviours with his family during mealtime routines: (a) leaving the table; (b) food refusal behaviours; (c) self-injurious behaviours; (d) aggressive behaviour towards others; and (e) crying or tantrumming. Overall the functional assessment confirmed the perception that persistent and serious problem behaviours occurred during snack routines at home.

During the snack routine, several ecological conditions appeared to contribute to Karim's problem behaviours. His parents had constructed a set of eating/mealtime routines that served to minimize problem behaviours in the short term, but provided few opportunities for Karim to overcome problem behaviours in the long run. For example, Karim ate snack type foods (e.g., crackers, cookies) in the living room while watching T.V. or in his bedroom while playing Nintendo. His mother tried to get Karim to sit at the table for family meals; however, Karim responded to such demands by screaming and falling to the ground. At best, his mother was able to get him to sit while she fed him a spoonful of preferred food. However as soon as he accepted the bite, Karim would leave his chair and run down the hallway or outside into the backyard. In addition, Karim's mother would allow Karim to snack on cookies and crackers indiscriminately throughout the day. As a result, Karim had developed an irregular appetite and thus was less motivated to eat during scheduled family meals.

Two antecedent events typically provoked problem behaviour. These were demands to sit and eat preferred foods at the table and presenting Karim with a non-

preferred food. Finally, common family responses to problem behaviours appeared to strengthen these behaviours. For example, when Karim engaged in screaming and self-injurious behaviour, his parents would either allow Karim to leave the table and eat his preferred food wherever he chose to eat it, remove the preferred food and not give it back to Karim unless he asked for it, or remove the non-preferred food from his plate. One hypothesis about the function of Karim's problem behaviour emerged from the assessment: Karim engaged in problem behaviour—in particular food refusal behaviour (e.g., pushing spoon away, turning head), screaming, tantrumming, self-injury and aggression to escape the demand to eat non-preferred foods or to escape the demands to sit at the table and eat preferred foods.

*Family ecology assessment.* The goal of this semi-structured interview was to gather information about the family's ecology and mealtime routines for the purpose of designing a behavior support plan that was contextually appropriate from the family's perspective. A series of open-ended questions (see Appendix D) were asked by the experimenter to assist in the development of an intervention plan that 'fit' with the larger ecology of child and family. Through a series of informal meetings with the mother, and one meeting with both parents, the experimenter gathered information regarding family's strengths, social supports and resources, stressors, and goals for the child and family. This entire assessment took approximately 2 hours to complete. The results of this interview are summarized below.

Shabnam and Jabbar described several clear goals for Karim and for their family as a whole. Foremost among child-centered goals was their desire for Karim to learn to eat a wider variety of foods so that he would no longer depend on Pediasure for his daily

source of vitamins and calories. They also hoped that Karim would learn to sit and eat at the table so that they all could sit and have a meal together as a family. A broader child-centered goal was to increase Karim and his younger brother Hussein's communication and independence skills. Shabnam spent most of the day tending to her youngest son (Hussein) thus leaving no time for the oldest two. A corollary family-centered goal was to access more formal supports (e.g., one-to-one support workers, respite care) for the two youngest boys so that Shabnam could give the two oldest boys the attention they needed. As well, Shabnam wished the two oldest would listen more to their mother and help out more with household chores.

To these goals, the family brought many strengths. The encompassing strength was their deep Islamic faith, which both parents expressed as giving them the strength and optimism to create a home life full of love, support, and kindness. Shabnam and Jabbar also possessed a partnership in which they shared caregiving responsibilities. Although Jabbar spent most of his time working, if Shabnam was ill or tired, Jabbar would immediately come home and take care of the children, or pick up the oldest two and take them out into the community. The parents also viewed the two oldest boys as helpful with both Karim and Hussein. They would play often with their younger siblings, teaching them new games on the computer, or taking them for walks or to the playground.

Karim and Hussein were perceived to possess a number of strengths despite their disabilities and problem behaviour. The parents viewed Karim and Hussein as two boys that had taught their family to forgive and love unconditionally. Both parents felt too that

Karim and Hussein had taught the two oldest to be more patient, and to understand and appreciate differences amongst individuals.

The family also described a host of social supports and resources. Shabnam and Jabbar had strong ties to their Muslim community. The parents got together often with friends for celebrations and special events at the community center. However, these types of gatherings were purely social, as both parents felt that they did not want to burden others with their stressors. Notwithstanding, Shabnam had developed a close friendship with a woman from the Mosque and had started to open up to this woman about the challenges she experienced raising four boys and managing a household.

In terms of formal supports, both Karim and Hussein participated in a community-based early intervention program for children with autism spectrum disorders. Karim also received strong support from the special education support team at the community elementary school.

Despite the family's many strengths and resources, they also experienced significant stressors that affected the quality of family life and their ability to support Karim and the other three boys. The pivotal stressor was raising two boys with ASD who also both exhibited problematic feeding behaviours. The demands associated with raising two children with ASD had a negative effect on each family member, but this effect was magnified in their mother to a debilitating level. Shabnam reported that as a result of Karim and Hussein's feeding difficulties (each required Pediasure® 4 times a day) and the worry both boys caused her, she was getting very little sleep at night. Additionally, her two oldest had suddenly become less cooperative with their mother, which she



hypothesized was due to them not receiving the attention that they needed from her. At the time of the study, Shabnam described herself as feeling exhausted and very weak.

*Preference assessment I: Determining food preferences of non-preferred (novel) foods.* Similar to the procedures employed by Levin and Carr (2001), an assessment of the relative preference of new, non-preferred foods was conducted. The purpose of this assessment was to develop a hierarchy of most acceptable to least acceptable non-preferred foods to be presented to Karim as part of an antecedent intervention. The mother met with the experimenter to discuss three types of foods she wished her child to be eating at the termination of intervention. These three food groups represented an instructional universe of snack items that sampled relevant stimulus properties and response requirements (Horner & Albin, 1988). The three types of foods chosen by Karim's mother were, crackers with spread, fruit, and soft blended food. Multiple examples were then chosen for each food group, three examples per group. Karim's mother chose the following nine foods, peanut butter and cracker, cream cheese and cracker, cheese whiz and cracker, apple, banana, grapes, yoghurt, pudding, and applesauce. These nine foods were then evaluated to determine their relative preference level.

During the assessment, the experimenter sat next to the child at a small table. The nine food items were presented in separate bowls situated on the table beside the experimenter and out of reach of the child. A bite size portion of each food was offered to the child with the instruction, "Take a bite". If the child accepted, the food was recorded as "consumed" on the data sheet. If the child did not accept the bite within 5-seconds the experimenter modeled the behavior of eating in addition to using the words, "Mmm

good!” The same food was then presented again, and if the child accepted, data was recorded as “consumed”. However, if the child did not accept the food within 5-seconds the trial was terminated and the food was labeled as “refused”. After approximately 20 seconds the next trial commenced. Each of the 9 food items were randomly presented 3 times each, yielding a total of 27 trials. Karim responded to all 27 presentations of food by screaming, hitting himself in the head, and/or running away from the table. As a result, it was decided that a feeding specialist from Gonzaga University in Spokane, Washington would be consulted for suggestions on how to proceed with this preference assessment. Given the results of the feeding assessment, the feeding specialist advised the experimenter that the antecedent intervention of presenting non-preferred foods from most preferred to least preferred would not be appropriate. As an alternative, the feeding specialist suggested that an escape-extinction procedure that involved gently depositing food on the child’s tongue or on the inside of his cheek would be a more appropriate and likely effective strategy (A. Baretto, personal communication, January 12, 2004). From this consultation, it was decided that the preference assessment would be terminated and instead a hierarchy of foods would be developed based on the ease to which the food could be deposited on the child’s tongue. The experimenter met with the mother and together they decided that the targeted non-preferred foods would be presented to Karim in the following order: (1) pudding; (2) yoghurt; (3) applesauce; (4) banana; (5) peanut butter and cracker; (6) apple; (7) cheese whiz and cracker; (8) cream cheese and crackers; and (9) grapes.

*Preference assessment II: Determining edible reinforcers for intervention.* Similar to Levin and Carr (2001), a second assessment was conducted to simultaneously compare

the three snack foods Karim ate at the time of the study (i.e., soda crackers, Dad's cookies, donut) to determine a hierarchy of edible reinforcers for intervention. Each of the three foods was randomly presented 5 times each, yielding a total of 15 trials.

Similar to the preference assessment of novel foods, Karim refused to eat or touch each item that was presented to him. As a result the experimenter presented each of the three foods on a plate in the kitchen and allowed Karim free access to the 3 food items for 5 minutes. The amount of food consumed and the order in which each item was consumed was recorded. Results from this assessment indicated that crackers were the most preferred food for Karim, followed by Dad's® oatmeal cookies, and donuts. However, because crackers were a staple for Karim, his mother felt uncomfortable restricting his access to crackers to only the snack routine. As a result, an additional toy preference assessment was conducted to determine potential non-edible reinforcers to be used during intervention.

*Preference assessment III: Determining toy reinforcers for intervention.* Before the assessment, the mother was asked to describe the types of toys with which her son likes to play. She reported that his most preferred toy was Gameboy, followed by toys that when manipulated produced an effect. For example, the toy may light up, spin, vibrate, play music or make sounds. The experimenter then collected toys with similar descriptions to use during the assessment. Four toys were used during the assessment. They were a Lightchaser® (spins and lights up), Gameboy® (visual graphics and sound), a bug (vibrates), and ball (squishes). Each toy was paired with the other three then randomly presented to Karim 5 times each, yielding a total of 15 presentations per toy. Toy preference was determined by the number of times the toy was chosen out of the

total number of times it was presented. Results from this assessment showed that of the four toys presented to Karim the vibrating bug was the most preferred, followed by the Lightchaser®, squishy ball, and Gameboy®.

#### *Positive Behaviour Support Plan Development*

Functional assessment results, feeding assessment results, and family ecology information were used to design a technically sound and contextually appropriate positive behaviour support for the snack routine (Lucyshyn et al., 2002). The design process was conducted in collaboration with Karim's mother. The process had three steps: (1) build a summary statement/competing behaviour pathways diagram; (2) identify strategies logically linked to features of problem in the eating routine; and (3) finalize strategies that are likely to be effective and contextually appropriate. Each of these steps is described below.

*Build a summary statement/competing behaviour pathways diagram.* Functional assessment results were used to develop a summary statement/competing behaviour pathway diagram for the snack routine. The diagram outlined the setting events; antecedent triggers; problem behaviours; and maintaining consequences (i.e., function) that were operating in the routine. The diagram also identified desired behaviour for the eating routine and acceptable alternative replacement behaviour. The diagram guided the design of a technically sound plan that was aimed at rendering problem behaviours irrelevant, ineffective and inefficient at achieving their purpose. See Figure 1.

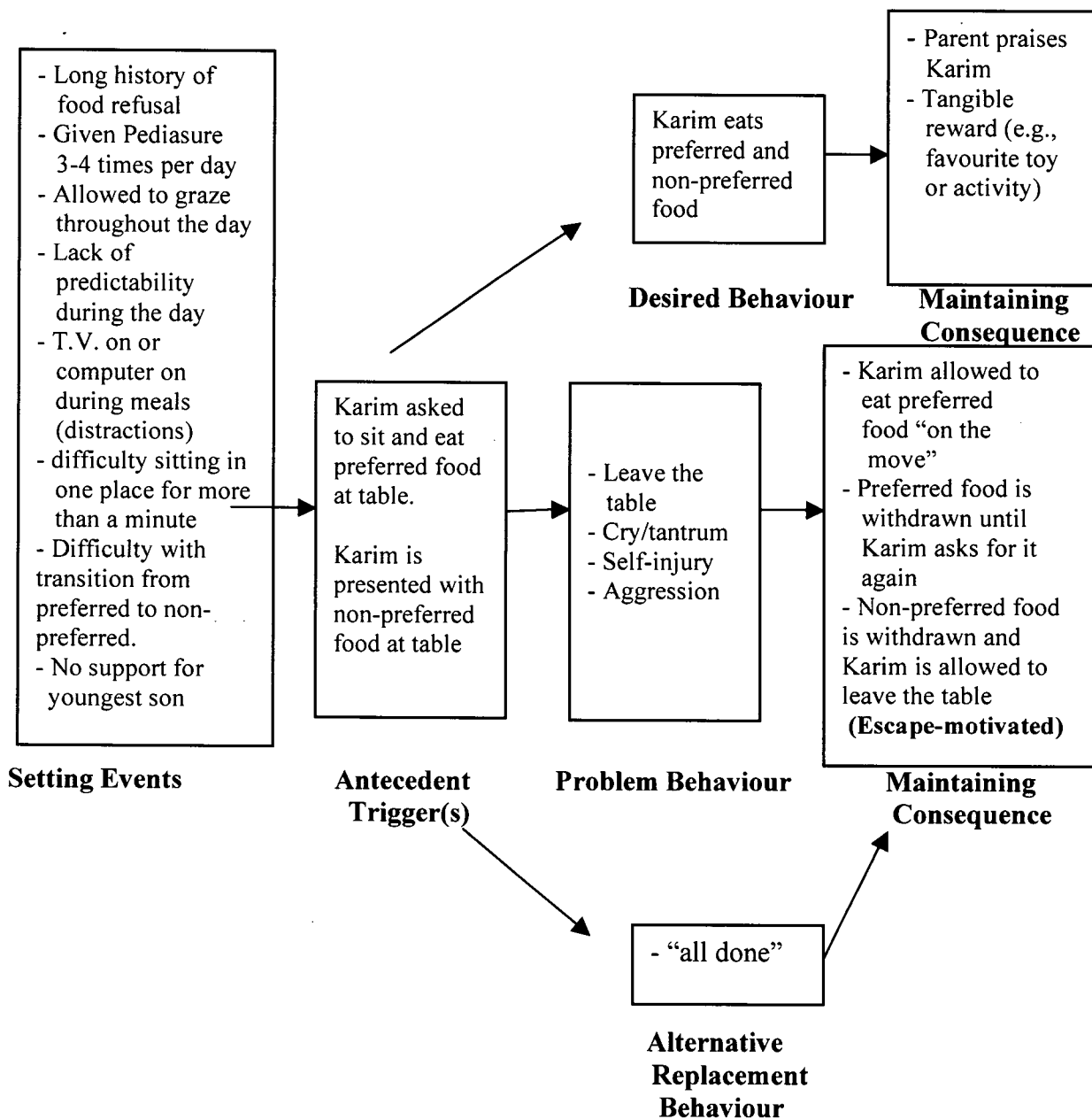
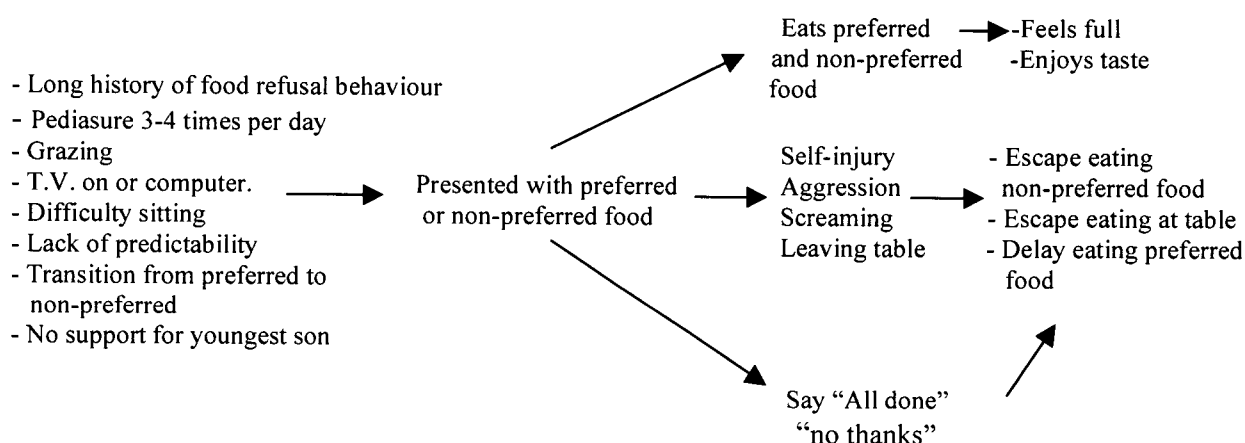


Figure 1. Summary statement/competing behaviour pathways diagram.

*Identify strategies logically linked to features of problem in the eating routine.*

For each feature of the problem in the pathways diagram for the snack routine (e.g., setting events, antecedent triggers, problem behaviour, maintaining consequences), a logical and empirically linked behaviour support strategy was generated. Strategies were designed to make problem behaviours no longer functional and to make positive behaviour highly functional. For the snack routine, positive behaviour supports were selected from a broad class of empirically validated interventions. The PBS plan included four categories of intervention: (1) setting event strategies; (2) preventative strategies; (3) teaching strategies; and (4) consequence strategies. The competing behaviour analysis framework for escape-motivated behaviours and the logically linked support procedures that were proposed in the preliminary behaviour support plan are presented in Figure 2.

*Finalize strategies that are likely to be effective and contextually appropriate.* The experimenter and Karim's mother engaged in two final steps to ensure that the plan was as simple and contextually appropriate as possible. First, they surveyed the proposed strategies and retained only those that were likely to be necessary and sufficient. Second, they reviewed the family ecology information and adjusted the strategies to better fit the routine. Three examples illustrate how features of the family's ecology contributed to the selection of support procedures. A superordinate goal of the Karim's parents was that Karim learn to eat a wider variety of healthy foods. However, based on past attempts, Karim's mother was not confident that she would have the strength or emotional "toughness" needed to transform her son's eating patterns. She also worried that starting intervention in the kitchen might upset her other children who were home at that time of day.



Setting Event Strategies	Preventative Strategies	Teaching Strategies	Consequence Strategies
<ul style="list-style-type: none"> <li>- Establish an instructional universe of foods.</li> <li>- Use visual systems to enhance predictability and expectations (e.g., home routine schedule, monthly calendar)</li> <li>- Give pediasure 30-60 minutes after mealtime</li> <li>- Offer Hussein (youngest son) a choice of activities to do while Mom is busy with snack routine. Toys are only available to Hussein at that time of day.</li> <li>- Have a set meal schedule by allowing 3-4 hours in between meals—optimal for appetite regulation</li> <li>- Provide Karim with sensory stimulation (i.e., sit fit) during meals</li> <li>- Engage Karim in a neutral activity immediately before meals</li> <li>- Turn off t.v. and computer during meals (use a family schedule to show when these activities can occur)</li> </ul>	<ul style="list-style-type: none"> <li>- Stimulus fading of amount of food (pea-sized amount to full spoonful)</li> <li>- Visual strategies               <ul style="list-style-type: none"> <li>i) picture sequence of steps in the routine</li> <li>ii) visually mediated positive contingency</li> </ul> </li> <li>- Review pictures sequences with Karim prior to presenting snack.</li> <li>- Use positive contingency statements.</li> <li>- Use proactive task prompts.</li> </ul>	<ul style="list-style-type: none"> <li>- Teach Karim to accept and consume age-appropriate portions of foods.</li> <li>- Teach Karim to sit at table for entire snack.</li> <li>- Teach Karim to throw his napkin away and put his dishes in the sink after snack is finished</li> <li>- Teach Karim to feed himself independently.</li> </ul>	<ul style="list-style-type: none"> <li>- Offer praise and physical affection contingent on him consuming a bite of food.</li> <li>- Offer praise contingent on sitting and cleaning up.</li> <li>- Offer preferred food and toy contingent on Karim finishing snack or consuming a bite of new non-preferred food.</li> <li>- Continue to hold spoon up to Karim's mouth until he accepts and consumes the food.</li> <li>- Ignore all minor problem behaviour and redirect him to the task of eating.</li> </ul>

Figure 2: Competing behaviour pathways diagram and the logically linked support procedures

The ecological intervention of establishing an instructional universe of snack foods based on the logic of general case programming (Horner & Albin, 1988) directly addressed the mother's goal of having her son learn to eat a wider variety of foods. Additionally, having initial training start with the therapist and then transfer to mom once Karim's feeding behaviour had improved was in direct response to the mother's lack of confidence. Finally, because the mother was concerned that implementing the feeding intervention in the kitchen would upset the other boys, training with the therapist began upstairs in Karim's bedroom.

A major source of stress for Karim's mother was the constant attention she needed to give her youngest son, Hussein. Devoting most of her day to caring for Hussein left her feeling exhausted and overwhelmed by other parental tasks and responsibilities. It was evident that intervention could not begin until some additional support was obtained for her youngest son. As a result, the experimenter contacted the behaviour consultant that was supporting Hussein to see whether the consultant knew of any available interventionists. The consultant referred one person, who after several interviews, was hired by the family to support Hussein. Throughout the study the behaviour interventionist provided eight hours per week of 1-to-1 support to Hussein at home and in the community. The ecological intervention of acquiring a behaviour interventionist for Hussein directly addressed this source of stress.

A pervasive strength of the mother was her loving kindness. Shabnam often praised Karim and offered him physical affection, but her expressions of love and regard tended to be unconditional (i.e., noncontingent) and problematic (i.e., reinforcing problem behaviours). Building on the mother's strength, the experimenter proposed



positive reinforcement strategies that emphasized (a) contingent praise and physical attention for appropriate behaviour, and (b) the absence of positive attention when problem behaviours occurred.

The experimenter met with Karim's mother one more time to finalize the preliminary behaviour support plan. The meeting lasted 1 hour. Throughout the meeting, the experimenter acknowledged contributions Karim's mother had made to the plan and encouraged her to suggest improvements to proposed intervention procedures. Shabnam expressed agreement with most proposed setting-event, antecedent, and skill-development procedures and made additional contributions to the design of reinforcement procedures. With these revisions and agreement on the plan, the meeting was concluded. The finalized plan was typed and distributed to Karim's parents. The finalized positive behaviour support plan is summarized in Table 5. See Appendix E for the full version of the finalized positive behaviour support plan. Additionally a more parent-friendly (i.e., non-jargon phrases, visuals to support ideas), one page implementation checklist of support strategies was developed and posted on the family's fridge (Sanders & James, 1982). This checklist served as a prompt for families to carry out each procedure listed. See Appendix F for implementation checklist.

### *Implementation Support*

Due to the severity of Karim's feeding difficulties, three phases of implementation were sequentially introduced: (a) intensive training with therapist; (b) parent training; and (c) generalization promotion. These three phases are discussed below.

*Intensive training with therapist.* After the behavior support plan was developed, intensive training began with therapist. Training with the therapist served three purposes: (a) to bring Karim's eating behaviour under stimulus control of the therapist and the targeted foods; (b) to set the stage for a transfer of stimulus control from the therapist to the mother in the natural setting of the snack routine (the kitchen); and (c) to instill confidence in the mother that Karim's eating behaviours could improve.

Intensive training sessions with therapist occurred 2-4 times per week ( $\underline{M}$  = 2.8 days/week) and lasted 60-70 minutes ( $\underline{M}$  = 62 minutes). Intensive training required 39 sessions across 14 weeks for a total of 40 hours.

At the start of the intensive training phase, materials for the implementation of support procedures were assessed, purchased if not typically available during the snack routine, and included in each training session. For example, depositing small portions of food onto Karim's tongue required the purchase of a soft plastic spoon to avoid inadvertently injuring his lips, teeth or gums. As well, contingent reinforcement strategies required the purchase of preferred toys that were previously assessed in the activity preference assessment.

In addition to purchasing materials, a variety of materials were developed and included in the training sessions. For example, digital photos were taken of all nine non-preferred foods. Picture symbols (e.g., finished, Gameboy®, break) also were created using Boardmaker® software system. These photos and picture symbols were then laminated, attached with Velcro®, and fastened to a plastic strip that also contained

Table 5

*Summary of Positive Behaviour Support Plan*

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Ecological Procedures

1. Establish a daily eating schedule with Karim.
2. Therapist provide intensive training with Karim in his bedroom; once change is established, do routine in kitchen, and fade in mother supporting Karim.
3. Give youngest child a choice of activities to do while mom is busy with snack.
4. Establish an instructional universe of foods.
5. Hire behaviour interventionist for youngest child.

Antecedent Procedures

1. Use stimulus fading procedure for amount of food.
2. Use picture schedule of steps in the snack routine
3. Use visually mediated contingency
4. Use positive contingency statements
5. Use proactive task prompts

Teaching New Behaviours

1. Teach Karim to eat new foods.
2. Teach Karim to sit at table and eat snack.
3. Teach Karim to put his dishes away and throw his napkin in the garbage.

Consequence Strategies

1. Offer praise and physical affection contingent on Karim accepting and consuming a bite of food.
  2. Offer praise and physical affection contingent on Karim trying, improving, and independently doing steps in the routine.
  3. Offer preferred food and toy contingent on Karim finishing his snack, or consuming a bite a new non-preferred food.
  4. When Karim engages in food refusal behaviour then use non-removal of the spoon procedure. Ignore all minor problem behaviour and redirect to Karim to the task of eating.
  5. De-escalate major problem behaviour by minimizing reinforcement: (a) move away from aggression; (b) quietly block self-injury and redirect when calm; (c) ignore throwing, prompt hands down, and redirect; (d) verbally redirect falling to the floor.
-

Velcro®. A brief support plan of the support strategies used specifically by the therapist during training sessions with Karim was written and attached as an addendum to the positive behaviour support plan written for the mother (See Appendix E).

*Parent training.* Once Karim was consistently consuming full-sized spoonfuls/bites of 5 of the 9 targeted foods, the second phase of implementation support commenced—parent training. During this phase of implementation, training and support activities served three purposes: (a) to bring Karim’s routine-related appropriate behaviours under the stimulus control of his mother and the relevant materials of routine, (b) to build Shabnam’s capacity to use strategies from the behaviour support plan effectively, and (c) to ensure that support procedures fit well with the routine and that support activities were acceptable to the mother.

Training sessions occurred 1-2 times per week ( $M = 1.9$  days/week) and lasted 50-60 minutes ( $M = 54.3$  minutes). Parent training involved 15 sessions across 8 weeks for a total of 14 hours.

During parent training and support sessions, the experimenter implemented a flexible but common set of activities. These activities included modeling of interventions for Karim’s mother, coaching Karim’s mother in the use of interventions, problem-solving discussions, behavioural rehearsal, and self-monitoring and self-evaluation. During early training sessions, the experimenter directly implemented support procedures with Karim during the routine while Karim’s mother observed and delivered positive reinforcement. Specifically, the experimenter taught Karim to eat a new non-preferred food (e.g., cheese whiz and cracker) while his mother observed and praised him for successful acceptance and consumption. Karim’s mother then implemented procedures

with Karim while the experimenter observed and coached (e.g., instruction, modeling, feedback) the mother in the accurate use of the procedures. Initially, Karim's mother supported Karim to eat food items previously mastered with the experimenter. As Karim became successful with having his mother support him during snack, the experimenter coached the mother to teach Karim to accept and consume a new non-preferred food (e.g., apple) within the previously established instructional universe of snack foods. After a training session was completed, the experimenter and Karim's mother discussed Karim's progress, highlighted effective implementation of procedures, and reviewed common implementation errors. As Karim and his mother became successful at participating in the snack routine together, the experimenter began to fade training and support activities.

During the last sessions of the parent training phase, the experimenter briefly coached Karim's mother just before the beginning of the routine, describing or modeling the skillful use of strategies that were still weak in the mother's repertoire. During the routine, the experimenter only provided training and support when it appeared that Karim's mother was not able to overcome an escalation in child problem behaviours or self-correct a series of implementation errors. After the routine, the experimenter provided Karim's mother with brief feedback, emphasizing her skillful use of support procedures.

*Generalization promotion.* Following the parent training phase, a phase that focused on assessing and promoting generalization of child's eating behaviour and parent's use of the support procedures was implemented. During this phase, three levels of generalization were assessed across three different observation probes. During the first

probe, we assessed whether the mother could teach Karim to eat a non-trained food from within the established instructional universe. During the second probe, we assessed whether Karim's father could successfully implement the snack routine. Last, during the third probe we assessed whether the mother could support Karim to eat a non-trained food that fell outside the instructional universe.

Two strategies were used to promote generalization. The first procedure, included in the original behaviour support plan, involved using a general case approach to establish a broadly defined instructional universe of snack foods that sampled the range of relevant stimuli and response requirements (Horner & Albin, 1988). As mentioned earlier in the chapter, Karim's mother selected three groups of snack foods that varied in texture, taste, and feeding method (e.g., finger foods, foods that required a utensil). Three foods were chosen per group, with a total of nine foods in all. We believed that a general case was developed from these nine foods. Therefore, based on the logic of general case programming, we predicted that Karim with little to no support from his mother would successfully generalize his eating behaviour to a non-trained food (cream cheese and cracker) that also fell within the instructional universe (Horner & Albin, 1988). This prediction was tested during the first observation probe.

The second generalization promotion strategy, train "to generalize" was used to promote generalization of the parent's use of the support procedures during the snack routine. Train "to generalize" involves telling the individual about the possibility of generalization and then requesting they try to do it (Stokes & Baer, 1977). In response to Shabnam's desire to include Karim's father in the support process, the experimenter prompted Shabnam to teach Jabbar to implement the behaviour support procedures with

Karim during the snack routine. The experimenter and Shabnam met in the home to discuss Karim's father implementation of the routine. Shabnam decided that Jabbar would learn best if first shown previous videos of Shabnam using the support procedures with Karim during the snack routine. The parents convened once for a half an hour training session during which Shabnam reviewed the video with Jabbar. The experimenter attended the training session, but only intervened if Jabbar had questions that Shabnam was unable to answer. After the training session, an observation probe of Jabbar supporting Karim during the snack routine was conducted.

Finally, the third observation probe examined the extent to which the positive behaviour support training empowered the mother to support Karim to eat a non-trained food from outside the defined instructional universe. The experimenter and Shabnam met to discuss the use of support procedures to teach Karim to eat a food outside the instructional universe. Shabnam needed little encouragement from the experimenter, as she was quite confident that she could help her son expand his repertoire of foods. The targeted non-trained food Shabnam chose for the third observation probe was a grilled sandwich filled with egg, tuna, and cheese.

*Termination of implementation support.* The implementation support phase of the study was concluded with a final home meeting in which Karim's mother and the experimenter reviewed the use of support procedures with trained and non-trained foods, and discussed the long-term maintenance of the mother and child's accomplishments. Karim's mother and the experimenter discussed key strategies for maintenance of Karim's behavioural improvements, obstacles to maintenance that could lead to regression, and solutions that would help Karim's mother continue to support Karim

effectively. On the topic of key strategies, Karim's mother was encouraged to continue to have Karim eat all the mastered foods, including the foods he learned to eat during generalization, to continue to use visual supports, and continue to fade prompts so that Karim would improve his self-feeding skills.

Obstacles to long-term maintenance that were discussed included: (a) Karim becoming sick or having a tooth ache, which causes him to lose his appetite; (b) reinforcer(s) no longer being desirable to Karim, thus lowering his motivation to eat; (c) the absence of structured mealtimes during the summer months, which causes Karim not to be hungry for snacks; and (d) too large of portion sizes, making it difficult for Karim to finish his food.

Solutions Karim's mother and the experimenter generated included: (a) stopping the snack routine for the duration of Karim's illness or tooth problems; (b) continuing to only allow Karim access to the toy reinforcer once a day after snack for 30 minutes, and rotating the toys week to week so they stay relatively new and interesting; (c) during the summer months, not allowing Karim to continue sleeping after 9:00 in the morning, thus ensuring that meals follow the same schedule as during the school year; and (d) consistently offering age-appropriate portion sizes during snack routines.

### *Follow-up*

The follow-up phase began after stable improvement in child behaviour and routine participation had been established, and after Karim's mother demonstrated the ability to accurately use the behavioural support strategies. Follow-up measurements occurred one, five and six weeks after the final home meeting in which maintenance of



the support plan was discussed. After the follow-up observation session was completed, additional training and support was provided to the family as needed.

## CHAPTER 3

### Results

#### *Overview*

Results of implementation of the family support approach are presented in this chapter. The goals of this study were to determine whether a strong association exists between a family-centered, positive behaviour approach and: (a) improvements in eating behaviour for a child with ASD during a home-based, mealtime routine, (b) generalized improvements in child eating behaviour; and (d) sustained improvements in child eating behaviour up to six weeks after the termination of implementation support. In addition, another goal was to assess the parent's level of treatment integrity during the intervention phase.

Direct observation data of child behaviour were displayed graphically and analyzed using visual analysis. For implementation of support approach outcome data, the level, trend, and variability of child behaviour were analyzed within and across baseline, parent training, generalization, and follow-up phases. In the quasi-experimental, case study design, the presence of a correlational relationship between the independent and dependent variables was assessed by looking for stable improvements in child feeding behaviour from baseline to intervention phases. The acceptability, contextual feasibility, and perceived effectiveness of the family support plan were assessed by examining parent indices of goodness-of-fit and social validity. Improvements in quality of life were assessed by comparing parental scores across five family quality of life domains before and after implementation of the support process. Treatment integrity was

assessed by examining the parent's ability to accurately implement the support procedures during the intervention phases.

### *Implementation of Family Support Approach Results*

Seven dependent variables were used to evaluate the impact of implementation of the family support approach: (1) food consumption during routine, (2) food consumption during training with therapist, (3) latency in minutes, (4) steps completed, (5) goodness-of-fit index, (6) social validity index, and (7) quality of life index. These seven variables are summarized below.

#### *Food Consumption During Routine*

Figure 3 shows the percentage of intervals of total consumption and self-initiated consumption within the snack routine. Overall, the data revealed marked improvements in feeding behaviour from baseline to intervention phases. During baseline, total consumption averaged 0% of intervals. This increased to an average of 64% of intervals during parent training, an average of 43% of intervals during generalization, and an average of 58% of intervals during follow-up. Self-initiated feeding averaged 0% of intervals during baseline, but increased to an average of 18% of intervals during parent training, 6% of intervals during generalization, and 8% of intervals in follow-up. A summary of food consumption data across phases is presented below.

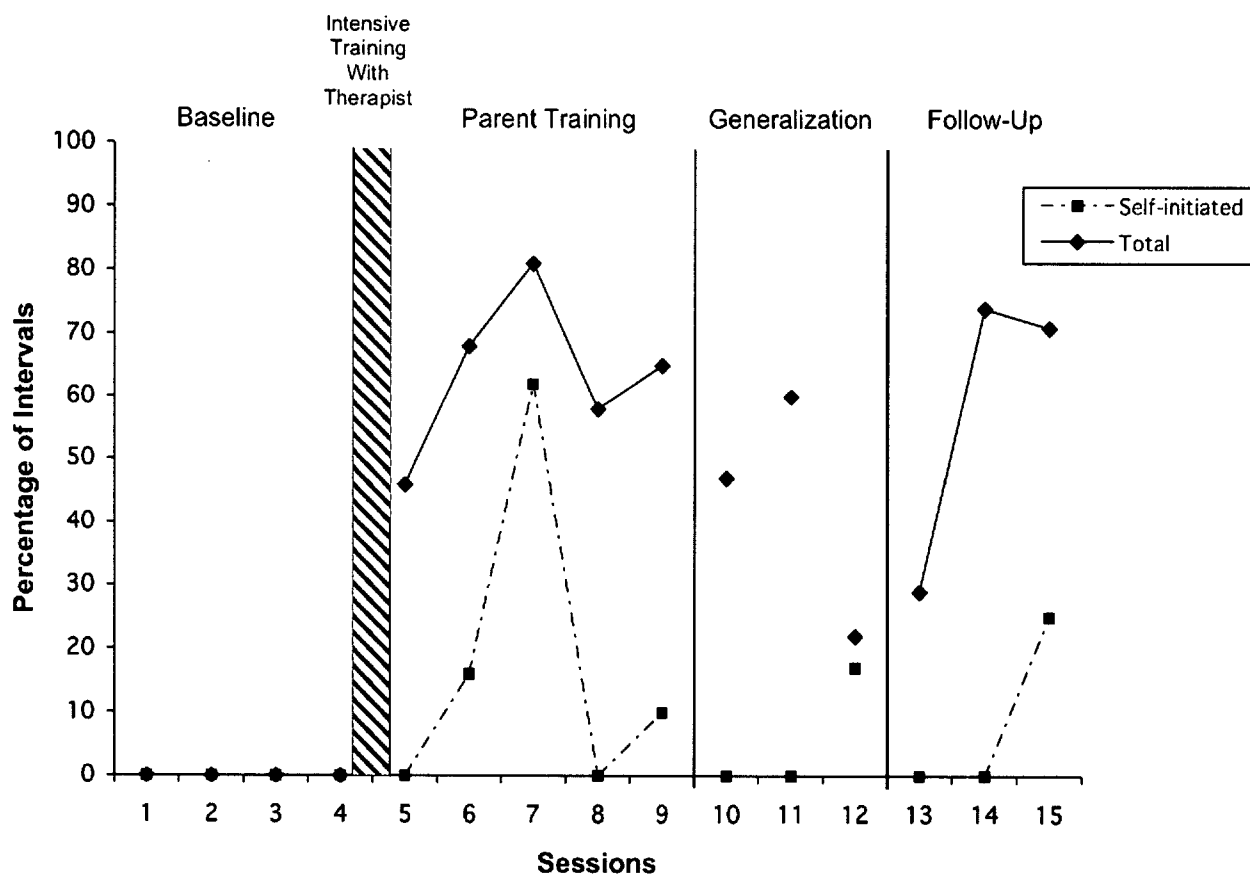


Figure 3. Percentage of intervals of food consumption during the routine.

*Baseline.* Baseline data revealed a low and stable percentage of food consumption in the snack routine. Both total and self-initiated consumption averaged 0% of intervals.

*Parent training.* During parent training, marked improvements in the level and trend of total food consumption were obtained, with only a temporary deterioration during the fourth observation probe. The average increased to 64% of intervals. Self-initiated consumption however, evidenced only a modest increase with an average of

18% of intervals. Similar to total consumption, self-initiated consumption showed an increasing trend with a temporary deterioration during the fourth observation probe.

*Generalization promotion.* During generalization promotion, the experimenter met briefly with the mother to discuss the use of support procedures to teach Karim to eat new foods, one within and one outside the established instructional universe of foods. As well, the experimenter attended a training session with both parents during which Shabnam reviewed video with Jabbar of Shabnam using the support procedures with Karim during the snack routine. The experimenter intervened only to field questions from Jabbar that Shabnam was unable to answer. Compared to the parent training phase, Karim's total consumption data dropped during observation probes that involved his mother teaching him to eat non-trained foods (within and outside the instructional universe). Specifically, total consumption data decreased to 47% of intervals for the first probe (food within the instructional universe), and 22% of intervals for the third probe (food outside the instructional universe). However, these results remained well above the level of consumption of zero percent during the baseline phase. Improvements achieved in the parent-training phase were maintained during the observation probe that involved Karim's father's implementation of the snack routine. Total consumption data for this probe was 60% of intervals.

Self-initiated consumption dropped to 0% of intervals for the first observation probe that involved Karim's mother teaching Karim to eat a non-trained food within the instructional universe and the second observation probe during which Karim's father implemented the snack routine. However, during the third observation probe, that

involved Karim eating a non-trained food from outside the instructional universe, self-initiated consumption increased to 17% of intervals.

*Follow-up.* The onset of the follow-up phase revealed a decrease in the total consumption data to 29% of intervals. Following a brief training session with the mother regarding strategies directly linked to this loss in stability, improvements in total consumption data were evidenced with an increase to consumption levels previously obtained during the parent-training phase (to an average of 73% of intervals). Self-initiated consumption however dropped to 0% of intervals for the first and five week follow-up probes, only to increase modestly to 25% of intervals for the six-week follow-up probe.

#### *Food Consumption During Intensive Training With Therapist*

Figure 4 shows the percentage of trials of food consumption during intensive training with therapist. Food consumption data is comprised of three behaviours: (1) food refusal; (2) food acceptance; and (3) self-feeding. Initial food consumption data during training with therapist revealed a very high and stable percentage of food refusal behaviour. Throughout sessions 1 to 15, Karim exhibited food refusal behaviour on average 99% of the trials. However, during sessions 15 to 23 marked improvements in level and trend of food refusal behaviour were obtained. Specifically, food refusal data fell from 100% of trials to 0% percent of trials. During session 24 however, a temporary increase in food refusal was evidenced. During this session, Karim was presented with a new flavour of pudding (chocolate), which he vehemently refused. Following this training session, food refusal data returned to zero levels for four sessions only to

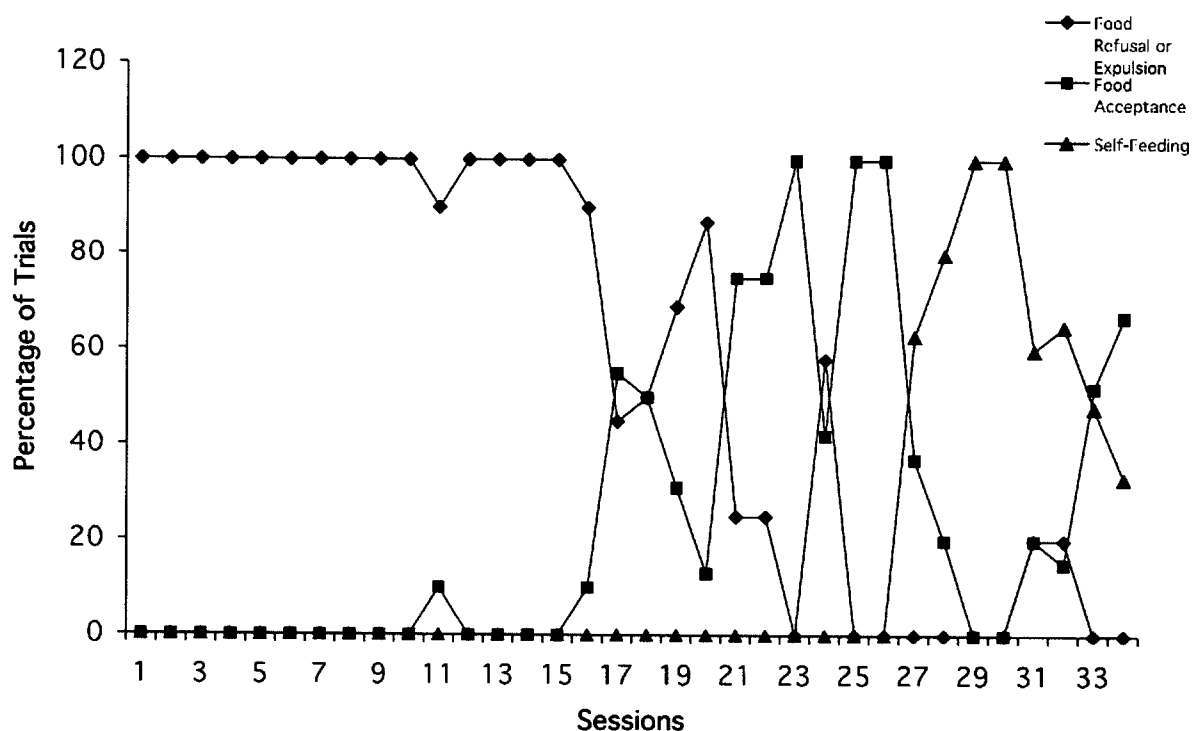


Figure 4. Percentage of trials of consumption during intensive training with therapist.

increase slightly with the introduction of peanut butter and crackers. After two sessions however, food refusal dropped again to 0% of trials and remained at this level for the final two sessions of intensive training with therapist.

Due to the incompatibility of food refusal and food acceptance, initial food acceptance and self-feeding data remained at zero or near zero levels throughout sessions 1 to 15. From session 16 to 23, marked improvements in level and trend of food acceptance were obtained. That is, food acceptance rose from 0% to 100% of trials. However, during session 24, the introduction of chocolate pudding resulted in a decrease in food acceptance to 42% of trials. Following this session, food acceptance returned to a

level of 100% of trials until session 26. Self-feeding however, continued to remain at zero levels from sessions 16 through 26. At session 26, food acceptance data dropped to an average of 14% of trials for a few sessions and self-feeding data rose precipitously to an average of 86% of trials for a few sessions. However, with the introduction of peanut butter and cracker during session 31, Karim's self-feeding data dropped to an average of 52% of trials for last four training sessions. Alternatively, food acceptance data increased during the last four training sessions to an average of 39% of trials. This drop in self-feeding and increase in food acceptance was due to Karim's extreme sensitivity to sticky textures. Karim was very resistant to picking up the peanut butter and cracker and feeding himself. However, Karim willingly accepted the cracker and peanut butter if the therapist fed it to him.

#### *Steps Completed*

Figure 5 shows the number of steps completed during the snack routine. During baseline, Karim completed an average of zero steps in the routine. Following the introduction of parent training there was an immediate and dramatic level change. The average number of steps completed increased to an average of 5.8 of 6 steps per observation probe. During generalization, the number of steps completed further improved to an average of 6 steps (i.e., 100% of steps) per observation session. This improvement remained stable during follow-up with an average of 6 steps completed.



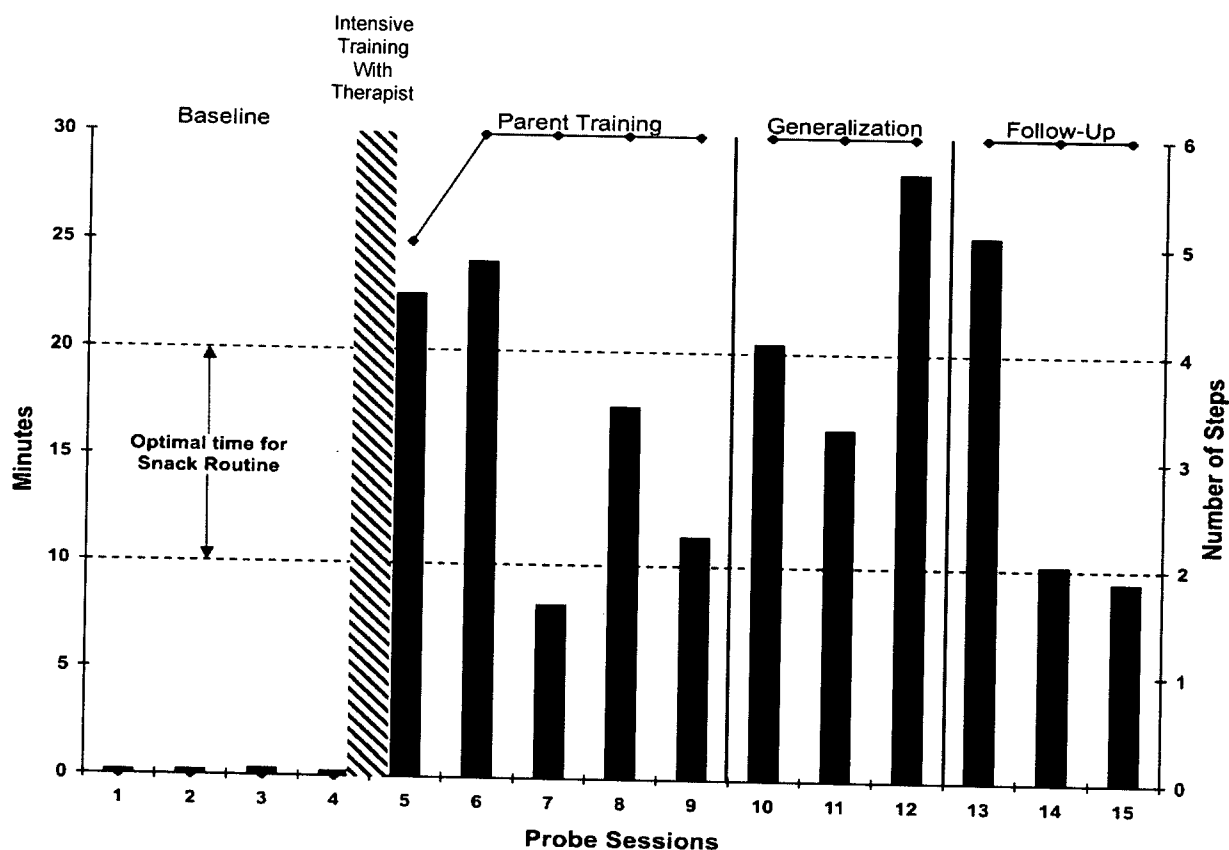


Figure 5. Latency in minutes to termination of the routine due to problem behaviour or to successful completion of the snack routine. Number of steps completed during the snack routine.

#### *Latency in Minutes*

Figure 5 shows the latency in minutes to termination due to problem behaviour or to successful completion of the snack routine. During baseline, Karim spent on average 24 seconds in the snack routine (range 18- 32 seconds) before the criteria for termination of the routine was met. All sessions required termination of the routine because of problem behaviours. During parent training, latency improved to an average of 17 minutes (range 8 to 24 minutes). Importantly, because Karim's mother envisioned the

routine to last no longer than 20 minutes, latency beyond this targeted time was considered problematic and a potential threat to maintenance. During the generalization phase, latency in minutes remained stable with an average of 22 minutes. During follow-up, latency improved to an average of 15 minutes. A summary of latency data by phase is presented below.

*Baseline.* Baseline data indicated a very short and stable latency to termination of the snack routine. Karim reached the criterion level of problem behaviour on average, within 24 seconds.

*Parent training.* The onset of parent training evidenced dramatic improvements in latency in minutes to completion of the routine. The average latency rose to 17 minutes (range 8 to 24 minutes). Although initially latency exceeded the optimal length of time for snack, the time it took Karim to finish snack stabilized during the last 3 probes, 2 of which fell within the optimal range, 1 below.

*Generalization promotion.* During the first and third generalization observation probes, Karim's latency data exceeded the optimal length of time for snack, 21 and 28 minutes respectively. For those two probes, Karim was presented with non-trained foods that fell within and outside the established instructional universe. As a result Karim was less willing to accept the first bite of food and thus took longer to finish his snack. Specifically, during the first observation probe, it took Karim eight minutes before he accepted the first bite of food (within the instructional universe) from his mother. In the third session, Karim accepted the first bite of food (outside the instructional universe) after 20 minutes of food presentation. The second probe involved Karim's father supporting Karim during snack. During this probe, Karim's latency's data fell within the

optimal range of time, with a score of 15 minutes. Importantly, during generalization, the criterion for problem behaviour was not reached for any of the observation probes.

*Follow-up.* One, five, and six-week follow-up data indicated that improvements in latency maintained with an average of 15 minutes, range (9 to 25 minutes). During the first probe, the time it took Karim to complete the routine surpassed the optimal length of time for snack. A decreasing trend in latency across the last two probes revealed a return to latency levels evidenced during the final probes of the parent-training phase. That is, latency data fell within the optimal range with an average of 10 minutes.

#### *Goodness-of-fit Ratings*

A goodness-of-fit index was devised in which 1 represented a poor fit and 5 represented a good fit with the family's ecology. For Karim's mother, the average contextual fit index across three evaluations, distributed across parent training, generalization promotion, and follow-up phases, was 4.2. (range = 4.1 - 4.3). Overall, Karim's mother believed that the support plan fit well with the family's ecology.

#### *Social Validity Ratings*

A social validity questionnaire also was administered during each phase of implementation support—parent training, generalization promotion, and follow-up. Across three evaluations (1 = disagree; 5 = agree), Karim's mother's average social validity rating was 4.4. (range = 4.3 - 4.6). Overall, Karim's mother perceived the plan goals, procedures, and outcomes as acceptable.

#### *Quality of Life Ratings*

Table 6 presents the average score across five quality of life domains before and after the implementation of the support process (1 = very dissatisfied; 5 = very satisfied).

These data suggest that following seven months of implementation support, quality of life substantially improved for Karim and his family. Specifically, from the parents' perspective, the greatest shift appeared to be in the areas of support for persons with disability (2.4 pre-intervention; 3.8 post-intervention), health and safety (3.4 pre-intervention; 4.6 post-intervention), and family resources (2.5 pre-intervention; 3.6 post-intervention). Within these areas, items that the parents perceived to have improved the most included: (a) my family has health care providers who understand our individual needs (satisfaction improved from a rating of 2 to 5); (b) my family has the support we need to relieve stress (satisfaction improved from a rating of 1 to 4); and (c) my family member with special needs has support to be included in community activities (satisfaction improved from a rating of 1 to 4).

Table 6

*Quality of Life Ratings*

Domain of Family Quality of Life Scale	Average Satisfaction Score Pre-Intervention	Average Satisfaction Score Post-Intervention
Family Interaction	3.7	4.7
Parenting	2.9	3.9
Health and Safety	3.4	4.6
Family Resources	2.5	3.6
Supports for Persons With Disability	2.4	3.8

*Parent's Use of Support Plan Procedures*

Parent treatment integrity data were gathered across four observation sessions during the parent training, generalization, and follow-up phases. These data showed an overall average level of treatment integrity of 68% of intervals (range 64-73% of intervals). The source of this moderate level of treatment integrity was the mother's inaccurate use of the proactive task prompt strategy. The mother had difficulty fading her verbal prompts to gestural or physical prompts when teaching Karim to self-feed. As fading of prompts was an important dynamic feature of this skill, when the mother continued to use verbal prompts when she should have faded to gestural or physical prompts, this category was scored as incorrect. However, for the other five support strategies, the parent's overall implementation fidelity averaged 93% of intervals (range 81-100% of intervals).

## CHAPTER FOUR

### Discussion

#### *Summary of Results*

The study addressed three questions about the efficacy of a collaborative family support approach for improving, generalizing, and sustaining child eating behaviour, and for empowering the parent to build a successful mealtime routine based on their vision. The results, comprised of multiple outcome measures, offer compelling evidence of a strong association between a parent implemented positive behaviour support plan and improvements in child eating behaviour within a valued snack routine.

Specifically, the results showed that following parent implementation of the multicomponent positive behaviour support plan, there was an immediate and dramatic improvement in Karim's consumption of targeted non-preferred foods. This improvement in eating behaviour maintained six weeks after the termination of implementation support. Self-initiated consumption, however, evidenced only modest improvements following intervention. Parent treatment integrity data suggest that this was due to the mother's difficulty with fading verbal prompts (e.g., proactive task prompts). Most importantly, following implementation of the support plan, Karim and his mother were able to participate together successfully in 91% of valued snack routines, as compared to 0% of routines during baseline. In addition, 36% of the routines were completed within the amount of time desired by the parent (between 10 and 20 minutes), and 18% of the routines were completed before 10 minutes had elapsed.

As well, implementation of the support process was associated with a broader range of improvements in child eating behaviour and family life. Improvements in eating

behaviour generalized to two new non-preferred foods and to Karim's father implementing the snack routine. Moreover, by the conclusion of implementation support, Karim's parents reported substantial improvements in family quality of life.

Additional validation of the implementation support process was found in: (a) high parent ratings of goodness-of-fit between the support plan and the family's ecology; and (b) high ratings of social validity for plan goals, procedures, and outcomes.

High parent treatment integrity data for five of the six support strategies suggest that the family support process was efficacious in: (a) developing Karim's mother's capacity to effectively support his participation in a valued snack routine; and (b) empowering Karim's mother to support her son to expand his repertoire of foods (within and outside an established instructional universe). Importantly, Karim's mother reported one month after the study ended that she continued to implement the snack routine five times a week and that she had successfully fed him a new food, mango. She also reported that snack time had become "easy and relaxed." Karim appeared to be happy and required less support from his mother with eating.

During follow-up, Karim's mother also reported collateral effects on Karim and herself. For example, Shabnam reported that Karim was accepting again foods that he had stopped eating several months before the study commenced. These foods included macaroni and cheese and scrambled eggs with hotdog. His mother also reported that with the increase in Karim's caloric intake due to all the new foods in his diet (both from the study and foods he was once again accepting), he no longer require 4 cans of Pediasure® a day. Instead, he received one 235 ml can of Pediasure® in the morning before school. Finally, Karim's mother reported that Karim now willingly swallowed medicine when it

was delivered to him through a syringe. This change in behaviour had a significant impact on the mother's stress level in that she no longer felt incapable of alleviating the pain or discomfort her son experienced due to illness or toothaches.

Shabnam reported that through the course of the study her feelings of exhaustion and weakness had diminished. With Karim eating more foods, and her youngest son receiving support from a behaviour interventionist, Shabnam stopped worrying as much and subsequently started sleeping better at night. As well, Shabnam said she felt much more confident about supporting Karim during snack and other home routines. This feeling of confidence also generalized to her other son with ASD, as she reported that she no longer responded to Hussein's problematic behaviour with hugs and cuddles and instead redirected him to use picture symbols to communicate what he wanted.

According to Kazdin (1982, 1992), this case study design provides a strong basis for drawing scientifically valid inferences about the impact of intervention. Specifically, characteristics of this study such as, continuous assessment of objective data, stable levels of performance before and after intervention, and an immediate and large treatment effect help to rule out specific threats to internal validity in a manner similar to a true experiment (Kazdin, 1992).

#### *Findings in Relation to the Literature*

The study provides further evidence of the efficacy of behavioural assessment and intervention in the natural home setting with family members as interventionists (Anderson & McMillan, 2001; Galensky et al., 2001; Luiselli, 2001; Werle, Murphy, & Budd, 1993). Similar to Anderson and McMillan (2001), we assessed the child in the home and taught the parent to implement the support procedures with their child while



other family members were present. Training and support activities included written strategies, modeling, coaching, and feedback. The effectiveness of parent training and support activities were consistent with previous findings in that the parent implemented the support procedures with fidelity up to six weeks after the termination of implementation support (Luiselli, 2001). High social validity ratings throughout the study also suggest that the intervention package was acceptable and important for the mother.

The study provides an empirical example of the efficacy of functional assessment procedures for understanding food refusal and related mealtime behaviours, and for designing effective interventions that are logically linked to the purpose of problematic feeding behaviour and the factors that set up or trigger such behaviours (Galensky et al., 2001; Girolami & Scott, 2001; Levin & Carr, 2001; Luiselli, 2001; Werle et al., 1993). Descriptive functional assessment procedures (e.g., observations, interviews) were conducted in the natural snack routine. Consistent with other studies (Galensky et al., 2001; Girolami & Scotti, 2001; Najdowski, Wallace, Doney, & Ghezzi, 2003; Werle et al., 1993), assessment findings revealed that Karim engaged in food refusal and other problematic mealtime behaviours to escape consumption of a non-preferred food. However, in this study, functional assessment procedures further revealed that Karim would engage in problematic feeding behaviour to escape any expectation to eat regardless of whether the food was preferred or non-preferred. This finding had important implications for designing an effective antecedent intervention (stimulus fading) that enabled the therapist to gain stimulus control of the child's behaviour in the most positive and proactive way. That is, intervention first began with Karim receiving reinforcement

contingent on accepting preferred foods from the therapist. After a few successful sessions, the therapist faded to non-preferred foods.

The study also confirms the usefulness of additional assessment procedures that focus on specific aspects of the feeding disorder (Galensky et al., 2001). The Behavioural Feeding Assessment Parent Interview (Budd, 1992) used in this study supplemented the functional assessment procedures in a very meaningful way. The items addressed in the feeding assessment helped to obtain a much more thorough understanding of Karim's problematic feeding behaviours. Information about past and current feeding patterns, parent's perspective on how feeding problems developed, and strategies the family currently used helped to build an intervention that was precisely honed to Karim's particular feeding disorder and history of feeding problems.

The study also adds to a growing body of evidence in the feeding literature of the importance of multicomponent treatment packages that include both antecedent-based and consequence-based support procedures (Freeman & Piazza, 1998; Luiselli, 2001; Shore et al., 1998; Werle et al., 1993). In this study, the behaviour support plan included core strategies consistent with a broad class of empirically validated feeding interventions. These core strategies included the following: (a) denial of preferred food 2-3 hours prior to snack intervention (setting event strategy) (Levin and Carr, 2001); (b) stimulus fading procedure (antecedent strategy) (Shore et al., 1998); (c) demand fading (antecedent strategy) (Najdowski et al., 2003); (d) visual cuing (antecedent strategy) (Luiselli, 2001); (e) escape extinction (consequence strategy) (Ahearn et al., 1996; Hoch et al., 1994); and (f) positive reinforcement (consequence strategy) (Kern & Marder, 1996).

Outcomes from the study also confirm that in severe cases of food refusal behaviour such as the child in this study, it is useful to first start the feeding intervention with a therapist and once the child's eating behaviour has improved, systematically transfer stimulus control to the parent in the natural meal routine. This strategy speaks directly to the question posed by Galensky et al. (2001), in which the authors asked if they could have done anything differently to prevent a family from opting out of the study. Although the authors reported that the parents were prepared for their child's extinction burst, they were unable to cope with the increase in food refusal behaviour and subsequently terminated treatment. In the present study, it appears that delaying the parent's involvement until the behaviour had improved helped to reduce the negative impact of problem behaviour on the family.

### *Contributions*

This study offers three unique contributions to the feeding literature on behavioural interventions. These contributions include: (a) parent as research collaborator; (b) assessment of the natural family context; and (c) multiple measurements. Each of these contributions is described below.

#### *Parent as Research Collaborator*

This study provides a demonstration of how a parent and child with ASD and severe food refusal behaviour can effectively collaborate with a researcher in natural family mealtime routine to promote meaningful and durable behavioural and lifestyle change that is important and acceptable to the parent (Albin et al., 2002; Fawcett, 1991). This study illustrates how a parent can play an active role in several aspects of the research and clinical support process.

From a clinical perspective, during assessment and plan development, Karim's mother collaborated with the experimenter to select the priority eating routine and define it in terms of the goals, values, resources, and tasks that were present or available in the family's ecology. As well, Shabnam actively participated by contributing knowledge about Karim's problem behaviour and assisting in the development of a criterion for terminating the routine due to problem behaviour. Shabnam offered invaluable information about the types of reinforcer to use with Karim during initial training with the therapist, and then again during follow-up when it appeared that this group of reinforcers had lost their potency. Shabnam collaborated with the experimenter regarding the order in which the foods were presented to Karim, as well as the temperature of the foods. Shabnam felt that because Karim's teeth were very sensitive, foods that are typically served cold such as yoghurt, pudding, and applesauce should be served at room temperature.

During intervention, Karim's mother decided that intensive training with the therapist should occur in a room other than the kitchen (the natural setting for snack) to prevent herself and her other children from getting upset by Karim's problem behaviour. Additionally, Shabnam suggested to the experimenter during initial parent training that implementing more than one session with Karim in the natural snack routine would be too difficult for Karim, especially when the three other boys were home. The therapist previously had set up a training protocol that included two twenty minutes feeding sessions separated by a ten minute break. In accordance with this suggestion, only one twenty minute feeding session was held.

From a research perspective, the parent participated in defining the independent and dependent variables (Albin et al., 2002). Throughout each phase of the study, Shabnam also helped to coordinate training sessions and observation probes. Although research activities were scheduled a week to two weeks in advance, the experimenter adjusted scheduled sessions if a family member was sick, or if Shabnam was too busy or tired.

Including the mother as an active decision-making partner across all essential tasks of the research and intervention process appeared to be vital to the success of the treatment plan. Throughout the study, the mother became increasingly confident. Shabnam gradually shared more ideas and observed how these ideas contributed the success of the support plan. With an increased sense of confidence, Shabnam also became more motivated and committed to helping her son expand his repertoire of foods. This became evident during the generalization promotion phase when Shabnam persisted despite being confronted with a very difficult task—teaching her son to eat non-trained foods.

This level of collaboration with a family of a child with food refusal behaviour is unprecedented in the behavioural feeding literature. However, in the larger problem behaviour literature there is evidence to suggest that collaborative research and intervention is associated with meaningful and durable treatment outcomes (Fox, Clarke, Dunlap, & Bucy, 1997; Lucyshyn, Albin, Nixon, 1997; Moes & Frea, 2002; Vaughn, Dunlap, Fox, Clarke, & Bucy, 1997).

*Assessment of the Family Context*

The study introduces to the current feeding literature, assessment procedures that extend beyond functional assessment of problem behaviour to also include assessment of the family context in which problem behaviour occurs. Behaviour support plans that are well grounded technically are likely to fail if they do not take into account features of natural settings that may support or impede implementation of the behavioural interventions (Albin, et al., 1996). Galensky et al. (2001) reported in their discussion that a major weakness of their study was that they did not consider the contextual variables of the natural mealtime routine and thus were unable to control extraneous variables such as the participant's interactions with a sibling.

This study, however, developed a behaviour support plan that appeared to have a good fit with family life. Specifically, support strategies were selected that (a) incorporated family goals and values, (b) built upon family strengths, (c) utilized resources available to the family, and (d) sought to minimize stressors. The fit between the behaviour support plan and the family's ecology was further refined by ensuring that interventions were congruent with elements of the valued snack routine; that is, time and place; people present; targeted foods; resources, tasks and their organization; goals and values; and child-parent interactions (Berheimer & Keogh, 1995; Lucyshyn et al., 2002). For example, the plan addressed changing setting factors like the coming and going of Karim's brothers during snack time. Specifically, a set of activities (e.g., video, swing, bubbles) were set up for Hussein to keep him safe and busy while his mother supported Karim during snack. Karim also learned to stay seated during snack to allow his mother the opportunity to check on Hussein or the oldest boys to make sure their needs were

being met. Occasionally too, his older brothers would join Karim for snack. Karim benefited from their participation in that he learned to eat amongst distraction, and observe his brothers' modeling appropriate eating behaviours.

The plan also addressed the goal of teaching Karim to eat new foods within a reasonable amount of time, ideally independent of his mother's support. The length of the snack routine was important to the mother, as she was concerned of potentially neglecting her other boys if too much of her time was spent supporting Karim. Attention to these contextual variables in plan design was associated with the implementation of a multicomponent support plan that appeared to be effective in ameliorating problematic feeding behaviours and was perceived by the mother to be acceptable and feasible.

Although this study is the first example in the feeding literature to use a goodness-of-fit framework to guide the design of a multicomponent support plan, this method of designing interventions is a growing point in the positive behaviour support literature. Several PBS studies provide descriptive evidence of the value of taking into consideration contextual fit variables when developing positive behaviour support plans (Clarke, Dunlap, & Vaughn, 1999; Lucyshyn, Albin, & Nixon, 1997; Moes & Frea, 2000).

### *Multiple Measures*

This study demonstrates how multiple measures pertinent to the child and family offered a richer and more comprehensive picture of child and family outcomes (Clarke, Worcester, Dunlap, Murray, & Bradley-Klug, 2002). Data gathered in the study offered evidence of the meaningfulness, acceptability, durability, and effectiveness of the positive behaviour support approach. In addition, these multiple measures strengthened

the internal validity of the quasi-experimental design in that most measures changed in the desired direction following implementation of the behaviour support procedures.

### *Unanticipated Problems*

#### *Time and Effort*

Although the data suggest that the support process was effective for Karim and his mother, it cannot be characterized as efficient or inexpensive in terms of time and effort. The outcomes summarized above required 54 hours of direct support (both training with therapist and parent training) distributed across five and a half months. Many factors contributed to this extensive training and support effort. First, it may be more difficult to improve the eating behaviour of a child of Karim's age (six and a half years old at the onset of intervention) as compared to a younger child. Karim was not only bigger and stronger, his food refusal behaviour had become entrenched from years of maladaptive parent-child feeding interactions. In addition, information derived from the community-based behaviour consultant's assessment report and Karim's school report indicated that Karim's refusal behaviour was pervasive. He appeared to be resistant to adult requests or demands across all routines and environments (e.g., home, school, community). This became evident during the functional assessment; Karim refused to eat any food (preferred or non-preferred) presented by an adult and he refused to sit at the table. Last, Karim suffered from severe toothaches and as a result, intervention was put on hold a few times until the pain and fevers had subsided.



### *Limitations and Cautions*

#### *Design*

Although there was an immediate, dramatic, and stable improvement in Karim's eating behaviour and his participation in the snack routine, one must use caution when interpreting the results. Although this quasi-experimental, case study design controls for six threats to internal validity, the design cannot entirely rule out the potential effects of history and maturation. However, as noted by Kazdin (1992) when immediate and large changes in behaviour are evidenced within a case study design, history and maturational factors are unlikely to account for the results.

#### *External Validity*

The results of this study, although encouraging, are based on support to one child and family, within one routine. For this reason, the ability to draw conclusions about the potential impact of the family support process with other families of children with ASD and food refusal behaviour is limited. Although there is experimental and quasi-experimental support for the efficacy of a positive behaviour support (PBS) approach with families of children with disabilities and general problem behaviour (Clarke et al., 1999; Lucyshyn et al., 1997; Moes & Frea, 2000), this study is the first example of the application of PBS to children with developmental disabilities and food refusal behaviour. Thus it is necessary to be cautious in extrapolating these results to other children with severe refusal behaviours and their families.

#### *Moderate Treatment Integrity*

Moderate treatment integrity (i.e., 60-70%) was the result of the experimenter's inability to effectively teach the mother to fade her verbal prompts when using the

proactive task prompt strategy. Although there were improvements, the mother continued to have a hard time delaying her verbal prompt to give Karim an opportunity to initiate eating on his own. As a result, by the end of the study, Karim still required support from his mother to feed himself. Nevertheless, the level of treatment integrity achieved appeared to be sufficient in improving Karim's consumption of non-preferred foods and his participation within the snack routine. This may bode well for other families who may need to learn to use positive behaviour supports to overcome food refusal behaviour. Families may be able to achieve significant improvement within child behaviour with only a moderate level (i.e., 60-70%) of treatment integrity.

#### *Minimal follow-up data*

Follow-up data were collected up to six weeks following the termination of intervention. Although these data are impressive, time constraints prohibited follow-up data to be collected beyond six-weeks. With minimal follow-up data, this study only very modestly speaks to the issue of durability. In order to assess the durability of improvements in child eating behaviour, outcomes should be collected for months, or better yet, years (Carr et al., 1999). Although this study did not provide sufficient evidence of durability, several factors suggest that the family is in a good position to maintain the gains made during treatment. First, high social validity and goodness-of-fit ratings suggest that the mother is likely to use the plan for a protracted length of time (Lucyshyn et al., 2002). Second, the success evidenced when Karim's father supported Karim during snack suggests that Karim's father has become a valuable source of support for Shabnam around mealtimes. With Jabbar able to effectively support Karim during snack times, Shabnam is relieved from having sole responsibility for supporting Karim's

eating behaviour. Secritz-Mertz et al. (1997) argue that mealtimes are less likely to become an aversive event when the parent responsible for feeding the child has support from others. Third, by the end of the study, Shabnam reported to have more energy to support her son during mealtimes. Overall, Shabnam reported that she experienced less stress in her life and that she was getting more sleep at night. Tentative anecdotal evidence of the value of these factors may be seen in a follow-up phone-call to the mother 10 weeks post intervention. Shabnam reported that she was continuing to implement the snack routine and had taught Karim to eat a new fruit (within the instructional universe).

### *Implications*

Results of the study offer several implications for practitioners and researchers who are involved in behavioural feeding interventions.

#### *Enhanced Model of Support for Individuals with Food Refusal Behaviour*

The study demonstrates an enhanced model of support for families of children who exhibit persistent feeding difficulties. This study merged the expanded features of positive behaviour support (PBS) with features already included in applied behaviour analysis research on feeding disorders. Consistent with previous feeding research, a parent implemented, multicomponent behaviour support plan based on a functional assessment and feeding assessment was efficacious in ameliorating severe food refusal behaviour for a young boy with ASD. However, expanded features of PBS—a collaborative partnership with parents, contextually appropriate support plans, and use of multiple measures—were associated with a broader range of outcomes not currently found in the feeding literature. Specifically, intervention and support procedures appeared

to be effective in: (a) improving a child's participation within a valued mealtime routine; (b) empowering the mother to teach her son to eat new foods and train her husband to implement the snack routine; and (c) improving quality of life for the family as a whole.

*Improving Eating Behaviour for a Child With ASD*

The study demonstrates an effective approach to improving eating behaviour for a child diagnosed with autism spectrum disorder (ASD). As mentioned earlier, parents of children with ASD commonly report a struggle to cope with their child's food refusal behaviour (DeMeyer, 1979; Legge, 2002). Previously, in chapter one, a causal classification system developed by Kedesdy and Budd (1998) was used to understand how problematic feeding behaviours might develop and be maintained in children with ASD. One causal factor, child constitution, suggested that specific characteristics of ASD such as sensory sensitivities and insistence on sameness contribute to the development of aberrant feeding behaviours. This study proposes however, that regardless of whether the child displays these autistic like characteristics, it is important to examine the child's individual learning style and develop support strategies that match this style. For example, Karim's mother reported during the functional assessment that Karim learns best when he knows what is expected of him and for how long. He also understands information best when it is presented visually. Providing Karim with a visual contingency gave him the predictability he needed in a format that he understood best. Karim was very attentive each time his mother or the therapist showed Karim the visual contingency of the type food and the number of bites/spoonfuls he was expected to eat that session. Also, he monitored the visual contingency so closely that he would remove the symbol if the therapist or his mother forgot to do it. As well, visual mapping out the steps of the

routine helped Karim become more independent. During follow-up, his mother was able to fade to using just the pictures to prompt Karim to clean up his dishes and throw away his napkin.

### *Routine as a Unit of Analysis and Intervention*

Analyzing and intervening within a valued routine appears to offer several benefits. First, the subjective and objective features of the activity setting (snack routine) provided an appropriate environment for designing a contextually appropriate support plan. Second, intervening within the context of a valued routine enhanced the meaningfulness and functionality of the support plan. The mother learned to support her son in the midst of carrying out other family responsibilities. Third, developing a contextually appropriate support plan appeared to contribute to the mother's accurate use of five of six support plan procedures.

In addition, supporting the mother to improve such a severely problematic behaviour in the context of a valued eating routine appeared to have had an impact beyond what would be predicted. This study evidenced several important collateral effects on the child and family. These collateral effects suggest the importance of choosing key routines that target important child behaviours. For Shabnam, trying to expand Karim's diet beyond cookies and crackers was a constant source of stress for her. After four years of struggling to improve Karim's eating habits, she had virtually given up and resorted to giving him nutritional supplements. Improving Karim's eating behaviour exemplifies what Rosales-Ruiz and Baer (1997) refer to as a behavioural cusp. A cusp is a behaviour that when changed systematically causes further, not formally programmed behaviour changes that are significant based on their importance to the

organism (child), or to his species (family) (Rosales-Ruiz & Baer, 1997). In this study, teaching Karim to eat new foods contributed to the expansion of his eating behaviour to non-trained foods (e.g., macaroni and cheese, scrambled eggs with hotdog, egg and tuna sandwich) and to accepting and consuming medicine. Furthermore, Karim's learning to eat transformed the mother's perception of Karim from a child with an eternal food refusal problem to a child who is a good eater who no longer required Pediasure® to meet his nutritional requirements. However, this notion of behavioural cusp is not able to describe the broader collateral effects on Karim's family. Indeed, this study appears to have changed more than just a child's eating behaviour, it improved a valued but problematic snack routine. The snack routine may be characterized as an "ecological cusp". Theoretically, an ecological cusp expands the concept of a behavioural cusp to include the ecology in which this important behaviour change occurred. For example, in this study, the mother expanded the skills taught to her during the snack routine to dealing with challenging behaviour exhibited by her youngest son. Teaching Karim to sit and eat at the table, and clean up after himself changed the mother's perception of a child who needed constant support to a child who now could be taught more independence. Finally, implementing a support plan that addressed features of the larger ecology of family life (e.g., stressors for the mother, available supports) was associated with improvements in family quality life, including improvements in the areas of health and safety, supports for persons with disability, and family resources.

The concept of an "ecological cusp" may provide a promising model for targeting some routines over others because of the potential for promoting changes in behaviour not formally programmed within the routine. Therefore, the potential of this concept is

that it may help to improve the effectiveness, acceptability, and durability of the support approach. The application of this model would however require the development of a process for selecting and prioritizing target routines (Boch & Fuqua, 2001). Based on the finding of this study, an essential component of this process would be the establishment of a collaborative partnership with parents. Without the families input, identification of a valued routine that may prove to be an ecological cusp is less likely.

### *Recommendations For Future Research*

Future research should consider three areas. First, because of the need to establish external validity, replication of the positive behaviour support approach with other families of children with ASD and severe food refusal behaviours is recommended. External validity would be particularly enhanced if the efficacy of the process were demonstrated with diverse families, including families of children at different age levels, single-parent families, or families of different cultures. Second, the concept of an “ecological cusp” as a guide to developing effective and durable behaviour support plans, although promising, requires empirical validation. Third, further research needs to be conducted to investigate the prevalence of aberrant feeding patterns in children with ASD. Without empirical validation that this is indeed a problem for families raising children with ASD, it is less likely that the current technology of behavioural support for children with food refusal behaviour will reach this population.

### *Conclusion*

This study examined three questions: (a) Is there correlational relationship between a family-centered, positive behaviour approach and improvements in eating behaviour for a child with ASD during a home-based, mealtime routine? (b) Is there a

correlational relationship between a family-centered, positive behaviour approach and generalized improvements in child eating behaviour? and (c) Is there a correlational relationship between a family-centered, positive behaviour approach and sustained improvements in child eating behaviour up to six weeks following termination of the implementation support?

The results suggest that a family-centered, positive behaviour support approach was efficacious in improving a child's eating behaviour and participation within a valued snack routine. In addition, these improvements were sustained for six weeks after the termination of the implementation support process. The results also suggest that implementation of a family centered, positive behaviour support approach effectively generalized the child's eating behaviour to new foods and to Karim's father implementing the snack routine. Finally, results suggest that the family-centered training and support activities facilitated the mother's ability to implement five of six strategies with accuracy.

The findings of this investigation make several unique contributions to the literature on behavioural feeding interventions. First, this research is the first study to document the effects of developing a collaborative partnership with a mother of a child with ASD and severe food refusal behaviour. Second, this study is the first example in the behavioural feeding literature to use a goodness-of-fit framework to guide the design of the behaviour support plan. The use of this framework was associated with moderate implementation fidelity and meaningful change in child behaviours and the routine. Third, the study demonstrates how the use of multiple measures painted a holistic picture of change in not only the child's eating behaviours, but also in the routine and in the



family's quality of life. These measures also strengthened the internal validity of the quasi-experimental, case study design. Fourth, the study demonstrated an improved model of support for families of children with food refusal behaviour. Integrating the expanded features of PBS with features already included in applied behaviour analysis research on feeding disorders was associated with a broader range of outcomes not currently found in the feeding literature. Fifth, the study illustrates the effectiveness of designing a behaviour support plan for a child with ASD based on functional assessment and feeding assessment findings. Finally, the study offers a potential new model for designing effective and durable behaviour support plans within family routines. It suggests that targeting routines that are highly valued and include behaviour changes important to the child and family may be associated with a broader range of positive outcomes not predicted by changing the child behaviour within the routine itself. Identification of such routines, or "ecological cusps", however would require the systematic development of a set of criteria for selecting and prioritizing target routines.

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Participation in the project will involve you and your family collaborating with the co-investigator in family support and research activities. Research and family support activities will occur over a 5-6 month period. During the first 4-5 months your child and family will be involved in support and research activities for approximately 2-4 hours per week. During the final month of the study, the family would be involved in support and research activities for approximately 1-2 hours. Research and family support activities are described below:

*Preliminary Assessment* Preliminary assessment activities will involve two interviews with you and other family members, with each interview lasting 1-2 hours. The purpose of the interviews is to identify valued eating/mealtime routines in the home and to develop a preliminary understanding about problem eating behaviour. Following the interviews, we will conduct two to three pilot observations in the identified routines. The purpose of these observations will be to verify the occurrence and purpose of problem eating behaviour. Each observation will last up to 15-20 minutes.

*Comprehensive Assessment* First, a functional assessment interview will be completed. This will involve one meeting of 1-2 hours in length. The assessment will help us to develop a comprehensive understanding of the conditions that occasion food refusal behaviour and food acceptance. Second we will complete a family ecology assessment. This will involve one meeting of 1-2 hours in length in which we learn about your family's strengths, social supports and resources, stressors, and goals for your child and family.

*Positive Behaviour Support Plan Design* Following assessment activities, we will collaborate with you to build a positive behaviour support plan for each problematic mealtime routine. This will be done one routine at a time through a series of two meetings. Each meeting will last 1-2 hours. During a planning meeting, family members and the co-investigator will review assessment information for a routine and build a support plan that fits well with the routine. The plan will be designed to improve child eating behaviour, parent-child interactions, and the success of the routine.

*Implementation Support* Training and support to help you and other family members implement the support plan in mealtime routines will occur approximately twice per week and involve 1 to 2 hours. During these meetings, the co-investigator will teach you and other family members how to implement support strategies with your child. After you have succeeded in improving child eating behaviour and parent-child interaction in the first routine, you will receive help in the second mealtime routine.

*Follow-up Support* After you have succeeded in improving child eating behaviour in both mealtime routines, we will transition to a phase of research called follow-up support. During follow-up, we will provide training and support as needed for one additional month.

*Videotaped Observations in Home-based Mealtime Routines* Videotaped observations in routines will occur an average of once or twice a week over a period of 11 weeks. During observation sessions, an observer will videotape your child and family's participation in selected mealtime routines. Each observation sessions will last between 20-30 minutes.

*Total Consumption of Preferred and Nonpreferred foods* You also will be asked to estimate the percentage of preferred and nonpreferred foods consumed by your child. As simple rating skill will assist you in making your estimations. Completing the rating form will take approximately 2-3 minutes.

*Assessment of Quality of Life* Another research activity that will take place is an assessment of your family's overall quality of life. This will occur at the beginning and end of the study. Completing the questionnaire will take approximately one hour.

## 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; (4) loss of confidentiality.

1. *Physical Risk* Because your child engages in problematic eating behaviour, there is more than minimal risk that you, your child, or another family member may experience physical injury during the study. Every precaution will be taken to minimize this risk:

- a. Members of the research team have extensive experience working with children who engage in problem behaviour in the home.
- b. Behaviour support strategies will focus on preventing behaviour problems and on teaching positive behaviour that are designed to replace problem behaviour.
- c. Observation sessions and training support activities will be terminated if your child begins to engage in medium or high intensity problem behaviour.

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

During observation sessions, the observer will maintain a low profile and not call attention to him or her self. You or other family members can terminate an observation session at any time. 'Family-friendly' features of the family support process should help to reduce stress associated with the study.

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 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:

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

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: change names of all persons, places, and programs described in the study; allow access to information only to members of the research team; and keep all data, notes, and videotapes in a locked file in a secure office.

## POTENTIAL BENEFITS



### **BROTHER OR SISTER ASSENT FORM**

#### A Family-Centred, Positive Behaviour Support Approach to Food Refusal Behaviour

We are interested in learning how to help your parents support Karim at home during mealtime routines. We plan to do this by conducting a study. We know that sometimes it's hard for Karim to do things without getting upset. We would like to help him and your family with this. We would do this by teaching your parents ways to help Karim stay calm and happy during mealtimes in the home. We may also spend some time teaching Karim ways to get what he wants by using words or pictures instead of problem behaviour. The things that Karim and your parents will learn will be pretty positive.

We also would like to ask you to participate in some of the mealtimes at home. If you agree to participate, we will ask you to do what you typically do during mealtime routines; that is, listen to your parents and cooperatively do the routine. We will make sure that while you and your family are working with us, you and your family are safe. We will do our best to make Karim's life more enjoyable for him. By doing so, we also hope to make your life and that of your family's more enjoyable.

When we begin, a person will visit your home to videotape you, Karim, and your parents in two mealtime routines. The observer will videotape about once a week for approximately four months. She will do our best to stay out of the way. Later, we will look at the videotapes and learn if our help is working or not. We will make sure that only those people who need to see the videotapes have a chance to see them. We would like to help your family for approximately 5 months.

By agreeing to participate, we will believe we can help your family make a happier life for Karim and also for your family. Your participation also will help us learn better ways to support other families. While we are helping your family or while a person is videotaping, if you do not want to participate, just tell us. You won't get in any trouble. If you don't want to participate at all, you don't have to. Just say so. Also, if you have any questions about what you will be doing, or if you cannot decide, just ask us if there is anything you would like us to explain. If you want to try, please sign your name on the line below. Your parents have already told us that is alright with them if you want to participate. Remember, you don't have to, and once you start you can rest or stop whenever you like.

Name of Participant: \_\_\_\_\_

\_\_\_\_\_ YES, I agree to participate

\_\_\_\_\_ NO, I do not agree to participate.

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Witness: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix B

**Social Validity Questionnaire**  
(Snack Routine)

Date: \_\_\_\_\_

Family member completing evaluation: \_\_\_\_\_

	Disagree					Agree				
	1	2	3	4	5					
1) The goals of the treatment plan are appropriate for my child.	1	2	3	4	5					
2) The goals of the plan are consistent with my my family's goals, values, and beliefs.	1	2	3	4	5					
3) The strategies and procedures used are difficult to carry out in the home.	1	2	3	4	5					
4) The strategies and procedures used are effective in improving my child's behaviour.	1	2	3	4	5					
5) The outcomes of the treatment effort are beneficial for my child.	1	2	3	4	5					
6) The outcomes of the treatment effort are beneficial to my family as a whole.	1	2	3	4	5					
7) The treatment effort has caused some unanticipated problems in our family.	1	2	3	4	5					
8) Training activities have been well organized, clear, and helpful.	1	2	3	4	5					
9) The person(s) providing technical assistance has shown respect for our family's values and beliefs.	1	2	3	4	5					
10) Overall, this treatment effort has strengthened our family.	1	2	3	4	5					

## Appendix C

**Goodness of Fit Survey for Treatment Plan Used by Family**  
(Snack Routine)

Date: \_\_\_\_\_ Family member completing evaluation: \_\_\_\_\_

	Little					A lot	Can't tell
	1	2	3	4	5		?
1) Do you believe that the treatment plan takes into account your understanding of your child (e.g., reasons for your child's eating problems, strategies that encourage positive behaviour, child preferences)?	1	2	3	4	5		?
2) Does the plan address your highest priority goals (types of foods he eats, level of independence during meals)?	1	2	3	4	5		?
3) Do you understand what you are expected to do with in this plan?	1	2	3	4	5		?
4) Are you comfortable with what you are expected to do?	1	2	3	4	5		?
5) Do you understand what others are expected to do within this plan (Lauren, other family members)?	1	2	3	4	5		?
6) Are you comfortable with what others are expected to do?	1	2	3	4	5		?
7) Does the snack routine reflect your highest priority mealtime routine?	1	2	3	4	5		?
8) Does the plan for the snack routine disrupt that time of day to the point that stress or hardship will be created?	1	2	3	4	5		?
9) Does the plan recognize and build on your family's strengths?	1	2	3	4	5		?
10) All things considered how difficult will it be for you use this treatment plan for the snack routine?	1	2	3	4	5		?
11) Do you believe the treatment plan will be effective?	1	2	3	4	5		?
12) If the plan is effective, do you believe you can keep using the strategies for a long time (e.g., over one year) even though Lauren will not be available as much? (little to no contact with Lauren, some assistance by phone)	1	2	3	4	5		?

Comments:

## Appendix D

### Family Ecology Assessment

1. What would you characterize as the strengths of your family?
2. What are sources of stress in your family?
  - a) What is the effect of your child's problem behaviours on you as a parent?
  - b) What is the effect of your child's problem behaviours on the family as a whole?
  - c) What are other sources of stress in the family?
3. What formal or informal resources have you used to help improve the situation (e.g., respite care, participation in a parent support group, help with childcare and household chores by other family members)?
4. What are your sources of social support (i.e., someone with whom you discuss problems and find solutions; someone with whom you do leisure activities; someone who validates your worth as a person)?
5. What are your goals for your child and family?

## Appendix E

### General Positive Behaviour Support Plan

- 1) **Daily eating schedule:** Establish set eating routines through out Karim's day. Allow 2-3 hours between meals. As well, to ensure Karim maintains proper health and nutrition give him pediasure 30-60 minutes after a meal, four times a day. Use a visual schedule to help Karim predict his day at home, including his mealtimes and snacks.
- 2) **Give Hussein choice of activities:** To keep Hussein busy while supporting Karim with snack, offer him a choice of activities. These activities should only be available to Hussein during Karim's snack time. If during snack, Hussein wants your attention, give him his communication book and ask him to make another choice.
- 3) **Intensive Training with Therapist:** Intensive training with therapist will occur until Karim is eating six of the nine targeted new foods. Intensive training will take place in Karim's bedroom. Once Karim is eating these six foods, the therapist will transfer implementation of the support procedures to the mother in the natural snack routine.
- 3) **Establish an Instructional Universe of Foods:** To promote generalization of Karim's eating behaviour, choose three groups of snack foods that sample the range of foods Karim would normally encounter during the snack routine (e.g., soft blended foods, crackers and spread, fruit). Then for each group, choose three foods you would like Karim to eat by the end of intervention.
- 4) **Stimulus Fading of Type of Food:** When teaching Karim to eat new non-preferred foods, present 3-4 pea-sized amounts on a spoon. If the targeted portion size is accepted and consumed (without gagging) on three consecutive snack sessions, increase the portion size by a specified amount ( $\frac{1}{4}$  of a spoonful,  $\frac{1}{2}$  of a spoonful,  $\frac{3}{4}$  of a spoonful). This step continues until Karim is consuming a portion size that is nutritionally appropriate for his age (e.g., full child size, spoonful of food). Ensure that Karim maintains previously mastered foods by interspersing them with new non-preferred foods.
- 5) **Visual Strategies:** Use two picture sequences with Karim during the snack routine: (1) use a picture sequence to increase Karim's knowledge and memory of expectations (e.g., snack, put plate in sink, throw napkin in garbage, finished, get toy); and (2) use a visually mediated positive contingency with Karim. The contingency differs depending on how successful Karim is at eating the targeted foods. For example, if Karim is just learning to eat a new food and is required to eat four bites, four pictures of the new food are placed on the picture schedule, each picture representing one bite of food. Alternatively, if Karim is able to eat a nutritionally appropriate portion of food, one picture symbol of that food will be placed on the schedule, with that one picture symbol representing the whole plate/dish of food. Review each picture sequence with Karim before presenting him with the food. As well, show Karim that a step has been completed, or a bite or dish of food has been consumed by removing the picture symbol from the picture sequence.

## Appendix E (continued)

6) **Positive Contingency Statement:** To motivate Karim to cooperate with snack routine tasks, tell Karim what he needs to do, and the positive reinforcer he will get after he engages in the behaviour(s). For example, "Finish your food and then you can watch a video" or "Eat your cracker and cheese and you can play gameboy." These statements should occur before Karim engages in any problem behaviours.

7) **Proactive Task Prompt:** Prompt Karim to eat his food before he makes a mistake or engages in problem behaviour. Prompt Karim from behind so that he looks at the food rather than you. Also, to avoid Karim from becoming prompt dependent, start with a gesture (e.g., point to the food, move the food closer to Karim), if no response from Karim, progress to a physical prompt, and then finally if no response, use a verbal prompt.

8) **Contingent Praise:** Offer praise and physical affection contingent on Karim consuming a bite of food, or completing other steps in the snack routine.

9) **Contingent Access to Preferred Toy:** Offer a preferred toy (e.g., game boy, video) contingent on Karim finishing his snack, or consuming a bite of a new non-preferred food.

10) **Escape Extinction Procedure:** Continue to hold the spoon of food up to Karim's mouth until he accepts and consumes the food. If Karim expels the food, immediately present him with another spoonful of the food that he previously expelled. Ignore all minor problem behaviours (e.g., turning head, crying, screaming, requests for hugs) and redirect him to the task (e.g., eat your food).

11) **De-escalation Procedure:** Minimize reinforcement for major problem behaviours: (a) move away from aggression; (b) quietly block self-injury and redirect when calm; (c) ignore throwing, prompt hands down, and redirect; (d) verbally redirect falling to the floor. If Karim escalates more than twice, terminate the meal.

### Intensive Training With Therapist

*The therapist followed all of the steps of the general positive behaviour support plan including the steps described below:*

1) **Distraction Free Room:** The therapist teaches Karim to accept and consume new foods in a room away from the kitchen devoid of potential distracters (e.g., family members, T.V., computer). Once Karim is consuming six new foods, the therapist transfers implementation to Karim's mother in the natural setting (kitchen).

2) **Massed trials of Targeted Foods:** The therapist teaches Karim to accept and consume a targeted new food by presenting the food to him 10 times in a row. Each presentation of food is represented by a picture symbol velcroed to a plastic strip. After a trial is

## Appendix E (continued)

complete the therapist or Karim pulls off the picture symbol and counts how many trials are left in the session. After 10 trials are complete, the therapist gives Karim a 10-minute break, followed by another 10 presentations of the targeted food. Feeding sessions occur three to four times per week, and are approximately an hour in length.

3) **Stimulus fading of type of food:** The therapist begins the feeding intervention with preferred foods (e.g., crackers and cookies). The therapist then progresses to foods that are soft/blended (e.g., pudding, applesauce) because such foods can easily be deposited on Karim's tongue, and are easier for Karim to consume. Once Karim is consuming 1/2 sized spoonfuls of all three blended foods, the therapist will progress to teaching Karim to consume fruit, and then finally crackers with spread.

4) **Demand Fading:** Demands by the therapist are slowly increased as Karim becomes successful with preceding steps. Initially Karim is given access to preferred foods or toys contingent on tolerating the therapist placing the spoon in his mouth. After 5 sessions, the therapist delivers preferred foods or toys contingent on Karim opening his mouth and spitting out the food. After 5 sessions, access to preferred items is restricted to Karim accepting and swallowing the pea-sized amount of food.

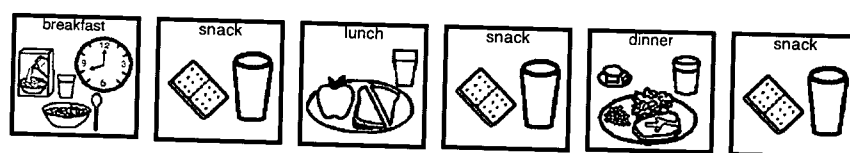
5) **First stage of Escape Extinction:** The therapist holds the spoon up to Karim's lips until there is an opportunity to deposit the food into his mouth. Another therapist uses nonaggressive physical restraint to keep Karim from leaving his chair or pushing the spoon away with his mouth. Once Karim is behaving cooperatively (i.e., sitting in his chair and allowing the therapist to present the spoon), the second therapist is faded from the feeding sessions.

6) **Second stage of Escape Extinction:** Once it is no longer acceptable for Karim to spit out the food, the therapist continues to present the food to Karim until he accepts and consumes it. The therapist ignores Karim if he engages in minor problem behaviour (e.g., turning head, pushing spoon away, crying or screaming) and redirects him to the task (e.g., eat your food).

## Appendix F

Implementation Checklist  
(SNACK ROUTINE)

- 1) Use Fridge schedule to show Karim when he gets to eat

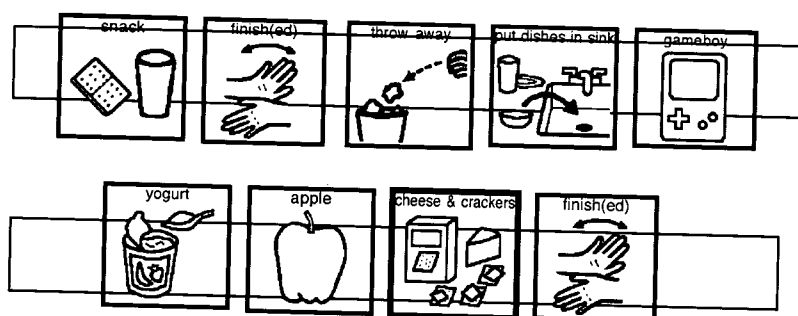


- 2) Don't let Karim play with toy before snack.

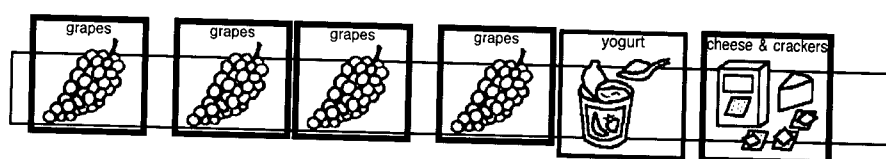


- 3) Allow \_\_\_\_\_ between meals.

- 4) Before Karim gets home from school set up two schedules

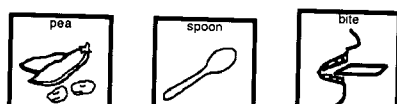


If it's a NEW food, show Karim how many bites he has to accept by putting that many pictures on the schedule.



- 5) Review both schedules with Karim before giving him his food.

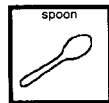
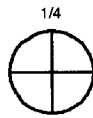
- 6) For \_\_\_\_\_ start with pea-sized spoonfuls or bites.





## Appendix F (Continued)

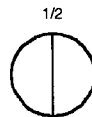
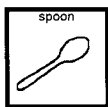
- 7) If Karim eats \_\_\_\_ pea-sized spoonfuls snacks in a row increase the amount of new food by \_\_\_\_ of a spoonful or ask him to take a bigger bite.



Take a bigger  
bite Karim!



Keep increasing by \_\_\_\_ until Karim eats a full spoonful of the new food.



full

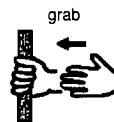
- 8) Help Karim eat by:

**1<sup>st</sup> Pointing**



**WAIT**

- 2<sup>nd</sup> Helping him grab his spoon or pick up the food.**

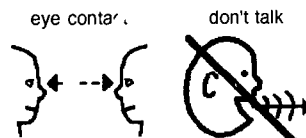


**WAIT**

- 3<sup>rd</sup> Telling him to take a bite, or eat his snack.**

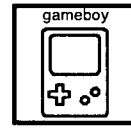
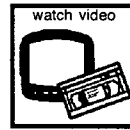
Eat your  
snack Karim!

- 9) Ignore non-eating behaviour
- don't give him eye contact
  - don't talk to him



## Appendix F (Continued)

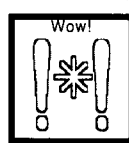
- 10)** Remind him using the pictures to eat keeping so he can  
Play gameboy or watch a video etc.



- 11)** Praise Karim and talk to him after he has eaten a bite of food.



Praise Karim MORE when he eats on his own without help.



- 12)** When Karim finishes his food, tell him to clean up.

