Water intake and adherence to clear fluid goals in children receiving treatment for encopresis

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Water Intake and Adherence to Clear Fluid Goals in Children Receiving Treatment for

Encopresis

by

Elizabeth Shannon Kuhl

Dissertation

Submitted to the Department of Psychology

Eastern Michigan University

in partial fulfillment of the requirements

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in

Clinical Psychology

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May 28, 2009

Ypsilanti, Michigan
Dedication

I would like to dedicate my dissertation to my mother, Jan Bierman. Ever since I was a little girl, you have encouraged me that I could achieve anything I set my eyes on with the utmost success. Your many personal sacrifices allowed me to receive the best education possible and to experience the world first hand. You encouraged me not to wait for anything or to expect opportunities to given to me. Instead, you taught me the value of hard work and persistence. You showed me how to gracefully accept that I may not always win or be given the opportunities I desire and to realize that these disappointments are mere bumps rather than roadblocks to my goals. You taught me to accept and embrace differences. You have always been there to provide me with support during times of self-doubt and celebrate with me during moments of accomplishment and victory. I can only hope that you are able to see that the person I am today and the accomplishments I have achieved are because of you. Thank you and I love you.
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Abstract

A six-session group intervention for treatment of retentive encopresis designed by Stark and colleagues yields high adherence for fiber (Stark et al., 1990a; Stark et al., 1997), but not fluid (Kuhl et al., 2009), recommendations. Children may also rely heavily on drinking juice to meet their clear fluid targets (Kuhl et al., 2009). This study examined the effectiveness of an enhanced intervention (EI) in improving children’s fluid goal adherence and modifying their daily fluid intake to include more water and less juice.

Data for 19 children who completed treatment previously served as the Non-Enhanced Intervention (NEI), and 18 children completed the EI. Participation in the EI significantly predicted higher daily water intake, lower daily juice intake, and better adherence to clear fluid goals. These findings demonstrate the importance of nutrition-based education and behavioral strategies in helping children make lifestyle changes necessary to meet fluid-based recommendations.
Introduction and Background

Retentive encopresis is a childhood elimination disorder that involves chronic constipation, stool withholding, and soiling accidents (leakage of fecal material into the underwear; American Psychiatric Association, 2000). It is estimated that 50-70% of children with retentive encopresis who are treated are responsive to medical management by laxative therapy (Felt, Brown, Coran, Kochhar, Opipari-Arrigan, et al., 2004; Spirito & Kazak, 2006). The problem is that prolonged use of medication is costly and may result in children becoming dependent upon the laxatives to have bowel movements. When laxatives are weaned, physicians may prescribe children to increase their daily intake of fiber and clear fluids (non-dairy, non-caffeinated beverages) to keep bowel movements soft, comfortable, and frequent (Felt et al., 2004; Houts, Mellon, & Whelan, 1988; Houts & Peterson, 1986). However, the literature suggests that prescriptions of dietary changes do not easily translate into parent actions to facilitate their child’s adherence to these recommendations (Mackner, McGrath, & Stark, 2001; Stark, 1999; Stark & Powers, 2005), and this may contribute to the high relapse rates and continued constipation for children with retentive encopresis (Bernard-Bonin, Haley, Belanger, & Nadeau, 1993; McGrath, Mellon, & Murphy, 2000; Opipari, Miller, Streisand, & Stark, 1999).

A group behavioral treatment designed by Stark and colleagues (Opipari et al., 1999; Stark, Opipari, Donaldson, Danovsky, Rasile, et al., 1997; Stark, Owens-Stively, Spirito, Lewis, & Guevremont, 1990b) targets improving adherence to these dietary recommendations as well as to medication and appropriate toileting behavior. The Multi-disciplinary Encopresis Clinic at the University of Michigan uses an adapted version of
this treatment. A preliminary quality control analysis for children participating in this intervention at the University of Michigan revealed that while children consistently achieved their fiber goals, less than 50% were adherent to their prescribed clear fluid goals at any point during treatment. This is problematic because increases only in fiber may worsen symptoms of constipation. Also of concern is the fact that children drank high quantities of juice to achieve their clear fluid goals. The high sugar and calorie content of juice places children at risk for cavities and even obesity.

The following study was thus proposed to examine the effectiveness of an enhanced version of the current group behavioral intervention protocol in improving children’s adherence to prescribed daily clear fluid goals and modifying their daily fluid intake to include more water.

**Characteristics of Encopresis**

Encopresis is an elimination disorder often diagnosed in early childhood that is characterized by involuntary or voluntary passage of feces into inappropriate places (e.g., clothing). In order to meet diagnostic criteria, this behavior must occur at least one time per month for a minimum of three months and cannot be the result of a medical condition other than constipation (American Psychiatric Association, 2000). Children must be at least four years old to receive this diagnosis although behavior consistent with diagnostic behaviors for encopresis have been observed in children ages three and younger (Reimers, 1996; Stark et al., 1997).

Two subtypes of encopresis have been defined. First, children who are medically diagnosed with constipation and who may experience overflow incontinence (leakage of fecal material into the underwear or soiling accidents) are diagnosed with retentive
Encopresis. Eighty to 95% of children diagnosed with encopresis are of the retentive subtype. Children with retentive encopresis commonly display one of two bowel movement patterns: either several days without having a bowel movement followed by a larger output, or smaller, unformed outputs on daily basis followed by a larger output several days later. Stools may be so large that they clog the toilet. This pattern often results from children withholding stool. Fecal impaction (blockage of the colon and rectum with hardened stool) may also occur due to infrequent bowel movements. It is common for children with retentive encopresis to report abdominal pain, pain upon defecation, poor appetite, and low energy (American Psychiatric Association, 2000; Bernard-Bonnin et al., 1993; Partin, Hamill, Fischell, & Partin, 1992; Walker, 2003). They may also attempt to hide soiled underwear due to shame or fear of punishment.

Second, children who demonstrate no physical evidence of constipation but who experience soiling accidents are diagnosed with non-retentive encopresis. Children with this subtype have regular, formed bowel movements, but often choose to expel stool in non-toilet locations. The literature suggests four categories for children with non-retentive encopresis: children who refuse initial toilet training, children who display toilet phobia, children who soil to manipulate their environment, and children who are diagnosed with irritable bowel syndrome (Kuhn, Marcus, & Pitner, 1999). Children with non-retentive encopresis are more likely to have a comorbid diagnosis of Oppositional Defiant Disorder or Conduct Disorder (American Psychiatric Association, 2000). Non-retentive encopresis is also common in children with developmental delays (Lancioni, O’Reiley, & Basili, 2001).
Due to the lower prevalence of non-retentive encopresis and the inclusion criterion of chronic constipation for group treatment at the Multidisciplinary Encopresis Clinic at the University of Michigan, the following review of the literature and project focused exclusively on children with retentive encopresis. The following topics are presented within the literature review section to provide a foundation for the systematic behavioral intervention enhancement that was designed. First, the characteristics of encopresis are reviewed, including a thorough behavioral analysis of the contingencies leading to the onset of this disorder and those that maintain it. Second, the treatment outcome literature for retentive encopresis is discussed and critiqued. Third, a more comprehensive review of the preliminary data analysis for adherence to daily clear fluid goals is provided to communicate the rationale for the proposed study. Fourth, a review of barriers to dietary adherence is presented including how they can be generalized to understanding barriers to children drinking water. Finally, the dietary adherence literature is briefly discussed.
Review of the Related Literature

**Prevalence of Retentive Encopresis**

One to two percent of all children are estimated to meet diagnostic criteria for encopresis, and this disorder is four to six times more likely to be diagnosed in males. Prevalence decreases as age increases, with one to seven and a half percent of children with encopresis falling between the ages of six and 10 and less than one percent between the ages of 10 and 12 (Christophersen & Mortweet, 2004; McGrath et al., 2000). Encopresis accounts for approximately three percent of all pediatrician visits and 25% of pediatric gastroenterologist visits (Ritterband, Cox, Walker, Kovatchev, McKnight, et al., 2003). Prevalence rates by ethnicity are not reported, and reviews of the literature reveal few minority participants in encopresis research studies.

**Comorbid Medical Disorders**

As was mentioned previously, the majority of children diagnosed with encopresis are also diagnosed with functional constipation, meaning that the constipation is not of an organic etiology. According to Rome II criteria, children are diagnosed with constipation when they produce three or fewer hard and painful bowel movements per week for a minimum of two weeks (Rasquin-Weber, Hyman, Cucchiara, Fleisher, Hyams, et al., 1999). In addition to constipation, it is estimated that 30% of children with encopresis also present with symptoms of or meet full criteria for enuresis, an elimination disorder specific to urination. Urine accidents are common for children with encopresis due to pressure on the bladder from the build-up and possible impaction of stool in the rectum (Levine, 1982). Finally, although exact prevalence rates are not reported, many children with encopresis (especially girls) experience frequent urinary tract infections due to
residual fecal matter in the underwear or diapers from soiling accidents or incomplete wiping (Felt et al., 2004).

**Comorbid Emotional and Behavioral Disorders**

The causal direction of behavioral and emotional problems and encopresis has been long debated in the literature. However, inclusion of standardized assessment measures during treatment outcome studies has led to the current belief that behavioral and emotional problems develop secondary to encopresis. Consistent use of the Child Behavior Checklist (CBCL; Achenbach, 1991) has revealed that children with encopresis have more global behavior problems than non-clinical children but that the severity of these problems is generally not within the clinical range (Gabel, Hegedus, Wald, Chandra, & Chiponis, 1986; Houts et al., 1988; Johnston & Wright, 1993; Loening-Bauck, Cruikshank, & Savage, 1987). However, the literature does suggest that 20-26% of children with encopresis are within the clinical range for hyperactivity (Cox, Morris, Borowitz, & Sutphen, 2002; Johnston & Wright, 1993) and withdrawn behavior (Cox et al., 2002) as measured by the CBCL.

The literature is less clear about the impact of encopresis on children’s self-esteem and social skills. More specifically, Owens-Stively (1986) found children with encopresis to have lower self-esteem than their peers, but this was contradicted by Cox et al. (2002) and Stark, Spirito, Lewis, & Hart (1990c). With respect to social skills, the literature suggests that children with encopresis are likely to have more difficulty establishing and maintaining friendships because of their smell and due to their having soiling accidents (Cox, Borowitz, Kovatchev, & Ling, 1998; Gimpel, 1998; Opipari et al., 1999). Empirical support for the presence and severity of social problems is, however,
inconsistent. Specifically, Young, Brennen, Baker, & Baker (1995) found that children with encopresis scored significantly lower than the non-clinical normative group for the Social Competence subscale of the CBCL (Achenbach, 1991) but did not indicate whether this group was within the clinical ranges for this scale. Results from two additional studies suggest that a small number of children with encopresis may have significant social impairments, with 0-8% of children falling within the clinical range for social competence on the CBCL (Loening-Baucke et al., 1987; Cox et al., 2002) and 21% on the Teacher Report Form of the CBCL (Cox et al., 2002).

The inconsistency of the literature regarding psychosocial functioning for children with retentive encopresis clearly warrants further investigation in this area and holds particular relevance for treatment outcome research and clinical practice. More specifically, the general pediatric literature suggests that child behavioral problems such as social difficulties and symptoms of depression and anxiety are related to poorer treatment adherence (Kanner, Hamrin, & Grey, 2003; La Greca & Bearman, 2003; Wysocki, 2006) and subsequently a worse prognosis (Kazdin, 2000).

**Etiology of Encopresis and Treatment Implications**

Perception of the etiological factors for encopresis influences case conceptualization as well as treatment planning. Three etiological theories have been presented in the psychological and medical literatures: emotional/psychodynamic, biological/physiological, and learning/behavioral. This section will review each theory and its implications for treatment.
Emotional/Psychodynamic

The earliest etiological theory regarding encopresis was noted in the 1920s and conceptualized encopresis as resulting from the interaction between poor emotional functioning of the child, child personality traits (e.g., immature and dependent), and negative family dynamic (Weissenburg, 1926). Children with encopresis were noted to live in chaotic homes with parents who were authoritative and emotionally absent (Bellman, 1966; Hoag, Norriss, Himeno, & Jacobs, 1971; Lehman, 1944; McTaggart & Scott, 1959; Richmond, Eddy, & Garrard, 1954; Warson, Caldwell, Warriner, Kirk, & Jensen, 1954). Parents described their children with encopresis as the least favorite child in the family and indicated that they were often the product of an unwanted pregnancy (Hoag et al., 1971). They were also commonly coerced to toilet train at an early age (one year or younger) without sufficient parental support and were punished by their mothers for lack of success in achieving fecal continence, even though their bodies often were not physically mature enough to achieve this developmental milestone.

Conceptualization of the etiology of encopresis in this manner resulted in treatments that focused on improving the family dynamic concurrent with teaching parents appropriate skills for toilet training. While some early case studies provided support for this type of treatment (e.g., Lehman, 1944; McTaggart & Scott, 1959), most noted that children and families were in therapy for multiple years and that sometimes children were institutionalized because problems with respect to encopresis could not be resolved with psychodynamic therapy. For children who were successfully treated, long-term maintenance of goals was poor. Support for the emotional/psychodynamic etiological theory and treatment of encopresis began to decline as empirical data...
supporting both biological/physiological and behavioral/learning etiological theories became available.

**Biological/Physiological**

The biological/physiological etiological theory has focused primarily on children with the retentive subtype due to the requirement of constipation for this diagnosis. In order to understand how biological and physiological factors contribute to encopresis, a brief overview of normal bowel functioning will be provided first. This will be followed by a discussion of the common causes of constipation and resulting physiological abnormalities that perpetuate the cycle of constipation and encopresis.

*Digestion and normal stool production.* Food that is eaten is digested in the stomach and passed to the small intestine by muscular contractions (peristalsis) where important micro- and macronutrients are absorbed. The remaining liquid waste is moved to the large intestine where water is removed, creating solid, formed stool. Peristalsis in the lower portion of the large intestine (colon) then moves the stool to the rectum when food and liquid are again consumed. This process is called the gastro-colic reflex and naturally occurs 15 to 20 minutes after eating. Solid stool accumulates in the rectum and receptors detect stool volume as it reaches fullness. Voluntary contraction of the external anal sphincter (EAS) keeps the stool in the rectum until an individual is in an appropriate place for defecation. The EAS is then relaxed and the abdominal muscles are contracted to evacuate the rectum (the valsalva maneuver). Physiologically, most children are able to demonstrate this muscular coordination between the ages of two and three, which often coincides with when parents begin to toilet train their children.
Etiology of constipation and its maintenance of encopresis. There are multiple biological, physiological, and behavioral etiological factors for constipation. Biological and physiological factors will now be reviewed, and behavioral factors will be discussed in the Learning/behavioral etiology section of this proposal.

Some children are genetically predisposed to constipation and have difficulties with stool passage due to slow motility (movement of the stool) through the colon. For other children, slow motility may develop due to dietary changes such as transitioning from breast milk to formula or from formula to solid foods. Slow motility may also be a side effect of some medications or can develop in response to stressful events. When stool does not move through the colon efficiently, the large intestine absorbs more water than usual, resulting in harder stools that are difficult to pass. It is possible that so much water is removed that the stool volume becomes too large to comfortably evacuate, which results in impaction of the stool in the rectum and occasionally in the sigmoid and descending colon as well. Impaction may also result if the child is not able to completely evacuate the rectum or chooses to withhold stool.

Chronic distention of the rectum with larger than standard stool volumes results in stretching of the rectal muscles and thus larger masses of stool are required before receptors in the rectum sense the need to evacuate stool. Stretching is also thought to weaken the rectal muscles, which makes it harder for children to fully expel the stool and keep their EAS contracted. Rectal stretching and loss of muscle control lead to soiling accidents because the child is not able to hold stool in and/or because the liquid stool seeps around stool that has become impacted. In addition, these physiological changes
frequently result in children reporting that they cannot feel when they have had a soiling accident or when they need to have a bowel movement.

Medical/physiological etiological theory underlies medical management of encopresis. Fecal impaction must be cleared first as additional medications cannot function properly if the large intestine and rectum are blocked. This is most often accomplished by prescription of suppositories or enemas, which can be frightening and uncomfortable for children and difficult for parents to administer. Daily laxatives or stool softeners, prescribed once impactions are cleared, serve to decrease water absorption in the large intestine, allowing the child to have softer bowel movements that could pass more comfortably and frequently. Laxatives also decrease the ease of stool withholding.

Learning/Behavioral

The psychological literature describes retentive encopresis as a learned behavior that is maintained by avoidance. More specifically, because pain is highly aversive, it is likely that children only need to experience one painful bowel movement for pain to become a conditioned response to defecation. Children then begin to withhold stool to avoid the emotional and physical pain that they anticipate will occur during defecation. This behavior is then maintained by negative reinforcement because the aforementioned negative consequences do not occur when defecation is avoided. Cognitive immaturity prevents children from understanding that, while withholding stool provides immediate satisfaction, it has the long-term consequence of making stools increasingly more painful. This pattern of withholding and experiencing uncomfortable bowel movements has been labeled by Rappaport & Levine (1986) as the Pain-Retention-Pain Cycle and is depicted below in Figure 1.
Conceptualization of encopresis in this manner would indicate that intervention should focus on treatment of constipation and rearranging the contingencies so children are positively reinforced for successful bowel movements in the toilet. Identifying how children’s learning history contributes to the onset of constipation is essential as treatment will not be successful unless this history is considered.

Several behavioral factors have been identified as contributing to the onset of constipation including poor diet, unsuccessful toilet training, fear of the toilet, incomplete stool evacuation, and painful defecation. What has not been discussed in the literature, however, is how antecedent events in the child’s learning history might serve as establishing operations for stool withholding behavior. Establishing operations are “events that alter the value of a reinforcer without altering the schedule of reinforcement or discriminative stimuli associated with reinforcer availability” (Kennedy & Meyer, p. 331, 1998). In this way, establishing operations alter an individual’s motivation to perform a behavior due to the strength of the reinforcer (Kennedy & Meyer, 1998; Michael, 1993 & 1982). It is therefore important to consider establishing operations in the conceptualization of the maintenance of encopresis as they could impact treatment.

Figure 1. Modified version of the Pain-Retention-Pain Cycle (Rappaport & Levine, 1986, p. 863)
decisions. Thus, a discussion of establishing operations will be integrated into a review of the behavioral factors in a child’s learning history that may contribute to the onset of constipation.

**Poor diet.** Constipation and painful bowel movements may be a consequence of children eating high quantities of low-fiber foods (e.g., pizza and chicken nuggets) and drinking low quantities of clear fluids (non-dairy, non-caffeinated). High fiber foods provide bulk to the stool and retain fluid, which helps the colon move it to the rectum and allows the rectal muscles to control when it is expelled. Fluids assist in keeping the stool soft and facilitating its movement through the body. When fiber and fluids are significantly reduced in the diet, stool may pass slowly through the digestive system and increase the risk of hardened stool or even impaction.

Hypothesized antecedents that may lead to a dietary style that is low in fiber and clear fluids include parents not presenting these choices for meals and snacks, family members and peers not modeling eating high-fiber foods and drinking clear fluids. Parental failure to provide or model eating high-fiber foods and drinking liquids such as water decreases the probability that children will acquire preferences for these dietary choices (Birch & Fisher, 1998; Campbell, Crawford, & Ball, 2006; Golan & Crow, 2004). Thus, protocols that do not teach parents how to discern high-fiber foods and clear fluids or how to model eating a diet consistent with treatment prescriptions have a lower probability of being effective.

Alternatively, parents may not possess the necessary skills to manage negative behaviors (i.e., tantrums, bargaining, and food refusal) displayed by children when presented with non-preferred food and drink items. Children are likely to continue to
display these negative behaviors because doing so allows them to escape from eating non-preferred food and drink items and parents are likely to continue providing alternative food choices because they are negatively reinforced for this behavior when the child eats. Thus, protocols that do not include parent training to manage child resistance to eating high-fiber foods and drinking adequate quantities of fluid have a lower probability of being effective.

It is also important to consider that constipation blocks the digestive system and decreases appetite that, in turn, makes eating less reinforcing and negative behaviors to escape from having to eat more reinforcing. In this way, the severity of constipation serves as an establishing operation for poor diet. This new conceptualization indicates that treatment protocols including dietary recommendations have a lower probability of being effective until constipation is reduced.

*Unsuccessful toilet training.* Achievement of fecal continence involves mastery of a multi-step sequence including discriminating the sensation of rectal fullness, going to the appropriate place to defecate, and performing the valsalva maneuver to expel stool. Children will struggle with toilet training if any of these steps are not mastered. Antecedents to children not learning to discriminate rectal fullness might include failure of parents to require children to complete toilet sits during times bowel movements are most likely (i.e., after meals) and failure of parents to transition children from diapers or pull-ups to underwear.

If children are encouraged to perform toilet sits when they are not likely to have a bowel movement, then they will not learn the correct behavioral sequence for defecation because the behavior of sitting on the toilet is not reinforced by release of pressure caused
by a full rectum. Parents may not prompt children to sit on the toilet after meals because they are unaware of the high probability of stool production at these times or because they cannot effectively manage their child’s resistance to using the toilet.

The consequences of children not discriminating cues to defecate include increased probability for soiling accidents as children are not able to get to the toilet in time, punishment from parents or teachers for having the accidents, stool withholding, and constipation. In addition, it is likely that parents will decrease the frequency of prompted toilet sits either because children do not report the need to use the toilet or because parents do not have effective behavioral skills to manage resistance displayed by children when prompted to sit on the toilet. Thus, treatment protocols that do not teach parents about when to schedule toilet sits or the techniques to enforce children’s completion of these sits have a lower probability of being effective.

Failure to transition children from wearing diapers and pull-ups to wearing underwear may also prevent learning to discriminate rectal fullness. More specifically, diapers and pull-ups promote passive defecation, which is adaptive for infants whose bodies are physiologically not able to sit and balance on the toilet or coordinate the muscles involved in defecation. Habituation to the sensation and smell of stool in one’s diaper is likely as most children wear diapers for almost two years of their lives. If parents do not take away the diaper, then children are not motivated to attend to bodily cues for defecation because there are no negative consequences for stooling in their diaper.

The decision to not transition children to underwear may also be a function of negative behaviors displayed by children when diapers are taken away. Children are
negatively reinforced for this behavior when parents provide them with a diaper, and parents are negatively reinforced for this behavior as it results in termination of children’s negative behaviors and because they do not have to clean underwear that may result if children experience soiling accidents. In addition, parents may continue to provide children with diapers and pull-ups to prevent social embarrassment that may result from children soiling when in the presence of peers.

Failure of parents to transition children to wearing underwear serves as an establishing operation for passive defecation because they continue to experience satisfaction from engaging in preferred activities and do not experience the negative consequences of soiled underwear. Thus, it is clear that transitioning children from diapers or pull-ups to underwear is a necessary element of treatment protocols for children with retentive encopresis in order to motivate the child to toilet train and to increase the reinforcing value of having bowel movements in the toilet.

Some children are able to discriminate when they need to have a bowel movement and know where this behavior should occur, but they are unable to successfully execute the valsalva maneuver. Antecedents to not learning the valsalva maneuver may include the inability of parents to teach this muscular coordination or children overlearning fecal retention during toilet training (Cox, Sutphen, Borowitz, Kovatchev, & Ling, 1994; Rappaport & Levine, 1986). Failure to learn how to relax the EAS while having a bowel movement could lead to incomplete evacuation, constipation, and painful defecation. Subsequently, urges to defecate may become a discriminative stimulus for tightening the EAS, and withholding behavior is maintained because children are positively reinforced for apparent control of bowel functioning and negatively reinforced for the absence of
painful defecation. Absence of soiling accidents also reinforces parental praise of withholding behavior especially if parents are not aware of how often their children should be having a bowel movement. Thus, protocols that do not teach children and parents the appropriate sequence of steps for having a bowel movement and that do not educate families about the etiology and physiology of encopresis (e.g., why soiling accidents occur) have a lower probability of being effective.

Toilet resistance. Refusal to sit on the toilet is a final antecedent to the onset and maintenance of constipation and stool withholding. Antecedents to children resisting sitting on the toilet or failing to sit on the toilet long enough to completely evacuate the rectum include fears of using the toilet, anxiety surrounding having an output, and boredom or impulsivity. The literature suggests that some children develop fears about using the toilet such as that they will fall in the basin and become stuck, that there are monsters in the bowl that will bite their bottoms, or that the bathroom will become flooded when the toilet is flushed (Cox et al., 1998; Levine, 1982). As a consequence, children resist sitting on the toilet and are negatively reinforced for withholding stool because doing so allows them to avoid the discomfort experienced upon exposure to the feared stimulus. This behavior may also be reinforced if children receive comfort from parents when displaying distress or if children are permitted to use a diaper or a pull-up for defecation. In turn, these parental behaviors are negatively reinforced as children’s distress dissipates and children’s display of resistant behavior is avoided. Thus, for children who have fears of using the toilet, treatment protocols that do not address these fears have a lower probability of being effective.
Children may also resist sitting on the toilet or verbalize that they do not need to have a bowel movement if they have been forcefully coerced to complete toilet sits or if they are punished for not producing a bowel movement while on the toilet. Finally, children may also resist sitting on the toilet because the bathroom is often not a child-friendly environment. Children may become bored when sitting on the toilet and stand up before they have fully expelled all stool contained in their rectums. This may be especially true for children with attention difficulties or who meet full criteria for attention-deficit hyperactivity disorder and thus are not able to control their impulse to move rapidly from one activity to the next (Cox et al., 2002). Thus, treatment protocols that do not teach parents how to structure toilet sits to ensure children remain on the toilet long enough to fully evacuate the rectum have a lower probability of being effective.

*Severity of constipation.* As was noted previously, pain during defecation is a common symptom of constipation. The severity of a child’s constipation serves as an establishing operation for stool withholding behavior. More specifically, the pain and discomfort experienced during defecation increases as constipation worsens, and this then strengthens the reinforcing value of withholding stool. This conceptualization indicates that treatment should include elements to decrease uncomfortable bowel movements and that stool withholding will become less reinforcing after repeated experiences with comfortable and successful bowel movements.

In sum, the etiology and maintenance of retentive encopresis is currently conceptualized as resulting from the interaction of several biological, psychological, social, and behavioral factors and is enhanced when establishing operations are considered. The fact that a diagnosis of constipation is necessary to diagnose retentive...
encopresis, and that it serves as an establishing operation to stool withholding behavior and decreased appetite, warrants medical intervention for the treatment of encopresis.

In addition, the psychological, social, and behavioral factors associated with the maintenance of constipation and stool withholding behavior suggests that children with retentive encopresis would also benefit from behavioral therapy. More specifically, the fact that most children withhold stool in fear of painful defecation warrants inclusion of relaxation and desensitization procedures into treatment packages for this disorder. Stimulus discrimination training is also essential as most children with retentive encopresis have lost the ability to detect the urge to defecate due to rectal stretching, ignoring urges due to fear of painful defecation, or never having learned how to discriminate when they need to have a bowel movement. In addition, contingency management (positive reinforcement for appropriate bowel movements and no soiling accidents) is likely to help make the toileting experience positive, thus increasing the reinforcing value of having regular bowel movements in the toilet. Finally, nutritional education is warranted to help families in providing their child with a high fiber and clear fluid diet.

**Encopresis Treatment Outcome Literature**

The treatment outcome literature for retentive encopresis will now be presented with an emphasis on how inclusion of specific treatment components addresses components of the behavioral contingencies maintaining this disorder. Treatments will be discussed under the following categories: medical management of encopresis, early behavioral treatments, biofeedback, enhanced toilet training, enhanced dietary and behavior modification, and group behavioral intervention.
Medical Management of Encopresis

Medical intervention is the first line treatment for retentive encopresis and routinely includes three components: education, medication, and behavioral strategies (Baker, Liptak, Colletti, Croffie, Di Lorenzo, et al., 1999; Felt et al., 2004). First, the physiology of constipation and soiling is explained to parents and children in order to “demystify” the etiology of encopresis, emphasizing that soiling accidents are not the child’s fault and rather are the result of physiological changes in the rectum. Thus, parents are told not to punish their children for soiling accidents as this behavior is not under their control. Second, medications are prescribed. A series of enemas (“enema clean-out”) or suppositories will be given if the child presents with a fecal impaction as additional medications cannot function properly if the large intestine and rectum are blocked. Daily laxatives or stool softeners are then prescribed to promote frequent, softer bowel movements. Thus, use of laxatives helps to decondition the pain that children have learned to associate with defecation. Use of these medications also makes withholding behavior difficult, which allows the rectum and rectal muscles to heal and regain strength and sensitivity to volume.

Third, physicians recommend that children make several behavioral changes. Specifically, they are asked to complete daily toilet sits upon waking and/or after major meals, as these are times that the gastro-colic reflex (and thus bowel movements) naturally occur. This stimulus control procedure aims to teach children stimulus discrimination so that they relearn the physiological cues for stooling. Parents may also be encouraged to provide children with rewards if they have an output on the toilet to make using the toilet a more positive experience. Operant conditioning is particularly
important as having a bowel movement will not be naturally negatively reinforced until the child can sense a full rectum at standard stool volume.

A fourth treatment recommendation to increase children’s daily fiber and fluid intake may also be made. As was noted previously, fiber promotes regular, comfortable bowel functioning by adding bulk to the stool and retaining fluid, which increases the child’s ability to control bowel movements because they are thus formed (Felt et al., 2004). Fluid recommendations are made to increase the likelihood that stools will remain soft and easy to pass given the increased bulk due to fiber.

Medical management is typically terminated when children have at least three bowel movements per week and no longer require use of laxatives (Felt et al., 2004; Loening-Baucke, 1993; Sutphen, Borowitz, Hutchison, & Cox, 1995). The literature suggests that medical management is successful for 50-70% of children with retentive encopresis but also that approximately 50% of this group report symptoms of constipation for up to five years post treatment (Spirito & Kazak, 2006; Bernard-Bonnin et al., 1993; Staiano, Andreotti, Greco, Basile, & Auricchio, 1994). In addition, full relapse after successful medical management is noted to be high (Opipari et al., 1999; Landman, Melvin, Levine, & Rappaport, 1983; Levine, 1982). Furthermore, there are a considerable number of children who are not initially responsive to medical management.

Lower success rates for medical management may reflect the fact that this type of intervention primarily treats the physiological symptoms of retentive encopresis (Opipari et al., 1999; Stark et al., 1990b; Stark et al., 1997). More specifically, children may be resistant to completing toilet sits because they have learned that bowel movements might be painful, they may reject taking stool softeners because they have learned that
complying results in initially increased frequency of soiling accidents, they may refuse to receive enemas because they have learned this procedure is uncomfortable, or they may refuse to eat high-fiber foods because they have learned they are often bland and not what their friends and other family members are eating. In addition, children may never have learned the appropriate way to strain in order to have a bowel movement.

It is thus clear that some families struggle to assist their children in making the lifestyle changes needed for treatment success. In addition, they struggle to maintain treatment gains long enough for their child’s rectum to return to its normal size and for their child’s rectal muscles to fully heal. It is for this reason that behavioral interventions have been developed to address the behavioral and emotional components of encopresis that are not necessarily primary targets for treatment when using medication alone and to assist families with making the prescribed difficult lifestyle changes needed for their children to fully recover from this disorder. The early behavioral treatment outcome literature will be reviewed first as it guided the development of more comprehensive behavioral interventions. This will be followed by a discussion of treatment protocols for biofeedback, enhanced toilet training, dietary modification, and a group behavioral intervention that were designed to enhance standard medical treatment for retentive encopresis.

Early Behavioral Treatments

From the 1950s to the early 1980s, several single case and small group studies examined the effectiveness of behavioral therapy for treating retentive encopresis. The rationale for utilizing behavior modification techniques stemmed from the belief that children developed encopresis because they had not learned the muscle control needed to
have a bowel movement, because children either lost the ability to detect the urge to defecate or never learned this stimulus discrimination, or because children were fearful of having bowel movements due to the negative consequences of this behavior (pain and punishment). Thus, techniques such as positive reinforcement, punishment, overcorrection, and stimulus discrimination training were applied to shape appropriate toilet behaviors and desensitize anxiety surrounding having a bowel movement. The treatment outcome literature for each of these techniques will now be presented.

**Reinforcement.** According to operant learning theory, the frequency of a behavior will depend upon the consequences that follow that behavior (Skinner, 1938). More specifically, behaviors that are followed by positive consequences (reinforcement) will occur at a higher frequency and those that are followed by negative consequences (punishment) will occur at a lower frequency. Six studies found that shifting parental attention from soiling accidents to appropriate bowel movements and/or absence of soiled underwear was successful in the treatment of encopresis in seven-48 weeks (Allyon, Simon, & Wildman, 1975; Bach & Moylan, 1975; Bornstein, Balleweg, McLellan, Wilson, Strum, et al., 1983; Neale, 1963; Keehn, 1965; Pedrini & Pedrini, 1971; Planchetta, 1976). One study achieved similar results by providing negative reinforcement (removal of an aversive stimulus) contingent upon the absence of soiling (Edelman, 1971).

**Punishment.** Behaviors that are punished decrease in frequency because absence of the behavior results in successful avoidance of negative consequences. Four studies examined the effectiveness of punishment in the treatment of encopresis (Barrett, 1969; Gelber & Meyer, 1965; Wright, 1973; Wright, 1975). Positive reinforcement for
appropriate defecation and absence of soiling was included in all treatment protocols to shape the desired toileting behaviors. The combination of punishment and positive reinforcement successfully treated encopresis in 65-75 days.

**Overcorrection.** Overcorrection is a specific type of punishment procedure where individuals are “required to engage in an effortful behavior for an extended period contingent on each instance of the problem behavior” (Miltenberger, p. 413, 2008). This procedure was originally developed by Foxx and Azrin, who described two types of overcorrection: positive practice and restitution (Foxx & Azrin, 1973; Foxx & Azrin, 1972). Positive practice procedures require the individual to perform the desired behavior for long periods of time or for multiple repetitions contingent upon display of the targeted (problem) behavior. Restitution procedures require the individual to return the environment to a state that is better than it was prior to the targeted behavior being emitted.

Studies that applied overcorrection to treating encopresis required children to either wash soiled underwear for multiple minutes past when the underwear was clean or wash multiple pairs of underwear in addition to the pair that had been soiled (restitution) and then perform multiple toilet sits (positive practice). Three studies found that encopresis was successfully treated by overcorrection in one to ten weeks (Butler, 1977; Crowley & Armstrong, 1977; Rolider & Van Houten, 1985).

**Stimulus discrimination training.** Stimulus discrimination training is a behavioral technique in which a behavior is conditioned to occur in the presence of a new antecedent. When applied to encopresis, this technique has been used to assist children in learning that the sensation of a full rectum (antecedent) should be followed by going to
the bathroom and having a bowel movement on the toilet (behavior). This behavior chain was taught by having children perform toilet sits after meals, a time where the probability of stool production increases due to the natural occurrence of the gastro-colic reflex. Depending upon the child’s encopresis history, suppositories were used to initially assist with bowel movement production. Three studies found that encopresis was successfully treated by stimulus discrimination training and positive reinforcement in 7-20 weeks (Ashkenazi, 1975; Wright, 1975; Wright, 1973).

In sum, the early behavioral therapy treatment outcome research indicated that behavioral techniques were effective in treating encopresis and thus provided support for a behavioral (learning) etiology for this disorder. However, many of the studies reviewed were conducted in inpatient settings, and translation of these interventions to outpatient settings resulted in treatments that were long in duration. Thus, the treatment outcome research shifted to examining the effectiveness enhanced behavior interventions consisting of intensive medical intervention (enema clean-out and laxative therapy) and different combinations of multiple behavior modification techniques. These enhanced protocols will now be reviewed. Duration and cost of treatment will be noted as these additional treatment outcome measures are prominent factors in treatment planning in the current managed care era (O’Donohue, Ferguson, & Cummings, 2002).

**Biofeedback**

Fifty-70% of children with encopresis may display paradoxical constriction (voluntary tightening of the external anal sphincter) or may have abnormal defecation dynamics (inability to control the external anal sphincter; Loening-Baucke et al., 1987; Molnar, Taitz, Urwin, & Whales, 1983; Van der Plas, Benninga, Redekop, Tamininiau, &
Büller, 1996). Relaxation of the external anal sphincter (EAS) during defecation is imperative because it controls the amount and speed of stool that is released from the rectum. Biofeedback has thus been suggested as a treatment for encopresis to shape or re-teach EAS control (Cox, Sutphen, Ling, Quillian, & Borowitz, 1996; Cox et al., 1998) and may also serve as a form of systematic desensitization as children learn that relaxing their EAS during defecation results in more comfortable bowel movements. During the biofeedback procedure, electrodes placed either internally (manometric biofeedback; MBF) or externally (electromyographic biofeedback; EBF) provide visual information for the child about whether the EAS is tensed or relaxed. Children observe EAS feedback from a healthy child who is defecating and then are coached on how to use their abdominal muscles and relax their own EAS to produce feedback similar to that of the healthy child. Feedback is faded once the child is able to successfully relax his or her EAS.

Biofeedback combined with laxative therapy is 50-100% effective in alleviating symptoms of encopresis in three to five sessions over an average of six weeks (Benninga, Büller, & Taminiau, 1993; Croffie, Ammar, Pfefferkorn, Horn, Klipsch, et al., 2005; Keren, Wagner, Heldenberg, & Golan, 1988; Loening-Baucke, 1990; Olness, McParland, & Piper, 1980; Van der Plas, Benninga, Büller, Bossuyt, Akkermans et al., 1996; Van der Plas et al., 1996; Wald, Chandra, Gabel, & Chiponis 1987; Weber, Ducrotte, Touchais, Roussignol, & Denis, 1987). In addition, four studies have found MBF plus medical intervention superior to standard medical care (Loening-Baucke, 1990; Wald et al., 1987; Van der Plas et al., 1996; Van der Plas et al., 1996). The long-term effectiveness of biofeedback is questionable; however, the initial superiority of MBF over standard
medical care (SMC) is not maintained six months to four years post-treatment (Loening-Baucke, 1995; Nolan, Catto-Smith, Coffey, & Wells, 1998; Van der Plas et al., 1996a; Van der Plas et al., 1996b).

In sum, the literature has provided modest support that using biofeedback to re-teach or shape EAS control results in successful, sustained treatment of retentive encopresis. However, there are distinct disadvantages to this type of intervention that may prevent its frequent use in clinical practice. First, the long-term superiority of biofeedback training to standard medical care has not been demonstrated. Second, biofeedback machines are costly and require that providers have specialty training in their use. Third, some biofeedback modalities are physically invasive and may be perceived as aversive to children and their parents. Thus, the costs of adding biofeedback to standard medical care intervention for treatment for encopresis appear to outweigh the benefits.

*Enhanced Toilet Training (ETT)*

Scheduled toilet sits (stimulus control) are a common component to standard medical care. In making this recommendation, physicians may assume that children either already know how to appropriately strain during defecation or that the brief overview provided during medical appointments will be satisfactory in teaching this skill. In addition, little time is usually spent addressing how to help children overcome fears that may have developed surrounding defecation or use of the toilet (Cox et al., 1996).

An enhanced toilet training intervention (ETT) was developed to address these two gaps in standard medical care (Cox et al., 1996; Cox et al., 1998). More specifically, children are provided with detailed instructions for how to relax their EAS while straining to expel stool (including modeling of the valsalva maneuver by the therapist).
and then are encouraged to engage in relaxing activities during the first half of scheduled toilet sits (i.e. reading or playing with toys) prior to practicing the valsala maneuver. Additional treatment components to this treatment package include psychoeducation regarding the etiology of encopresis, contingency management (positive reinforcement for independent toilet sits and no soiling accidents), self-monitoring of bowel functioning, and dietary recommendations (increase daily fiber and fluid intake).

The ETT intervention has a 75-85% success rate when combined with laxative therapy and has demonstrated superiority over laxative therapy (LT) alone and over ETT + biofeedback (Cox et al., 1996; Cox et al., 1998). In addition, the ETT intervention requires significantly fewer treatment sessions (mean of 2.93-3.0 sessions over three months) than LT alone (mean of 3.92-4.0 sessions over three months) and fewer treatment sessions than ETT + BF (mean of 3.4 sessions over three months; Cox et al., 1996; Cox et al., 1998). Furthermore, children participating in the ETT intervention remained on laxative therapy fewer weeks than children in the LT and the ETT + LT + BF groups. Cox et al. (1996) also found that children in all three treatment groups (ETT, ETT+BF+LT, and LT) increased fluid intake as a function of intervention participation but that improvements were not significant. The long-term superiority of ETT is not demonstrated, however, as success rates for ETT (48%), ETT + BF (37%), and LT alone (36%) did not differ significantly 12 months post-treatment (Cox et al., 1998).

In sum, although long-term success rates were not significantly higher, inclusion of specific instructions, modeling, rehearsal, and systematic desensitization to standard medical care produced significantly better treatment results in the fewest treatment sessions. In addition, the fact that success rates for children in the ETT alone and the ETT
Water and Clear Fluid Goals

+ BF groups were similar suggests that children can learn EAS control without use of expensive biofeedback equipment and in fewer sessions than what has been demonstrated in the literature as necessary for effective biofeedback treatment.

While these aspects of the ETT + LT treatment are advantageous, there are disadvantages to utilization of this intervention. Specifically, most behavior modification techniques cannot be taught in the 10-15 minutes allotted during physician appointments. Thus, the multitude of behavior modification techniques included in the ETT enhancement would require either longer treatment sessions or multiple 10-15 minute sessions to ensure techniques are learned. In addition, inclusion of behavior modification techniques warrants their administration by a professional trained in behavioral therapy (i.e., psychologist or social worker) who may or may not already be on the clinical staff in a pediatrician or pediatric gastroenterologist’s office. If it is not possible to include a psychologist on staff, then physicians would need to be trained in behavioral modification techniques, and the efficacy of their delivery of these techniques would need to be demonstrated.

In order to address these concerns, and in attempts to make the ETT intervention more accessible, it has been adapted for use on the internet (Ritterband et al., 2003). The computerized version of ETT includes three core modules: anatomy/physiology (psychoeducation on anatomy, physiology, and the purpose of using enemas, laxatives, and behavior modification strategies in treating encopresis), medications (psychoeducation on types of medications and age-based recommendations for specific medications), and behavioral intervention (instructions about proper straining and relaxing of EAS). Each core module requires participants to take a quiz upon completion.
to reinforce presented material and assess knowledge gained while completing the module. Self-monitoring forms are also provided for parents to track their child’s bowel movement functioning.

Users are asked to return to the site one week after completion of all core modules for a follow-up visit, and recommendations for completion of any number of 26 optional treatment and education modules are made at this time based upon user information regarding treatment progress. Users can, however, access any of the supplementary modules. Optional modules cover additional education such as how to talk to schools about encopresis treatment, the relationship between diet and constipation, and supplementary behavior modification techniques such as contingency management and systematic desensitization to address toileting fears. One study has examined the effectiveness of this intervention and found that 70% of children in the internet group (who were also receiving medical intervention) were classified as treatment successes after three weeks compared to only 45% of the children treated by medical intervention alone (Ritterband et al., 2003).

In sum, the internet adaptation of the ETT intervention appears to be highly effective in a short duration of time and suggests that parents and children can learn behavior modification techniques independent of face-to-face interaction with a professional. An additional advantage to the internet version of ETT is that it allows families to complete part of their treatment for encopresis in the privacy of their home. Three potential limitations should be considered when making decisions about implementing ETT. First, only one study has examined its effectiveness. Thus, while it demonstrates superiority over standard medical care, its value over other enhanced
behavioral interventions remains unknown. Second, the long-term effectiveness of intervention is unknown. Third, children participating in the study by Ritterband et al. (2003) had fewer soiling accidents and more frequent bowel movements per week at the onset of treatment than children participating in other treatment outcome studies for retentive encopresis. Thus, it is not possible to say whether this intervention would be effective for children with more severe cases of this disorder. Finally, use of this treatment requires internet access, which may not be affordable or accessible to all families needing care.

Enhanced Dietary and Behavior Modification

Acquisition of a regular stooling schedule (three or more bowel movements per week) is a primary goal of encopresis treatment. Initially, laxative therapy assists children in making this change. However, long-term laxative use is discouraged because of the potential for negative health consequences and because children may learn to rely on the laxative to have a bowel movement (passive defecation). Some evidence exists in the medical literature to suggest that a high-fiber diet may be a natural way to increase the frequency of stool production (e.g., Morais, Vitolo, Aguirre, & Fagundes-Neto, 1999; Roma, Adamidis, Nikolara, Constantooulos, & Messaritakis, 1999). Thus, physicians may recommend increasing daily fiber intake as laxatives are weaned. This goal may be challenging given that many foods children prefer (e.g., chicken nuggets, macaroni and cheese, and ice cream) contain little to no fiber and parents may perceive that the costs of trying to manage children’s negative behaviors when presented with high-fiber foods are higher than struggling to make this dietary change.
Three studies have explored the effectiveness of a dietary and behavior modification intervention for the treatment of retentive encopresis (Houts & Peterson, 1986; Houts et al., 1988; Nabors & Morgan, 1995). Components included in treatment packages across all studies included nutritional education about fiber, a point contingency management system for increasing fiber intake, self-monitoring, and scheduled toilet sits (stimulus control). With respect to the contingency management system, points are earned for eating high-fiber foods and subtracted for eating foods high in dairy or refined sugars. Two studies encouraged children to eat a higher fiber total each week (Houts & Peterson, 1986; Houts et al., 1988) and one study set fiber and fluid goals (Nabors & Morgan, 1995). Positive reinforcement for appropriate bowel movements and absence of soiling accidents and overcorrection procedures were utilized in two studies (Houts & Whelan, 1986; Nabors & Morgan, 1995).

Between-studies comparisons revealed 100% success rate for this treatment package with respect to increasing daily fiber intake and decreasing symptoms of retentive encopresis in an average of 16-26 weeks. Thus, increasing dietary fiber may be a viable addition or alternative to laxative therapy. The single study that set fluid goals along with fiber goals reported 100% adherence to prescribed fluid goals (Nabors & Morgan, 1995). Three potential limitations should be considered when making decisions about implementing a treatment package, including dietary recommendations and behavioral modification. First, this treatment package required a long duration of active treatment with a psychologist, and this may difficult to justify in the current era of managed care. Second, two studies were single-case design (Houts & Peterson, 1986; Nabors & Morgan, 1995), and one study included only three participants (Houts et al.,
1988). Thus, it is difficult to discern whether the high success rate of this treatment package would generalize to other children with retentive encopresis. Third, no studies examined the superiority of this treatment package to other effective interventions.

*Group Behavioral Intervention*

As has been discussed previously, children with encopresis often demonstrate resistance to toilet training, dietary changes, and adhering to medications, and parents often lack the skills to effectively manage these resistant behaviors (Levine & Bakow, 1976; Rappaport et al., 1986; Stark et al., 1990b). A six-session, comprehensive, group intervention was designed to address these behavioral difficulties in the context of common treatment recommendations for children with retentive encopresis. This enhanced treatment package includes self-monitoring, contingency management, differential attention, consequences, behavioral contracting, modeling, relaxation, dietary modification, and goal-setting in addition to psychoeducation about encopresis, stimulus control, and medication.

During the intervention, parents and children meet in separate but simultaneous groups that cover the same information but at a developmentally appropriate level for children. Parent sessions include a review of self-monitoring forms and graphs of treatment progress, education, teaching of behavior modification skills, and discussion of homework. Child sessions include education, educational activity, high-fiber snack, presentation of prizes, and discussion of homework. Self-monitoring of bowel movement functioning and daily dietary intake is completed by parents with assistance from their children throughout the duration of the intervention. Weekly goals reflecting material covered during group sessions are also provided, and a contingency management system
is used to facilitate adherence to these goals. Children have the opportunity to earn prizes at subsequent group sessions for meeting their goals during the week.

The group behavioral intervention is divided into three phases (psychoeducation and medical management, dietary modification, and child behavior management surrounding appropriate toileting) and each phase consists of two treatment sessions. In phase one, parents and children learn about the anatomy of the digestive system, the physiology of encopresis, and medications used to treat encopresis. Time is also spent educating parents on how to administer enemas and teaching children relaxation techniques to aide in decreasing discomfort and stress that many children experience during this procedure. In phase two, parents and children are provided with education about the importance of a high-fiber and high-fluid diet and with suggestions for how to increase daily fiber intake. Children are provided with age-based fiber and clear fluid goals and parents are taught how to provide differential attention, positive praise, and consequences to help their children achieve dietary goals. In phase three, appropriate toilet sitting (including straining and relaxing) is modeled by group leaders and rehearsed by children. Children and parents create behavior contracts to facilitate adherence to daily, scheduled toilet sits. Parents also receive education about how to apply newly learned behavior modification and child behavior management techniques to maintain treatment gains, including how to modify treatment goals and wean schedules of reinforcement.

Two studies have found this intervention to have a success rate of 87-89% (Stark et al., 1990b; Stark et al., 1997). Fluid intake was not a dependent variable in either evaluation of this study, and thus adherence to clear fluid goals was not reported. One
study investigated the long-term effectiveness of this group behavioral intervention and found that children were able to maintain treatment gains with respect to bowel movement functioning and daily fiber intake at six months post-treatment (Stark et al., 1990b). Additional advantages to the group behavioral intervention include that it is cost-effective and that it unites children and families who may otherwise feel alone in managing symptoms of encopresis. Furthermore, the high success rate demonstrates that teaching parents behavior modification techniques such as differential attention and contingency management are effective in managing resistance to the behavior changes required in most medical protocols for the treatment of retentive encopresis.

Despite these important strengths, three potential limitations should be considered when making decisions about implementing the group behavioral intervention. First, the true superiority of the group behavior treatment cannot be discerned because it has not been compared to other enhanced behavioral interventions. Second, no dismantling studies have been performed to determine the active components to this treatment package. Third, not all third-party payers will reimburse for group treatment, and out-of-pocket costs may be high, as families will pay for both medical and psychological care.

In sum, the treatment outcome research demonstrates that enhancement of standard medical care with behavior modification techniques is superior to providing standard medical care alone for the treatment of retentive encopresis. However, there are several limitations with respect to research design that do not permit for designation of the true efficacy and effectiveness of each enhanced behavioral intervention. First, few studies report adherence. For example, several interventions prescribed that children increase their fluid intake, but only two studies provided information regarding whether
children were successful in making this dietary changes (Cox et al., 1996; Nabors & Morgan, 1995). This is problematic because if children are not adherent, then the accuracy of data regarding the effectiveness of treatments and, more importantly, specific treatment components will be compromised (Johnson, 2000; Matsui, 1997; Rapoff, Purviance, & Lindsley, 1988; Riekert & Drotar, 2000; Spirito & Kazak, 2006).

Second, the impact of all treatment components is not consistently evaluated. For example, several interventions include psychoeducation about encopresis, but only three studies assess whether this information was retained (Cox et al., 2002; Ritterband et al., 2003; Ritterband, Cox, Gordon, Borowitz, & Kovatchev, 2006). Thus, it is not possible to evaluate the impact of each individual treatment component (Kazdin, 2000). Third, while many studies collected continuous data, only pre-post data are presented. Although this information indicates whether a treatment works, it does not describe the process of change. Absence of this information makes it difficult to draw firm conclusions about the effectiveness of various treatment phases and treatment components (Kazdin, 2000).

Fourth, no studies provide information with respect to treatment integrity. Thus, internal validity of each enhanced behavioral intervention is compromised, as it is not known whether all participants received the same intervention in the same way (Drotar, 2006; Kazdin, 2000; Spirito & Kazak, 2006).

**Preliminary Data**

The literature suggests that the group behavioral intervention presented by Stark and colleagues may be an efficacious and cost-effective treatment for retentive encopresis (McGrath et al., 1999; Opipari et al., 1999; Stark et al., 1990b; Stark et al., 1997). The effectiveness of this intervention is attributed to teaching parents behavior management
skills to improve their children’s adherence to medication, practicing toilet sitting behaviors, and to a high-fiber, high-fluid diet (Opipari et al., 1999; Stark et al., 1990b; Stark et al., 1997). Particular emphasis is placed on the importance of the dietary recommendations as they may prolong treatment success in the absence of continued use of medications. While data have been presented in the literature on adherence to fiber targets (Stark et al., 1990b; Stark et al., 1997), no data have been presented with respect to adherence to prescriptions to increase clear fluid intake. Thus, it is not possible to draw conclusions about the true effectiveness of this intervention and the importance of dietary changes until adherence to all aspects of dietary recommendations has been demonstrated.

In order to address this gap, a retrospective analysis of fluid adherence was performed for 19 children who completed the group behavioral intervention at the Multidisciplinary Encopresis Clinic at the University of Michigan from 2005-2007 (Kuhl, et al., 2009). As part of standard clinical care, families were advised to increase their child’s daily clear fluid intake (non-caffeinated, non-dairy beverages) and were provided with two sets of goals to facilitate this dietary modification. Adherence was examined on a weekly basis by comparing children’s mean daily clear fluid intake [total weekly clear fluid intake/number of days of diet diary data] to their clear fluid goals. Children were labeled adherent if their mean daily clear fluid intake was equal to or higher than their prescribed daily clear fluid goal and non-adherent if their mean daily clear fluid intake was lower than their prescribed daily clear fluid goal. As is noted in Table 1, only 50% of children met their first clear fluid goal and adherence worsened as time in treatment and size of clear fluid goals increased.
Table 1

Percent (Actual Number) of Children Who Achieved Clear Fluid Goals for the Sample as a Whole and By Age

<table>
<thead>
<tr>
<th>Fluid Goal 1</th>
<th>Whole Sample (N = 19)</th>
<th>Younger Children (n = 9)</th>
<th>Older Children (n = 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1(^a)</td>
<td>50% (n=9)</td>
<td>56% (n=5)</td>
<td>44% (n=4)</td>
</tr>
<tr>
<td>Time 2(^b)</td>
<td>47% (n=9)</td>
<td>67% (n=6)</td>
<td>30% (n=3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fluid Goal 2</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1(^a)</td>
<td>22% (n=4)</td>
<td>33% (n=3)</td>
<td>11% (n=1)</td>
</tr>
<tr>
<td>Time 2(^b)</td>
<td>11% (n=2)</td>
<td>22% (n=2)</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Note. Time 1 = first 7 days with goal. Time 2 = days seven through 14 with goal. Younger children = ages 3-5. Older children = ages 6-12.*

Adherence was also examined individually by tabulating the number of times each child’s mean daily fluid intake equated with their clear fluid goal. Similar to group adherence, individual adherence was poor, as 32% of children (n = 6) met no clear fluid goals, 16% (n = 3) met one clear fluid goal, 37% (n = 7) met two clear fluid goals, 11% (n = 2) met three clear fluid goals, and only one child met all four clear fluid goals.

A secondary analysis was performed to examine whether the type and quantity of fluid children drank might be impeding progress towards achieving their clear fluid goals. As is indicated in Table 2, children as a whole drank more water and juice in efforts to achieve their clear fluid goals. In addition, when fluid intake was examined by age, younger children significantly increased their juice intake ($p < .05$) and older children significantly increased their water intake ($p < .05$).
Table 2

*Changes Between Children’s Mean Daily Intake for All Fluid Categories During the First (Pre) and Last (Post) Weeks of Treatment*

<table>
<thead>
<tr>
<th>Group</th>
<th>Whole Sample</th>
<th>Younger Children</th>
<th>Older Children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>p</td>
</tr>
<tr>
<td></td>
<td>M(SD)</td>
<td>M(SD)</td>
<td>Value</td>
</tr>
<tr>
<td>Clear Fluid</td>
<td>15(11)</td>
<td>23(11)</td>
<td>.00</td>
</tr>
<tr>
<td>Water</td>
<td>6(6)</td>
<td>9(8)</td>
<td>.02</td>
</tr>
<tr>
<td>Juice</td>
<td>6(4)</td>
<td>8(6)</td>
<td>.02</td>
</tr>
<tr>
<td>Other</td>
<td>3(4)</td>
<td>4(6)</td>
<td>.40</td>
</tr>
<tr>
<td>Milk</td>
<td>6(4)</td>
<td>5(5)</td>
<td>.42</td>
</tr>
<tr>
<td>Soda</td>
<td>2(3)</td>
<td>2(4)</td>
<td>.16</td>
</tr>
</tbody>
</table>

Note. Clear fluids include any non-dairy, non-caffeinated drinks. Category of “other” includes Gatorade, lemonade, Kool-Aid, hot chocolate, fruit drinks, and slurpees.

While these changes were consistent with treatment recommendations, increased juice intake was problematic because the percentage of children exceeding the lower end of the age-based juice recommendations (American Academy of Pediatrics, 2001; see Table 3) increased from 32% (n=6) at the beginning of treatment to 47% (n=9) at the conclusion of treatment. Children who exceed the age-based juice guidelines are at higher risk for developing cavities, over- or under-nutrition, and even obesity (Dennison, Rockwell, & Baker, 1997; Harnack, Stang, & Story, 1999; O’Connor, Yang, & Nicklas, 2006; Sohn, Burt, & Sowers, 2005).
Table 3

*Age-Based Recommendations (Fluid Ounces) for Daily Juice and Milk Intake Provided by the American Academy for Pediatrics*

<table>
<thead>
<tr>
<th></th>
<th>Ages 1-6</th>
<th>Ages 7-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Juice</td>
<td>4-6 fluid ounces</td>
<td>8-12 fluid ounces</td>
</tr>
<tr>
<td></td>
<td>(½ to ¾ cup)</td>
<td>(1 to 1 ¼ cups)</td>
</tr>
</tbody>
</table>

In sum, results from this retrospective chart review revealed that children were successful in increasing their clear fluid intake but generally did not achieve the minimum daily intake recommended based on age-based fiber goals. In addition, adherence worsened as clear fluid goals increased in size. Children modified the type of fluid they consumed according to treatment recommendations, with the largest increases occurring in their daily intake of water and juice. However, children’s increase in juice intake was problematic because close to half of the sample met or exceeded the American Academy of Pediatrics (AAP) age-based guidelines for juice during the last week of group treatment (AAP, 2001). Many children were also noted to consume large quantities of other high-sugar, high-calorie liquids (e.g., fruit punch and sports drinks) in efforts to achieve their clear fluid goals. While increasing clear fluid intake may be important to decreasing symptoms of constipation, this positive change should not be at the cost of increasing children’s risk for other negative health consequences such as dental carries and over- and under-nutrition. Thus, changes to the original treatment protocol were made to help improve children’s clear fluid adherence and to modify the quality of their fluid intake to include more water.

Understanding the contingencies maintaining children’s fluid intake patterns is necessary in order to generate protocol changes that will yield significant improvements
to clear fluid adherence and the quality of fluids children drink. While fluid
recommendations are included in disease management and health promotion programs
for children with chronic illnesses such as sickle cell disease and chronic headache,
behavioral research in the pediatric literature has focused primarily on patients’
adherence to food-based dietary recommendations. Thus, speculations regarding barriers
to fluid adherence and children’s consuming water will be made based upon what is
known about barriers to food-based dietary prescriptions.

*Barriers to Dietary Adherence*

Adherence to dietary prescriptions can prevent the worsening of illness symptoms
and may be essential to preventing life-threatening disease complications for children
with chronic health conditions. Despite the importance of following these prescriptions,
pediatric dietary adherence rates are estimated to range from 12-56% (Mackner et al.,
2001; Stark, 2003). Researchers have identified several child, parent, and environmental
barriers that contribute to low adherence rates (Birch & Fisher, 1998; Linscheid, Budd, &
Rasnake, 2003).

*Child Behavioral Barriers*

Data collected by parent self-report and also by videotaped mealtime observation
reveal that dietary adherence is lower for children with chronic health conditions who
whine, cry, refuse to eat, talk, eat slowly, or spit out food during mealtimes (Mackner et
al., 2001; Patton, Dolan, & Powers, 2006; Stark, 2003). These behaviors may be the
result of developmental factors associated with food preferences, satiety, or because these
behaviors are operantly conditioned.
Developmentally, children prefer sweet, salty, and familiar foods (Cowart, 1981). Dietary prescriptions for chronically ill children may restrict access to these foods or violate these preferences, creating a state of deprivation that then serves as an establishing operation for negative mealtime behaviors because the reinforcement value of preferred foods increases. Developmental factors are also likely to influence the fluids children drink. Children’s preference for sweet tastes suggests that they will find drinks with fruit or cola flavors more reinforcing than drinks such as water. As is the case with solid food, denying or restricting children’s access to preferred fluids creates a state of deprivation that serves as an establishing operation for negative behaviors because the value of preferred fluids increases.

Satiety is also a barrier to dietary adherence. Physiologically, children have a smaller appetite than older children and adults (Linscheid et al., 2003; Birch & Fisher, 1998) and thus will feel satiated more quickly. Appetite can be further diminished by aspects of a child’s illness such as stomach pain (Stark & Powers, 2005). Pain from illness or being satiated decreases the reinforcement value of eating, creating an establishing operation for negative mealtime behaviors to avoid having to eat. It can be hypothesized that a similar establishing operation would decrease fluid adherence as drinking would be aversive instead of pleasurable if children are feeling full or in pain.

Finally, it is highly likely that children’s display of negative mealtime behaviors is operantly conditioned. Negative mealtime behaviors are negatively reinforced if parents remove non-preferred foods, present children with preferred foods, or dismiss children from the dinner table without eating. The probability that children will repeat these behaviors increases dependant upon the rate of parental negative reinforcement.
Children’s refusal to drink water may also be maintained by operant conditioning if parents negatively reinforce this behavior by providing children with access to alternate drink choices or if parents allow children to escape from drinking entirely.

*Parent Behavioral Barriers*

Mealtime is noted to be stressful for most parents, but parents of children with chronic health conditions note increased stress because eating is also a component of disease management (Mitchell, Powers, Byars, Dickstein, & Stark, 2004). Coaxing, providing alternate food choices, extending mealtime, attending to negative behaviors, giving ineffective commands, and failing to follow through on consequences are parent behaviors that serve as barriers to dietary adherence for chronically ill children (Patton et al., 2006; Powers, Mitchell, Patton, Byars, Jelalian, et al., 2005; Stark, Jelalian, Powers, Mulvihill, Opipari, et al., 2000). Parents are intermittently, negatively reinforced for use of these ineffective child management techniques when children eat. However, residual anxiety and stress may remain if the foods children eat are not consistent with dietary prescriptions. Parents may also be less stringent about enforcing dietary prescriptions because they may already experience guilt associated with their child having a chronic health condition (Stark & Powers, 2005). Alternatively, parents may not promote dietary adherence if they do not understand how dietary recommendations are related to disease management and optimal treatment outcome. A similar pattern of parental behaviors could maintain contingencies supporting children’s low fluid intake.

*Environmental Barriers*

Four environmental variables may serve as barriers to dietary adherence for children with chronic health conditions. First, children are more likely to develop a
preference for foods they see their family members and peers eating (Birch & Fisher, 1998). Dietary prescriptions may contradict social norms for eating, and thus parent and peer eating behaviors may not provide good examples for children with chronic health conditions (Stark & Powers, 2005). Children may receive negative feedback from family members or peers when eating foods that are consistent with dietary prescriptions, and this social punishment makes it more likely that children will chose to eat foods that are not consistent with dietary recommendations. Social norms with respect to fluids suggests that drinks such as milk, soda, and juice are more popular with children as they are commonly served at home, schools, after-school activities, and birthday parties. Similar to food, modeling and social reinforcement children receive from family members and peers for having popular drink choices increases the probability that children will chose these drinks instead of choosing water (Birch & Fisher, 1998; Budd, Chugh, & Berry, 1989).

Second, foods consistent with dietary recommendations may not be those marketed to children. Television commercials for child-friendly items such as pizza and macaroni and cheese are colorful, loud, and usually show children having fun while consuming the product. Those specific to foods such as whole grain bread or milk often include adults and use language that is not developmentally appropriate for children. Thus, it is not surprising that children request foods marketed to them and display negative behaviors when parents deny requests because they do not satisfy dietary prescriptions. It is likely that heavy marketing of juice, soda, and sports drinks instead of water is also related to childrens’ preferences for these fluids.
Third, foods that are consistent with children’s dietary recommendations may not be readily accessible. The general nutrition literature has demonstrated that access to foods such as fruits and vegetables predicts children’s intake of these foods (Cullen, Baranowski, Owens, Marsh, Rittenberry, et al., 2003; Hearn, Baranowski, Baranowski, Doyle, Smith, et al., 1998; Kratt, Reynolds, & Shewchuck, 2000). Accessibility may also affect the amount of water children drink. Tap water is naturally one of the most available fluids, but it has been made less accessible in the growing popularity of bottled water. The likelihood that children may choose water also remains low if they have more visual cues for juice, milk, or soda.

Finally, cost must also be considered. Foods that are cheaper are more likely to be purchased at higher quantities and to influence one’s diet (Cinciripini, 1984; French, Jeffery, Story, Hannan, & Snyder, 1997; Glanz, Basil, Maibach, Goldberg, & Snyder, 1998; Jeffery, French, Raether, & Baxter, 1994). Water from the tap is free; however, social norms that tap water is not safe have led to trends of purchasing bottled water instead of drinking from the tap. Juice, soda, and fruit drinks are often priced lower than bottled water, so they are thus more likely to be purchased.

The Matching Law

The Matching Law specifies that all voluntary behavior is a choice but that choices regarding which behavior to perform are guided by the amount of reinforcement available for one behavior compared to concurrent reinforcement available for all alternate behaviors in a given context or environment (Hermnstein, 1970). Thus, behaviors that receive the most frequent reinforcement will be performed most frequently.
To this author’s knowledge, no studies have examined the applicability of the Matching Law to understanding pediatric dietary adherence. However, it is likely that this model is highly relevant to integrating the aforementioned barriers into a model for pediatric dietary non-adherence. When children are presented with foods that are consistent with dietary prescriptions, they have two choices: to eat or not to eat. The consequences of eating non-preferred food might include bad taste, negative feedback from others about the food that must be consumed, or frustration as others eat preferred foods. While improved health is also a consequence, children’s cognitive immaturity does not permit them to see this positive outcome of adherence to dietary prescriptions. The consequences of refusing non-preferred foods might include escape from having to eat those foods, gaining access to preferred foods, or parental attention. It should not be surprising, then, that children choose to engage in negative mealtime behaviors as there is clearly more reinforcement for these behaviors than for adhering to dietary prescriptions. The Matching Law can also be applied to create a conceptual model for understanding why children chose not to drink water. The consequences for drinking water (non-preferred fluid) and for refusing water might be similar to those noted above for eating and refusing non-preferred foods. Thus, the fact that less reinforcement is available for drinking water suggests that contingencies support children refusing water and choosing an alternate, preferred fluid.

In sum, several child, parent, and environmental variables serve as barriers to food-based dietary adherence, and it is likely that these same variables can be generalized to poor fluid adherence for the children completing the group behavioral intervention for retentive encopresis at the University of Michigan. Application of the Matching Law to
understanding pediatric dietary adherence makes it clear why simply providing a family with dietary recommendations does not easily translate into their adherence to these recommendations. Conceptualization in this way also demonstrates that many of the barriers to dietary adherence are behavioral, which makes this problem ripe for psychological intervention.

**Interventions Targeting Dietary Adherence**

Despite the high frequency of dietary non-adherence, treatment outcome research for this problem is sparse. One treatment package that has received much attention in the pediatric dietary adherence literature and demonstrated effectiveness for a diverse set of pediatric illnesses is a group behavioral intervention originally developed for children with cystic fibrosis (Stark, Bowen, Tyc, Evans, & Passero (1990a). This intervention protocol includes providing disease and nutritional education to parents and children and training parents to apply goal setting, self-monitoring, differential attention, positive reinforcement, token systems, rules, and modeling to help them translate dietary prescriptions into eating practices. Modeling, rehearsal, and role-playing are also included as group teaching techniques to facilitate child mastery of nutrition education and eating behaviors consistent with dietary prescriptions and to facilitate parental mastery of child behavior management techniques before using them in less controlled environments such as the family’s home. Children who completed the group behavioral intervention increased their daily caloric intake by 23-60%, and they subsequently met the high-calorie diet recommended for individuals with CF (Stark et al., 1996; Stark et al., 2003).
The group behavioral intervention has been generalized to target dietary adherence in other pediatric chronic illness groups. Ninety-two percent of children diagnosed with juvenile rheumatoid arthritis (JRA) who completed an adapted version of the group behavioral treatment achieved daily calcium requirements compared to only 17% of those who received dietary education alone (Stark, Janicke, McGrath, Mackner, Hommel, et al., 2005b). A modified version of the original protocol was also successful for children with irritable bowel disease (IBD), with 82% of those receiving the group behavioral intervention meeting calcium requirements at the conclusion of treatment compared to only 19% of those receiving standard nutritional education (Stark, Hommel, Mackner, Janicke, Davis, et al., 2005a). Furthermore, application of this treatment package to children with retentive encopresis resulted in 40-118% increase in daily fiber intake (Stark et al., 1997; Stark et al., 1990a). Improvements in dietary adherence for children with CF, retentive encopresis, and JRA were maintained 6-12 months post-treatment (Stark et al., 1990a; Stark et al., 2005b), and changes for children with CF were maintained at a two-year follow-up (Stark et al., 2003).

The fact that this group behavioral intervention protocol has been effective in improving adherence to a diverse group of dietary recommendations for children with a variety of chronic health conditions suggests that it might be successfully adapted to promote improved clear fluid adherence and water intake for children receiving treatment for retentive encopresis.
Research Design and Methodology

Rationale

Dietary modifications of increasing daily fiber and fluid intake are hypothesized to be important to successful medication weaning and long-term maintenance of gains made during treatment for retentive encopresis (Felt et al., 2008; McGrath, Mellon, & Murphy, 2000; North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition, 2006). The group behavioral intervention designed by Stark and colleagues yields high adherence to fiber recommendations (Stark et al., 1990a; Stark et al., 1997), but its effectiveness in increasing children’s fluid is not known. Our preliminary quality control analysis demonstrated that children struggled to meet their clear fluid goals and that parents often relied on high-sugar drinks such as juice to help increase children’s clear fluid intake. Thus, the purpose of this study was to examine whether providing families with enhanced fluid education and teaching parents to generalize behavior modification techniques would improve children’s clear fluid adherence and increase their daily water intake. To this author’s knowledge, this was the first study to apply these strategies to modifying fluid intake in a non-experimental setting and to systematically target fluid adherence and increasing water intake for children.

Modifications to the Group Behavioral Intervention

Each of the behavior modification techniques included in the protocol for the group behavioral treatment targeting retentive encopresis will now be reviewed. Emphasis is placed on how each technique targets barriers to increasing children’s fiber and clear fluid intake in the non-enhanced intervention (NEI) and how each technique
was modified to target increasing children’s fluid adherence and water intake in the enhanced intervention (EI).

Nutritional Education

Most families receive dietary prescriptions from physicians and dieticians but may not receive instructions for how to specifically alter their child’s diet to parallel these recommendations. In addition, physicians may vary with respect to how much they emphasize the importance of dietary adherence and the relationship between adherence to dietary recommendations and disease symptoms. In the NEI, parents and children learned how a high-fiber diet decreases symptoms of constipation, what types of foods were high in fiber, and how to supplement low-fiber to increase their fiber content. These elements addressed barriers to dietary adherence by educating families about the relationship between fiber and optimal bowel functioning and increasing meal-related problem-solving skills so children can eat preferred foods and still meet their fiber targets. Parents and children also learned how to differentiate clear and non-clear fluids. Families were encouraged to increase their children’s clear fluid intake, but they did not receive specific guidance for how to facilitate this dietary change. Further, while the relationship between clear fluid and bowel movement functioning was reviewed, it was not heavily emphasized.

Nutritional education in the Enhanced Intervention. Enhanced fluid education was provided in the EI that included a heavier emphasis on the relationship between fluid and constipation, discussing the negative health consequences of only increasing children’s fiber intake, reviewing the AAP guidelines for juice and milk, and providing anticipatory guidance about meal planning to promote children’s success achieving their
clear fluid goals. Children learned this same information through structured discussions, educational activities, and games. In addition, a modified version of the Traffic Light Diet (Epstein, Myers, Raynor, & Saelens, 1998) was used to help children understand which fluids counted towards their clear fluid goals. Specifically, children were taught that drinking red fluids (caffeinated or dairy drinks) kept them from meeting their clear fluid goals, that yellow fluids (all non-water clear fluids) counted towards their clear fluid goal but that they should slow down their intake of these fluids, and that drinking green fluids (water) would help them go towards their clear fluid goal.

**Goal Setting**

Goals are an important element to a successful behavior modification plan because they define the desired behavior, describe direction for self-change and provide a benchmark for discerning whether change has occurred. Goals are often stated as outcomes and can be difficult to achieve if individuals do not possess the skills necessary for successful behavior change. Setting smaller process goals is important to achieving larger outcome goals as they maximize the opportunities for reinforcement and subsequently increase the probability that the new behavior will be learned.

The NEI included dietary goals in a changing criterion design. Age-based fiber and fluid goals were prescribed during two separate two-week phases: children receive smaller daily fiber and clear fluid goals in phase one that are increased to the desired outcome level for treatment in phase two. More specifically, in the first phase of dietary intervention (weeks three and four), children’s fiber goal equated to their age + five (grams) and their clear fluid goal equated to twice the value of their fiber goal in fluid ounces. Thus, a five year-old child would be prescribed daily goals of ten grams of fiber
and twenty ounces clear fluid during the first phase of dietary intervention. During the second phase of dietary intervention (weeks five and six), children’s fiber goal increased to their age + ten (grams) and their clear fluid goal increased to twice the value of their new fiber goal (fluid ounces). For example, for the same five year-old child, daily dietary goals increased to 15 grams of fiber and 30 ounces of clear fluid during the second dietary intervention phase. Additional examples are provided in Table 4 below to provide clarity on how age-based fiber and clear-fluid goals were generated.

Table 4

<table>
<thead>
<tr>
<th>Age</th>
<th>Dietary Intervention Phase One</th>
<th>Dietary Intervention Phase Two</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fiber&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Clear Fluid&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Four</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Six</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Ten</td>
<td>15</td>
<td>30</td>
</tr>
</tbody>
</table>

<sup>a</sup>Measured in grams.

<sup>b</sup>Measured in fluid ounces.

This design addresses barriers to dietary adherence by allowing children to be introduced to new dietary changes slowly rather than making abrupt changes. Children were also initially prescribed meal-based fiber goals. These process goals address barriers to dietary adherence by providing more learning trials for children to taste new high-fiber foods and decreased the probability that children will become satiated from trying to eat their entire fiber goal in one setting. Children were not given meal-based fluid goals, however.
Goal setting in the Enhanced Intervention. In the EI, children were prescribed two sets of process goals in order to help them achieve their larger daily clear fluid goal (outcome): meal-based water goals and a water bottle goal. Water goals (see Table 5) were derived from the recommendation that children consume one high-fiber food (minimum of 3g) per meal and that children consumed twice as much fluid (fluid ounces) as they consumed in fiber (grams). In addition, the values of daily clear fluid goals for the most probable oldest child-age for each group (younger versus older children) were considered in finalizing the meal-based and water bottle goals. For example, children in the “younger” child group tend to be either age five or six. Daily clear fluid goals for children of these ages would be 20 fluid ounces and 22 fluid ounces, respectively, for the first phase of dietary intervention and 30 fluid ounces and 32 fluid ounces, respectively, for the second phase of dietary intervention. Thus, for a child in the younger child’s group, meeting all water goals (meal-based and water bottle) during the first phase of dietary intervention would equate to 20 fluid ounces and the child would have either met or be close to meeting his/her daily clear fluid goal. For the second fluid phase, if this same child met all daily water goals, then he or she would be within one glass (eight ounces) of meeting their daily clear fluid goal.

Parents were encouraged to provide praise when they observed children drinking water at meals, and children earned stickers if they drank enough water to meet their meal-specific water goals. Fluid consumed in efforts to achieve these smaller goals was counted towards children’s larger daily clear fluid goals.

Water bottle goals were also prescribed to promote children drinking fluid throughout the day. Children received a 16-ounce Nalgene water bottle donated by Fisher
Scientific to help them meet these goals. Children in the younger child group were prescribed a water bottle goal of one-half a bottle (eight fluid ounces) per day for both phases; older children were prescribed one-half a bottle during the first phase and one entire bottle (16 fluid ounces) during the second phase. Water bottle goals were created to help decrease the gap between the amount of water children would consume from their meal-based water goals and their daily clear fluid goals. The water consumed to meet water bottle goals was counted towards children’s daily clear fluid goals.

Table 5

*Water Goals by Age and Fluid Intervention Phase*

<table>
<thead>
<tr>
<th></th>
<th>Phase 1</th>
<th>Phase 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger child group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meal-based</td>
<td>4 fluid ounces per meal</td>
<td>6 fluid ounces per meal</td>
</tr>
<tr>
<td>Water bottle</td>
<td>8 fluid ounces per day</td>
<td>8 fluid ounces per day</td>
</tr>
<tr>
<td>Older child group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meal-based</td>
<td>6 fluid ounces per meal</td>
<td>8 fluid ounces per meal</td>
</tr>
<tr>
<td>Water bottle</td>
<td>8 fluid ounces per day</td>
<td>16 fluid ounces per day</td>
</tr>
</tbody>
</table>

Inclusion of meal-based water goals addressed barriers to fluid adherence in two ways. First, meeting meal-based water goals decreased the establishing operation of satiation. Second, consistent with operant conditioning principles, setting several smaller goals maximized opportunities for reinforcement of water-drinking behavior and increased the probability that children might pair water with food in subsequent meals (see Figure 2).
Self-monitoring involves documenting whether a specific behavior has occurred. This form of self-report decreases memory bias and recency effects if behaviors are recorded immediately after they occur and often increases goal-oriented behavior due to reactivity of the targeted behavior to the self-monitoring process itself. Families that participated in the NEI were asked to record the type and quantity of foods and drinks consumed by children after each meal in seven-day diet diaries. Families also noted the amount of fiber in food items children consumed, summed the amount of fiber children ate during all meals and snacks, and wrote children’s total daily fiber intake and their daily fiber goals. Families were not asked to use the same specificity with respect to monitoring children’s fluid intake, and no space was provided for families to log children’s daily clear fluid goals. Self-monitoring addressed barriers to dietary adherence by helping children and parents learn which foods were high in fiber, by facilitating meal planning, and by alerting parents and children about whether dietary goals were achieved. Children’s active role in completing diet diaries increased their opportunities to learn about dietary prescriptions and, when combined with positive reinforcement, increased the likelihood that they would begin to regulate their own eating behavior to be consistent with dietary prescriptions.

*Self-monitoring in the Enhanced Intervention.* Because children who completed the group behavioral intervention from 2005-2007 were highly adherent to fiber...
prescriptions, it was hypothesized that asking families to record children’s fluid intake at the same level of specificity would be related to improved clear fluid adherence. Families were also asked to note whether children exceeded age-based recommendations for juice and milk. Together, it was hoped that these visual cues would increase parent and child attention to clear fluid adherence and support high water intake. Group leaders completed snack time report cards to help address the low rate of recording foods and fluids children consumed during group treatment sessions for children who completed the NEI. Snack time report cards also addressed barriers to fluid adherence by verifying to their parents childrens’ willingness and ability to drink water.

Positive Reinforcement

Positive reinforcement is a behavior modification technique where a positive consequence is provided contingent upon display of a desired behavior, increasing the probability that the desired behavior will be repeated (Pierce & Cheney, 2004). Reinforcers can be verbal or tangible but are most effective when delivered immediately after the desired behavior is displayed (Forehand & McMahon, 1981). In the NEI, parents were taught to use positive reinforcement (verbal praise and stickers) to establish eating contingencies with respect to fiber, as high-fiber foods may not be naturally reinforcing for children.

Positive reinforcement in the Enhanced Intervention. Parents were taught to use positive reinforcement (verbal praise and special water stickers) to establish positive drinking contingencies with respect to fluids and specifically for drinking water. Increasing the frequency of reinforcement for drinking water should have then resulted in
children choosing to drink water instead of other alternate fluid choices (Herrnstein, 1970).

**Differential Attention**

Differential attention is a behavior change technique in which attention is provided contingent upon display of the desired behavior (positive reinforcement) and is removed contingent upon display of the undesired behavior (ignoring; Forehand & McMahon, 1981). Shifting parental attention to desired behaviors not only increases the frequency of these behaviors but also serves to extinguish the targeted behaviors (Budd et al., 1989). In the NEI, parents learned how to apply differential attention to increase children’s fiber intake (Stark et al., 1999). Differential attention addressed parent and child barriers to dietary adherence by breaking the contingencies that maintain negative mealtime behaviors and creating contingencies to shape desired mealtime behaviors.

**Differential attention in the Enhanced Intervention.** The success of differential attention within the context of the NEI (Stark et al., 1990a; Stark et al., 1997) and the treatment outcome literature for feeding disorders (Kerwin, 1999) suggested that differential attention might have been effective in shaping children’s water drinking behavior. More specifically, teaching parents how to redistribute their attention to when their child drinks water and to ignore alternate, negative behaviors (e.g., refusing to drink or children drinking non-water fluids) would increase the probability that children will drink water in order to receive attention from their parents.

**Token System**

In a token system, individuals earn tokens contingent upon display of a desired behavior that are then applied towards earning a larger, tangible reinforcer (Pierce &
Cheney, 2004). In some systems, tokens are lost if the desired behavior is not performed and/or if the targeted behavior is displayed.

A token system was utilized within the NEI to establish eating behavioral contingencies consistent with children’s prescribed dietary goals. Children earned stickers (tokens) for achieving treatment goals that were placed onto sticker charts and returned at subsequent group sessions. Children received prizes if they had at least 75% of the total stickers possible for all treatment goals that week. Once families entered the phase of treatment where diet was targeted, children had between six to eight goals depending upon the week. Two to four of these goals were related to eating fiber (week dependent), but only one goal pertained to fluid, so children could meet their 75% target without ever even meeting their clear fluid goal during the week. Thus, the token system was effective for establishing positive eating contingencies and supporting adherence to fiber goals but not for shaping fluid drinking behavior.

*Token System in the Enhanced Intervention.* Once families entered the phase of treatment where diet was targeted in the EI, the token system included five goals specific to fluid intake (meal-based water goals, water bottle goals, and daily clear fluid goals). This change not only increased the opportunities for children to be reinforced for drinking clear fluid, but it also made it impossible for children to earn a prize without meeting at least some of their clear fluid and water goals.

*Rules*

Rules are statements that provide information about a behavioral contingency and thus alert an individual about the consequences of performing a desired or an alternate behavior (Pierce & Cheney, 2004). For children, rules are most effective when they are
frequently repeated, when parents ensure that children understand them, and when parents are consistent with providing the consequences outlined in the rule (including negative consequences; Stark et al., 2006). In the NEI, parents were encouraged to develop rules consistent with dietary prescriptions. Rules help decrease barriers to dietary adherence because they communicate what eating behavior is expected of children and the consequences for not eating high-fiber foods.

_Rules in the Enhanced Intervention._ Parents were encouraged to use the AAP age-based fluid recommendations as guidelines for developing rules about juice and milk intake. They were also taught how to integrate the Premack Principle (Premack, 1959) into rules to increase the amount of water their children drank, such as, “You have to drink one glass of water before you can have juice.” Rules thus addressed child barriers to adherence to fluid goals by establishing the contingencies for drinking clear fluids and increasing daily water intake.

_Modeling_

Modeling is a technique in which a desired skill set is performed by an expert in the presence of a learner (Naugle & Maher, 2003). The consequences of the model’s behavior should be apparent or discussed so the advantages for performing the new behavior are understood. Observers then utilize this information to modify and regulate their own behavior. In the NEI, parents were taught to serve high-fiber foods to all family members because children are more likely to eat what other family members are eating (Birch & Fisher, 1998).

_Modeling in the Enhanced Intervention._ Families were asked to model water-drinking behavior for their children at meal time, which increased the probability that
children might imitate this behavior. Parents were also encouraged to provide water
during play dates and social activities so peers could serve as models for children
receiving treatment for retentive encopresis.

Group Teaching Techniques

Several of the behavior modification techniques taught to parents are also utilized
during both the child and parent group sessions in the NEI. Modeling, rehearsal, and role-
play are included in parent group sessions to promote mastery of behavioral skills prior to
parents attempting to utilize them in non-controlled environments. In the child group,
differential attention and positive reinforcement are used by group leaders to shape eating
and drinking behaviors consistent with dietary prescriptions. Children were also given a
rule that they must take at least one sip of their water during snack and that they could not
have seconds on snack until they finished their entire glass of water. Children served as
models to each other by eating high fiber foods and drinking water during snack at group
sessions. This type of modeling is particularly important because of the strong influence
peers have on food choices and preferences (Cullen et al., 2003; Cullen, Ash, Warneke,
& de Moor, 2002).

Group teaching techniques in the Enhanced Intervention. The same group
teaching techniques described above were included in the EI, but their presentation was
modified so parents could generalize them to increase childrens’ clear fluid intake and to
shape children’s water-drinking behavior. In the child group, the snack rules with respect
to drinking water were maintained to promote peer modeling of water-drinking behavior
in the treatment setting. Children were verbally praised for drinking water and were
provided with stickers if they finished their entire glass.
New Components to the Enhanced Intervention

Classical conditioning, operant conditioning, stimulus generalization, and liquid fading were added to enhance the NEI protocol to facilitate fluid adherence and children’s increased water intake.

Classical conditioning. Classical conditioning procedures involve pairing a previously neural stimulus repeatedly with an unconditioned stimulus until the neutral stimulus independently elicits the desired behavior (Powell, Symbaluk, Macdonald, 2002). Drinking is a natural, unconditioned response to thirst (unconditioned stimulus), but it is not likely that children will achieve their clear fluid goals if they drink only when thirsty. Thus, classical conditioning procedures were used to condition children to drink (conditioned response) in the presence of their new water bottles (conditioned stimulus). Parents were asked to provide children with their water bottles when children express thirst. Repeated pairing of the water bottle (the conditioned stimulus) with thirst (the unconditioned stimulus) will result in children drinking water (conditioned response) when they see their water bottles even if they do not sense that their body is thirsty. This is summarized in Figure 3 below.
Before the conditioning process:

\[
\text{Thirst } \rightarrow \text{ Drink} \\
\text{US} \quad \text{UR}
\]

During the conditioning process:

\[
\text{Water bottle (neutral stimulus) + Thirst } \rightarrow \text{ Drink} \\
\text{US} \quad \text{UR}
\]

After the conditioning process:

\[
\text{Water Bottle } \rightarrow \text{ Drink} \\
\text{CS} \quad \text{CR}
\]

Figure 3. Classical conditioning of water drinking behavior in response to water bottle. US = unconditioned stimulus, UR = unconditioned response, CS = conditioned stimulus, and CR = conditioned response.

Operant conditioning. Operant conditioning is a procedure in which a new behavior is learned based upon its consequences in the presence of a specific, discriminative stimulus (Pierce & Cheney, 2004; Powell et al., 2002). Individuals learn to repeat behaviors that are followed by a positive consequence and not to repeat behaviors that are followed by a negative consequence. Operant conditioning principles were used to shape water-drinking behavior at meals by asking parents to reinforce children for achieving their meal-based water goals (see Figure 4 below). Operant conditioning was also paired with classical conditioning to increase the probability that children would drink from their water bottles when they viewed this stimulus.

Water Bottle: Drink \rightarrow \text{ Parent attention/sticker}

\[
S^D \quad R \quad S^R
\]

Figure 4. Operant conditioning of water drinking in presence of water bottle. $S^D$ = discriminative stimulus, R = response, $S^R$ = reinforcing stimulus.
Stimulus generalization. Stimulus generalization procedures were included in the enhanced protocol because, while it is beneficial for a behavior to be under the control of a particular stimulus when it is initially being learned, it is not always desirable for that behavior to remain under the control of a single stimulus. Stimulus generalization is a procedure used to increase the number of stimuli that result in the desired behavior and is most effective when new stimuli are similar to the discriminative stimulus (Pierce & Cheney, 2004; Powell et al., 2002). Stimulus generalization was included in the EI in three ways to increase children’s water-drinking behavior. First, because it is not desired that children drink water only from the water bottles, parents were encouraged to positively reinforce their children for drinking water from all types of containers such as cups, water fountains, and other water bottles. Second, because it is not desired that children drink water only during meals at their homes, parents were encouraged to positively reinforce children’s water drinking behavior in multiple eating settings such as at restaurants or at a relative’s home. Third, because children prefer drinks and foods with sweet tastes (Birch & Fisher, 1998), the discriminative stimuli of color and taste were generalized to water. Parents were provided with water recipes and children tasted these recipes during an educational activity where they had to guess what was added to their water to change its color and taste (the Mystery Water Taste Test).

Liquid fading. Fading is a behavior modification technique in which preferred stimulus properties are shifted to a new stimulus or set of stimuli (Pierce & Cheney, 2004). Liquid fading is a specific fading procedure in which a non-preferred fluid is mixed in increasing quantities into a preferred fluid until 100% of the mixture is the non-preferred fluid (Luiselli, Ricciardi, & Gilligan, 2005; Patel, Piazza, Kelly, Ochsner, &
Santana). In the EI, parents were taught to use liquid fading by adding increasingly larger amounts of water to their children’s juice, milk, or other preferred high-sugar fluids (e.g., sports drinks).

Specific Aims and Hypotheses

This study had three aims. The first aim was to examine the effectiveness of the EI in increasing children’s water intake and included four hypotheses. First, inclusion of meal-based water goals, classical and operant conditioning, and generalizing the stimulus properties of color and sweet taste to water would increase the natural reinforcement value of drinking water. Because behaviors are displayed at the rate for which they are reinforced (Herrnstein, 1970), it was hypothesized that participation in the EI would be a significant determinant of water intake during the active fluid phases of treatment compared to participation in the NEI. Second, because children had increasingly larger clear fluid goals during the course of group treatment, it was hypothesized that water intake would increase in a stepwise manner consistent with the changing criterion design for children participating in the EI.

Third, inclusion of meal-based water goals and a daily water bottle goal provided children with smaller goals to shape their water drinking behavior. Thus, to achieve these goals, children were asked to change one behavior: substituting water for alternative fluid types typically consumed at meals.Achieving water bottle goals was thought to be more challenging because it required children to potentially change two behaviors: drinking fluid at non-meal times and substituting water for other fluid types. Thus, when assessing achievement to water goals (meal-based and water bottle), it was hypothesized that the
mean percent adherence for the water goals will be at least 75% each week for children participating in the EI.

Fourth, retrospective visual inspection of adherence charts for children who completed the NEI indicated that children who were not successful in achieving their first clear fluid goal were not likely to be successful in achieving their second, higher clear fluid goal. The EI taught parents how to use behavior modification techniques to help children habituate to drinking water at the quantity prescribed. If children successfully achieved their water goals during the first fluid phase, then it is likely that physiologically and behaviorally it would be easier for them to regularly achieve their water goals during the second fluid phase. Thus, it was hypothesized that adherence to water goals (75% criterion) during fluid phase one would explain adherence to water goals (75% criterion) during fluid phase two for children participating in the EI.

The second aim was to examine the effectiveness of the EI in improving children’s adherence to their prescribed daily clear fluid goals and included two hypotheses. First, nutritional education and use of behavioral modification techniques are effective in increasing dietary adherence for children with CF (Stark, 2003), JRA (Stark et al., 2005b) and IBD (Stark et al., 2005a). It was likely, then, that applying a similar treatment package would effectively increase children’s daily clear fluid intake (particularly water intake) and thus improve their adherence to prescribed daily clear fluid goals. Thus, it was hypothesized that participation in the EI would increase the odds of children meeting prescribed daily clear fluid goals compared to participation in the NEI. Second, in line with the physiological and behavioral rationale described in aim one regarding changes in children’s water intake, it was hypothesized that adherence to
prescribed daily clear fluid goals during phase one of the fluid intervention would explain adherence to prescribed daily clear fluid goals during phase two of the fluid intervention for children participating in the EI only.

The third aim of this study was to examine the impact of increasing children’s water intake on displacing their juice and milk intake and included two hypotheses. Behavior modification techniques maximized the opportunity for reinforcement of water-drinking behavior and decreased the reinforcement value of drinking juice and milk. Thus, it was hypothesized that first, water intake would displace juice intake for children participating in the EI only during the active phases of fluid intervention and that second, water intake would displace milk intake for children participating the EI only during the active phases of fluid intervention.

A summary of the aims and hypotheses for this study is provided below.

**Aim 1: Examine effectiveness of the EI in increasing children’s water intake.**

Hypothesis 1: Participation in the EI would be a significant determinant of water intake during the active fluid phases of treatment compared to participation in the NEI.

Hypothesis 2: Water intake would increase in a stepwise manner consistent with the changing criterion design for children participating in the EI.

Hypothesis 3: Mean percent adherence to water goals would be at least 75% for children participating in the EI for each week of active fluid intervention (weeks 3-6).
Hypothesis 4: Adherence to water goals (75% criterion) during fluid phase one would explain adherence to water goals (75% criterion) during fluid phase two for children participating in the EI.

**Aim 2: Examine the effectiveness of the EI on improving adherence to prescribed daily clear fluid goals.**

Hypothesis 1: Participation in the EI would increase the odds of children meeting prescribed daily clear fluid goals compared to participation in the NEI.

Hypothesis 2: Adherence to prescribed daily clear fluid goals during phase one of the fluid intervention would explain adherence to prescribed daily clear fluid goals during phase two of the fluid intervention for children participating in the EI only.

**Aim 3: Examine the impact of increasing children’s water intake on displacing their juice and milk intake and improving their adherence to daily clear fluid goals.**

Hypothesis 1: Water intake would displace juice intake for children participating in the EI only during the active phases of fluid intervention.

Hypothesis 2: Water intake would displace milk intake for children participating in the EI only during the active phases of fluid intervention.

*Secondary Research Questions*

There are seven additional secondary research questions. First, were children participating in the EI more likely to adhere to the prescription that their *actual* daily fluid intake is twice their *actual* daily fiber intake than children who completed the NEI? Second, did children participating in the EI demonstrate improvement as measured by independent ratings from each treating professional (developmental behavioral
pediatrician and pediatric psychologist)? Third, were parents in the EI satisfied with the group treatment they received as was measured by the Client Satisfaction Questionnaire (CSQ)? Fourth, did parent-knowledge of the AAP age-based guidelines, as measured by the Fluid Questionnaire, for children’s daily intake of juice and milk improve as a function of participation in the EI? Fifth, were children who participated in the NEI more likely to meet or exceed AAP guidelines (AAP, 2001) with respect to juice intake than children who participated in the EI? Sixth, did mean daily intake of sodium change as a function of participation in the group treatment for children participating in the EI as compared to children in the NEI? Finally, did parents learn which behavior modification techniques they can use to increase their child’s intake of water, which techniques did they plan to continue using, and which techniques did they think they could implement effectively?

Methods

Design

A two-group, experimental design was used to examine the causal relationship between participation in the EI and the three dependent variables of interest: children’s water intake, their adherence to prescribed daily clear fluid goals, and their adherence to daily water goals. Fluid modifications were included in a changing criterion design (see Table 6 below).
Table 6

*Fluid Modifications by Phase Across Treatment*

<table>
<thead>
<tr>
<th></th>
<th>Baseline (No fluid changes)</th>
<th>Phase 1 (First fluid goals)</th>
<th>Phase 2 (Second fluid goals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Enhanced Intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little Kidsa</td>
<td>Session 1</td>
<td>Session 2, 3</td>
<td>Sessions 4, 5</td>
</tr>
<tr>
<td>Big Kids</td>
<td>Sessions 1, 2</td>
<td>Session 3, 4</td>
<td>Sessions 5, 6</td>
</tr>
<tr>
<td>Enhanced Intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little Kids</td>
<td>Sessions 1, 2</td>
<td>Session 3, 4</td>
<td>Sessions 5, 6</td>
</tr>
<tr>
<td>Big Kids</td>
<td>Sessions 1, 2</td>
<td>Session 3, 4</td>
<td>Sessions 5, 6</td>
</tr>
</tbody>
</table>

*Children who completed the Little Kids groups from Fall 2005-Spring 2007 completed 5 sessions over 6 weeks and subsequently only spent 1 week in the baseline period.*

*Operationalized Definitions of the Dependent Variables*

*Water intake.* Water intake was measured in fluid ounces (continuous variable) and was examined per meal, per day, per week, and per fluid phase (baseline, phase 1, and phase 2).

*Adherence to prescribed daily clear fluid goals.* Adherence to prescribed daily clear fluid goals (those generated from the age-based fiber goals) was measured as a binary variable where children who achieved their prescribed daily clear fluid goal were categorized as adherent and children who do not achieve their prescribed daily clear fluid goal were categorized as non-adherent. This variable was dummy coded with “1” representing adherent and “0” representing non-adherence. Adherence to prescribed daily
clear fluid goals was examined per day, per week, and per fluid phase (phase one and two only).

*Adherence to daily water goals.* Adherence to daily water goals was measured as a binary variable. A percentage was calculated by dividing the number of treatment goals pertaining to water a child achieved (numerator) by the total number of treatment goals per day pertaining to water possible (denominator). The denominator was equal to four, representing the water bottle goal and each of the meal-based water goals (breakfast, lunch, and dinner). Children who achieved 75% or 100% of their daily water goals were labeled as adherent that day and children who achieved 50% or less of their daily water goals were labeled non-adherent. This variable was dummy coded with “1” representing adherence and “0” representing non-adherence. Adherence to daily water goals was examined per day, per week, and per fluid phase (fluid phase 1 and 2 only).

*Data Entry and Statistical Analyses*

*Data entry.* All demographic and fluid variables of interest were entered into both an Excel spread sheet and a SPSS database. Fluid data entered into Excel was used to create a panel data set. A panel data set contains information on multiple variables for multiple individuals over time (Hsiao, 2003; Baltagi, 1995), and thus combines a cross-section design with a time-series design. The panel data set was created in Excel and imported into SAS because SPSS is not capable of performing panel analyses.

*Panel analysis.* Panel data sets have traditionally been used within the field of economics. However, their distinct advantages over use of traditional statistical analyses (i.e., analysis of variance and repeated measures analysis of variance) commonly utilized in the psychological treatment outcome literature suggest that this type of analysis should
be utilized whenever possible. First, use of a panel data set allows for exploration of the independent causal effects for variables of interest and for discerning the variables that are most important to predicting the outcome variable such as the factors that determine whether children will drink water or meet their clear fluid goals. In this way, panel analysis can answer one of the most challenging questions for pediatric psychologists: what behaviors or variables should be targeted during interventions to improve adherence?

Second, the fact that the panel data set contains multiple data points for multiple people over time allows for the examination of more complex behavioral models. This is particularly advantageous in treatment outcome studies because it allows for evaluation of dynamic models rather than the static models (pre-post group differences) that are often examined (Baltagi, 1995). Consideration of a dynamic model is important because it can indicate whether a mean value is reflective of stable increase (linear), a stepwise behavior change that is consistent with changing criterion design, or inconsistent values (values that are highly variable and thus have a larger standard deviation). Thus, individual variations over time are included in the data set and analyses reflect the relationships between each data point and those following it. In this way, panel data sets encourage more robust conclusions about whether observed changes in dependent variables are due to changes in the independent variable(s).

Third, panel data sets allow for greater control of individual heterogeneity. Specific to this study, there are several individual variables that cannot be assessed such as children’s physiological need for water and the changes in weather that may alter children’s thirst. It is likely that these variables will contribute to the amount of water
children drink. Therefore, not controlling for these variables might decrease the accuracy of the conclusions drawn from the findings. Inclusion of both cross-sectional and time-series data in a panel data set allows for control of variables that cannot be observed and measured (Hsiao, 2003).

Fourth, the increased number of data points for each individual and across individuals decreases the probability of multicollinearity among the variables of interest (Hsiao, 2003; Baltagi, 1995). Multicollinearity occurs when two variables of interest are highly correlated, which in turn decreases the probability that significant results will be found with respect to hypothesized models, and so can increase the probability of committing a type II error (Field, 2005). Minimizing multicollinearity increases the probability that the unique amount of variance accounted for by each predictor variable will be accurately determined, which is important to understanding models of behavior change.

Finally, a panel data set includes more data points than a typical cross-sectional data set, so it increases the degrees of freedom and power (Hsiao, 2003; Baltagi, 1995). Panel analysis is thus highly suitable for treatment outcome research when it is not possible to recruit the large sample sizes often required to have enough power to detect significant effects using more traditional statistical analysis procedures (Cohen, 1992).

Analyses used to explore hypotheses. Six sets of statistical analyses were conducted to evaluate the aforementioned hypotheses. Data were analyzed using Statistical Analysis Software Version 9.1 (SAS) and were grouped into the following three phases for some analyses: baseline (Session one and two), phase one of the fluid intervention (Session three and four), and phase two of the fluid intervention (Session
five and six). First, descriptive analyses were calculated on all independent and dependent variables of interest. Second, ordinary least squares (OLS) regression analyses were conducted when the dependent variable was continuous (water intake). Strengths of using OLS regression include that it can determine the unique contribution of one independent variable to the variance of the dependent variable while controlling for the intercorrelations among the independent variables and also between specific alternate independent variables and the dependent variable. Third, multiple logistical regression analyses were used for hypotheses that examined children’s adherence to daily clear fluid goals and to water goals. Logistic regression is a type of regression analysis conducted when the outcome variable (dependent variable) is dichotomous (Field, 2005). The fact that the outcome variable is dichotomous increases the probability that the data will not be linear. Because regression requires a linear relationship, data in logistic regression are transformed using logarithms so they are expressed in a linear manner (LOGIT) while their non-linear relationship is maintained (Field, 2005; Hutcheson & Sofroniou, 1999). Similar to multiple regression analyses, multiple logistic regression analyses allow for examination of the predictive value of multiple independent variables that may be dichotomous, categorical, or continuous in nature.

*Treatment Integrity, Enhanced Intervention Only*

Three measures were taken to improve internal validity and promote treatment integrity (Kazdin, 2003; Spirito & Kazak, 2006). First, group leaders were trained by the primary investigator using written treatment manuals. Separate manuals were created for the parent and child groups that were developed to supplement the current group behavioral intervention protocol utilized in the Multidisciplinary Encopresis Clinic at the
University of Michigan (see Appendixes A and B). Second, parent and child group sessions were videotaped and reviewed by individuals who will be trained in using checklists to ensure all components of the enhanced behavior intervention are implemented appropriately. Third, post-doctoral fellows and graduate students who led and/or assisted with leading group sessions received weekly supervision by the licensed clinic psychologist, and implementation of the manual was discussed during this time.

Participants

Sixty-two children were eligible for participation in this study. Figure 5 depicts the flow diagram for participant inclusion and exclusion for this study.
Figure 5. Flow of participants through each stage of intervention trial (Consolidated Standards of Reporting Trials, 2008).
The final sample included 37 children: 18 in the EI and 19 in the NEI. The full demographic information for ethnicity, marital status, and income (EI only) is presented in Table 7.

Table 7

*Additional Demographic Information*

<table>
<thead>
<tr>
<th>Minority Status</th>
<th>NEI (n=19)</th>
<th>EI (n=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Black</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Biracial</td>
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<td>3</td>
</tr>
<tr>
<td>Muslim</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Latino</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parental Marital Status</th>
<th>NEI (n=19)</th>
<th>EI (n=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
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<td>16</td>
</tr>
<tr>
<td>Separated</td>
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<td>-</td>
</tr>
<tr>
<td>Divorced</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Never Married</td>
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<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Annual Family Income¹</th>
<th>NEI (n=19)</th>
<th>EI (n=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Not Available</td>
<td>-</td>
</tr>
<tr>
<td>3 25,000-49,999</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4 50,000-74,999</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5 75,000-99,000</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6 100,000+</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

¹ Demographic information for these variable for the control was not available
EI was 61% male, 72% white, had a mean age of 6.22 years (±2.44), had experienced symptoms of encopresis for a mean of 3.55 years (± 2.13) and had a mean BMI of 16.89 (±2.52). Families in the EI had a mean of 1.88 children (± 0.62), mean parent age was 36 years (±6.2), 65% had an annual income of $75,000 or more, and 78% of mothers and 56% of fathers held a 4-year college or graduate degree.

The NEI was 68% male, 79% white, had a mean age of 6.47 years (± 2.14), had experienced symptoms of encopresis for a mean of 3.29 years (± 2.31), and had a mean body mass index (BMI) of 17.13 (± 1.72). Families in the NEI had an average of 2.16 children (± 0.83). Data regarding family annual income, parent education level, or parent age are not available for the NEI because this group consisted of data obtained by chart review, and a demographics questionnaire was not part of standard care during their treatment.

Treatment groups did not differ significantly with respect to age (t_{35,37}=0.33, p=0.74), BMI (t_{33,35}=0.32, p=0.75), number of children in the family’s homes (t_{35,37}=1.34, p=0.19), or length of time with encopresis symptoms (t_{35,37}=-0.63, p=0.72).

In addition, group participation was not a significant predictor for gender (χ²_{1}=0.22, p = 0.64), minority status (χ²_{1}=0.23, p=0.63), or marital status (χ²_{1}=2.01, p ≤ 0.57).

**Procedure**

*Enhanced Intervention (experimental group).* Families were recruited over the course of three group sessions (fall, winter, and spring) that spanned ten months. Criteria utilized by the Multidisciplinary Encopresis Clinic at the University of Michigan for discerning group behavioral intervention eligibility guided decisions for participant recruitment. Specifically, families were approached if their child was given a diagnosis of
retentive encopresis during their intake appointment and if their child was between the ages of four and 12 years, 11 months. Families were excluded if their child was developmentally delayed or if the child or either parent had a history of severe psychopathology that required hospitalization. Families interested in participating in this study were referred to the primary investigator and formal informed consent and assent procedures were completed. Once informed consent and assent forms were signed, families were given the initial questionnaire packet to complete and return at their first group treatment session.

Non-Enhanced Intervention (control group). The NEI consisted of daily diet diary data for families who participated in the NEI from 2005-2007. Inclusion criteria were participation in the group behavioral intervention at the University of Michigan; child age between four and 12 years, 11 months; and a minimum of five days of diet diary data for the first and last weeks of group treatment. A waiver of informed consent and assent was obtained from the University Institutional Review Boards at the University of Michigan Health System and Eastern Michigan University as daily diet diaries were collected as part of standard clinical care.

Intervention

Parents/legal guardians and children meet in separate but simultaneous groups. The same information was covered in both groups but at a developmentally appropriate level for children. All treatment sessions lasted approximately 60 minutes. A summary of the fluid-based modifications to the NEI that are included in the EI that were discussed previously are presented in Appendix C.
Enhanced Intervention (experimental group). Families in the enhanced intervention attended group treatment sessions as regularly scheduled by the Multidisciplinary Encopresis Clinic at the University of Michigan. Children were placed in either a younger (ages three to five) or older (ages six to 12) child’s group and all families attended six sessions over seven weeks. The enhanced intervention (EI) was utilized during all treatment sessions for the enhanced intervention (see Appendixes A and B). The parent groups were led by a developmental behavioral pediatrician and a pediatric psychologist. A post-doctoral fellow also assisted with running the fall and winter parent-group sessions for the EI only. Child groups were led by the primary investigator or a postdoctoral fellow.

Non-Enhanced Intervention (control group). Children included in the NEI completed the non-enhanced group behavioral intervention (NEI) from 2005-2007. The NEI employed a modified version of the group behavioral intervention protocol presented by Stark and colleagues (Opipari et al., 1999; Stark et al., 1990b; Stark et al., 1997). Families completed either five group sessions over six weeks (younger children, 3-5 years) or six sessions over seven weeks (older children, 6-11 years). All parent group sessions were led by the same developmental behavioral pediatrician and pediatric psychologist. Child group sessions for the NEI were led by a post-doctoral fellow from 2005-2006 and were led by the primary investigator from 2006-2007.

Measures and Data Collection
Enhanced Intervention

Data for the Enhanced Intervention were collected both as part of standard clinical care and supplemental to standard clinical care. A timetable of survey distribution is
presented in Table 8 below. Bolded information reflects data that families are required to complete as part of standard clinical care. All data are currently stored in a locked file cabinet in the Department of Child Behavioral Health at the University of Michigan.

Table 8

**Timeline for Survey Distribution and Data Collection for the Enhanced Intervention Only**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pre&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Diet Diary</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Fluid Knowledge Questionnaire</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Child Outcome Questionnaire</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Client Evaluation of Services-8*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>*</sup>Larsen, Attkisson, Hargreaves, & Nguyen (1979)

<sup>a</sup>Questionnaire distributed to families upon the conclusion of their diagnostic interview

_Demographics questionnaire._ Parents/legal guardians in the Enhanced Intervention only completed a demographics questionnaire generated by the staff at the Multidisciplinary Encopresis Clinic at the University of Michigan Health System. For the purposes of this study, only questions specific to child and parent(s) age, gender, ethnicity were examined (see Appendix D).

_Daily diet diaries._ Families were asked to provide detailed records for all foods and fluids their children consumed each day. Two modified versions of the diet diaries were used. Diet diaries given prior to presenting children with clear fluid goals contained space to document clear fluid children consumed at each meal, snack, and for the day in
whole (see Appendix E). Diet diaries provided to families after Session 3 contained a box for recording children’s clear fluid goals and whether age-based recommendations for juice and milk were exceeded (see Appendix F).

*Client Satisfaction Questionnaire-8 (CSQ; Larsen, Attkisson, Hargreaves, & Nguyen, 1979; see Appendix G).* Parents/legal guardians completed a modified version of the CSQ. Specific changes included adding three items and expanding questions to understand satisfaction with specific components of the group treatment for retentive encopresis. Response choices are presented in a four-point Likert scale format, with wording for each choice specific to the question topic. A higher score represents higher treatment satisfaction.

*Fluid Knowledge Questionnaire (FKQ).* A fluid knowledge questionnaire was created by the principal investigator to assess children’s tolerance for different fluids and parental knowledge of age-based fluid recommendations, behavior modification techniques that could be used to alter children’s fluid intake, and behavior modification techniques parents are likely to use to modify their child’s fluid intake. Two versions of this questionnaire were used to discern whether parents gained knowledge of behavior modification techniques. Specifically, the “pre fluid questionnaire” provided parents with definitions of different behavior modification techniques (see Appendix H) and the “post fluid questionnaire” (Appendix I) did not. To score the FKQ, one point is provided for each correct answer to the age-based fluid recommendation questions and for each correct behavior modification technique parents endorse that could be used to modify children’s fluid intake. Total fluid knowledge is calculated by summing all points earned.
Child Outcome Questionnaire. The developmental behavioral pediatrician and clinical psychologist provided independent ratings of treatment success for each child (see Appendix J). Ratings were based upon the child’s adherence to dietary recommendations, the child’s compliance with prescribed toilet sits, the child’s placement of bowel movements in the toilet, and the character and frequency of the child’s stool.

Non-Enhanced Intervention

Diet diary data for the 19 families in the NEI were extracted from medical charts, de-identified, and copied. Because this was a retrospective chart review, complete demographic information and data with respect to parent fluid knowledge, family satisfaction with care, and provider opinion about child treatment outcome at the conclusion of the group treatment were not available for the NEI.
Results

This study explored the effectiveness of an enhanced intervention (EI) in improving adherence to prescribed daily clear fluid goals and increasing daily water intake for children participating in a group behavioral intervention for the treatment of retentive encopresis. Key dependent variables of interest for this study included water intake (fluid ounces), juice intake (fluid ounces), adherence to clear fluid goals, and adherence to water goals; key independent variables of interest were group type (NEI versus EI), juice intake, “other” clear fluid intake (sports drinks, non-100% fruit juice, fruit aides, fruit punch, and powder-mixed drinks), milk intake, soda intake, and fiber intake.

A summary of the descriptive analyses for all fluid variables of interest will be presented first in order to provide a foundation for information presented in the main analyses. Next, results of the tests of the primary hypotheses will be presented by aim, beginning with Aim One and ending with Aim Three. This will be followed by a review of the data obtained by analyzing the secondary research questions. The results section will conclude with a review of the data regarding evaluation of treatment integrity.

Descriptive analyses

Children’s mean daily intake of water, juice, “other” clear fluids, milk, soda, and fiber for each fluid phase (baseline, fluid phase one, and fluid phase two) was tabulated for the sample as a whole (NEI plus EI) and treatment by group type (NEI vs. EI; see Appendix K). Treatment groups did not differ significantly in their mean daily intake of any fluid type or fiber or in their mean daily intake of clear fluid during the baseline period. During fluid phase one, mean daily intake of clear fluid ($t_{1,35} = 2.17$, $p \leq 0.05$)
and water \((t_{1,35} = 4.07, p \leq 0.001)\) was significantly higher for children in the EI compared to children in the NEI. Treatment groups did not differ significantly in their mean daily intake of any additional fluid types or fiber intake during fluid phase one. During fluid phase two, mean daily intake of clear fluid \((t_{1,35} = 3.37, p \leq 0.001)\), water \((t_{1,35} = 3.67, p \leq 0.001)\), and fiber \((t_{1,35} = 2.37, p \leq 0.05)\) was significantly higher, and mean daily intake of juice \((t_{1,35} = -2.15, p \leq 0.001)\) was significantly lower for children in the EI than children in the NEI. Treatment groups did not differ significantly in their mean daily intake of any additional fluid types during fluid phase two.

**Aim One**

*Hypothesis One*

The first hypothesis, that participation in the EI would be a significant determinant of water intake during both of the active fluid phases of treatment compared to participation in the NEI, was supported.

Preparation of data for analysis included the following steps. First, a dummy variable was created for group type \((NEI = 0, EI = 1)\). Second, a separate, continuous variable was generated to represent children’s daily water intake during the active fluid phases of treatment only (excluded water data from the baseline period). Third, due to limited variability in parental marital status and for data analysis purposes, this categorical variable was collapsed to form a binary variable \((0=not\ married, 1=married)\).

Water intake was regressed onto group type while controlling for age, gender, ethnicity, marital status, total number of children in the family’s home, children’s BMI, length of time children had been experiencing symptoms of encopresis, and children’s intake of juice, “other” clear fluids, milk, soda, fiber, sodium, and calories. The overall
model was significant ($F_{15, 32} = 20.21, p \leq 0.001$). As indicated by the estimate for participation in the EI ($7.58, p \leq 0.001$), the model suggested that during both of the active phases of fluid intervention, children participating in the EI drank 7.58 more fluid ounces of water per day than children participating in the NEI when all other variables were controlled (see Table 9).

Table 9

Ordinary Least Squares Estimation of the Determinants of the Effect of Participation in the Enhanced Intervention on Water Intake During Active Phases of Fluid Intervention

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Standard Error</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>EI</td>
<td>7.576</td>
<td>2.079</td>
<td>3.64</td>
<td>0.001</td>
</tr>
<tr>
<td>Age</td>
<td>0.915</td>
<td>0.768</td>
<td>1.19</td>
<td>0.242</td>
</tr>
<tr>
<td>Gender</td>
<td>0.393</td>
<td>1.987</td>
<td>0.20</td>
<td>0.844</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-4.542</td>
<td>2.003</td>
<td>-2.27</td>
<td>0.030</td>
</tr>
<tr>
<td>Parental Marital Status</td>
<td>4.388</td>
<td>2.459</td>
<td>1.78</td>
<td>0.084</td>
</tr>
<tr>
<td>Total Children in the Home</td>
<td>-1.627</td>
<td>1.072</td>
<td>-1.52</td>
<td>0.139</td>
</tr>
<tr>
<td>BMI</td>
<td>0.552</td>
<td>0.321</td>
<td>1.72</td>
<td>0.100</td>
</tr>
<tr>
<td>Time with Encopresis Symptoms</td>
<td>0.204</td>
<td>0.803</td>
<td>0.25</td>
<td>0.801</td>
</tr>
<tr>
<td>Juice Intake During Fluid</td>
<td>-0.403</td>
<td>0.095</td>
<td>-4.26</td>
<td>0.000</td>
</tr>
<tr>
<td>Phases One &amp; Two</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Other” Clear Fluid Intake During Fluid</td>
<td>-0.315</td>
<td>0.160</td>
<td>-1.97</td>
<td>0.058</td>
</tr>
<tr>
<td>Phases One &amp; Two</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Table 9 continues)
(Table 9 continued)

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Standard Error</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk Intake During Fluid</td>
<td>-0.353</td>
<td>0.107</td>
<td>-3.30</td>
<td>0.002</td>
</tr>
<tr>
<td>Phases One &amp; Two</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soda Intake During Fluid</td>
<td>-0.207</td>
<td>0.135</td>
<td>-1.54</td>
<td>0.134</td>
</tr>
<tr>
<td>Phases One &amp; Two</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiber Intake During Fluid</td>
<td>0.360</td>
<td>0.080</td>
<td>4.53</td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Phases One &amp; Two</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium Intake During Fluid</td>
<td>-0.001</td>
<td>0.000</td>
<td>-1.81</td>
<td>0.080</td>
</tr>
<tr>
<td>Phases One &amp; Two</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calories Intake During Fluid</td>
<td>0.005</td>
<td>0.002</td>
<td>3.38</td>
<td>0.002</td>
</tr>
<tr>
<td>Phases One &amp; Two</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This model also suggested that, for the sample as a whole (both the EI and NEI), children drank more water the greater their fiber and daily caloric intake. Specifically, children drank 0.36 fluid ounces more water per day for each gram increase in their daily fiber intake when all other variables were held constant, and 0.01 fluid ounces more water per day for each one kilocalorie increase in their daily caloric intake when all other variables were held constant. In addition, this model suggested that children of minority status drank 4.54 fluid ounces less water per day than white children when all other variables were held constant. They also drank less water the less juice and milk they consumed. Specifically, children drank 0.40 fluid ounces less water per day for each one fluid ounce increase in their daily juice intake when all other variables were held constant.
and 0.35 fluid ounces less water per day for each one fluid ounce increase in their daily milk intake when all other variables were held constant.

Three strong trends regarding determinants of water intake during the active fluid phases of treatment were also observed. Specifically, children whose parents were married drank 4.39 fluid ounces more water than children whose parents were not married when all other variables were held constant. In addition, children drank less water the more “other” clear fluids and sodium they consumed. Specifically, children drank 0.32 fluid ounces less water per day for each one fluid ounce increase in their daily “other” clear fluid intake when all other variables were held constant, and children drank 0.001 fluid ounces less water per day for each one gram increase in their daily sodium intake when all other variables were held constant.

Hypothesis Two

The second hypothesis, that water intake would increase in a stepwise manner consistent with the changing criterion design for children participating in the EI, was supported.

Preparation of data for analysis to test this hypothesis included creation of following two interaction terms. For the first interaction term, group type (NEI=0, EI=1) was interacted with fluid phase one (not in fluid phase one=0; in fluid phase one=1). For the second term, group type (NEI=0, EI=1) was interacted with fluid phase two (not in fluid phase two=0; in fluid phase two=1).

Water intake during the active fluid phases only was regressed onto both interaction terms while controlling for age, gender, ethnicity, marital status, total number of children in the family’s home, children’s BMI, length of time children had been
experiencing symptoms of encopresis, and children’s intake of juice, “other” clear fluids, milk, soda, fiber, sodium, and calories during the active fluid phases only. The overall model was significant ($F_{16, 32} = 23.07, p \leq 0.001$). As is indicated by the estimate for the interaction of participation in the EI and fluid phase one (6.11, $p \leq 0.001$), the model suggested that children who participated in the EI drank 6.11 more fluid ounces of water in fluid phase one than children who participated in the NEI when all other variables were held constant. In addition, as is indicated by the estimate for the interaction of participation in the EI and fluid phase two (9.19, $p \leq 0.001$), the model suggested that children who participated in the EI drank 9.19 more fluid ounces water in fluid phase two than children who participated in the NEI when all other variables were held constant (see Table 10).

**Table 10**

*Ordinary Least Squares Estimation of the Determinants of the Effect of Participation in the Enhanced Intervention and Fluid Phase on Water Intake*

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Standard Error</th>
<th>$t$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction of Enhanced Intervention and Fluid Phase One</td>
<td>6.110</td>
<td>2.035</td>
<td>3.00</td>
<td>0.005</td>
</tr>
<tr>
<td>Interaction of Enhanced Intervention and Fluid Phase Two</td>
<td>9.189</td>
<td>2.339</td>
<td>3.93</td>
<td>0.000</td>
</tr>
<tr>
<td>Age</td>
<td>0.943</td>
<td>0.762</td>
<td>1.24</td>
<td>0.225</td>
</tr>
<tr>
<td>Gender</td>
<td>0.278</td>
<td>1.978</td>
<td>0.14</td>
<td>0.889</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-4.518</td>
<td>1.996</td>
<td>-2.26</td>
<td>0.031</td>
</tr>
</tbody>
</table>

(Table 10 continues)
(Table 10 continued)

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Standard Error</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental Marital Status</td>
<td>4.521</td>
<td>2.467</td>
<td>1.83</td>
<td>0.076</td>
</tr>
<tr>
<td>Total Children in the Home</td>
<td>-1.659</td>
<td>1.070</td>
<td>-1.55</td>
<td>0.131</td>
</tr>
<tr>
<td>BMI</td>
<td>0.590</td>
<td>0.314</td>
<td>1.88</td>
<td>0.069</td>
</tr>
<tr>
<td>Time with Encopresis Symptoms</td>
<td>0.194</td>
<td>0.734</td>
<td>0.24</td>
<td>0.809</td>
</tr>
<tr>
<td>Juice Intake During Fluid Phases One &amp; Two</td>
<td>-0.408</td>
<td>0.093</td>
<td>-4.38</td>
<td>0.000</td>
</tr>
<tr>
<td>“Other” Clear Fluid Intake During Fluid Phases One &amp; Two</td>
<td>-0.337</td>
<td>0.166</td>
<td>-2.03</td>
<td>0.051</td>
</tr>
<tr>
<td>Milk Intake During Fluid Phases One &amp; Two</td>
<td>-0.363</td>
<td>0.105</td>
<td>-3.44</td>
<td>0.002</td>
</tr>
<tr>
<td>Soda Intake During Fluid Phases One &amp; Two</td>
<td>-0.231</td>
<td>0.134</td>
<td>-1.72</td>
<td>0.095</td>
</tr>
<tr>
<td>Fiber Intake During Fluid Phases One &amp; Two</td>
<td>0.314</td>
<td>0.084</td>
<td>3.75</td>
<td>0.001</td>
</tr>
<tr>
<td>Sodium Intake During Fluid Phases One &amp; Two</td>
<td>-0.001</td>
<td>0.000</td>
<td>-2.06</td>
<td>0.050</td>
</tr>
<tr>
<td>Calories Intake During Fluid Phases One &amp; Two</td>
<td>0.006</td>
<td>0.002</td>
<td>3.63</td>
<td>0.001</td>
</tr>
</tbody>
</table>

This model also suggested that, for the sample as a whole (both EI and NEI), children consumed 0.314 fluid ounces more water for each one gram increase in their...
daily fiber intake when all other variables were held constant and that children drank 0.006 fluid ounces more water for each one kilocalorie increase in their daily caloric intake when all other variables were held constant. In addition, this model suggested that children of minority status drank 4.52 fluid ounces less water per day than white children when all other variables were held constant. Further, this model suggested that children consumed 0.41 fluid ounces less water per day for each one fluid ounce increase in their daily juice intake when all other variables were held constant, that children drank 0.34 fluid ounces less water per day for every one fluid ounce increase in their daily intake of “other” clear fluids when all other variables were held constant, that children drank 0.36 fluid ounces less water per day for every one fluid ounce increase in their daily milk intake when all other variables were held constant, and that children drank 0.001 fluid ounces less water for each one gram increase in their daily sodium intake.

Strong trends that children whose parents were married drank 4.52 fluid ounces more water per day than children who parents were not married when all other variables were held constant, that children drank 0.60 fluid ounces more water per day for each one point increase in their BMI when all other variables were held constant, and that children drank 0.23 fluid ounces less water per day for each one fluid ounce increase in their daily soda intake when all other variables were held constant were observed.

*Secondary analysis.* In order to examine the relationship between participation in the EI and water intake further, a second OLS regression was conducted to examine whether there were separate main effects for each fluid phase on daily water intake for the sample overall. Data preparation for the secondary analysis included creating the following three dummy variables: one to represent when participants were in the baseline
phase (0=not in the baseline phase, 1= in the baseline phase), one to represent when participants were in fluid phase one (0=not in fluid phase one, 1=in fluid phase one), and one to represent when participants were in fluid phase two (0=not in fluid phase two, 1=in fluid phase two).

Water intake was regressed onto variables representing active participation in fluid phases one and two while controlling for group, age, gender, ethnicity, marital status, total number of children in the family’s home, children’s BMI, length of time children had been experiencing symptoms of encopresis, and children’s intake of juice, “other” clear fluids, milk, soda, fiber, sodium, and calories. The variable representing being in the baseline phase was not entered into the regression equation as it served as the fluid phase reference variable.

The overall model was significant ($F_{17, 34} = 36.85, p \leq 0.001$). As is indicated by the estimate for being in fluid phase one (3.69, $p \leq 0.001$), this model suggested that children drank 3.69 more fluid ounces of water per day during fluid phase one than during the baseline phase, irrespective of group participation when all other variables were held constant. In addition, as is indicated by the estimate for being in fluid phase two (5.81, $p \leq 0.001$), this model suggested that children drank 5.81 more fluid ounces of water per day during fluid phase two than the baseline phase, irrespective of group participation when all other variables were held constant (see Table 11).
Table 11

*Ordinary Least Squares Estimation of the Determinants of the Effect of Fluid Phase on Water Intake*

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Standard Error</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid Phase 1</td>
<td>3.685</td>
<td>0.947</td>
<td>3.89</td>
<td>0.000</td>
</tr>
<tr>
<td>Fluid Phase 2</td>
<td>5.809</td>
<td>1.039</td>
<td>5.59</td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Enhanced Intervention</td>
<td>6.645</td>
<td>1.846</td>
<td>3.60</td>
<td>0.001</td>
</tr>
<tr>
<td>Age</td>
<td>0.339</td>
<td>0.634</td>
<td>0.53</td>
<td>0.596</td>
</tr>
<tr>
<td>Gender</td>
<td>1.419</td>
<td>1.585</td>
<td>0.90</td>
<td>0.377</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-4.345</td>
<td>1.702</td>
<td>-2.55</td>
<td>0.015</td>
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<tr>
<td>Parental Marital Status</td>
<td>1.739</td>
<td>1.928</td>
<td>0.90</td>
<td>0.373</td>
</tr>
<tr>
<td>Total Children in the Home</td>
<td>-2.634</td>
<td>0.859</td>
<td>-3.07</td>
<td>0.004</td>
</tr>
<tr>
<td>BMI</td>
<td>1.053</td>
<td>0.267</td>
<td>3.94</td>
<td>0.000</td>
</tr>
<tr>
<td>Time with Encopresis Symptoms</td>
<td>0.306</td>
<td>0.654</td>
<td>0.47</td>
<td>0.643</td>
</tr>
<tr>
<td>Juice Intake During Fluid Phases</td>
<td>-0.204</td>
<td>0.114</td>
<td>-1.79</td>
<td>0.082</td>
</tr>
<tr>
<td>“Other” Clear Fluid</td>
<td>-0.172</td>
<td>0.170</td>
<td>-1.01</td>
<td>0.319</td>
</tr>
<tr>
<td>Milk</td>
<td>-0.328</td>
<td>0.089</td>
<td>-3.68</td>
<td>0.001</td>
</tr>
<tr>
<td>Soda</td>
<td>-0.325</td>
<td>0.091</td>
<td>-3.58</td>
<td>0.001</td>
</tr>
<tr>
<td>Fiber</td>
<td>0.287</td>
<td>0.067</td>
<td>4.29</td>
<td>0.000</td>
</tr>
<tr>
<td>Sodium</td>
<td>-0.001</td>
<td>0.001</td>
<td>-1.31</td>
<td>0.198</td>
</tr>
<tr>
<td>Calories</td>
<td>0.004</td>
<td>0.001</td>
<td>3.91</td>
<td>0.000</td>
</tr>
</tbody>
</table>

This model also suggested that children participating in the EI drank 6.65 more fluid ounces of water per day than children participating in the NEI for the intervention as
a whole when all other variables were held constant, and that children drank more water the higher their BMI and the greater their intake of fiber and calories. More specifically, the model suggested children drank 1.05 fluid ounces more water per day for each one-point increase in their BMI when all other variables were held constant, that children drank 0.29 fluid ounces more of water per day for each one gram increase in their daily fiber intake when all other variables were held constant, and that children drank 0.004 fluid ounces more water per day for each one kilocalorie increase in their daily caloric intake when all other variables were held constant.

In addition, this model suggested that, for the group as a whole, children of minority status consumed 4.35 fluid ounces less water per day than white children when all other variables were held constant. Children also drank less water the more siblings they had and the greater their intake of milk and soda. Specifically, the model suggested that children drank 2.63 fluid ounces less water per day for each one additional sibling in their household when all other variables were held constant, that children drank 0.33 fluid ounces less water per day for each one fluid ounce increase in their milk intake when all other variables were held constant, and that children drank 0.33 fluid ounces less water per day for each one fluid ounce increase in their soda intake when all other variables were held constant. A main effect for sodium was not found.

Hypothesis Three

The third hypothesis, that mean percent adherence to water goals would be 75% for children participating in the EI each week of active fluid intervention, was not supported (see Table 12).
Table 12

*Group Mean Percent of Total Water Goals Met Per Week for the Enhanced Intervention Only*

<table>
<thead>
<tr>
<th></th>
<th>Fluid Phase 1</th>
<th></th>
<th>Fluid Phase 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Week 1</td>
<td>Week 2</td>
<td>Week 1</td>
<td>Week 2</td>
</tr>
<tr>
<td>Whole Sample</td>
<td>46%</td>
<td>48%</td>
<td>46%</td>
<td>47%</td>
</tr>
<tr>
<td>Younger Kids</td>
<td>49%</td>
<td>48%</td>
<td>49%</td>
<td>51%</td>
</tr>
<tr>
<td>Older Kids</td>
<td>41%</td>
<td>48%</td>
<td>42%</td>
<td>44%</td>
</tr>
</tbody>
</table>

*Secondary analysis.* In order to provide insight on potential barriers to meeting the 75% criterion, mean group percent adherence for each type of water goal for each week of the fluid intervention was explored. As would be noted by visual inspection of Table 13, children in the EI were most likely to meet their water bottle goals and least likely to meet their breakfast water goals.
Table 13

*Group Mean Percent Adherence for Each Category Of Water Goal Across Treatment for the Enhanced Intervention Only*

<table>
<thead>
<tr>
<th></th>
<th>Fluid Phase One</th>
<th></th>
<th>Fluid Phase Two</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Week 1</td>
<td>Week 2</td>
<td>Week 1</td>
<td>Week 2</td>
</tr>
<tr>
<td><strong>Breakfast</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole Sample</td>
<td>35%</td>
<td>42%</td>
<td>37%</td>
<td>37%</td>
</tr>
<tr>
<td>Younger Kids</td>
<td>39%</td>
<td>43%</td>
<td>34%</td>
<td>39%</td>
</tr>
<tr>
<td>Older Kids</td>
<td>31%</td>
<td>41%</td>
<td>39%</td>
<td>36%</td>
</tr>
<tr>
<td><strong>Lunch</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole Sample</td>
<td>34%</td>
<td>28%</td>
<td>34%</td>
<td>40%</td>
</tr>
<tr>
<td>Younger Kids</td>
<td>43%</td>
<td>35%</td>
<td>40%</td>
<td>46%</td>
</tr>
<tr>
<td>Older Kids</td>
<td>20%</td>
<td>20%</td>
<td>27%</td>
<td>32%</td>
</tr>
<tr>
<td><strong>Dinner</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole Sample</td>
<td>40%</td>
<td>48%</td>
<td>45%</td>
<td>42%</td>
</tr>
<tr>
<td>Younger Kids</td>
<td>47%</td>
<td>43%</td>
<td>44%</td>
<td>41%</td>
</tr>
<tr>
<td>Older Kids</td>
<td>31%</td>
<td>54%</td>
<td>46%</td>
<td>43%</td>
</tr>
<tr>
<td><strong>Water Bottle</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole Sample</td>
<td>70%</td>
<td>74%</td>
<td>73%</td>
<td>71%</td>
</tr>
<tr>
<td>Younger Kids</td>
<td>69%</td>
<td>70%</td>
<td>77%</td>
<td>77%</td>
</tr>
<tr>
<td>Older Kids</td>
<td>71%</td>
<td>79%</td>
<td>68%</td>
<td>64%</td>
</tr>
</tbody>
</table>
Hypothesis Four

The fourth hypothesis, that adherence to water goals (75% criterion) during fluid phase one would explain adherence to water goals (75% criterion) during fluid phase two for children participating in the EI, was not supported.

A logistic regression was conducted to examine this hypothesis. Limitations due to degrees of freedom prevented all demographic and dietary variables from being entered into the regression equation. Demographic and dietary variables entered into the regression equation were selected to be consistent with previous analyses. For the final model, adherence to water goals (75% criterion) during fluid phase two was regressed onto adherence to water goals (75% criterion) during fluid phase one while controlling for age, gender, ethnicity, family marital status, total number of children in the family’s home, children’s BMI, length of time children had been experiencing symptoms of encopresis, and children’s intake of juice, “other” clear fluid, milk, soda, fiber, sodium, and calories. The overall model was significant ($\chi^2_{14}=144.71, p \leq 0.001$). However, as indicated by the odds ratio of water adherence in fluid phase one, the model suggested only a strong trend that being adherent to water goals (75% criterion) during fluid phase one increased the odds of being adherent to water goals during fluid phase two by 108% when all other variables were held constant (see Table 14).
Table 14

Logistic Regression of Adherence to Water Goals During Fluid Phase One on Adherence to Water Goals During Fluid Phase Two for the Enhanced Intervention Only

<table>
<thead>
<tr>
<th></th>
<th>Percent</th>
<th>Odds Ratio</th>
<th>Change in Odds</th>
<th>Standard Error</th>
<th>Wald</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Goal Adherence in Fluid Phase One</td>
<td>11%</td>
<td>2.081</td>
<td>0.435</td>
<td>2.845</td>
<td>0.092</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>3%</td>
<td>1.026</td>
<td>0.247</td>
<td>0.011</td>
<td>0.917</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>74%</td>
<td>1.737</td>
<td>0.527</td>
<td>1.096</td>
<td>0.295</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-34%</td>
<td>0.661</td>
<td>0.403</td>
<td>1.059</td>
<td>0.304</td>
<td></td>
</tr>
<tr>
<td>Parental Marital Status</td>
<td>474%</td>
<td>5.736</td>
<td>0.704</td>
<td>6.162</td>
<td>0.013</td>
<td></td>
</tr>
<tr>
<td>Total Children in the Home</td>
<td>31%</td>
<td>1.314</td>
<td>0.360</td>
<td>0.575</td>
<td>0.448</td>
<td></td>
</tr>
<tr>
<td>Time with Encopresis Symptoms</td>
<td>-10%</td>
<td>0.898</td>
<td>0.203</td>
<td>0.283</td>
<td>0.595</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>23%</td>
<td>1.228</td>
<td>0.134</td>
<td>2.345</td>
<td>0.126</td>
<td></td>
</tr>
<tr>
<td>Juice</td>
<td>-6%</td>
<td>0.936</td>
<td>0.056</td>
<td>1.413</td>
<td>0.235</td>
<td></td>
</tr>
<tr>
<td>“Other” clear fluid</td>
<td>-11%</td>
<td>0.887</td>
<td>0.035</td>
<td>11.564</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>-16%</td>
<td>0.841</td>
<td>0.052</td>
<td>11.093</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Soda</td>
<td>-16%</td>
<td>0.845</td>
<td>0.064</td>
<td>6.990</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td>Fiber</td>
<td>7%</td>
<td>1.070</td>
<td>0.034</td>
<td>4.026</td>
<td>0.045</td>
<td></td>
</tr>
<tr>
<td>Sodium</td>
<td>0%</td>
<td>1.000</td>
<td>0.000</td>
<td>1.138</td>
<td>0.286</td>
<td></td>
</tr>
<tr>
<td>Calories</td>
<td>0%</td>
<td>1.000</td>
<td>0.000</td>
<td>0.042</td>
<td>0.838</td>
<td></td>
</tr>
</tbody>
</table>

This model did suggest that the odds of children being adherent to their clear fluid goals in fluid phase two increased by 474% if children’s parents were married when all
other variables were held constant and by 7% for each additional gram increase in their daily fiber intake when all other variables were held constant.

In addition, the odds of children being adherent to their clear fluid goals in fluid phase two decreased by 11% for each additional fluid ounce increase in their daily “other” clear fluid intake when all other variables were held constant, by 16% for each additional fluid ounce increase in their daily milk intake when all other variables were held constant, and by 16% for each additional fluid ounce increase in their daily soda intake when all other variables were held constant. A main effect for sodium was not found.

Secondary analyses. In order to better elucidate variables explaining water goal adherence (75% criterion), a logistic regression was conducted to examine the determinants of water goal adherence (75% criterion) in fluid phase one. Limitations due to degrees of freedom prevented all demographic variables for the Enhanced Intervention from being entered into the regression equation. Demographic variables entered into the regression equation were selected to be consistent with previous analysis for factors explaining water goal adherence. For the final model, adherence to water goals during fluid phase one (75% criterion) was regressed onto age, gender, ethnicity, family marital status, total number of children in the family’s home, children’s BMI, length of time children had been experiencing symptoms of encopresis, and children’s intake of juice, “other” clear fluid, milk, soda, fiber, sodium, and calories.

This overall model was significant ($\chi^2_{14}=53.61, p < 0.001$) and suggested that being female increased the odds of children meeting 75% of their water goals each day during fluid phase one by 506% when all other variables were held constant, and that the
odds of children meeting 75% of their water goals each day during fluid phase one increased by 0.1% for each one additional kilocalorie increase in children’s daily caloric intake when all other variables were held constant (see Table 15).

Table 15

Logistic Regression of Variables Explaining Adherence to Water Goals During Fluid Phase One for Children in the Enhanced Intervention Only

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>Percent Change in Odds</th>
<th>Standard Error</th>
<th>Wald Statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.888</td>
<td>-11%</td>
<td>0.290</td>
<td>0.682</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>6.059</td>
<td>506%</td>
<td>0.831</td>
<td>4.704</td>
<td>0.030</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>0.666</td>
<td>-33%</td>
<td>0.844</td>
<td>0.630</td>
<td></td>
</tr>
<tr>
<td>Parental Marital Status</td>
<td>1.538</td>
<td>54%</td>
<td>0.925</td>
<td>0.642</td>
<td></td>
</tr>
<tr>
<td>Total Children in the Home</td>
<td>0.927</td>
<td>-7%</td>
<td>0.665</td>
<td>0.910</td>
<td></td>
</tr>
<tr>
<td>Time with Encopresis Symptoms</td>
<td>1.252</td>
<td>25%</td>
<td>0.338</td>
<td>0.510</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>1.337</td>
<td>34%</td>
<td>0.188</td>
<td>0.123</td>
<td></td>
</tr>
<tr>
<td>Juice</td>
<td>0.979</td>
<td>-2%</td>
<td>0.085</td>
<td>0.801</td>
<td></td>
</tr>
<tr>
<td>&quot;Other&quot; clear fluid</td>
<td>0.920</td>
<td>-8%</td>
<td>0.073</td>
<td>0.300</td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>0.867</td>
<td>13%</td>
<td>0.055</td>
<td>0.010</td>
<td></td>
</tr>
</tbody>
</table>

(Table 15 continues)
This model also suggested that the odds of children meeting 75% of their water goals each day during fluid phase one decreased by 13% for each fluid ounce increase in their daily milk intake when all other variables were held constant, by 13% for each fluid ounce increase in their daily soda intake when all other variables were held constant, and by 0.1% for each calorie consumed when all other variables were held constant. A main effect for sodium was not found.

Aim Two

Hypothesis One

The first hypothesis, that participation in the EI would increase the odds of children meeting their prescribed daily clear fluid goals compared to participation in the NEI, was supported.

Two logistic regression analyses were conducted to explore this hypothesis. For the first logistic regression analysis, data preparation included creation of a dummy variable to represent adherence to prescribed daily clear fluid goal during fluid phase one only (0=did not meet daily clear fluid goal, 1=met daily clear fluid goal). Separate
continuous variables were also created to represent children’s daily intake of milk, soda, fiber, sodium, and calories during fluid phase one only.

Adherence to prescribed daily clear fluid goals during fluid phase one was regressed onto participation in the EI while controlling for age, gender, ethnicity, marital status, total number of children in the family’s home, children’s BMI, length of time children had been experiencing symptoms of encopresis, and children’s intake of milk, soda, fiber, sodium, and calories. This overall model was significant ($\chi^2_{13}=176.56, p \leq 0.001$) and suggested that participation in the EI increased the odds of children adhering to their prescribed daily clear fluid goals during fluid phase one by 317% (see Table 16) when all other variables were held constant.

Table 16

*Logistic Regression Analysis of the Effect of Participation in the Enhanced Intervention on Clear Fluid Adherence During Fluid Phase One Only*

<table>
<thead>
<tr>
<th></th>
<th>Percent</th>
<th>Odds Ratio</th>
<th>Change in Odds</th>
<th>Standard Error</th>
<th>Wald Statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced Intervention</td>
<td></td>
<td>4.173</td>
<td>317%</td>
<td>0.495</td>
<td>8.340</td>
<td>0.004</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>0.722</td>
<td>-28%</td>
<td>0.140</td>
<td>5.449</td>
<td>0.020</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td>0.749</td>
<td>-25%</td>
<td>0.431</td>
<td>0.448</td>
<td>0.503</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td>0.357</td>
<td>-64%</td>
<td>0.387</td>
<td>7.094</td>
<td>0.008</td>
</tr>
<tr>
<td>Total Children in the Home</td>
<td></td>
<td>0.287</td>
<td>-71%</td>
<td>0.363</td>
<td>11.812</td>
<td>0.001</td>
</tr>
<tr>
<td>Parental Marital Status</td>
<td></td>
<td>1.467</td>
<td>47%</td>
<td>0.621</td>
<td>0.381</td>
<td>0.537</td>
</tr>
</tbody>
</table>

(Table 16 continues)
(Table 16 continued)

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>Percent Change in Odds</th>
<th>Standard Error</th>
<th>Wald Statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time with Encopresis Symptoms</td>
<td>1.035</td>
<td>4%</td>
<td>0.179</td>
<td>0.038</td>
<td>0.845</td>
</tr>
<tr>
<td>BMI</td>
<td>1.291</td>
<td>29%</td>
<td>0.093</td>
<td>7.510</td>
<td>0.006</td>
</tr>
<tr>
<td>Milk Intake During Fluid Phase One</td>
<td>0.870</td>
<td>-13%</td>
<td>0.040</td>
<td>12.379</td>
<td>0.000</td>
</tr>
<tr>
<td>Soda Intake During Fluid Phase One</td>
<td>0.978</td>
<td>-2%</td>
<td>0.031</td>
<td>0.511</td>
<td>0.475</td>
</tr>
<tr>
<td>Fiber Intake During Fluid Phase One</td>
<td>1.033</td>
<td>3%</td>
<td>0.018</td>
<td>3.557</td>
<td>0.060</td>
</tr>
<tr>
<td>Sodium Intake During Fluid Phase One</td>
<td>1.000</td>
<td>0%</td>
<td>0.000</td>
<td>0.128</td>
<td>0.721</td>
</tr>
<tr>
<td>Calories Intake During Fluid Phase One</td>
<td>1.002</td>
<td>0.2%</td>
<td>0.001</td>
<td>6.954</td>
<td>0.010</td>
</tr>
</tbody>
</table>

This model also suggested that, for the group as a whole (both EI and NEI), the odds of children adhering to their prescribed daily clear fluid goals during fluid phase one increased by 29% for each additional one-point increase in their BMI when all other variables were held constant and by 0.2% for each one additional one kilocalorie increase in their daily caloric intake when all other variables were held constant. In addition, this model suggested that minority status decreased the odds of children adhering to their prescribed daily clear fluid goals during fluid phase one by 64% and that the odds of children adhering to their prescribed daily clear fluid goals during fluid phase one decreased by 28% for each additional one-year increase in their age when all other
variables were held constant, by 71% for each additional sibling in the home when all other variables were held constant, and by 13% for each one additional fluid ounce increase in children’s daily milk intake when all other variables were held constant. There was a strong trend that the odds of children adhering to their prescribed daily clear fluid goals during fluid phase one increased by 3% for each additional one gram increase in children’s daily fiber intake when all other variables were held constant. A main effect for sodium was not found.

For the second logistic regression analysis, the data preparation included creation of a dummy variable representing adherence to prescribed daily clear fluid goals during fluid phase two only (0=did not meet daily clear fluid goal, 1=met daily clear fluid goal). Separate continuous variables were also created to represent children’s daily intake of milk, soda, fiber, sodium, and calories during fluid phase two only.

Adherence to prescribed daily clear fluid goals during fluid phase two was regressed onto participation in the EI while controlling for age, gender, ethnicity, marital status, total number of children in the family’s home, children’s BMI, length of time children had been experiencing symptoms of encopresis, and children’s intake of milk, soda, fiber, sodium, and calories. This overall model was significant ($\chi^2_{13}=181.42$, $p \leq 0.001$) and suggested that being in the EI increased the odds of children adhering their prescribed daily clear fluid goals during fluid phase one by 626% (see Table 17) when all other variables were held constant.
### Table 17

**Logistic Regression Analysis of the Effect of Being in the Enhanced Intervention on Clear Fluid Goal Adherence During Fluid Phase Two**

<table>
<thead>
<tr>
<th></th>
<th>Percent</th>
<th>Odds Ratio</th>
<th>Change in Odds</th>
<th>Standard Error</th>
<th>Wald Statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced Intervention</td>
<td></td>
<td>7.263</td>
<td>626%</td>
<td>0.469</td>
<td>17.858</td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>0.681</td>
<td>-32%</td>
<td>0.194</td>
<td>3.905</td>
<td>0.048</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td>0.822</td>
<td>-18%</td>
<td>0.392</td>
<td>0.251</td>
<td>0.617</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td>0.317</td>
<td>-68%</td>
<td>0.636</td>
<td>3.266</td>
<td>0.071</td>
</tr>
<tr>
<td>Parental Marital Status</td>
<td></td>
<td>3.415</td>
<td>242%</td>
<td>1.075</td>
<td>1.307</td>
<td>0.253</td>
</tr>
<tr>
<td>Total Children in the Home</td>
<td></td>
<td>0.400</td>
<td>-60%</td>
<td>0.452</td>
<td>4.109</td>
<td>0.043</td>
</tr>
<tr>
<td>Time with Encopresis</td>
<td></td>
<td>1.065</td>
<td>7%</td>
<td>0.243</td>
<td>0.067</td>
<td>0.796</td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td>1.226</td>
<td>23%</td>
<td>0.095</td>
<td>4.565</td>
<td>0.033</td>
</tr>
<tr>
<td>Milk Intake During Fluid</td>
<td></td>
<td>0.914</td>
<td>-9%</td>
<td>0.034</td>
<td>7.154</td>
<td>0.008</td>
</tr>
<tr>
<td>Soda Intake During Fluid</td>
<td></td>
<td>0.962</td>
<td>4%</td>
<td>0.076</td>
<td>0.258</td>
<td>0.612</td>
</tr>
<tr>
<td>Fiber Intake During Fluid</td>
<td></td>
<td>1.020</td>
<td>2%</td>
<td>0.016</td>
<td>1.539</td>
<td>0.215</td>
</tr>
</tbody>
</table>

(Table 17 continues)
This model also suggested that the odds of being adherent to prescribed daily clear fluid goals during fluid phase two increased by 23% for each additional one-point increase in children’s BMI when all other variables were held constant and by 0.1% for each additional one kilocalorie increase in children’s daily caloric intake when all other variables were held constant. In addition, the odds of being adherent to prescribed daily clear fluid goals during fluid phase two decreased by 60% for each additional sibling in the family’s home when all other variables were held constant, by 32% for each one-year increase in children’s age when all other variables were held constant, and by 9% for each additional fluid once increase in children’s daily milk intake when all other variables were held constant. A strong trend was evident that minority status decreased the odds of children adhering their prescribed daily clear fluid goals in fluid phase two by 68% when all other variables were held constant.

**Hypothesis Two**

The second hypothesis, that adherence to prescribed daily clear fluid goals during phase one of the fluid intervention would explain adherence to prescribed daily clear
fluid goals during phase two of the fluid intervention for children participating in the EI only, was not supported.

A logistic regression analysis was conducted to explore this hypothesis. Data preparation for analysis included creation of two interaction terms: the first to represent the interaction of phase one and adherence to prescribed daily clear fluid goals (phase 1 and adherent = 1; phase 1 and not adherent = 0) and the second to represent the interaction of phase two and adherence to prescribed daily clear fluid goals (phase two and adherent = 0; phase two and not adherent =1). Dummy coding numerals were reversed for this second interaction term for data analysis purposes only. Limitations due to degrees of freedom prevented all demographic variables for the Enhanced Intervention from being entered into the regression equation. Demographic variables entered into the regression equation were selected to be consistent with previous analysis for factors explaining water goal adherence.

For the final model, the interaction of fluid phase two X adherence to prescribed daily clear fluid goals was regressed onto the interaction of fluid phase one X adherence to prescribed daily clear fluid goals while controlling for age, gender, ethnicity, marital status, total number of children in the family’s home, children’s BMI, length of time children had been experiencing symptoms of encopresis, and children’s intake of water, juice, milk, soda, fiber, sodium, and calories during fluid phase two only. While this overall model was significant ($\chi^2_{13}=72.9738, p \leq 0.001$), it did not suggest that being adherent to prescribed daily clear fluid goals during fluid phase one increased the odds of being adherent to prescribed daily clear fluid goals during fluid phase two for children participating in the EI only when all other variables were held constant (see Table 18).
### Table 18

**Logistic Regression Analysis of the Effect of Clear Fluid Goal Adherence During Fluid Phase One on Clear Fluid Goal Adherence During Fluid Phase Two for Enhanced Intervention Only**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio</th>
<th>Percent Change</th>
<th>Standard Error</th>
<th>Wald Statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction of Fluid Phase One</td>
<td>1.133</td>
<td>13%</td>
<td>0.412</td>
<td>0.091</td>
<td>0.763</td>
</tr>
<tr>
<td>Age</td>
<td>0.879</td>
<td>-12%</td>
<td>0.226</td>
<td>0.343</td>
<td>0.558</td>
</tr>
<tr>
<td>Gender</td>
<td>1.439</td>
<td>44%</td>
<td>0.552</td>
<td>0.435</td>
<td>0.510</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>0.266</td>
<td>73%</td>
<td>0.606</td>
<td>4.785</td>
<td>0.029</td>
</tr>
<tr>
<td>Parental Marital Status</td>
<td>13.771</td>
<td>1277%</td>
<td>1.510</td>
<td>3.016</td>
<td>0.083</td>
</tr>
<tr>
<td>Total Children in the Home</td>
<td>0.615</td>
<td>39%</td>
<td>0.525</td>
<td>0.855</td>
<td>0.355</td>
</tr>
<tr>
<td>Time with Encopresis</td>
<td>0.801</td>
<td>20%</td>
<td>0.249</td>
<td>0.793</td>
<td>0.373</td>
</tr>
<tr>
<td>BMI</td>
<td>1.293</td>
<td>29%</td>
<td>0.106</td>
<td>5.890</td>
<td>0.015</td>
</tr>
<tr>
<td>Milk Intake During Fluid Phase Two</td>
<td>0.929</td>
<td>-7%</td>
<td>0.031</td>
<td>5.781</td>
<td>0.016</td>
</tr>
<tr>
<td>Soda Intake During Fluid Phase Two</td>
<td>0.843</td>
<td>-16%</td>
<td>0.065</td>
<td>7.024</td>
<td>0.008</td>
</tr>
<tr>
<td>Fiber Intake During Fluid Phase Two</td>
<td>1.025</td>
<td>3%</td>
<td>0.026</td>
<td>0.934</td>
<td>0.334</td>
</tr>
</tbody>
</table>

(Table 18 continues)
(Table 18 continued)

<table>
<thead>
<tr>
<th>Percent</th>
<th>Odds</th>
<th>Change in Odds</th>
<th>Standard Error</th>
<th>Wald Statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Intake During Fluid Phase Two</td>
<td>1.000</td>
<td>0%</td>
<td>0.000</td>
<td>0.210</td>
<td>0.646</td>
</tr>
<tr>
<td>Caloric Intake During Fluid Phase Two</td>
<td>1.002</td>
<td>0.2%</td>
<td>0.001</td>
<td>6.520</td>
<td>0.011</td>
</tr>
</tbody>
</table>

This model did suggest that, for children participating in the EI only, the odds of being adherent to prescribed daily clear fluid goals during fluid phase two increased by 29% for each one-point increase in their BMI when all other variables were held constant and by 0.2% for each one additional kilocalorie increase in their daily caloric intake when all other variables were held constant. In addition, being of minority status decreased the odds that children met their prescribed daily clear fluid goals during fluid phase two by 74% when all other variables were held constant. The odds of adhering to prescribed daily clear fluid goals during fluid phase two also decreased by 7% for each additional fluid ounce increase in children’s daily milk intake when all other variables were held constant and by 16% for each additional fluid ounce increase in children’s daily soda intake when all other variables were held constant. A strong trend that having parents who were married increased the odds of children adhering their prescribed daily clear fluid goals during fluid phase two by 1277% was observed when all other variables were held constant.
Aim Three

Hypothesis One

The first hypothesis, that water intake would displace juice intake for children participating in the EI only during the active phases of fluid intervention, was not supported.

An OLS regression analysis was conducted to examine this hypothesis. Limitations due to degrees of freedom prevented all demographic variables for the Enhanced Intervention from being entered into the regression equation. Demographic variables entered into the regression equation were selected to be consistent with previous analyses. Juice intake was regressed onto water intake controlling for age, gender, ethnicity, marital status, total number of children in the family’s home, children’s BMI, length of time children had been experiencing symptoms of encopresis, and children’s intake “other” clear fluids, milk, soda, fiber, sodium, and calories during the active phases of the fluid intervention only.

While the overall model was significant \( F_{14, 15} = 25.54, p \leq 0.001 \), it suggested only a strong trend that children drank 0.05 fluid ounces less juice per day for each one fluid ounce increase in their daily water intake (see Table 19).
Table 19

*OLS Estimation of the Determinants of the Effect of Water on Juice Intake During Active Fluid Intervention for the Enhanced Intervention Only*

<table>
<thead>
<tr>
<th>Estimate</th>
<th>Standard Error</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Intake During Fluid Phases One &amp; Two</td>
<td>-0.054</td>
<td>0.028</td>
<td>-1.97</td>
</tr>
<tr>
<td>Age</td>
<td>-1.391</td>
<td>0.546</td>
<td>-2.55</td>
</tr>
<tr>
<td>Gender</td>
<td>-3.533</td>
<td>1.101</td>
<td>-3.21</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-1.523</td>
<td>1.343</td>
<td>-1.13</td>
</tr>
<tr>
<td>Parental Marital Status</td>
<td>-1.090</td>
<td>1.646</td>
<td>-0.66</td>
</tr>
<tr>
<td>Total Children in the Home</td>
<td>-2.293</td>
<td>1.281</td>
<td>-1.79</td>
</tr>
<tr>
<td>Time with Encopresis Symptoms</td>
<td>1.076</td>
<td>0.624</td>
<td>1.73</td>
</tr>
<tr>
<td>BMI</td>
<td>0.349</td>
<td>0.154</td>
<td>2.26</td>
</tr>
<tr>
<td>“Other” Clear Fluid Intake During Fluid Phases One &amp; Two</td>
<td>-0.227</td>
<td>0.058</td>
<td>-3.95</td>
</tr>
<tr>
<td>Milk Intake During Fluid Phases One &amp; Two</td>
<td>-0.244</td>
<td>0.073</td>
<td>-3.34</td>
</tr>
<tr>
<td>Soda Intake During Fluid Phases One &amp; Two</td>
<td>-0.088</td>
<td>0.058</td>
<td>-1.50</td>
</tr>
<tr>
<td>Fiber Intake During Fluid Phases One &amp; Two</td>
<td>0.024</td>
<td>0.026</td>
<td>0.94</td>
</tr>
</tbody>
</table>

(Table 19 continues)
(Table 19 continued)

<table>
<thead>
<tr>
<th>Estimate</th>
<th>Standard</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Intake During Fluid Phases One &amp; Two</td>
<td>0.000</td>
<td>0.000</td>
<td>0.06</td>
</tr>
<tr>
<td>Calories Intake During Fluid Phases One &amp; Two</td>
<td>0.003</td>
<td>0.001</td>
<td>3.01</td>
</tr>
</tbody>
</table>

This model suggested that, for the EI only, children drank 0.35 fluid ounces more juice per day for each one point increase in their BMI when all other variables were held constant and that children drank 0.003 fluid ounces more juice per day for each one kilocalorie increase in their daily caloric intake when all other variables were held constant. In addition, for the EI only, girls drank 3.53 fluid ounces less juice per day than boys when all other variables were held constant, children drank 1.39 fluid ounces less juice per day for each one-year increase in their age when all other variables were held constant, and children drank 0.23 fluid ounces less juice per day for every one fluid ounce increase in their daily “other” clear fluid when all other variables were held constant.

Hypothesis Two

The second hypothesis, that water intake would displace milk intake for children participating the EI only during the active phases of fluid intervention, was not supported. An OLS regression analysis was conducted to examine this hypothesis. Limitations due to degrees of freedom prevented all demographic variables for the Enhanced Intervention from being entered into the regression equation. Demographic
variables entered into the regression equation were selected to be consistent with previous analyses. Milk intake was regressed onto water intake controlling for age, gender, ethnicity, marital status, total number of children in the family’s home, children’s BMI, length of time children had been experiencing symptoms of encopresis, and children’s intake “other” clear fluids, juice, soda, fiber, sodium, and calories during the active phases of fluid intervention only. The overall model was significant ($F_{14, 15} = 21.23, p \leq 0.001$) but did not suggest that children’s daily water intake displaced their daily milk intake when all other variables were held constant (see Table 20).

Table 20

*OLS Estimation of the Determinants of the Effect of Water on Milk Intake During Active Fluid Intervention for the Enhanced Intervention Only*

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Standard Error</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Intake During Fluid Phases One and Two</td>
<td>-0.056</td>
<td>0.050</td>
<td>-1.12</td>
<td>0.280</td>
</tr>
<tr>
<td>Age</td>
<td>-0.400</td>
<td>0.445</td>
<td>-0.90</td>
<td>0.383</td>
</tr>
<tr>
<td>Gender</td>
<td>0.348</td>
<td>1.028</td>
<td>0.34</td>
<td>0.739</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-4.538</td>
<td>1.359</td>
<td>-3.34</td>
<td>0.005</td>
</tr>
<tr>
<td>Parent Marital Status</td>
<td>1.380</td>
<td>1.795</td>
<td>0.77</td>
<td>0.454</td>
</tr>
<tr>
<td>Total Kids</td>
<td>-2.665</td>
<td>0.994</td>
<td>-2.68</td>
<td>0.017</td>
</tr>
<tr>
<td>Time with Encopresis</td>
<td>0.927</td>
<td>0.517</td>
<td>1.79</td>
<td>0.093</td>
</tr>
<tr>
<td>BMI</td>
<td>0.131</td>
<td>0.248</td>
<td>0.53</td>
<td>0.603</td>
</tr>
</tbody>
</table>

(Table 20 continues)
(Table 20 continued)

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Standard Error</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Other&quot; Clear Fluid Intake During Fluid Phases One and Two</td>
<td>-0.185</td>
<td>0.069</td>
<td>-2.68</td>
<td>0.017</td>
</tr>
<tr>
<td>Juice Intake During Fluid Phases One and Two</td>
<td>-0.290</td>
<td>0.102</td>
<td>-2.83</td>
<td>0.013</td>
</tr>
<tr>
<td>Soda Intake During Fluid Phases One and Two</td>
<td>-0.186</td>
<td>0.061</td>
<td>-3.05</td>
<td>0.008</td>
</tr>
<tr>
<td>Fiber Intake During Fluid Phases One and Two</td>
<td>-0.016</td>
<td>0.047</td>
<td>-0.34</td>
<td>0.735</td>
</tr>
<tr>
<td>Sodium Intake During Fluid Phases One and Two</td>
<td>-0.000</td>
<td>0.000</td>
<td>-0.42</td>
<td>0.679</td>
</tr>
<tr>
<td>Calories Intake During Fluid Phases One and Two</td>
<td>0.004</td>
<td>0.001</td>
<td>5.16</td>
<td>0.000</td>
</tr>
</tbody>
</table>

This model did suggest that, for the EI only, children drank 0.004 more fluid ounces of milk per day for each one kilocalorie increase in their daily caloric intake when all other variables were held constant. In addition, this model suggested that, for the EI only, children of minority status drank 4.54 fluid ounces less milk per day than white children when all other variables were held constant and that children drank 2.67 fluid ounces less milk per day for each additional sibling in their household when all other variables were held constant. Children also drank less milk the more juice, “other” clear fluids, and soda they drank. Specifically, children drank 0.29 fluid ounces less milk for each additional fluid ounce increase in their daily juice intake when all other variables were held constant, children drank 0.18 fluid ounces less milk per day for each additional fluid ounce increase in their daily intake of “other” clear fluids when all other variables were held constant, and children drank 0.016 fluid ounces less milk per day for each additional fluid ounce increase in their daily fiber intake when all other variables were held constant.
were held constant, and children drank 0.17 fluid ounces less milk per day for each one additional fluid ounce increase in their daily soda intake when all other variables were held constant.

Secondary Research Questions

Question One

The first of the secondary research questions was whether children participating in the EI were more likely to adhere to the prescription that their daily fluid intake should be twice their daily fiber intake than children who participated the NEI.

A logistic regression was conducted to examine this question. Two steps were performed in preparation for this analysis. First, the ratio of children’s actual clear fluid intake to their actual fiber intake was calculated for each day of the dietary intervention (week three through six of treatment). Second, a dummy variable was created to discern whether this ratio of actual daily clear fluid to fiber intake was consistent with the prescription that daily clear fluid intake was twice daily fiber intake (0=did not meet ratio; 1=met or exceeded ratio). Adherence did not reflect whether children were adherent to prescribed daily clear fluid and fiber goals. Fluid-fiber ratio adherence was regressed onto group type controlling for age, gender, ethnicity, marital status, time with encopresis symptoms, total number of children in family’s homes, and children’s intake of water, juice, “other” clear fluid, milk, soda, fiber, sodium, and calories during the active fluid phases of treatment only. This overall model was significant ($\chi^2_{13}=83.64, p \leq 0.001$), and suggested that participation in the EI increased the odds of children adhering to the prescribed fluid-fiber ratio each day by 205% when all other variables were held constant (see Table 21).
### Table 21

**Logistic Regression Analysis of the Effect of the Enhanced Intervention on Daily Fluid-Fiber Ratio Adherence During Active Fluid Intervention Only**

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>Percent Change in Odds</th>
<th>Standard Error</th>
<th>Wald Statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enhanced Intervention</strong></td>
<td>3.051</td>
<td>205%</td>
<td>0.455</td>
<td>6.012</td>
<td>0.014</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>0.957</td>
<td>-4%</td>
<td>0.121</td>
<td>0.129</td>
<td>0.720</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>1.248</td>
<td>25%</td>
<td>0.276</td>
<td>0.643</td>
<td>0.423</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td>0.346</td>
<td>-65%</td>
<td>0.267</td>
<td>15.792</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Parent Marital Status</strong></td>
<td>1.452</td>
<td>45%</td>
<td>0.559</td>
<td>0.445</td>
<td>0.505</td>
</tr>
<tr>
<td><strong>Total Children in the Home</strong></td>
<td>0.628</td>
<td>-37%</td>
<td>0.303</td>
<td>2.351</td>
<td>0.125</td>
</tr>
<tr>
<td><strong>Time with Encopresis Symptoms</strong></td>
<td>1.051</td>
<td>5%</td>
<td>0.129</td>
<td>0.150</td>
<td>0.699</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td>1.242</td>
<td>24%</td>
<td>0.068</td>
<td>10.168</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Milk Intake During Fluid Phases One and Two</strong></td>
<td>0.887</td>
<td>-11%</td>
<td>0.032</td>
<td>13.844</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Soda Intake During Fluid Phases One and Two</strong></td>
<td>0.977</td>
<td>2%</td>
<td>0.044</td>
<td>0.285</td>
<td>0.594</td>
</tr>
<tr>
<td><strong>Fiber Intake During Fluid Phases One and Two</strong></td>
<td>0.939</td>
<td>-6%</td>
<td>0.033</td>
<td>3.562</td>
<td>0.060</td>
</tr>
<tr>
<td><strong>Sodium Intake During Fluid Phases One and Two</strong></td>
<td>1.000</td>
<td>0%</td>
<td>0.000</td>
<td>3.542</td>
<td>0.060</td>
</tr>
<tr>
<td><strong>Calories Intake During Fluid Phases One and Two</strong></td>
<td>1.002</td>
<td>0.2%</td>
<td>0.000</td>
<td>12.810</td>
<td>0.003</td>
</tr>
</tbody>
</table>
This model did suggest that, for the sample as a whole, the odds of meeting the prescribed fluid-fiber ratio each day increased by 24% for each additional one-point increase in children’s BMI when all other variables were held constant and by 0.2% for each one additional calorie increase in the children’s daily caloric intake when all other variables were held constant. In addition, being of minority status decreased the odds that children would meet the prescribed fluid-fiber ratio by 65%. Furthermore, the odds of children meeting the prescribed fluid-fiber ratio decreased by 11% for each one fluid ounce increase in their daily milk intake. Strong trends were observed that the odds of children meeting the prescribed fluid-fiber ratio increased by 0% for each one gram increase in their daily sodium intake when all other variables were held constant and that the odds of children meeting the prescribed fluid-fiber ratio decreased by 6% for each one gram increase in their daily fiber intake when all other variables were held constant.

*Secondary analyses.* Descriptive analyses regarding the actual achieved fluid-fiber ratio for the NEI and the EI were also conducted. Across the active fluid phases of treatment, the group mean actual fluid-fiber ratio for the children participating in the EI was 1.88 (range 1.45-2.67) and the group mean actual fluid-fiber ratio for the children participating in the NEI was 1.74 (range 0.68-5.98). These data for the NEI reflect inclusion of one participant who anomalously ate one gram of fiber but drank 80 ounces of water on one day. When that day’s data for that participant are not included, the group mean fluid-fiber ratio for the children participating in the NEI was 1.56 (range 0.68-4.72). The higher ratio for the children in the EI versus NEI, as well as the narrower range for children in the EI (difference of 1.22) compared the NEI (difference of 4.04)
suggests that children participating in the EI were closer to meeting the actual 2:1 fluid-fiber ratio on a daily basis.

While the above analyses were determined based upon children’s actual daily clear fluid and fiber intake, group means for the difference between children’s actual daily fiber and clear fluid intake and their prescribed daily fiber and clear fluid goals were calculated in efforts to gain insight on dietary patterns that may have contributed to children in the EI being more likely to meet the prescribed 2:1 fluid-fiber ratio. Results indicated that children in both groups consumed more fiber per day than prescribed (EI = 3.96 more grams of fiber; NEI = 2.32 more grams of fiber), but that children in the EI drank an average of 1.58 fluid ounces more clear fluid per day than their prescribed fluid goals, whereas children participating in the NEI drank 5.66 fluid ounces less clear fluid per day than was their prescribed clear fluid goals. In addition, as was described earlier, treatment groups did not differ significantly in their intake of clear fluid or fiber during the baseline phase or during the first fluid phase. During the second fluid phase, children participating in the EI drank significantly more clear fluid per day ($t_{1, 35} = 3.37, p \leq 0.001$) and ate significantly more fiber per day ($t_{1, 35} = 2.37, p \leq 0.05$) than children participating in the NEI. In addition, group means for the actual clear fluid-fiber ratio across the active fluid phases of the group intervention did not differ significantly between treatment groups ($t_{1, 35} = 1.24, p \geq 0.22$).

**Question Two**

The second secondary research question was whether children participating in the EI demonstrated improvement as measured by independent ratings from each treating professional (developmental behavioral pediatrician and pediatric psychologist). While
both health care professionals agreed that most children improved as a function of their participation in the group treatment, exact between-rater agreement was not obtained. More specifically, the developmental-behavioral pediatrician rated that 14 (78%) of the children in the EI improved during treatment and six (32%) did not, and the clinical psychologist rated that 11 (58%) of the children completing the EI improved during treatment and eight (42%) did not. Percent agreement between the developmental behavioral pediatrician and the pediatric psychologist was 89% (16 of 18 children). As was noted previously, ratings were not made for children in the NEI in efforts to decrease memory biases and recency effects as children in this group completed treatment between one to two years ago.

**Question Three**

The third secondary research question was whether parents in the EI were satisfied with the group treatment they received. Completed Client Satisfaction Questionnaires (CSQ) were available for 14 of 18 families participating in the Enhanced Intervention. The total possible score for this measure was 48, with higher scores representing greater satisfaction with treatment. The mean CSQ score for this sample was 42.29 (+5.25), and the range was 31 to 48.

**Question Four**

The fourth secondary research question was whether parent-knowledge of the AAP age-based guidelines for children’s daily intake of juice and milk, as measured by the Fluid Questionnaire, improved as a function of participation in the EI? Pre-treatment Fluid Questionnaire data were available for all families participating in the Enhanced Intervention (N=18) and post-treatment Fluid Questionnaire data were available for only
14 families. Group mean for Fluid Knowledge increased from 9.15 (+1.68) to 9.31 (+2.39), but this change was not significant ($t_{12,13}=-0.23$, $p=.82$). Table 22 presents more data regarding individual parent changes in knowledge of the AAP guidelines.

Table 22

Changes in Knowledge of the AAP Guidelines for Juice and Milk for the Enhanced Intervention Only ($n=14$)

<table>
<thead>
<tr>
<th></th>
<th>Juice</th>
<th>Milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Improved</td>
<td>5 (36%)</td>
<td>1 (7%)</td>
</tr>
<tr>
<td>Knowledge Stayed Same, Correct</td>
<td>3 (21%)</td>
<td>1 (7%)</td>
</tr>
<tr>
<td>Knowledge Stayed Same, Incorrect</td>
<td>3 (21%)</td>
<td>8 (57%)</td>
</tr>
<tr>
<td>Knowledge Decreased</td>
<td>3 (21%)</td>
<td>4 (29%)</td>
</tr>
</tbody>
</table>

**Question Five**

The fifth secondary research question was whether children who participated in the NEI were more likely to meet or exceed AAP guidelines with respect to juice intake than children who participated in the EI.

A logistic regression was conducted to examine this question. In preparation for this analysis, a dummy variable was created to denote whether children met or exceeded the AAP age-based guidelines for juice intake for each day of treatment (0=daily juice intake was less than AAP guidelines; 1=daily juice intake was equivalent to or greater than the AAP guidelines). Whether children’s daily juice intake met or exceeded the AAP guidelines was regressed onto group type while controlling for age, gender, ethnicity, marital status, time with encopresis symptoms, total number of children in family’s homes and children’s intake of fiber, sodium, water, “other” clear fluid, milk, and soda.
This overall model was significant ($\chi^2_{15}=323.80$, $p \leq 0.001$) but did not suggest that participation in the EI decreased the odds of whether children met or exceeded the AAP age-based guidelines for daily juice intake (see Table 23).

**Table 23**

*Logistic Regression Analysis of the Effect of the Enhanced Intervention on Children’s Meeting or Exceeding AAP Recommendations for Daily Juice Intake*

<table>
<thead>
<tr>
<th>Percent</th>
<th>Odds Ratio</th>
<th>Change in Odds</th>
<th>Standard Error</th>
<th>Wald Statistic</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced Intervention</td>
<td>0.604</td>
<td>-40%</td>
<td>0.523</td>
<td>0.932</td>
<td>0.334</td>
</tr>
<tr>
<td>Age</td>
<td>0.621</td>
<td>-38%</td>
<td>0.226</td>
<td>4.443</td>
<td>0.035</td>
</tr>
<tr>
<td>Gender</td>
<td>0.507</td>
<td>-49%</td>
<td>0.356</td>
<td>3.644</td>
<td>0.056</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>0.480</td>
<td>-52%</td>
<td>0.461</td>
<td>2.540</td>
<td>0.111</td>
</tr>
<tr>
<td>Parent Marital Status</td>
<td>1.636</td>
<td>64%</td>
<td>0.355</td>
<td>1.919</td>
<td>0.166</td>
</tr>
<tr>
<td>Total Children in the Home</td>
<td>0.568</td>
<td>-43%</td>
<td>0.351</td>
<td>2.587</td>
<td>0.108</td>
</tr>
<tr>
<td>Time with Encopresis Symptoms</td>
<td>1.145</td>
<td>15%</td>
<td>0.253</td>
<td>0.286</td>
<td>0.593</td>
</tr>
<tr>
<td>BMI</td>
<td>1.042</td>
<td>4%</td>
<td>0.141</td>
<td>0.087</td>
<td>0.768</td>
</tr>
<tr>
<td>Water Intake During Fluid Phases One &amp; Two</td>
<td>0.942</td>
<td>6%</td>
<td>0.021</td>
<td>8.438</td>
<td>0.004</td>
</tr>
</tbody>
</table>

(Table 23 continues)
<table>
<thead>
<tr>
<th>“Other” Clear Fluid Intake During Fluid Phases One &amp; Two</th>
<th>Odds Ratio</th>
<th>Percent Change in Odds</th>
<th>Standard Error</th>
<th>Wald Statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk Intake During Fluid Phases One &amp; Two</td>
<td>0.899</td>
<td>-10%</td>
<td>0.025</td>
<td>18.237</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Soda Intake During Fluid Phases One &amp; Two</td>
<td>0.861</td>
<td>-14%</td>
<td>0.031</td>
<td>23.258</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Fiber Intake During Fluid Phases One &amp; Two</td>
<td>1.038</td>
<td>4%</td>
<td>0.019</td>
<td>4.085</td>
<td>0.043</td>
</tr>
<tr>
<td>Sodium Intake During Fluid Phases One &amp; Two</td>
<td>1.000</td>
<td>0%</td>
<td>0.000</td>
<td>2.945</td>
<td>1.186</td>
</tr>
<tr>
<td>Caloric Intake During Fluid Phases One &amp; Two</td>
<td>1.002</td>
<td>0.2%</td>
<td>0.000</td>
<td>32.690</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

This model suggested that the odds that children would meet or exceed the AAP guidelines for daily juice intake increased by 4% for each additional gram increase in their daily fiber intake when all other variables were held constant and by 0.2% for each additional kilocalorie increase in their daily caloric intake when all other variables were held constant. In addition, this model suggested that the odds that children would meet or exceed the AAP guidelines for daily juice intake decreased by 38% for each additional one-year increase in children’s age when all other variables were held constant. Also this
model suggested that the odds that children would meet or exceed the AAP guidelines for daily juice intake decreased the more their water, “other” clear fluids, milk, and soda increased. Specifically, the odds that children would meet or exceed the AAP guidelines for daily juice intake decreased by 6% for each additional fluid ounce increase in their daily water intake when all other variables were held constant, by 12% for each additional one fluid ounce increase in their daily “other” clear fluid intake when all other variables were held constant, by 10% for each additional fluid ounce increase in their daily milk intake when all other variables were held constant, and by 14% for each additional fluid ounce increase in their daily soda intake when all other variables were held constant.

**Question Six**

The sixth secondary research question was whether mean daily intake of sodium changed as a function of participation in the group treatment for children participating in the EI as compared to children in the NEI, and whether sodium intake was a significant predictor of water intake. Means testing indicated that mean daily intake of sodium did not increase significantly for the NEI ($t_{18,19} = 0.40, p \leq .69$) or the EI ($t_{18,19} = -0.67, p \leq .51$) from the first to last week of treatment. Daily mean intake of sodium also did not differ significantly between the NEI and the EI for the first ($t_{35,37} = -1.02, p \leq .31$) or last ($t_{35,37} = -1.59, p \leq .12$) week of group treatment. In addition, as was discussed previously in relation to the OLS analysis of water intake, no main effects for sodium intake on water intake were found (see Table 9).
Question Seven

The seventh secondary research question included three parts. First, did parents learn which behavior modification techniques they could use to increase their children’s intake of water? Parents correctly endorsed an average of 8.61 (SD ± 1.58, range 6-12) behavior modification techniques before treatment and an average of 8.54 (SD ± 2.11, range 7-14) after the group treatment concluded. This decrease was not statistically significant ($t_{12,14} = -0.23, p = .82$).

Second, which behavior modification techniques did parents believe they were most likely to continue using after the group treatment concluded to maintain and/or persist in their efforts to increase their children’s daily water intake? Inspection of mean self-rating scores revealed that parents were most likely to continue using positive reinforcement, goal-setting, and modeling and least likely to use negative punishment, time-out, and ignoring (see Table 24). Means testing with Bonferonni correction for multiple comparisons indicated that parent use of each behavior modification technique described in Table 24 did not differ significantly from pre- to post-treatment.
Table 24

**Changes in Pre- and Post Parent Self-Rated Likelihood of Using Behavior Modification Strategies to Increase Their Child’s Daily Water Intake for the Enhanced Intervention**

*Only (n=11)*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Pre Mean (SD)</th>
<th>Post Mean (SD)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
</table>
| Positive Reinforcement
a | 4.50 (0.67)   | 4.67 (0.65)    | -1.48 | 0.17 |
| Negative Reinforcement  | 1.64 (0.81)   | 1.36 (0.67)    | 1.00  | 0.34 |
| Positive Punishment     | 2.09 (1.14)   | 1.64 (1.21)    | 0.96  | 0.36 |
| Negative Punishment     | 1.91 (0.83)   | 1.09 (0.30)    | 3.11  | 0.01 |
| Time-out                | 2.36 (1.21)   | 1.18 (0.60)    | 2.80  | 0.02 |
| Shapingc                | 3.00 (1.00)   | 2.33 (1.32)    | 1.16  | 0.17 |
| Goal-settinga           | 3.50 (1.51)   | 4.00 (1.13)    | -1.25 | 0.24 |
| Self-monitoring         | 2.36 (1.21)   | 3.63 (1.21)    | -2.35 | 0.04 |
| Extinction              | 1.45 (0.69)   | 1.73 (1.01)    | -0.67 | 0.52 |
| Liquid Fading           | 2.36 (1.63)   | 1.82 (1.33)    | 1.03  | 0.33 |
| Differential Attentionb | 2.00 (1.05)   | 1.60 (1.07)    | 0.89  | 0.40 |
| Ignoring                | 1.18 (0.40)   | 1.55 (1.21)    | -0.89 | 0.40 |
| Rule Setting            | 3.00 (1.34)   | 2.64 (1.21)    | 0.77  | 0.46 |
| Token System            | 3.09 (1.45)   | 2.45 (1.69)    | 1.00  | 0.34 |
| Modeling                | 3.45 (1.21)   | 3.73 (1.49)    | -0.49 | 0.64 |

*Note.* Scale for ratings was 1-5, with 1 being not likely to use a specific technique at all and 5 being highly likely to use a specific technique.

*a* n=12  
*b* n=10  
*c* n=9
Third, at the conclusion of group treatment, which techniques did parents think they could implement effectively to increase their children’s daily water intake? Inspection of mean self-rating scores revealed that parents were most confident in their use of positive reinforcement and goal-setting and least confident in their use of negative reinforcement and negative punishment (see Table 25). Means testing with Bonferroni correction for multiple comparisons indicated that parent confidence in using of each behavior modification technique described in Table 25 did not differ significantly from pre-post treatment.
Table 25

*Changes in Pre- and Post Parent Self-Rated Confidence in Using Behavior Modification Strategies to Increase Their Child’s Daily Water Intake for the Enhanced Intervention* 

*Only* (n=10)

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Pre</th>
<th>Post</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Reinforcement&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.09 (1.22)</td>
<td>4.54 (0.69)</td>
<td>-1.17</td>
<td>0.27</td>
</tr>
<tr>
<td>Negative Reinforcement</td>
<td>1.60 (0.70)</td>
<td>1.50 (0.85)</td>
<td>0.36</td>
<td>0.73</td>
</tr>
<tr>
<td>Positive Punishment</td>
<td>2.30 (1.34)</td>
<td>1.80 (0.92)</td>
<td>1.10</td>
<td>0.30</td>
</tr>
<tr>
<td>Negative Punishment</td>
<td>2.00 (1.05)</td>
<td>1.40 (0.70)</td>
<td>1.41</td>
<td>0.19</td>
</tr>
<tr>
<td>Time-out</td>
<td>2.30 (1.16)</td>
<td>1.60 (0.84)</td>
<td>1.77</td>
<td>0.11</td>
</tr>
<tr>
<td>Shaping</td>
<td>3.40 (1.35)</td>
<td>2.40 (1.35)</td>
<td>2.54</td>
<td>0.03</td>
</tr>
<tr>
<td>Goal-setting</td>
<td>3.36 (1.57)</td>
<td>4.27 (0.90)</td>
<td>-1.99</td>
<td>0.07</td>
</tr>
<tr>
<td>Self-monitoring</td>
<td>2.20 (1.14)</td>
<td>3.60 (1.26)</td>
<td>-2.81</td>
<td>0.02</td>
</tr>
<tr>
<td>Extinction</td>
<td>1.40 (0.70)</td>
<td>1.90 (1.37)</td>
<td>-1.00</td>
<td>0.34</td>
</tr>
<tr>
<td>Liquid Fading</td>
<td>2.20 (1.40)</td>
<td>1.70 (1.25)</td>
<td>0.79</td>
<td>0.45</td>
</tr>
<tr>
<td>Differential Attention</td>
<td>2.10 (1.29)</td>
<td>1.70 (1.34)</td>
<td>0.58</td>
<td>0.57</td>
</tr>
<tr>
<td>Ignoring</td>
<td>1.20 (0.42)</td>
<td>1.90 (1.37)</td>
<td>-1.48</td>
<td>0.17</td>
</tr>
<tr>
<td>Rule Setting</td>
<td>2.90 (1.45)</td>
<td>2.70 (1.25)</td>
<td>0.35</td>
<td>0.74</td>
</tr>
<tr>
<td>Token System&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.33 (1.50)</td>
<td>2.89 (1.62)</td>
<td>0.69</td>
<td>0.51</td>
</tr>
<tr>
<td>Modeling&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.64 (1.43)</td>
<td>3.82 (0.98)</td>
<td>-2.14</td>
<td>0.06</td>
</tr>
</tbody>
</table>

<sup>a</sup> n=11 
<sup>b</sup> n= 9 
<sup>c</sup> n=13
Treatment Integrity

Efforts were made to videotape all parent and child group sessions of the EI in order to promote treatment integrity. However, due to technological difficulties, only 16 of 24 sessions were videotaped. In addition, auditory difficulties may have negatively impacted reliability of coding for some sessions. Two post-doctoral fellows were trained in how to use coding sheets to check for adherence to the treatment modifications outlined in the fluid intervention treatment manuals for both the child and parent groups. Due to limitations with respect to availability of individuals to code treatment tapes, inter-rater reliability was examined using a subset of four sessions where the session content emphasized fluid intake. To calculate reliability, the number of instances of agreement between raters was divided by the total number of observations.

Overall, adherence to modifications to sessions one, two, and four for both the child and parent groups was 100%. For the child groups, adherence to sessions three, five and six was rated 83-95%, 80%-100%, and 90-100%, respectively. Across these sessions, children were sometimes not reminded of the snack time rule specific to drinking water. In addition, for sessions three and five, time constraints sometimes limited the educational activities that could have been completed. For the parent groups, adherence to sessions three and five was rated 60-100% and 86%-100%, respectively. As with the child groups, time limits often restricted what information was covered. For example, parents did receive handouts regarding different behavioral strategies that could be used to increase their children’s water intake, but each technique was not always reviewed in explicit detail. Adherence to session six was rated 90-100% as some groups did not
review fluid graphs in great detail. Inter-rater reliability for the four sessions viewed by both coders was 93% (kappa=0.92).

Discussion

The group behavioral treatment designed by Stark and colleagues is one of the few empirically-supported interventions for the treatment of retentive encopresis and is one of three published studies that emphasized dietary modifications of increased daily fiber and fluid intake as part of treatment. While adherence to fiber recommendations for children participating in this group treatment has been demonstrated (Stark et al., 1990; 1997), adherence to fluid recommendations has not (Kuhl et al., 2009). This is problematic because increasing fiber intake without increasing fluid intake could result in more severe constipation. In addition, Kuhl et al. (2009) found that children significantly increased their juice intake in efforts to meet clear fluid goals, which equated to 46% of children meeting or exceeding the American Academy of Pediatrics’ age-based guidelines for juice intake (AAP, 2001) during the last week of treatment. This inadvertent negative consequence places children at risk for other negative health consequences such as developing dental carries or becoming overweight. Thus, the purpose of this pilot study was to examine whether the combination of enhanced fluid education and use of behavior modification techniques was effective in improving adherence to clear fluid goals and increasing daily water intake for children participating in a group behavioral treatment for retentive encopresis.

The findings of this study will now be discussed by aim and integrated with the dietary adherence, retentive encopresis treatment outcome, and general pediatric fluid
intake literatures. This will be followed by a review of strengths and limitations of the study and suggestions for future directions for research.

Aim One

The first aim was to examine the impact of the EI on water intake. The first hypothesis that participation in the EI would explain water intake as compared to participation in the NEI was supported. Specifically, children who participated in the EI drank eight more fluid ounces of water per day than children who participated in the NEI. This finding was expected given that, in accordance with the Matching Law (Hernnstein, 1971), the EI included several educational and behavioral approaches that systematically targeted shifting contingencies to support children’s water-drinking behavior.

The model used to test Hypothesis One also provides insight on demographic and dietary variables that may impact daily water intake for children receiving treatment for retentive encopresis at large. Specifically, for the sample as a whole, being of minority status and drinking larger quantities of juice, “other” clear fluids, and milk each day were related to drinking less water, whereas eating more calories was related to drinking more water. The finding that minority children in both the EI and the NEI drank less water is interesting, but our small sample size of minority children prevents drawing strong conclusions about this finding. To this author’s knowledge, no published data are available regarding differences in water intake by ethnic and cultural groups for children. Thus, our finding does suggest that further research is needed to examine patterns of water intake for children of different cultural and ethnic backgrounds. The finding that children consumed less water if they consumed more juice, “other” clear fluid, or milk is expected. Children physiologically have smaller stomachs, and if they drink any of the
aforementioned fluids, this will decrease the physiological capacity they have to be able to drink water. Children may also become satiated more quickly given the higher caloric content of fluids like juice and milk.

The second hypothesis that water intake would increase in a stepwise manner consistent with the changing criterion design for children participating in the EI as compared to children in the NEI was also supported. Specifically, children participating in the EI drank eight more fluid ounces of water during the first two weeks of the dietary intervention and ten more fluid ounces of water during the second two weeks of the dietary intervention than children who completed the NEI. This finding was expected, given patterns of increasing incremental dietary change for children participating in similar group behavioral interventions (Stark et al., 2005a; Stark et al., 2005b; Stark et al., 2003; Stark et al., 1990b; Stark et al., 1997), and suggests that changing criterion designs may be effective when modifying both food and fluid intake. A dismantling study would be necessary to discern the most active elements of the EI (e.g., provision of daily water goals), but this type of design would be difficult to implement due to the multiple components that were added to enhance the fluid-specific components of the NEI. An alternative design would be to examine the effectiveness of enhanced fluid education only versus enhanced behavioral intervention only versus combination of enhanced fluid education and behavioral intervention. Based upon the existing literature of studies with similar designs that target dietary adherence (Powers et al., 2005; Stark et al., 2005a; Stark et al., 2005b; Stark et al., 2003) and randomized controlled trials examining pediatric adherence-based interventions at large (Kahana, Drotar, & Frazier, 2008), it can be hypothesized that the combination of behavioral strategies and fluid education would
be more effective than provision of fluid education alone (e.g., recommendations to increase water) or fluid-based behavioral intervention alone.

The fact that children participating in the EI consumed significantly more water per day than children participating in the NEI during the last phase of the fluid intervention is impressive given the brevity of intervention targeting fluid intake. Specifically, the dietary intervention component to the group treatment for retentive encopresis was addressed in two sessions over four weeks compared to six sessions over eight to nine weeks for the group behavioral interventions targeting caloric intake for children with cystic fibrosis (Powers et al., 2005; Stark, 2003) and calcium intake for children with juvenile rheumatoid arthritis and irritable bowel disease (2000a; Stark et al., 2005b). In addition, dietary modification was only one component to treatment for children participating in the group intervention for retentive encopresis compared to being the sole focus of the treatments targeting caloric and calcium intake for children with cystic fibrosis, juvenile rheumatoid arthritis, and irritable bowel disease. Thus it is possible that children participating in the EI may have increased their daily water intake even more had they not been targeting multiple behaviors for change at one time. Furthermore, children participating in the group behavioral intervention for retentive encopresis were asked to implement fluid changes at all meals and snacks at the same time rather than designs of similar group and individual interventions that modified children’s food intake one meal at a time (Powers et al., 2005; Stark et al., 2005a; Stark et al., 2005b; Stark et al., 2003). Thus, it is possible that it may be easier to change drinking behavior than eating behavior.
Interestingly, the mean daily water intake for the EI during the second fluid phase (15 fluid ounces per day) was still lower than daily water intake data reported for children in the data collected during the National Health and the Third Nutrition Examination Survey (NHANES III) from 1988-1994 (22 fluid ounces; Sohn et al., 2005). Direct comparison of fluid intake for children participating in the EI to a sample of healthy children would be necessary before drawing any inferences regarding the possible relationship between daily water intake and having retentive encopresis, especially as the NHANES data is over ten years old. However, the fact that treatment recommendations for chronic constipation include increasing fluid intake suggests that this population either may generally consume lower quantities of fluid each day than individuals without constipation or may require more fluid each day to counter the effects of slow motility or painful stools. Alternatively, it is possible that children who participated in the EI drank more water than was reported. This issue regarding the reliability of self-report measures in the assessment of water and overall fluid intake is discussed further in the limitations section of this paper.

The third hypothesis, that children participating in the EI would meet 75% of their daily water goals, was not supported. Rather, mean weekly adherence to water goals suggests that children were more likely to meet 50% of their water goals. Barriers to meeting daily water goals are not known, but examining adherence to each of the specific types of water goals provides insight on possible reasons children had difficulty meeting their water targets. Children’s adherence was highest to their water bottle goals. The novelty of having a special water bottle may have contributed to this pattern as several families reported that children preferred to drink out of the water bottle provided during
the group treatment, even for children who already had the same type of water bottle prior to the onset of the group treatment. Use of water bottles may have helped with overall water intake as they provide visual cues for children to drink water and for parents to prompt children to drink water throughout the day, rather than relying on natural tendencies of drinking only when thirsty or in the presence of food.

Of the meal-based goals, adherence to breakfast and lunch water goals was generally low and adherence to dinner goals was comparatively high. Most parents of families participating in the EI had part- or full-time jobs, and most children attended daycare, preschool, or elementary school. Mornings are often a rushed time for families, and it is possible that parents may have been more focused on preparing children for school than ensuring that children drank prescribed amounts of water. Alternatively, breakfast may be a harder meal to target with respect to changing children’s fluid intake patterns as juice and milk are often paired with breakfast foods. Some children also received breakfast at daycare or school, where it may have been more difficult for families to control what type of fluid was served and record how much fluid children consumed. Similar barriers might also be responsible for lower rates of adherence to lunch water goals. Specifically, juice boxes and fruit drinks are heavily marketed for inclusion in children’s lunches so children’s desire to be similar to peers may have prevented them from drinking water at lunch (Budd et al., 1989). In addition, daycare centers and schools that provide drinks at lunch for children often serve milk or juice, so water may not have been available to children if they did not bring their own lunch.

In this light, dinner goals may have been easier for children to meet because of the increased control over this meal by parents. Previous studies targeting dietary adherence
have included similar meal-based changing criterion designs, but also targeted changing nutrient consumption one meal at a time (Powers et al., 2005; Stark et al., 2005a; Stark et al., 2005b; Stark et al., 2003). It is possible that families need this type of intensive intervention in order to meet meal-based goals and that a similar treatment structure may be beneficial if water intake is the primary focus of behavioral intervention. Multiple treatment tasks are addressed within the context of the group intervention for retentive enuresis, however, so it is not possible to target water intake on a meal-by-meal basis without extending the length of treatment.

The fourth hypothesis, that the odds of children adhering to their water goals (75% criterion) during fluid phase two would be higher if they were adherent to their water goals (75%) criterion during fluid phase one, was not supported. Rather, there was a strong trend for this relationship. Use of a larger sample size may provide more insight into whether children are more likely to meet larger goals for water intake after being successful at meeting smaller goals for water intake.

In sum, the analyses investigating hypotheses one through four suggest the first aim of this study was met. Specifically, the combination of enhanced fluid education and behavioral strategies proved to be an effective treatment package for increasing daily water intake for pre-school and school-aged children receiving treatment for retentive encopresis. This finding has several implications. First, this treatment package provides direction to health care providers for helping families successfully meet goals specific to increasing children’s intake of water. In particular, families may be less likely to successfully help their children consume more water each day without education about why water consumption is important and without specific strategies for how to increase
the quantity of water their children drink each day. The basic educational components, water recipes, and behavioral strategies of the EI could be easily summarized in a handout to be distributed during the context of a standard medical visit. Families requiring additional assistance with implementing strategies could be referred for brief treatment with a child or pediatric psychologist with behavioral training.

Second, the EI treatment package yields significant increases in children’s daily water intake in a relatively short period of time. Thus, increasing children’s water intake may not be a behavior that requires lengthy or intensive intervention for most children. However, future investigation into the maintenance of fluid intake gains once active treatment is completed would be necessary to provide insight into the putative role of increased fluid intake in keeping stools soft during the medication weaning process. Third, providing meal-based and water bottle goals may play a particularly important role in shaping children’s water-drinking behavior by eliminating physiological and preference-based establishing operations for water refusal behaviors. Specifically, providing several smaller goals rather than one larger daily goal increased the opportunity for reinforcement of water-drinking behavior and may have decreased the probability of children becoming satiated. In addition, daily water goals also provided structured learning trials for children to become more familiar with and possibly develop a preference for drinking water. Fourth, teaching parents how to generalize behavioral strategies previously taught exclusively for increasing daily fiber intake and how to utilize new behavioral strategies, such as stimulus generalization and stimulus control, to increase children’s daily water intake likely decreased behaviorally-based establishing operations for water refusal behaviors. Fifth, the treatment package utilized to help
children with retentive encopresis increase their daily intake of water may be effective for use with other populations for whom increasing water and fluid intake in general is important to treatment outcome (e.g., migraine and sickle cell disease).

Aim Two

The second aim was to examine the impact of the EI on improving children’s adherence to prescribed daily clear fluid goals. The first hypothesis, that children who participated in the EI would be more likely to be adherent to their daily prescribed clear fluid goals than children who participated in the NEI, was supported. Specifically, participation in the EI increased the odds of children meeting their prescribed daily clear fluid goals by 317% for fluid phase one and 626% for fluid phase two. These findings were expected, given the greater emphasis on water and fluid intake in general within the context of the EI and the significantly higher intake of water for children participating in the EI. These outcomes are consistent with the success of interventions combining enhanced nutritional education and behavioral strategies on improving dietary and general treatment adherence (Kahana et al., 2008; Powers et al., 2005; Stark, 2003; Stark et al., 2005a; Stark et al., 2005b). In addition, these findings provide further support for the necessity of providing families with structured guidelines for slowly introducing changes to children’s diet. The finding regarding improved adherence during fluid phase two is particularly exciting as preliminary data revealed that children in the NEI struggled more in meeting their second, higher clear fluid goals than their first clear fluid goals. It is possible that teaching parents how to transfer stimulus properties of sweet taste and color by creating low-calorie, low-sugar waters contributed to these changes. Many parents did not document water recipes by names used within the EI on diet diaries,
however, so further analyses to explore the causal effect of stimulus generalization on adherence to prescribed daily clear fluid goals in this sample is not possible.

The second hypothesis, that adherence to prescribed daily clear fluid goals during phase one of the fluid intervention would explain adherence to prescribed daily clear fluid goals during phase two of the fluid intervention for children participating in the EI only, was not supported. This finding was surprising as it was expected that children who experienced success in meeting their first, smaller clear fluid goals would be able to continue strategies that helped them make this initial behavior change to continuing to increase their daily clear fluid intake. The exact reason for this finding is unclear, but it is possible that parents may have prioritized other, competing treatment goals over clear fluid goals. More specifically, prescribed daily clear fluid goals are increased one session after toilet sitting schedules are recommended. Many families struggle with implementing sitting schedules and it is possible that, even with additional fluid education, they focused more energy on goals that appeared more immediately salient to helping with increasing the frequency of stools children had in the toilet.

In sum, the analyses investigating Hypothesis One suggest that the second aim of this study was met. Specifically, the combination of enhanced education and behavioral strategies is also effective in improving adherence to prescribed daily clear fluid goals for pre-school and school-aged children receiving treatment for retentive encopresis. While adherence to larger prescribed daily clear fluid goals (provided during fluid phase two) was not determined by adherence to smaller prescribed daily clear fluid goals (provided during fluid phase one), there are several important implications of improving adherence to prescribed daily clear fluid goals during each separate phase of the active dietary
intervention portion of the group treatment. First, demonstrating improved adherence to prescribed daily clear fluid goals provides further empirical support for group behavioral intervention as a whole. In addition, it creates the necessary platform for further evaluating the effectiveness of dietary modifications on decreasing symptoms of constipation both during active treatment as well as during the maintenance phase when medications are weaned. Second, families may be less likely to meet clear fluid goals if they do not receive education about why these goals are important to treatment outcome and if they do not receive specific strategies for how to help modify children’s daily fluid intake to include high quantities of non-dairy, non-caffeinated beverages. Third, providing smaller, process goals is likely important to helping children achieve larger, outcome goals with respect to increasing their daily clear fluid intake.

**Aim Three**

The third aim of this study was to examine whether water intake displaced juice and milk intake for children participating in the EI. Contrary to the hypotheses, water intake did not displace juice or milk intake. However, the finding that mean daily juice intake was lower during fluid phase one and significantly lower during fluid phase two for children participating in the EI than children in the NEI suggests that children in the EI may have relied less heavily on juice to meet their clear fluid goals. In addition, although changes were not statistically significant, both groups decreased their intake of milk as a function of participation in the group treatment. This decrease in milk intake warrants future examination of how group treatment (EI and NEI) might impact children’s calcium and vitamin D intake, given the importance of these vitamins to growth and general health.
In sum, the tests of Hypotheses One and Two suggest that the third aim of this study was not met. Specifically, increasing water intake did not displace the quantity of juice and milk children drink each day. There are two implications of this finding. First, although water intake did not replace juice intake for children in the EI, the combination of enhanced fluid education and behavioral strategies effectively reversed the unhealthy trend of children increasing their juice intake to meet clear fluid targets. Thus, it is crucial to educate parents and children about the negative health consequences of high juice intake and provide suggestions about alternative, healthier fluid choices that can be substituted for juice when increasing daily fluid intake. Failure to provide parents with strategies for how to make these changes may also result in parents’ inability to successfully adhere to verbal prescriptions to modify the quality of children’s fluid intake. Second, this treatment package may be effective for use with other pediatric populations where high juice intake is problematic to health outcome (e.g., pediatric overweight and obesity or type 1 diabetes). Third, while water intake did not displace milk intake for children participating in the EI, mean daily intake of milk did decrease from five fluid ounces per day during the baseline phase to one fluid ounce per day during the second fluid phase. This decrease may be negative to children’s overall growth and nutrition if children were not able to obtain calcium and vitamin D from other dietary sources.

Relationship to Treatment Outcome

The exploration of the relationship between children’s increased adherence to prescribed daily clear fluid goals and increased water intake and bowel movement functioning is beyond the scope of this study. However, fluid recommendations were a
component of a larger recommendation that children’s daily clear fluid intake (fluid ounces) equated to twice their daily fiber intake (grams) and this relationship was examined. Participation in the EI increased the odds of children meeting the prescribed fluid-fiber ratio by three-fold, which was expected given the heavy emphasis on fluid intake. When this relationship was explored further, the *actual* mean fluid-fiber ratio for children participating in both treatment groups did not equate to the *prescribed* 2:1 ratio, and children participating in the NEI were further from the *prescribed* ratio than children participating in the EI. This difference was likely related to the fact that children in both treatment groups were noted to consume, on average, more fiber per day than their prescribed daily fiber goals, but only children in the EI averaged more clear fluid per day than their prescribed daily clear fluid goals. In this way, the EI was successful in helping children to meet their prescribed clear fluid goals, but not effective in helping them to meet the *prescribed* 2:1 fluid-fiber ratio. This suggests that children may have stopped consuming clear fluid once they hit their prescribed, daily clear fluid goal instead of adjusting their clear fluid intake to account for the excess fiber. Thus, children may remain at risk for increased symptoms of constipation in the absence of enough fluid to keep stool soft, as stools become more solidified from increased fiber intake.

The reason for this pattern is not clear. One possible explanation for this trend is that the increased availability of high-fiber products that appeal to children’s palates makes it easier to increase children’s daily fiber intake without modifying the quantity of food that children regularly consume. In contrast, not all children were drinking enough fluid each day at the onset of treatment to be consistent with their clear fluid goals. Thus, increasing fluid intake not only involved modifying the type of fluid children were
drinking but also changing the quantity of fluid ingested by children. Physiologically, this may have been a challenging task, especially for younger children. This suggests that more emphasis should be placed on the ratio of clear fluid to fiber within the treatment protocol. Given the success of the contingency system in increasing water and clear fluid intake, it is likely that including a goal specific to meeting the fluid-fiber ratio might prevent families from over-serving fiber.

A second possible explanation is that parents were not able to successfully implement behavioral strategies to counter negative behaviors children displayed in efforts to avoid drinking non-preferred fluids. Data from the Fluid Knowledge Questionnaire completed by parents at the conclusion of treatment suggested that they only felt very confident using an extremely small repertoire of behavioral skills to target their children’s water intake. A third potential barrier may have been the frequency with which parents recorded children’s daily dietary intake or tallied meal-based totals for fiber and clear fluid intake. Specifically, if parents waited until the end of the day to record this data, then they would not be aware that the prescribed 2:1 ratio was not met until after children had consumed all of their meals and snacks. In addition, parents may have been hyper-focused on solely meeting the minimum criterion for the prescribed daily fiber and fluid goals.

These data illustrate a need for health care professionals delivering this group behavioral treatment to alert children and families about 1) the commonality of children overshooting the prescribed daily fiber goals and undershooting the prescribed daily clear fluid goals, and thus undershooting the important 2:1 fluid-fiber ratio and 2) the importance of meeting the minimum prescribed clear fluid and fiber goals, but equally as
important that children’s actual daily clear fluid and fiber intake be at the recommended 2:1 ratio.

**Study Strengths**

This study has five strengths. First, as the first to systematically, and effectively, target water intake, this study thus makes a significant contribution to the pediatric and adult literature at large. The findings also provide further support for the efficacy of combined enhanced nutritional education and behavioral strategies in modifying dietary intake and improving dietary adherence.

Second, this is one of the first studies in the psychological literature to use panel analysis to evaluate treatment outcome. Use of a panel data set addresses many limitations and challenges inherent in completing treatment outcome research. For example, because panel analysis includes both cross-sectional and time-series data, we were able to have enough power to yield significant main effects with only 18 participants in each of our treatment groups (N=37), whereas a larger sample size would have been necessary to run more commonly used analyses in cross-sectional data sets such as ANOVAs or regressions. In addition, panel data permits drawing inferences regarding the causal factors of change rather than just describing trends and relationships between variables. Thus, we were able to say with certainty that the enhanced protocol was responsible for the change in children’s water intake and clear fluid goal adherence. Furthermore, clustering data by participant diminished standard error and decreased the probability that type one errors were committed.

Third, many studies within the encopresis literature make reference to including fluid recommendations within multi-component interventions for this disorder (McGrath
et al., 2000), but few report specific fluid targets or adherence to fluid recommendations. The current study addresses these gaps in the literature and thus provides direction to health care providers who wish to include dietary recommendations in their prescriptions for children receiving treatment for retentive encopresis.

Fourth, when components of the EI specific to water are extracted, the resulting intervention is brief and could easily be integrated into the context of traditional medical or psychotherapy visits. Education and strategies used to target water intake could be adapted and generalized for use in the treatment of other acute and chronic health conditions when fluid recommendations are warranted. The costs associated with the modifications to the NEI and to running this study were also minimal. Supplies were provided to families participating in the EI (e.g., water bottle, mixes to make lemonade), but it is estimated that the cost per participant was roughly twelve dollars. This cost could be decreased if families chose a lower-cost water bottle (Nalgene water bottles cost between seven to ten dollars).

Fifth, this study addresses the paucity of data regarding daily water intake for children. More specifically, only two studies were found in the pediatric literature that published data describing the amount of water consumed per day for children similar in age to those included in the current sample (ages four to 12; Marshall, Eichenberger, Broffitt, Stumbo, & Levy, 2005; Sohn, et al., 2005). The exact reason for this gap in the literature is not known, but it is suggested that it may be related to perceptions that water intake is more difficult to measure than intake of other pre-packaged fluids such as juice or soda (Forshee & Storey, 2003). Failure to measure water intake presents an incomplete picture of children’s water intake, which can be damaging, particularly if modification of
the quality of children’s overall fluid intake is a goal. While not perfect, this study does
provide strategies for increasing the reliability of measuring water consumption without
increasing participant burden such as training families to measure fluid intake, using
water bottles containing fluid ounce markers, and providing fluid “report cards” to
monitor children’s fluid intake in environments where parents are not present.

Limitations to the Study Design

Internal Validity

This study had four limitations with respect to internal validity. First, participants
were not randomized to treatment condition. Thus, it is possible the factors other than the
EI itself may have contributed to between-groups differences in water intake and
adherence to daily clear fluid goals. Second, the design did not include a no-treatment
NEI. Even though results were more robust for children participating in the EI, both
groups demonstrated increases in clear fluid and water intake. Thus, it is possible that
changes may be more related to reactivity or use of self-monitoring. Third, due to the
multitude of elements that were added to the EI to target water intake and adherence to
daily clear fluid goals, a dismantling study would be necessary to discern the most
“active” elements of the intervention. Fourth, the market for fiber products changed
considerably from 2005 to 2008 as a wider variety of fiber-dense products were available
to children participating in the EI than children participating in the NEI. For example,
several brand names now make granola bars containing seven to nine grams of fiber that
were not available from 2005-2007. This change may have made it easier for children
who completed the EI to not only meet their daily fiber goals, but also to overshoot them
without drastically changing the quality of their regular diet. Children participating in the
NEI likely needed to rely more heavily on either less child-friendly foods with high fiber density (e.g., All-Bran cereal) or on supplements to enhance the fiber of foods that are naturally lower in fiber. Fifth, technological difficulties did not permit for all sessions to be videotaped, and characteristics of the treatment environment (e.g., loud air vents) also compromised the auditory quality of some tapes.

External Validity

This study had two limitations with respect to external validity. First, data presented in this study were collected from primarily white, middle- to upper-class families in southeastern Michigan whose child’s clinical treatment was covered by medical insurance or paid for out of pocket. Because families were not recruited for research, this sample is likely highly representative of the population served at the University of Michigan for this problem. Thus, the ability to generalize the findings of this study to families seeking treatment for retentive encopresis in geographic areas or treatment settings with different demographic characteristics may be limited.

Second, this sample may not be representative of the retentive encopresis population as a whole. Specifically, our sample included twice as many boys as girls, which is inconsistent with prevalence rates suggesting boys are four to six times more likely to be diagnosed with retentive encopresis (APA, 2000). Thus, our sample likely includes an overrepresentation of girls and thus findings specific to gender may not be generalizable.

Measurement Issues

There are four limitations with respect to how data were measured.
**Fluid Intake.** Daily diet diaries were completed based upon child and parent self-report, which means that the validity of the data reported may be influenced by social desirability and recency effects. While efforts to increase the reliability of self-report data were made in this intervention (e.g., use of water bottles and snack-time report cards), anecdotal report from parents suggests it is likely that children’s actual water intake continues to be underreported.

**Conceptualization of adherence.** Adherence was conceptualized as a binary variable (adherent or non-adherent) to be consistent with the token system utilized with families during the group treatment (Opipari et al, 1999; Stark et al., 1999; Stark et al., 1990). However, conceptualization in this way may have excluded the positive incremental or marginal changes made by children with respect to increasing their clear fluid intake. More specifically, children in both groups increased their water intake and their overall clear fluid intake. Use of a criterion for measurement of adherence provides information regarding outcome, but not about the process of change. In addition, no empirically-supported criterion exists regarding the quantity of clear fluid children need to consume to decrease symptoms of constipation. Thus, it may be more important to emphasize the positive gains children made with respect to how much clear fluid children consumed overall.

**Assessing adherence.** In addition, adherence to clear fluid and water goals was likely overreported. Diet diaries and sticker charts were used to measure fluid intake and adherence, respectively, as this was part of standard clinical practices within the Multidisciplinary Encopresis Clinic at the University of Michigan. Comparison of sticker chart data to diet diary data may have increased the reliability of data regarding children’s
adherence to water goals. Visual inspection of diet diaries revealed that not all parents documented whether children consumed water from their water bottles or other fluid vessels. While this is an important limitation to this intervention trial, the clinical significance of this limitation may be minor as overall it is most important to note that children consumed water in general.

*Fluid Knowledge Questionnaire.* The Fluid Knowledge Questionnaire was developed by the primary investigator for the purposes of this study and subsequently has not been validated or standardized. Parental response patterns regarding remembering the names of specific behavior modification techniques may also have been compromised by the fact that specific labels were not used during all parent group treatment sessions. It can be argued, however, that whether parents know the name of a particular behavior modification technique is not as important as whether they know when and how to use a particular technique. The utility of this questionnaire to examine parental understanding of behavior modification techniques to shape children’s water drinking behavior might be enhanced by providing scenarios and asking parents to specify how they would address a particular behavior related to drinking water or rating the effectiveness of the method a parent used in the scenario in addressing a particular behavior related to drinking water.

*Directions for Future Research*

First, future research should attempt to replicate these findings in different treatment settings. Second, it would be interesting to examine whether children consumed more pure water or whether they were more reliant on water that included a sweet taste/color mix-in. Examination of this question may provide insight on whether it is necessary to continue encouraging children that beverages need to contain a sweet taste
when they may be able to satisfy this craving through other dietary choices such as fruit.

Third, it will be important to examine the relationship between adherence to the prescribed versus actual 2:1 fluid-fiber ratio and decreased symptoms of constipation. For example, it would be interesting to explore whether symptoms of constipation were worse for children participating in the EI and the NEI who were not adherent to the fluid-fiber ratio in their actual intake (i.e., if they consumed more fiber than prescribed but did not increase their fluid intake sufficiently in excess of the prescribed theoretical fluid goals). In addition, future research should examine whether greater emphasis in the group treatment (educational and application of behavioral strategies) is effective at improving adherence to the fluid-fiber ratio. Furthermore, it will be important to examine just how adherent children need to be to this ratio in order to experience positive clinical outcomes.

Fourth, longitudinal research should be conducted to examine whether treatment gains with respect to improved water and overall clear fluid intake are maintained. Fifth, a dismantling study should be conducted to examine the elements of the EI that were most causally related to changes in children’s water intake and adherence to prescribed daily clear fluid goals. Sixth, given that most children with retentive encopresis are treated by pediatricians and pediatric gastroenterologists, future research should examine whether fluid-specific components of the EI can be effectively used within these treatment settings to help children achieve dietary recommendations to increase daily fluid intake.

Seventh, given the multitude of other chronic and acute health conditions where fluid recommendations are part of disease-management, future research should also
examine daily water intake and the effectiveness of the fluid-components of the EI on water intake for other pediatric populations. For example, children with chronic migraine and sickle cell disease are often asked to increase fluid intake in efforts to decrease and prevent pain resulting from dehydration. Increasing water intake and decreasing intake of high-sugar, high-calorie fluids may also be important for children who are overweight or obese given the relationship between high-calorie fluids and weight gain. Fluid-based components of the EI could be adapted for these illness groups and could then be further modified for use in other group therapies, individual outpatient psychotherapy, or standard medical visits.

Eighth, future research should continue to explore methodologies for improving measurement of fluid intake and clear fluid goal adherence. Seven-day diet diaries were utilized within the context of this study because this was part of standard clinical care for group treatment within the Multidisciplinary Encopresis Clinic at the University of Michigan. The general dietary literature has demonstrated that data obtained from three-day diet diaries is representative of seven- and 28-day diet diaries for several dietary variables (Stuff, Garza, Smith, Nichols, & Montandon, 1983; Daniels, 1984; St. Jeor, Guthrie, & Jones, 1983). Requiring fewer days of diet diary might increase reliability of fluid data due to decreasing family burden. However, this type of methodology does not permit for creation of a panel data set and subsequently would not provide sufficient data to examine the process or causal factors related to dietary change. Thus, using seven-day diet diaries may be important in initial steps of discerning whether a particular intervention effectively yields change, whereas three-day diet diaries could be used in
follow-up studies that either explore whether change was maintained or in studies where examining treatment outcome is the primary goal.

Modifying the format of diet diaries might increase the reliability of self-reported fluid data. For example, Cowbrough & Lloyd (2003) incorporated pictures of different fluid-containing vessels and fluid serving sizes on self-monitoring forms to measure fluid intake in adults. Given that using visual cues has been shown to increase reliability of self-reported dietary information in children (Domel, Thompson, Baranowski, & Smith, 1994), this may be a particularly helpful strategy for measuring children’s fluid intake in the absence of parents without increasing the burden to other adult supervisory figures such as teachers.

Diet diaries could also be converted to electronic format and emailed or uploaded to a database each night or imported for use with palm pilots. Palm pilots may be particularly advantageous because of their portability, ease of use, their provision of real-time data (e.g., whether water goals were met and how many more fluid ounces children need to drink to meet daily clear fluid goals) to both participants and researchers. Alternatively, phone-based systems that use daily reconstruction methodology, such as Daily Phone Diaries (Modi, Lim, Yu, Geller, Wagner, et al., 2006; Quittner & Opipari, 1994) or 24-hour phone-based recalls (e.g., Johnson, Silverstein, Rosenbloom, Carter, & Cunningham, 1986), are also effective strategies for measuring adherence (Quittner, et al., 2008). These strategies may help to decrease memory bias, but are often costly financially and with respect to time, so their feasibility within the context of standard clinical care is questionable.
Exploration of electronic methods for direct assessment of water intake and fluid adherence, similar to the Medication Event Monitoring System (MEMS) for pill bottles or the MDI monitors (MDILog) for asthma inhalers, is another avenue for future research that could enhance the reliability and validity of fluid intake data. Development of a specialized sensor that could be placed within the neck of a water bottle could be used to detect when the bottle is opened and closed, when water passes out of the bottle, and whether water may be ingested versus dumped (temperature). Electronic monitors would provide valuable time-series data and would be subject to less reactivity bias than what is expected from self-report measures (Quittner et al., 2008; La Greca & Bearman, 2003). However, given the potential for malfunctioning and mechanical failure of electronic monitoring devices, the time and cost of developing this type of technology may outweigh the benefits. In addition, an electronic sensor placed within a water bottle would provide insight to only one aspect of drinking behavior and fluid adherence unless children were required to drink only from the specialized water bottle, which would significantly increase burden to children and families.

Finally, it might be interesting to more systematically explore barriers to children drinking water. Barriers discussed in this study were generalized from the food-based pediatric literature, but it is not clear whether these same contingencies apply to water refusal behavior. It would be particularly important to explore mealtime interactions as they apply to fluid intake as the behavioral strategies included in the EI were largely based upon findings regarding the finding that parents of children with cystic fibrosis and type 1 diabetes frequently employed ineffective child behavior management strategies to manage their children’s negative mealtime behaviors. Observational data regarding
mealtime interactions specific to children’s drinking behavior may help to streamline techniques that are included within the intervention.

Summary

This study is the first to systematically target water intake and adherence to prescribed clear fluid goals in children with retentive encopresis and in the pediatric population at large. Participation in the EI resulted in children drinking 8 more fluid ounces of water per day than children in the NEI and increased the probability of children adhering to their clear fluid goals by three- to six-fold depending upon the size of the clear fluid goal. Children participating in the EI also consumed significantly less juice than children participating in the NEI during the last two weeks of treatment, suggesting that they relied more heavily on increasing intake of pure water to meet their clear fluid goals. These findings provide further empirical support for the effectiveness of combined enhanced nutritional education and behavioral strategies in helping children to meet dietary goals. While these findings are statistically significant, their clinical significance is unknown as participation in the EI did not result in improved adherence to the prescribed 2:1 fluid-fiber ratio, and this remains an important area for future research.
References


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Appendix A

Child Group Manual Supplement

CHILD Group MANUAL
Supplement
Guidelines for Child Group Leaders: Child Management Strategies

I. Differential attention: attention should be provided when children display behaviors consistent with drinking water (ex: picking up their glass) and should be removed when children display undesired behaviors (ex: whining because they do not like the taste of water).

II. Ignoring: attention should not be given to children who display negative behaviors (ex: dipping fingers into water).

III. Praise: positive statements specifying what you like about the child’s behavior should be provided when child behavior is consistent with drinking water.

A. Praise should be delivered often.

B. Examples:

“I can see that Sarah is picking up her glass and is about to take a big gulp of water!”

“I really like the way that Jack is drinking his water.”

“Sam just took a monster drink of his water. Way to go Sam! It looks like you are almost finished with your glass!”

“Jan just finished her entire glass of water! Nice work!”

IV. Object removal: water glasses provided during snack or learning activities should be removed if children do not use them appropriately. This technique should be applied if differential attention and ignoring do not work. Group leaders should say “We do not play with cups/water at group” and promptly remove the water glass.

A. Water glasses should not be returned if taken during snack.

B. Water glasses should be returned after a brief period of appropriate behavior if part of a learning activity.
## Outline of child groups by session and topic

<table>
<thead>
<tr>
<th>Week</th>
<th>Session</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1    | 1       | **Physiology**  
|      |         | - Education regarding relationship between water, digestion, encopresis, and constipation |
| 2    | 2       | **Medication**  
|      |         | - Review of education material presented in session 1 |
| 3    | 3       | **Increasing fiber and fluids**  
|      |         | - Review importance of drinking water  
|      |         | - Provide age-based clear fluid goals and water bottles  
|      |         | - Explain difference between clear and non-clear fluids  
|      |         | - Meal planning to achieve fiber and clear fluid goals |
| 4    | 4       | **Toilet sitting**  
|      |         | - Inquire about use of water bottle during the week |
| 5    | 5       | **Achieving fiber and fluid goals**  
|      |         | - New fluid goals  
|      |         | - Mystery water taste test (water mix-ins) |
| 6    | -       | **No group session** |
| 7    | 6       | **Maintaining treatment gains**  
|      |         | - Education about continuing to drink lots of water  
|      |         | - Review importance of water when sick  
|      |         | - Drinking water on vacation |
Addendum to Session 1 (Physiology)

Goal: To educate children about the importance of water in digestion and of drinking water to keeping stool soft and making bowel movements comfortable.

Supplies needed: cups and pitcher filled with water

I. Emphasize the role of water to digestion, constipation, and encopresis

“After the food we eat gets mashed up and turned into liquid in the stomach, it passes into the small intestine. Water is used in the small intestine to help move the parts of our food that our body needs to the rest of our body so we can grow, run, learn, and play. The part of our food that our body doesn’t need then goes to the large intestine or the poop factory. The large intestine takes some water out of our waste to help our body make the poop.

“When we don’t have a bowel movement everyday, more water gets removed from our poop, which makes our poop hard and less comfortable to get out into the toilet. Sometimes, when a lot of water gets removed, the poops get stuck. So you can see that drinking lots of water is important to keeping our poops soft and helping our bodies to have a comfortable poop each day.”

III. Snack

“We are going to start helping our bodies make our poops soft today by drinking water during snack. We have a rule at poop group that everyone must take at least one sip of their water. At the end of snack we will write down how much water you drank on your snack report card and give this to your moms and dads.”

Note to group leaders: Remember to use differential attention, ignoring, praise, and object removal as appropriate during snack to begin shaping water drinking behavior. Stickers should be provided to children who drink all of their water.

IV. Homework

“One of your goals for this week is to tell your moms and dads what you drink, especially when you are in a place where they are not there like school. If you meet this goal, then you will earn a sticker which goes towards earning your prize at group next week. We are going to practice telling moms and dads what you ate and drank by talking about your snack time report card at the end of group today.”

Pass out snack report cards to parents. Assist children in talking with parents about what they drank during snack today and ensure that parents provide praise for this communication.
Snack Report Card

Today’s Snack: ______________________________

Amount of snack I ate: _______________________

Amount of water I drank: _____________________
Addendum to Session 2 (Medication)

Supplies needed: cups and pitcher filled with water

I. Review the importance of water to digestion and normal bowel functioning

II. Snack

“Remember, the rule at poop group is that everyone must take at least one sip of their water. At the end of snack we will write down how much water you drank during snack today on your snack report card and give this to your moms and dads to help you keep working hard on your goals.”

Note to group leaders: Remember to use differential attention, ignoring, praise, and object removal as appropriate during snack to begin shaping water drinking behavior. Stickers should be provided to children who drink all of their water.

III. Homework

“This week you need to continue telling your moms and dads what you drink each day so you can keep earning stickers.”

Pass out snack report cards to parents. Assist children in talking with parents about what they drank during snack today and ensure that parents provide praise for this communication.
**Addendum to Session 3 (Fiber and Fluids)**

**Goals:**
1. Review role of water in constipation
2. Provide children with clear fluid goals
3. Educate children about clear versus non-clear fluids.
4. Provide children with strategies for how to increase water intake

**Supplies needed:** Stoplight felt board and pieces, menu planning felt board and pieces, Nalgene water bottles, IceTubes, pitcher filled with water, special water stickers, and special water bottle stickers

I. Daily clear fluid goals and meal-based water goals

“You just learned a lot about fiber and how making changes to the things you eat can help make your poops easier to control. You can also make your poops soft and easier to get out and into the toilet just by changing the how much you drink and the types of things you drink. The types of fluids that will help keep the poops soft and make them easy to pass are called clear fluids.

Not all fluids are clear fluid. Clear fluids are things like water, juice, flavored drinks that don’t have caffeine, lemonade, and sports drinks like Gatorade. Things that are not clear fluids are milk, drinks that contain milk like a milkshake, and most sodas/pops. You can drink as much water each day as you want but there will be rules about how much of the other clear fluid and non-clear fluid choices you can have so that the types of fluids you drink keep you healthy. So you might find that you don’t get to drink as much juice or milk as usual.

There are lots of other reasons that we want you to drink lots of water each day besides the fact that it keeps your poops soft and easy to get out. Our bodies have some water inside, but we lose water when we play, sweat, and pee. So we need to drink lots of water every day to help replace the water that gets used up and still have some left over to help our poops stay soft and comfortable.

Everyone just got a fiber goal to help you increase the amount of fiber you eat each day and now you are going to get a clear fluid goal to help you increase the amount of clear fluids you drink each day. You always want to drink twice as much clear fluid as the number of grams of fiber that you eat. Your mom’s and dads will help you with this part, but knowing that you need to drink twice as much clear fluid as you eat in grams of fiber will help you to remember your clear fluid goal. Your clear fluid goal is twice your fiber goal. So if your fiber goal is your age plus five, your fluid goal is your age plus five times two. We’re going to help you figure out your fluid goal now.”

**Provide each child with their age-based fluid goal**

You are all also going to get a goal for drinking water at meals.
A. Younger kids group

1. Similar to the rule that you need to eat 3 grams of fiber at each meal, you need to drink 4 ounces of water at each meal. You might think that 4 ounces sounds like a lot, but 4 ounces is half as much of what you drink during snack time. So it’s not a lot of water at all! Once you drink that much, then you can have more water or juice, milk, or other things you like to drink at your meals. We will practice drinking 4 ounces during snack today so you can see how easy is to drink this much.

B. Big kids group

1. Similar to the rule that you need to eat 3 grams of fiber at each meal, you need to drink 6 ounces of water at each meal. You might think 6 ounces sounds like a lot, but most of you drink 9 ounces or more during snack here at group each time we meet! So this goal of 6 ounces at each meal will be very easy for you. Once you drink that much, then you can have more water or juice, milk, or other things you like to drink at your meals. We will practice drinking this amount during snack today so you can see how easy is to drink 6 ounces.

II. Clear fluid education

It can be tricky to remember the types of drinks that will help you to achieve your clear fluid goal, so we are going to teach you a way to remember. This is a picture of a traffic light. Who can tell me what it means when the traffic light is green? (Let children try to answer). That’s right! When the stoplight is green, it means go. Water is a green drink and is the best drink choice you can make. Water is also available almost everywhere you go like from the tap at your house or from a fountain at school or at a park. I am going to place these pictures of water in the green light.

Place picture of glass of water, water bottle, and water fountain by the green light.

Who can tell me what it means when the traffic light is yellow? (Let children try to answer). The yellow light is tricky. It means caution or slow down. Yellow drinks help you move towards achieving your clear fluid goal, but you should only have small amounts because they are not as good of a choice as water. Yellow drinks are juice, sports drinks like Gatorade, or lemonade. I am going to place these pictures of water in the green light.

Place picture of juice box, pitcher of lemonade, and hot chocolate next to the yellow light.

Who can tell me what it means when the traffic light is red? (Let children try to answer). The red light means stop! Red drinks do not help you achieve your clear
fluid goals, so you don’t want to drink as many red drinks or you won’t earn stickers for meeting your clear fluid goals. Remember, if you don’t earn stickers, then you cannot get a prize during group. Red drinks are milk and soda/pop.

Place pictures of milk and soda next to the red light.

So when it’s time to pick a drink to have with breakfast, lunch, dinner, or a snack, you want to pick drinks that will help you go towards achieving your clear fluid goal. Remember, water is the best choice because it is a green drink. Juice, sports drinks, and lemonades are still good choices because they are yellow drinks, but they won’t help you move as fast as green drinks.

III. Menu planning activity (combined with learning to discriminate fiber foods)

“We are now going to play a special game in order to help you all learn how to tell the difference between clear fluids and non-clear fluids and to help you learn how to help your parents make good choices about drinks when you eat so you can achieve your clear fluid goal.

Here is a picture of a table top. It’s time to eat breakfast, and I would like to help my mom and dad with selecting a meal that is high in fiber and helps me work on my clear fluid goal. You have helped me pick a high-fiber cereal and I have put milk on my cereal, but I would like to have something to drink with my breakfast. I have choices here that represent all the types of drinks I could have in one day. Once I make a choice for a meal, I have to pick from what is left for the next meal. Who can tell me which of these drinks I should pick to so I can work on my clear fluid goal too?

Group leader holds up pictures of a glass of milk, a glass of orange juice, a soda bottle, and a glass of water. If children pick milk, remind them that they already have milk on their cereal and that milk is a red drink. If they pick soda, remind them soda is also a red drink and does not help them with their clear fluid goal. If children pick orange juice, remind them that this is a yellow drink and that it is a good choice, but not the best choice. In addition, children should be informed that having orange juice for breakfast might mean that they do not have anymore juice the rest of the day. If children pick water, praise them for making a choice consistent with one of their new treatment goals and for making the best drink choice.

It’s time to eat lunch now. You have helped me pick out a peanut butter and jelly sandwich on whole grain bread and carrots. (Review drink choices left). Who can tell me which of these drinks I should pick so I can keep working hard on my clear fluid goal?

Group leader holds up choices that are left. If children pick milk, remind them that milk is a red drink. If they pick soda, remind them soda is also a red drink and does not help them with their clear fluid goal. If children pick orange juice, remind them
that this is a yellow drink and that it is a good choice, but not the best choice. In addition, children should be informed that having orange juice for breakfast might mean that they do not have anymore juice the rest of the day. Finally, if children pick water, praise them for making a choice consistent with one of their new treatment goals and for making the best drink choice.

*It’s time to eat an after school snack now. I picked an apple and some crackers, but I’m thirsty! What drink choice should I make to help me go towards my clear fluid goal?*

Group leader holds up choices that are left. If children pick milk or soda, remind them that these choices do not help them with their clear fluid goal. If children pick orange juice, remind them that this is a yellow drink and that it is a good choice, but not the best choice. Emphasize that it is okay to sometimes have a drink that is a yellow or red drink. Finally, if children pick water, praise them for making the best drink choice.

*Now it’s time for dinner. I had milk and ____ (Fill in what drink choice was) for breakfast. I drank ____ (fill in with what drink choice was) and ____ (fill in what drink choice was) for my snack. What should I pick for my drink with dinner?*

Group leader holds up choices that are left. If children pick milk, remind them that milk is a red drink. If they pick soda, remind them soda is also a red drink and does not help them with their clear fluid goal. If children pick orange juice, remind them that this is a yellow drink and that it is a good choice, but not the best choice. In addition, children should be informed that having orange juice for breakfast might mean that they do not have anymore juice the rest of the day. Finally, if children pick water, praise them for making a choice consistent with one of their new treatment goals and for making the best drink choice.

Review the menu that the children selected and indicate whether they would have received special water stickers and achieved their clear fluid goal.

**IV. Educational activity**

**A. Fiber and clear fluid collage (young child group only)**

*Now we are going to continue learning how to tell the difference between clear and non-clear fluids and fiber and no fiber foods by making a collage. A collage is a piece of paper that has pictures glued onto it. Our collages are going to only have pictures of clear fluids and fiber foods. We have cut out lots of pictures of food and drinks and your job is to pick out clear fluids and fiber foods to glue on your piece of paper. If you have trouble, talk with a friend or raise your hand and a group leader will help you. When you are finished, you will have something to take home to help your family learn about fiber and clear fluids and to remind*
you what types of drinks and foods will help you to achieve your clear fluid and fiber goals.

B. Fiber and clear fluid bingo (older child group only)

Now we are going to continue learning how to tell the difference between clear and non-clear fluids and fiber and no-fiber foods by playing bingo. Everyone will receive a game board that has lots of pictures of drinks and foods. One of the group leaders will hold up a picture of a drink or food. Your job is to figure out whether the drink is a clear fluid or whether the food contains fiber. If you think the group leader is holding a picture of a clear fluid or a fiber food, and that picture is also on your game board, then you should cover the picture with one of your pieces of paper. When you cover all of the pictures either across, up and down, or diagonal, you should say “BINGO!” and the group will help decide whether you really do have a bingo.

V. Water bottles and Ice Tubes

“Sometimes you are in places where you do not have drinks around. Everyone here is going to receive a special water bottle so you can always have water near by. For example, you can take your water bottle when you go play at a friend’s house or at the park. Your water bottles will also help you and your moms and dads keep track of how much water you drink, especially during the day at school when your moms and dads are not there.

A. Younger kids group

1. One of the best things about your water bottle, however, is that if you drink half of it each day, then you will be very close to meeting your big clear fluid goal for the day! In fact, if you drink half of your water bottle and drink all of your water at each meal, you might be right at or even past your big clear fluid goal! You will earn a special water bottle sticker each time you drink half of your water bottle (show kids the stickers).

B. Older kids group

1. One of the best things about your water bottle, however, is that if you drink half of it each day, then you will be very close to meeting your big clear fluid goal. In fact, if you drink all of your water bottle and drink all of your water at each meal, you might actually be right at or even past your clear fluid goal! You will earn a special water bottle sticker each time you drink half of your water bottle (show kids the stickers).”
Your moms and dads will get extra water bottle stickers so you can put the stickers on your water bottle or another special place in addition to your sticker chart if you want to.

We are going to let each of you pick out a water bottle and you can see that we have lots of different colors. You are also going to receive these long things (show children an IceTube) that are called IceTubes. These tubes fit in your water bottle and keep your water cold for a long time. They are a lot like ice cubes.”

**Note to group leaders:** Children who have been well behaved during the group session and are sitting quietly should be called on to pick first. Remember to praise each child for sitting quietly/paying attention as he or she is called up.

IV. Snack

“Today we are going to have water at snack again, but this time you will get to practice drinking water from your water bottles. If you drink all of your water from your water bottle, then you will get a special water sticker that you can put on your water bottle to show your moms, dads, and poop group friends that you achieved your water goal of (4 or 6 ounce for younger and older child groups, respectively) of clear fluid when you ate. These are the same stickers you will earn at home each time you drink (4 or 6 ounce for younger and older child groups, respectively) of water when you eat. We will write down how much water you drink on your snack report card.”

**Note to group leaders:** Remember to use differential attention, ignoring, praise, and object removal as appropriate during snack to begin shaping water drinking behavior. Special water stickers should be provided ONLY to children who drink all of their water. Children can earn additional stickers for each additional 6 ounces that they drink.

V. Homework

“This week for homework you need to keep telling your moms and dads what you drink each day. You are also going to have five other goals that you need to meet to get stickers so you can earn your prize at the next group session. First, you need to drink your clear fluid goal each day.

Have each child repeat his or her fluid goal and provide prompts as appropriate.

Next,

A. Younger child group

1. You need to drink 4 ounces of water at each meal. So that means 4 ounces at breakfast, lunch, and dinner. Remember, 4 ounces is easy! You will get a special water sticker each time you drink 4 ounces of
water at a meal, so that means you can get three special water stickers if you drink your water at every meal!

B. Older child group

1. You need to drink 6 ounces of water at each meal. So that means 6 ounces at breakfast, lunch, and dinner. Remember, 6 ounces is easy! You will get a special water sticker each time you drink 6 ounces of water at a meal, so that means you can get three special water stickers if you drink your water at every meal!

Finally,

A. Younger child group

1. You need to drink half of your water bottle each day. You will get the special water bottle sticker if you meet this goal.

B. Older child group

1. You need to drink one water bottle each day. You will get the special water bottle sticker if you meet this goal.

Pass out snack report cards to parents. Assist children in talking with parents about what they drank during snack today and ensure that parents provide positive praise for this communication.
Addendum to Session 4 (Toilet Sits)

Goal: 1. Review importance of drinking water.
   2. Have children share experience with drinking water and using water bottle in past week.

Supplies needed: cups, pitcher filled with water, special water stickers

I. Review

“During the last group session we talked about how it is important to drink lots of water each day in order to keep our poops soft and comfortable. Each of you also received a goal for how much clear fluid and water you should drink every day and got a water bottle to help you achieve this goal.

How many people drank lots of fluid last week? How many people used their water bottles? How many people met their fluid goals? What kinds of fluids did each of you drink to meet your fluid goals?”

Provide praise after children respond to each question

II. Snack

“Today we are going to have water at snack again. Remember that everyone has to drink at least one sip of their water. If you finish all of the water in your cup, then you can earn another special water sticker to put on your water bottle. We will write down how much water you drink on your snack report card so your moms and dads know that you were working hard on your fluid goals during group today.”

Note to group leaders: Remember to use differential attention, ignoring, praise, and object removal as appropriate during snack to begin shaping water drinking behavior. Special water stickers should be provided ONLY to children who drink all of their water. Children can earn additional stickers for each additional 6 ounces that they drink.

III. Homework

“This week for homework you are going to keep working on your fluid goals. This means that you can earn stickers if you tell your moms and dads what you drink each day, if you meet your fluid goal, and if you drink (4 or 6) ounces of water at breakfast, lunch, and dinner. Remember, you can also earn special stickers if you drink an entire water bottle and if you drink water at each meal.”

Pass out snack report cards to parents. Assist children in talking with parents about what they drank during snack today and ensure that parents provide positive praise for this task.
Addendum to Session 5 (Achieving fiber and fluid goals)

Goal: 1. Provide new clear fluid goals.  
2. Educate children on items that can be mixed into water to make it taste better and more fun to drink.

Supplies needed: five pitchers with water, kool-aid mix, Gatorade mix, crystal light/Kroger water mix-ins, fresh fruit (pre-sliced and added to water), paper cups labeled 1-5 and one paper cup with “S” label, Benefiber or FiberSure, Mystery Water Taste Test handout, fun-shaped ice cubes (some containing frozen fruit), food coloring, special water stickers, Super Water stickers, markers, and bags of water supplies for each family

Note to group leaders: it is important to put only a small amount (1-2 ounces) of each type of water in to cups so children do not become satiated.

I. Education

“You just learned ways to make eating fiber more fun. Now you’re going to learn ways to make drinking water more fun to help you achieve your new fluid goals. Your new fluid goal will be twice your new fiber goal. We will help you figure out your new fluid goals now”

Help children calculate new clear fluid goals.

“Your goals for how much water you need to drink at breakfast, lunch, and dinner are also going to get a little bit bigger.

A. Younger child group

1. Instead of 4 ounces, you need to now drink 6 ounces. I know you all can drink this much because it is still less than what you drink at group each time! Your parents will help to make sure you have at least 6 ounces in your cup for breakfast, lunch, and dinner.”

C. Older child group

2. Instead of 6 ounces, you need to now drink 8 ounces. I know you all can drink this much because it is still less than what you drink at group each time! Your parents will help to make sure you have at least 8 ounces in your cup for breakfast, lunch, and dinner.”
Finally, remember that you need to keep drinking from your water bottle because you still have your water bottle goals.

A. Younger child group

1. Your water bottle goal is to drink half of your water bottle.

B. Older child group

1. Your water bottle goal is to drink one full water bottle.

II. Activity: Mystery water taste test

Who has ever heard of a taste test? A taste test is an activity where you taste different types of foods and drinks and then decide which one you like best.

Today you are all going to participate in a mystery water taste. Each type of water will be in a cup with a number marked on it. After you taste the water, you will have a chance to guess what the secret ingredient is and then you are going to rate how much you liked it on your taste test form. After you have tasted all of the waters, then you are going to pick which one you liked best. When we are finished with the taste test, then we will tell you the secret ingredients for the water mix-ins. We’ll also share the types of waters that you like and how to make them with your moms and dads.

Are you ready to start the taste test?! Everyone needs to try at least one sip of each type of water and you need to wait to take a drink until everyone has a cup.

Here is water number 1. The water looks just like regular water, but there is something different about it. Now that everyone has a cup, let’s take a sip! What do you all think is in this water?! Remember to rate how much you like this water with a “1” being that it is okay and a “5” being that you really liked it.

Here is water number 2. This water is a different color than regular water. Now that everyone has a cup, let’s take a sip! What does it taste like? What do you think is mixed in? Remember to rate how much you like this water with a “1” being that it is okay and a “5” being that you really liked it.

Here is water number 3. This water is like the last one because it has a color. Now that everyone has a cup, let’s take a sip! Does it taste different than the last one? What does it taste like? Remember to rate how much you like this water with a “1” being that it is okay and a “5” being that you really liked it.

Here is water number 4. This water is like the last two because it has a color. Now that everyone has a cup, let’s take a sip! Does it taste like any of the other waters?
Remember to rate how much you like this water with a “1” being that it is okay and a “5” being that you really liked it.

Here is water number 5. It has a color. Now that everyone has a cup, let’s take a sip! What does it taste like? Remember to rate how much you like this water with a “1” being that it is okay and a “5” being that you really liked it.

Here is water number 6. It has no color. Now that everyone has a cup, let’s take a sip! What does it taste like? Remember to rate how much you like this water with a “1” being that it is okay and a “5” being that you really liked it.

Here is our last water. It also has no color, but it has little bubbles. Now that everyone has a cup, let’s take a sip! What does it taste like? Remember to rate how much you like this water with a “1” being that it is okay and a “5” being that you really liked it.

Now we have tried all of the waters, please circle the number of water that you liked best. Raise your hand if you need help. When you are finished, tell a group leader so we can collect your paper.

You all are probably curious about what was in each of the different waters, so now we will tell you!

Reveal each type of water and tell children how it was made.

Mix-ins
a. #1: Fruit water (sliced fresh fruit that has soaked in water)
i. Fruits: lemons, limes, oranges, strawberries, watermelon, etc.
b. #2: Cool Water (contains sugar-free Kool-Aid)
i. You mom’s and dad’s can also add powders to your water that have flavors
c. #3: Fun Water (contains water mix-ins such as those made by Crystal Light/Kroger)
d. #4: Wacky Water (contains food coloring)
e. #5: Sport Water (contains Gatorade powdered mix)
f. #6: Super Water (contains fiber supplement)
g. #7: Bubble Water (carbonate water with no sugar)

III. Additional ways to make water fun: shaped, flavored, and colored ice-cubes

“We know that water always tastes better when it is cold, and ice cubes help to make water cold. Each of you will be receiving a special ice cube tray today that you can use to make ice cubes in fun shapes and then put in your water at home. You can make ice cubes even more fun by turning them certain colors or changing their taste. For example, placing fruit in the water before you freeze it (show children an ice cube like this). That way you have a special surprise when your ice cube melts that
can even add flavor to your water. Everyone is going to receive a fun-shaped ice cube tray in the bag of water mix-ins that your family will get at the end of group today.”

IV. Super Water

“This type of water is actually very special because it helps you work on your fluid AND your fiber goals, and we call this Super Water. The secret ingredient to Super Water is Benefiber (or FiberSure), which you all tried earlier when you mixed it into your pudding or apple sauce and when you played the mystery water taste test game. So adding this white powder to water is another way to make a no-fiber item have lots of fiber! You can add Benefiber (or FiberSure) to regular water or to any of the special types of water you tried today.

When you drink Super Water, you get a special Super Water sticker that you can put onto your sticker chart or your water bottles. Everyone who drank their Super Water today gets a Super Water sticker right now (pass out stickers). Your moms and dads will receive Super Water stickers for you to earn when you are not at group.

Note to group leaders: Remember to use differential attention, ignoring, praise, and object removal as appropriate during snack to begin shaping water drinking behavior. Special water stickers should be provided ONLY to children who drink all of their water. Children can earn additional stickers for each additional 4 ounces that they drink.

V. Homework

“This week you can earn stickers for doing five things with respect to drinking clear fluid and water. You can earn stickers for telling your moms and dads what you drink, for meeting your clear fluid goal that is different this week, for drinking water at breakfast, lunch, and dinner, and for drinking from your water bottle. You will still get special water bottle stickers if you meet your water bottle and meal-based water goals. You can also earn super water stickers if you drink super water.”

Note to group leaders: Review each child’s new clear fluid goal when discussing ways to earn stickers.

Pass out snack report cards and mystery water taste test sheet to parents. Assist children in talking with parents about what they drank during snack today and ensure that parents provide positive praise for this communication.
My favorite type of water: ___________
Addendum to Session 6 (Sick days and review)

Goal: 1. Review use of water mix-ins and whether children achieved clear fluid goals.
   2. Discuss importance of continuing to drink water after group treatment is completed.
   3. Educate children about drinking fluids when sick and on vacation.

Supplies needed: paper cups, pitcher filled with water, Benefiber or FiberSure

I. Review

“Welcome back to group. I know that everyone hear has been working very hard on drinking lots of water. How many people met their new clear fluid goals? How many people tried one of the new types of water that we learned about the last time we met? How many people drank Super Water?”

Provide praise to children for their accomplishments and for answering questions.

II. Maintaining gains

“You all have done a very good job working to drink more water. Today is the last time that we are going to be meeting together but it is important for you to keep drinking lots of water each day even when we don’t meet as a group anymore. You will be coming back with your moms and dads to meet with the doctors who will check in to see if you are still drinking lots of water. Your moms and dads will help you with this, but we want to spend some time talking today about how you can keep working on your clear fluid goals even when you are sick and when you go on vacation.”

III. Sick days

“It is important to drink lots of fluids when you are sick, especially water, to keep your poops soft and to prevent dehydration. When you are dehydrated, it means that your body doesn’t have enough water and you might feel even more tired or achy. Sports drinks like Gatorade are another good fluid to drink when you are sick because they have many nutrients that your body needs that you might not be getting because you aren’t eating as much as normal.”

2. Vacation

“Another time that can sometimes be hard to remember to drink lots of water is when you go on vacation. However, drinking lots of water will help keep your poops soft and comfortable when you are not at home and will also help you have lots of energy
so you can swim and play. If you forget your water bottle, you can always drink water from water fountains.”

3. Extra activities

   a. Poop Group Jeopardy (Big kids group only)

   “One of the Jeopardy categories is Fluids. This category will ask you questions about the information you learned about how much fluid you need to drink each day, what types of fluids count towards your clear fluid goal, and water mix-ins.

   Fluid questions:

   1 point: What can you earn if you meet your fluid goal each day?
   2 points: What is one thing you can do to make drinking water more fun?
   3 points: What is your fluid goal? How can you figure it out?
   4 points: Name three types of fluids that you can drink to achieve your fluid goal.
   5 points: How is drinking water related to having comfortable bowel movements?

   B. Poop Group Candyland (Little kids group only)

   Children should drink at least one sip of water if they pull a single blue card and should drink at least two sips of water if they pull a double blue card.

VI. Snack

   “Today we are going to have water at snack again. If you would like to make your water Super Water, raise your hand and a group leader will add Benefiber to your cup. Remember that everyone has to drink at least one sip of their water. If you finish all of the water in your cup, then you can earn another special water sticker to put on your water bottle. We will write down how much water you drink on your snack report card so your moms and dads know that you were working hard on your fluid goals during group today.”

   **Note to group leaders:** Remember to use differential attention, ignoring, praise, and object removal as appropriate during snack to begin shaping water drinking behavior. Special water stickers should be provided **ONLY** to children who drink all of their water. Children can earn additional stickers for each additional 6 ounces that they drink.
Treatment Integrity Forms
Instructions

In order to maintain the integrity of the enhanced behavioral intervention, treatment integrity forms should be completed by raters after each session. Raters should watch tape-recorded sessions and then place a check mark in each box if that item was discussed or occurred during the treatment session.
**Session 1**

- Role of water in digestion
- Snack time rule of at least one sip of water
- Group leaders use positive praise, ignoring, and differential attention to shape water drinking behavior
- Assist children in helping parents to complete first diet diary entry using the snack time report card
Session 2

☐ Snack time rule of at least one sip of water

☐ Group leaders use positive praise, ignoring, and differential attention to shape water drinking behavior

☐ Assist children in helping parents to complete first diet diary entry using the snack time report card
Session 3

☐ Educate children on importance of water to daily, bodily functioning

☐ Difference between clear and non-clear fluids

☐ Clear fluid goals prescribed

☐ Meal-based water goal prescribed

☐ Stoplight technique for discerning clear fluids

☐ Menu planning activity emphasizing children choosing fluids

☐ Fiber and clear fluid collages (younger child group)

☐ Fiber and clear fluid bingo (older child group)

☐ Distribute water bottles and Ice Tubes/discuss how to use them to achieve clear fluid goals

☐ Review clear fluid goal and meal-based water goal

☐ Snack time rule of at least one sip of water

☐ Group leaders use positive praise, ignoring, and differential attention to shape water drinking behavior

☐ Assist children in helping parents to complete first diet diary entry using the snack time report card
Session 4

☐ Review children’s progress on clear fluid goals

☐ Review children’s use of water bottles/Ice Tubes

☐ Snack time rule of at least one sip of water

☐ Group leaders use positive praise, ignoring, and differential attention to shape water drinking behavior

☐ Assist children in helping parents to complete first diet diary entry using the snack time report card
Session 5

☐ Prescribe new clear fluid goals

☐ Prescribe new meal-based water goals

☐ Mystery water taste test

☐ Reveal how to make each type of mystery water

☐ Ice cubes: special shaped and how to add frozen fruit

☐ Superwater

☐ Snack time rule of at least one sip of water

☐ Group leaders use positive praise, ignoring, and differential attention to shape water drinking behavior

☐ Provide parents with Mystery Water Taste Test handout children completed

☐ Assist children in helping parents to complete first diet diary entry using the snack time report card
Water and Clear Fluid Goals 201

Rater: ________________________

**Session 6**

☐ Importance of continuing to meet clear fluid and meal-based water goals

☐ Strategies for how to maintain high fluid intake when sick or on vacation

☐ Poop Group Jeopardy (older child group) or Poop Group Candyland (younger child group)

☐ Snack time rule of at least one sip of water

☐ Group leaders use positive praise, ignoring, and differential attention to shape water drinking behavior

☐ Assist children in helping parents to complete first diet diary entry using the snack time report card
PARENT Group Manual Supplement
## Outline of child groups by session and topic

<table>
<thead>
<tr>
<th>Week</th>
<th>Session</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1    | 1       | Physiology  
- Education: water, digestion, constipation, and encopresis  
- Self-monitoring: daily diet diaries |
| 2    | 2       | Medication  
- Feedback: adherence to guidelines for diet diaries specific to monitoring fluids |
| 3    | 3       | Increasing fiber and fluids  
- Feedback: adherence to guidelines for diet diaries specific to monitoring fluids  
- Education: water, digestion, constipation, and encopresis  
- Children’s age-based clear fluid goals  
- Age-based guidelines for juice and milk  
- Behavior modification techniques to increase children’s daily water intake  
- Water bottles |
| 4    | 4       | Toilet sitting  
- Feedback: adherence to guidelines for diet diaries specific to monitoring fluids  
- Problem-solve use of behavior modification techniques |
| 5    | 5       | Achieving fiber and fluid goals  
- Feedback: adherence to guidelines for diet diaries specific to monitoring fluids  
- New age-based fluid goals  
- Water mix-ins and other ways to increase reinforcing value of drinking water  
- Review behavior modification techniques to increase children’s daily water intake |
| 6    | -       | No group session |
| 7    | 6       | Maintaining treatment gains  
- Strategies for maintaining gains  
- Sick days and vacation |
Addendum to Session 1 (Physiology)

Goals: 1. Educate parents regarding role of fluid in prevention of constipation.
   2. Train parents in recording children’s fluid intake.

Supplies needed: Diet diary guidelines and Tips-Fluids handout, How to Complete a Diet Diary handout, and diet diary forms (7 for each parent)

I. Emphasize the role of water to digestion

“After the food gets mashed up and turned into liquid in the stomach, it passes into the small intestine where nutrients and water are absorbed and sent to the rest of the body. The remainder of eaten food then goes to the large intestine, where more water is removed and where the waste is converted into stool.

When your child does not have a bowel movement everyday, more water gets removed from his or her stool than normal, which makes the stool hard and less comfortable to pass. This can contribute to children not wanting to have a bowel movement again because they naturally want to avoid what they think will be painful. When your child withholding stool, or goes several days without a bowel movement, even more water is removed from the stool and it can get stuck or impacted. So you can see that drinking lots of water is important to keeping your child’s stool soft, comfortable, and regular.”

III. Daily diet diaries

A. How much?

“In addition to recording all the items your child eats, we ask that you also record everything your child drinks. Fluids can be listed in either cups or fluid ounces, but graphs that you receive during group will use fluid ounces. The handout that you receive today about keeping the diet diary will include a conversion table from fluid ounces to cups. The handout also includes the fluid ounces for common liquid serving modalities such as a standard table glass, a box of juice, or a sippy cup.

It is important that you try to be as accurate as possible in your recording. If you are uncertain how many fluid ounces are in a cup or bottle that you may be using, fill the cup or bottle and then pour the contents into a measuring cup. If you are eating at a fast food restaurant, please remember to document which restaurant, as portion sizes for a child’s size or medium drink may be different.

Similar to what you just learned about foods, it is important for you to write down the type and quantity of liquid you provide to your child AND how much he or she actually drank. If you are unsure how much liquid your child actually consumed,
you can always pour the remainder into a measuring cup and subtract this amount from what you originally presented.

B. What type?

“It is important to document the type of fluid your child consumed and indicate brand names. If your child drinks juice, it is important to note whether it is 100% juice. For example, Juices made by Juicy Juice are 100% fruit juice while some varieties or Oceanspray are fruit cocktails and are not 100% juice. It is important to make this specification because it helps us with analyzing your children’s daily diet diaries. On a similar note, if your child drinks milk, it is important to note whether it is whole milk, organic skim milk, or soy milk.”

C. Tricky items…

“We have noticed in past groups that there are some items that parents often forget to document, so we want to tell you about those today so you may be more likely to remember. First, it is important that you note how much milk you added to your child’s cereal. You should also specify whether your child consumed all of the milk or whether some is left in the bowl.

Second, if you cut your child’s juice or any other drink with water, please specify how much water and much juice was in the cup. For example, 40% water and 60% juice.”

IV. Snack at group

“Your children will be provided with a snack at each group session, which includes a high-fiber food and water to drink. Because you cannot be an observer during snack time, the group leaders for the child’s group will be completing a snack time report card for each child that you will receive at the end of group to help with keeping the diet diaries.”

V. Homework

“Each week your children will receive goals that reflect material taught during group sessions. This week your child’s goal is to help you with the diet diaries by telling you what he or she ate and drank at all meals and snacks. You will need to prompt your child to help you with this task and you may even need to prompt them with the types of fluids they drank. It is likely that children will not know how many fluid ounces they consumed, so you may need to ask them questions like “Did you drink half or your glass/juice box?” After your child actively helps to complete the diet diary, provide praise about what you liked. For example, you could say:
“Mike, you did a great job telling dad what you had for lunch today. You are on your way to earning a sticker today!”

“Melanie, you had one glass of water for breakfast and milk in your cereal. What do you think I should write on your daily diet diary?”

If your child communicates with you about what he or she ate and drank at each meal during the day, then you should place a sticker on his or her chart and use positive praise again. For example,

“Matt, you did a really nice job telling mom what you drank today. Let’s put a sticker on your chart. Way to go!”

We are going to practice this teamwork today when we join the children’s group”

VI. Join child’s group

A. Review homework goals and number of stickers needed to earn prize at next group session.

B. Assist parents and children in documenting the information from the snack report card onto the diet diary. Ensure that parents provide children with praise for this communication.
Diet Diary Guidelines and Tips—Fluids

- Record immediately after your child drinks to increase the likelihood that you will remember exactly what and how much was consumed.
  - If you are away from home, keep a small notebook or piece of paper with you to make recording immediately after meals and snacks easier.

- Document the brand name/type of what your child drank, the amount offered, and the amount consumed
  - Indicate the type of milk your child drank and whether juice was 100% juice
  - Remember to record the amount of milk in your child’s cereal
  - Note how much water/juice if you cut your child’s juice with water

- Measuring
  - All drinks should be recorded in either cups or fluid ounces.
    - Use a measuring cup if you are unsure
    - Check labels of water, fruit drink, etc. for fluid ounces
    - Specify fast food restaurants as portion sizes vary
  - Typical portion sizes
    - Table glass (short or tall) = 8 ounces
    - Sippie cup = 4-6 ounces
    - Juice box = 6.75 ounces (standard), 4.23 ounces (small)
    - School milk carton = 8 ounces
  - Fluid ounces → Cups conversion
    - ¼ cup = 2 fluid ounces
    - ½ cup = 4 fluid ounces
    - ¾ cup = 6 fluid ounces
    - 1 cup = 8 fluid ounces
How to Complete a Diet Diary

Incomplete Diet Diary

**BREAKFAST**

<table>
<thead>
<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
<th>Amount Left</th>
<th>Amount Consumed</th>
<th>Fiber</th>
<th>Fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereal</td>
<td>1 cup</td>
<td>none</td>
<td>All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange juice</td>
<td>1 cup</td>
<td>half</td>
<td>Half</td>
<td></td>
<td>½ cup</td>
</tr>
</tbody>
</table>

Total Fiber =  
Total Fluid = ½ cup

*Remember, you must document what type of milk and how much was added to the cereal!*  

**LUNCH**

<table>
<thead>
<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
<th>Amount Left</th>
<th>Amount Consumed</th>
<th>Fiber</th>
<th>Fluid</th>
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<tbody>
<tr>
<td>Chicken noodle soup</td>
<td>1 cup</td>
<td>none</td>
<td>All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>1 water bottle</td>
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</table>

Total Fiber =  
Total Fluid = ??

*Remember, you must document the amount of fluid left so we can determine how much your child actually drank*

Completed Diet Diary

**BREAKFAST**

<table>
<thead>
<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
<th>Amount Left</th>
<th>Amount Consumed</th>
<th>Fiber</th>
<th>Fluid</th>
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</thead>
<tbody>
<tr>
<td>Wheat Chex Cereal</td>
<td>1 cup</td>
<td>none</td>
<td>All</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1 cup Skim Milk</td>
<td>1 cup</td>
<td>none</td>
<td>All</td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Orange juice</td>
<td>1 cup</td>
<td>half</td>
<td>Half</td>
<td></td>
<td>½ cup</td>
</tr>
</tbody>
</table>

Total Fiber =  
Total Fluid = 1 ½ cups
Sample Diet Diary form*

Date: ____________

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<th>DIET DIARY</th>
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**BREAKFAST**

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<th>Amount Consumed</th>
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Total Fiber =
Total Fluid =

**SNACK**

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<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
<th>Amount Left</th>
<th>=</th>
<th>Amount Consumed</th>
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Total Fiber =
Total Fluid =

**LUNCH**

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</table>

Total Fiber =
Total Fluid =

**SNACK**

<table>
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</table>

Total Fiber =
Total Fluid =

*Actual form includes more lines for parents to document foods and drinks consumed under each meal heading*
### Water and Clear Fluid Goals

#### DINNER

<table>
<thead>
<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
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<th>Fluid</th>
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</table>

Total Fiber =

Total Fluid =

#### SNACK

<table>
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<th>Food &amp; Beverage</th>
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</tbody>
</table>

Total Fiber =

Total Fluid =

Daily total fiber: _______g

Daily total fluid: ____ounces

*Actual form includes more lines for parents to document foods and drinks consumed under each meal heading*
Addendum to Session 2 (Medication)

Goal: Review diet diaries and provide feedback

Supplies: diet diaries (7 for each parent)

I. Diet diary feedback

“We are going to take the first few moments of the group to review your diet diaries and provide you with feedback.”

A. Discuss examples of good self-monitoring

“I can see that Mr. Smith did an excellent job with monitoring what his son drank this week. For example, I can see here that John ate cereal for breakfast that contained 1 cup of skim milk. Mr. Smith also noted that ½ of the milk remained in the bowl after John was finished eating. Nice work with recording Mr. Smith!”

B. Discuss example of problematic self-monitoring

“In looking at the diet diaries, I noticed that many of you did not record the actual amount of fluid your child drank. This is a common thing to forget, but important to remember because sometimes your child does not drink as much fluid as you offer to him or her. This will become especially important when your child is given fluid goals in later group sessions”

Note to group leader: When reviewing diet diaries, remember to note whether parents documented total amount of fluid consumed by the child, whether juices were 100% juice, and the type of milk provided. Make hand written comments on each diet diary.

II. Homework

“Your child needs to continue to communicate with you about what he or she drank this week and should earn a sticker if this goal is achieved. Remember, you may need to prompt your child to engage in this discussion.”

III. Join child group

A. Review homework goals and number of stickers needed to earn prize at next group session.

B. Assist parents and children in documenting the information from the snack report card onto the diet diary. Ensure that parents provide positive praise.
Addendum to Session 3 (Fiber and Fluids)

Supplies: handouts (Clear vs. Non-Clear Fluids, Traffic Light, AAP recommendations, Caring for Your Child’s Nalgene Water Bottle, Techniques for Helping Your Child Achieve Clear Fluid Goals, Sample Meal Plan), new diet diary form (7 for each parent), cups with red tape at 6-ounce marker, special water stickers

Goals: 1. Review diet diaries and graphs and provide feedback.  
2. Review water, digestion, constipation, and encopresis.  
3. Provide education about clear versus non-clear fluids and age-based recommendations for juice and milk.  
4. Teach behavior modification techniques to help increase adherence to clear fluid goals.

I. Review of diet diaries and graphs  
A. Praise parents for maintenance and/or improvement with respect to self-monitoring.  
B. Provide written feedback on diet diaries if parents are still not adhering to guidelines for self-monitoring.  
C. Graphs  

“Today you are all receiving a graph of how much clear fluid your child during the first week of treatment. You’ll notice that the date is provided on the bottom of the graph and the amount consumed in fluid ounces is on the vertical. There are two lines on your graph. The blue line has many dots and reflects the pattern of how much your child drank day by day. The pink line is the weekly average for how much your child drank. The only fluids that are added into the graph are clear fluids. Each week you when you come to group you will receive a graph and the previous week’s information will be added. This data is helpful because it allows you to see whether your child is making progress. The average line is added because it is often difficult to determine whether progress is made if your child’s data points do not go up rapidly, if they go up and down, or if they don’t seem to follow any pattern.”

II. Clear fluid goals  

“We are also going to set goals with respect to the amount of clear fluid that your child needs to drink each day. Remember, drinking clear fluids is important to keeping your child’s stool soft and helping to make the stools comfortable and easy to pass. Your child’s clear fluid goal is twice his or her fiber goal in fluid ounces. So, for example, Mrs. Rice’s son is 6 years-old. Adding five to his age is 11, so his fiber goal is 11 grams. His fluid goal is then two times 11, which is 22 fluid ounces. Let’s calculate the fluid goals for all of your children.”
III. Clear versus non-clear fluids

"Now that everyone knows their child’s clear fluid goal, it is important to talk about what fluids count towards that goal. We will be providing you with a handout that summarizes the types of fluids that are clear versus not clear. Clear fluids are any fluid that does not contain dairy and is not caffeinated. As you can see on the handout, water, juice, Gatorade and other sports drinks, Iced Tea, and hot chocolate made with water are all examples of clear fluids.

Fluids that do not count towards your child’s clear fluid goal include milk, soda, and any other fluids that contain dairy or caffeine such as an ice-cream smoothie or some iced teas. Your children are learning a special way to remember the types of fluids that count towards their clear fluid goals. They are being shown a picture of a stoplight and taught that water is a green fluid because it helps them go towards their clear fluid goal. They are learning that juice, Gatorade, and lemonade are yellow drinks, which means they help them move towards their clear fluid goal but that they should only drink these types of fluids in smaller amounts. Finally, they learn that red drinks are drinks like milk and soda/pop that do not help them towards their clear fluid goal at all. We have a handout for you that summarizes the stoplight for drinking clear fluids.

It is very important that you continue to document the type and brand name for all fluids your child drinks so we can help you discern whether items are clear fluids or not. It is also important to remember to document the amount of fluid your child actually consumes. If this spot is blank, then we cannot add fluid towards your child’s goal because we don’t know how much he or she actually drank."

IV. Age-based fluid recommendations

A. Milk

“One concern that parents often have is that we make the recommendation to cut back on the amount of dairy your child consumes, including milk, and that this might mean that your children would not getting enough calcium each day. The American Academy of Pediatrics has stated that children 8 and under can meet their daily calcium requirements by drinking 3 glasses (24
ounces) of milk each day and that children 9 and older can meet their daily calcium requirements by drinking 4 glasses (32 ounces) of milk each day.

We did an analysis of diet diaries for all of the children who participated in our group intervention in the past two years and found that 63% of the children exceeded this recommendation during the first week of treatment and that 50% of the children exceeded milk recommendations during the last week of treatment. This is problematic because the extra glasses of milk could have been substituted with fluids that would help kids achieve their clear fluid goals. It is also important for you to know that your children can meet their daily calcium requirements by eating foods that are high in calcium such as broccoli and beans. These foods are also good for your children because they are high in fiber. We will give you a handout today with the age-based recommendations for milk and also a list of foods that are high in calcium.

B. Juice

“In our analysis, we also noticed that children were heavily increasing the amount of juice they drank each day to meet their clear fluid goals. This does follow treatment recommendations, but the problem is that in doing so, 50% of children met or exceeded age-based daily juice recommendations from the American Academy of Pediatrics. Exceeding these recommendations places your child at risk for cavities and over or malnourishment because of the high calorie content and low nutrient content of juice. In fact, the American Academy of Pediatrics also states that there is no nutritional benefit of children drinking juice over eating whole fruit. If your children eat whole fruit instead of drinking fruit juice, they are also working on their fiber goal because most fruits contain fiber.

You will probably be surprised to know that the recommendations for juice intake are ½-¾ of a cup for children ages 6 and under and 1 to 1 ½ cups for children ages 7 and older. These recommendations are also on the handout you are going to receive now. Similar to milk, many of you might find that your children are exceeding the age-based juice recommendations. Thus, if you cut back on juice to meet recommendations, which leaves room for your children to drink other types of clear fluid such as water.

C. Drinking in moderation

“There are not age-based guidelines for other clear fluids like hot chocolate or Gatorade. You will still want to provide these drinks to your children, but only in moderation. If you withhold all of the drinks that your child typically drinks, then you may find that your children become resistant and even tantrums. This also applies to providing juice and milk. More specifically, if your children are used to drinking juice and milk each day, then continue to
provide juice and milk at levels that are consistent with the age-based recommendations we discussed earlier.”

D. Water and water bottles

“The one type of fluid that your children should have unlimited access to is water. There are lots of health benefits to drinking water besides its ability to help decrease symptoms of constipation and you will receive a handout about that today. The problem is that many children do not like to drink water. Part of what you are going to learn today are skills that you can use to help your children change this part of their diet, which will help them achieve their clear fluid goals.

In addition, each of your children will be receiving a Nalgene water bottle today. These water bottles have a fluid ounce marker on the side (show example), which will help you monitor how much water your child is drinking during the day. Each bottle holds 16-ounces, so if your child drinks one bottle each day, he or she will be well on the way towards achieving his or her clear fluid goal. This feature is also helpful because it can serve to help you gauge how much water your children drinks during times when you are not able to monitor such as school or at a particular activity like a sports practice or boy scouts.

Nalgene water bottles fit easily in the side pocket of most backpacks and also have a loop on the top that makes them easy to carry. They also come in bright colors so they will be a good visual cue to remind you to prompt your children to drink water and for your children to remember to drink water on their own. Many people decorate these types of water bottles with stickers from special places and events.

In addition to a daily clear fluid goal, your children are going to receive a water bottle goal. This will not only help them towards earning their big clear fluid goal, but will also help them drink regularly from their water bottles.

Your child’s water bottle goal is to drink at least ½ of a water bottle. This is equivalent to 8 ounces or one glass of water. If he or she meets this goal, then you should put a special water bottle sticker (show stickers) on his or her sticker chart. You are receiving extra water bottle stickers that you can give to your child when he or she meets this goal to put on his or her water bottle.

Your child will also be receiving IceTubes today. IceTubes are special ice cubes that are longer so that they can fit into water bottles with narrow necks. Once frozen, they can be placed in your child’s Nalgene bottle and will help to keep water cold. Alternatively, you can also put a small amount of water in the bottom of your child’s Nalgene bottle and freeze that overnight to keep water chilled the next day.
We will be providing you with a handout about how to care for your child’s Nalgene water bottle. It is VERY important that you clean the water bottle after each use as we know that failing to do so can increase the probability that bacteria will begin to grow in your child’s water bottle. Washing also helps prolong the life of the water bottle and decreases the probability that it will begin to smell or stain.

IV. Meal planning

“Your children are participating in an activity today to teach them how to make good choices and meals and snacks with respect to drinking fluids to help them achieve their clear fluid goals. We are going to provide you with some tips for meal planning as well because remember, most of the time your children do not make meals and get drinks on their own. You are the ones who provide them with the things they eat and drink!

At breakfast, if your child has milk in his or her cereal, then you need to think about the fact that this should be deducted from how much milk he or she should drink each day in total. Rather than giving your child another serving of milk, think about a clear fluid that could be presented instead. Water is always the best choice. If your child asks for juice, you should remind him or her that he or she can only have one cup of juice each day. So, if he or she picks juice for breakfast, then no more juice will be served for the rest of the day. Also remember that many children are served juice for snack at school or other social activities. So it might be best to let them use their juice at those events and stick to drinking water, other types of clear fluid, or limited amounts of milk at home.

You also might want to save your child’s serving of juice for lunch if he or she is used to having a juice box. Children want to drink what other children are drinking, and we all know that it’s more likely for your child’s peers to have juice or milk in their lunch than water. You may be able to control what your family drinks for meals at home, but it is much harder to control what other people will send with their child for lunch.

At dinner, it might be wise to review your child’s diet diary and count how much juice, milk, and clear fluids he or she has already consumed. If your child is close to or already has achieved his or her clear fluid goal, then it might be a good opportunity to provide your child with a special drink for dinner. If your child has not achieved his or her goal, then you should provide clear fluid during the meal.”

V. Behavior modification techniques for improving daily water intake

“Some of the techniques we are going to talk about now you have already learned about either earlier today or in previous sessions. Others will be new. You will
receive a handout that summarizes all the skills as they apply to increasing water intake for quick reference during the week."

A. Positive reinforcement

“The first technique we are going to review is positive reinforcement. As you remember, in the context of our group treatment children earn stickers for meeting their daily goal. When your child achieves his or her clear fluid goal for the day, then you should reward your child by placing a sticker on his or her star chart. We have special stickers for you to use that you will receive at the end of group today. Remember, stickers should ONLY be placed on the chart if your child achieves his or her fluid goal.”

B. Positive praise

“The second technique we will review is positive praise, which is providing verbal or non-verbal feedback to your child when he or she does something that you like. In this case, the behavior you want to praise is drinking clear fluid and especially drinking water. You should provide extra praise if your child independently asks you for a glass of water. Remember to use a variety of words or phrases in your positive praise and remember to state what your child is doing that you like so he or she knows the behavior that needs to be repeated to receive your praise. For example:

I really like the way you just took a big gulp of water Jason!

You just finished your whole water bottle Samantha! Way to go! Let’s put a sticker on your star chart.

You can add non-verbal gestures to your verbal praise to make it even more effective. For example, you might give your child a hug or a high-five. Also remember that your praise will be most effective if you deliver it immediately after your child’s behavior.”

C. Differential attention

“The third technique to use is differential attention. Remember that this is providing attention to your child when he or she is behaving in a way that you like and removing attention when he or she is behaving in a way that you don’t like. When applied to drinking water, you should provide praise and attention when your child drinks water and ignore when your child engages in behaviors that are incompatible with drinking water, such as whining or asking you for a different type of fluid. If your child struggles to drink clear fluids other than juice, you may need to provide attention and praise for behaviors such as touching the cup or picking up the glass. For example:
Kelly, I can see that you are thinking about drinking your water because you have your cup in your hand.

As we said before, ignoring your child’s negative behaviors is often the hardest part! So if you have difficulty with this technique or feel frustrated, that’s okay! Just keep working hard and remember that your child’s behavior may get worse before it gets better. This is because your child has learned that acting negatively results in attention, so it is natural for your child to think that he or she needs to act worse to get your attention. By consistently ignoring the negative behaviors, your will extinguish them. Your child will learn the appropriate behaviors when you shift your attention to the desired behaviors.

Because this technique can be more challenging to use, you may want to practice using it with your spouse, a friend, or a grandparent before using it with your child.”

D. Goal setting

“A fourth technique that you are going to learn today is goal setting. Many of you have probably set goals before and we would like to assist you in thinking about how to set smaller goals for your child to help him or her achieve his or her larger, daily clear fluid goal. Using goal setting in this way is helpful when establishing a new behavior because it is often hard to go from no instances of a behavior to performing a new behavior.

For our purposes, the new behavior is your child drinking his or her fluid goal. Not all children drink lots of fluid each day, so having to drink more than one glass may be a big challenge! In addition, children have smaller stomachs than adults and thus will get fuller faster. Furthermore, your children may be used to drinking lots of juice or milk but not lots of water.

In order to overcome these challenges, we are going to give your children a smaller water goal that they need to meet at breakfast, lunch, and dinner.

1. Younger child group

   a. In order to overcome these challenges, we are giving your children a smaller water goal of drinking 4 ounces of water that they need to meet at breakfast, lunch, and dinner. This is equivalent to ½ cup of water.

   b. This amount is recommended because it reflects the earlier discussion we had that children should always drink twice the amount of fiber they eat. In addition, it helps your child to achieve the goal of 4 ounces of water that we talked about before. Thus, 4 ounces of water at each meal will be the
minimum needed to match the minimum requirement of 2 grams of fiber per meal.

2. Older child group

   a. In order to overcome these challenges, we are giving your children a smaller water goal of drinking 6 ounces of water that they need to meet at breakfast, lunch, and dinner. This is equivalent to ¾ cup of water.

   b. This amount is recommended because it reflects the earlier discussion we had that children should always drink twice the amount of fiber they eat. In addition, it helps your child to achieve the goal of 6 ounces of water that we talked about before. Thus, 6 ounces of water at each meal will be the minimum needed to match the minimum requirement of 3 grams of fiber per meal.

   (4 or 6, for younger and older child groups respectively) ounces may sound like a lot of fluid, but it really is not. We brought some different size cups today and have included a ring around each to show you the (4-ounce or 6-ounce) mark to show you that most likely your children are drinking more than (4 or 6) ounces of fluid at a time.

   As you can see here, (4 or 6) ounces of water in this sippy cup would not even fill the entire cup. Most sippy cups hold 6-12 ounces, so you’ll want to be familiar with how much your child’s cup holds if he or she is using a sippy cup.

   This is a child size cup and once again (4 or 6) ounces of water would not fill it completely. Most child size cups hold around 10 ounces of fluid. The cups that we use to serve water to your children during snack time hold 9 ounces and most of your children drink an entire glass of water during group with ease. Adult size cups typically hold between 12-22 ounces. So when you place (4-6) ounces in an adult size cup, the amount actually looks tiny!

   Similar to with the water bottles, we have special water stickers for you to provide to your child when he or she meets his or her meal-based water goal. It is important to present this sticker right as they finish their water so they learn what behavior you like. You should also place one sticker on the child’s chart at the end of the day if he or she drank (4 or 6) ounces of water at each major meal.”

E. Modeling

“A fifth technique that will help your child to achieve his or her clear fluid goal is modeling. This technique involves having a model perform the desired behavior for the learner. In this case, the desired behavior is drinking water and you, your
spouse, and other family members are the models. So we would ask that your family also drink water at meals. Remember that children develop preferences for food and drinks based upon what they see other people drinking. Your child may learn to associate drinking water with being sick if he or she is the only person in the house drinking water, so be a good model and make sure you drink 6-8 ounces of water at each meal too.

It is also important when using modeling that the consequences of the desired behavior are very clear. The consequence of your child drinking 6 ounces is receiving a special water sticker. We do not expect that you would provide a spouse with a sticker for drinking water. However, you can provide positive praise. For example,

“Wow, I really like how daddy is drinking his water”

You can also model good water drinking when at restaurants or public places by asking for water. Don’t forget that lemon, lime, and orange slices are often available at restaurants and can be added to regular water to enhance its flavor.”

F. Liquid Fading

“Liquid fading is a sixth technique that can be helpful especially if your child typically drinks high quantities of juice and milk and is resistant to drinking water. Fading is a technique where you decrease the strength of a cue for one behavior and transfer it to increase the strength for another behavior. For our purposes, there are visual cues that your children use to know what they are drinking and whether they will probably like the taste. For example, milk is white and juice often has different colors. However, water doesn’t have any color.

Liquid fading can be used by slowly adding more and more water to the juice and/or milk that is served to your child. This way, the color and taste of the milk or juice becomes more diluted and your child slowly learns to drink water. This is a great technique to use to decrease your child’s juice and milk intake to the age-based recommendations we discussed earlier. The question you might be asking is how much water to add at a time and the answer is that it depends upon how much fluid you serve to your child and whether you are already cutting juice or milk with water.

We would recommend beginning by replacing ¼ of the fluid you typically serve to your child with water. You can begin with a larger portion of water if you already cut your child’s juice or milk with water. Once he or she drinks the new mixture without displaying resistance, you should increase the amount of water by ¼ increments until your child is drinking 100% water.
G. Rules and consequences

“A seventh technique that may be helpful is to set rules about the types and amounts of fluids your child can drink. Rules tell your child what behavior needs to occur in order to receive the positive consequence and also alert your child to the negative consequence for not performing the desired behavior.

There are five things that you should do to increase the probability that using rules will be effective. In other words, there are rules for using rules! First, you need to tell your child what the rule is prior to putting it into effect. For example:

It’s dinner time. You need to drink one glass of water with dinner or you will not earn your sticker.

Second, have your child repeat the rule back to you to make sure he or she understands. You can also use a “what if...” to provide an example to further ensure your child understands the rule. For example:

What happens if you do not drink your glass of water at dinner?

Third, rules only work if you are consistent in applying the appropriate consequences. If you are not consistent with the consequences, then your child learns that he or she can keep performing the undesired behavior like crying or whining. Fourth, make sure to repeat the rule before each meal as a reminder for your child. Finally, make sure that you provide positive praise when your child abides by the rule.

You can use rules to help with your child’s meal-based water goal. For example, you can set a rule that your child must drink 6 ounces of water at each meal. Because drinking 6 ounces of clear fluid at each meal is one of your child’s goals for this week, if he or she does not meet this goal then the consequence is that no star is given, which decreases the probability of your child earning enough stars for a prize at the next group session.

A second rule is that only water will be provided for drinks between meals. If he or she does not accept water, then the consequence is not getting anything to drink.

Finally, one type of rule that we know works particularly well for shaping children’s eating and drinking behavior is to use a preferred food or drink as the reward for eating or drinking a non-preferred food or drink. For example:

You must drink one glass of water before you can have juice or milk.
VI. Homework

“This week you’ll notice that the number of boxes on the sticker chart has grown. Your child has five goals with respect to drinking clear fluids. First, your child needs to continue to communicate with you about the fluids he or she drinks each day. By now this should be habit but you may sometimes still need to encourage and prompt your child to help him or her achieve this goal. Second, your child needs to achieve his or her clear fluid goal each day. Third, your child should drink at least (4 or 6) ounces of water at each meal to meet his or her meal-based water goal. Finally, your child needs to drink (one-half water bottle) to meet his or her water bottle goal.

If your children achieve these goals at the end of the day, then you should put stickers on their charts accordingly. Don’t forget, however, that stickers should also be provided immediately as your child meets his or her meal-based water goal. If you wait until later, then he or she might not remember why the sticker was earned. Finally, please remember to provide your child with water bottle stickers if he or she meets his or her water bottle goal.”

VII. Daily diet diaries

“Until this week, we have been totaling the amount of clear fluid your child drinks each day. Similar to the shift with calculating your child’s fiber intake at all meals and snacks, you are now going to begin calculating your child’s clear fluid intake at all meals and snacks. By documenting this information you will know whether your child drank 4 or 6 ounces of water at each meal and subsequently whether to put a sticker on his or her chart for achieving this goal. You will also be asked to total how much clear fluid your child drank each day and write your child’s clear fluid goal. This will provide you with information to determine whether or not your child achieved his or her clear fluid goal and whether to place a sticker on his or her chart for this goal. In addition, reviewing diet diaries during the day can be helpful to meal planning as was demonstrated earlier. Finally, you will be asked to circle whether your child exceeded age-based guidelines for juice and milk intake. Providing this information will alert you on how you are doing with ensuring your child drinks healthy amounts of these types of fluids.”

VIII. Join child’s group

A. Review each child’s fiber and clear fluid goals.

B. Review homework goals and number of stickers needed to earn prize at next group session.

C. Assist parents and children in documenting the information from the snack report card onto the diet diary. Ensure that parents use positive praise.
### Clear versus Non-clear fluids

<table>
<thead>
<tr>
<th>Clear Fluids</th>
<th>Non-Clear Fluids</th>
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<tbody>
<tr>
<td>Water</td>
<td>Milk</td>
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<td>(includes flavored waters)</td>
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<tr>
<td>Juice and fruit drinks (e.g., SunnyD and Cranberry Cocktail)</td>
<td>Energy drinks</td>
</tr>
<tr>
<td>Non-caffeinate slurpees/slushies</td>
<td>Caffeinated slurpees/slushies</td>
</tr>
<tr>
<td>Hot chocolate made with water</td>
<td>Hot chocolate made with milk</td>
</tr>
<tr>
<td>Fruit smoothies made with ice</td>
<td>Fruit smoothies made with milk/ice cream</td>
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<tr>
<td>Non-caffeinated soda, pop, or teas</td>
<td>Caffeinated soda, pop, or teas</td>
</tr>
<tr>
<td>Gatorade and other sports drinks</td>
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</table>
Going for my clear fluid goal!
Caring for your child’s Nalgene Water Bottle

1) Remember to wash your child’s water bottle after every use.

2) To wash by hand, empty contents from water bottle and soak in warm, soapy water (baking soda can be added).

3) To wash in the dishwasher, empty contents and place on the top rack away from the heating elements.

4) If the water bottle begins to smell, and washing by hand or dishwasher does not help, then roll a charcoal briquette into a piece of newspaper and place in the bottle (lid screwed on) for a couple of days. Make sure to wash either by hand (warm, soapy water) or in dishwasher after treating with the charcoal!

5) If staining in the water bottle occurs, mix 1 tablespoon of bleach for every cup of water added to the bottle to cover the stained section. Let the water bottle soak over night, and then make sure to wash either by hand (warm, soapy water) or in dishwasher!

*http://www.nalgene-outdoor.com*
American Academy of Pediatrics
Age-Based Fluid Recommendations

Milk
- Ages 2-8: 3 cups (24 ounces)
- Ages 9-12: 4 cups (32 ounces)

Juice
- Ages 3-6: \(\frac{1}{2} - \frac{3}{4}\) cup (4-6 ounces)
- Ages 7-12: 1- 1 \(\frac{1}{2}\) cups (8-12 ounces)
Techniques for helping your child achieve clear fluid goals

Positive reinforcement: providing a good consequence after your child drinks clear fluids. This technique works best if given immediately after the good behavior.

Ex: having child place sticker on chart for achieving fluid goal

Positive praise: providing positive verbal or non-verbal feedback after drinking clear fluid. Remember to:

- Provide immediately after behavior is performed
- Use different words if providing verbal feedback
- Describe exactly what behavior you liked (i.e., drinking water)

Differential attention: provide attention or positive praise to your child when he or she drinks clear fluid (especially water!) and remove attention or ignore your child if he or she displays behaviors incompatible with drinking water (i.e., whining, bargaining, or refusing to drink the water).

- Don’t forget that you can attend to others who are drinking clear fluids to show your child what behavior he or she needs to perform to gain your attention!

Fading: Adding increasing larger proportions of water to your child’s milk and juice to decrease consumption of these fluids to age-based recommendations and to help increase his or her overall daily water intake.

- Start by replacing ¼ of the milk or juice typically served to your child with water. Once your child drinks this mixture with no resistance, continue substituting with water in ¼ increments.

Modeling: you and additional family members drink water in front of your child who is participating in group.

- Set a good example by drinking water at meals with your child
**Rules**: a statement about the consequences for drinking clear fluids or not drinking clear fluids. Remember the following rules for using rules:

- State the rule before you want to use it
- Make sure your child understands the rule
- Provide appropriate consequences
- Repeat rules before each meal
- Praise your child for following the rules

**Suggested rules:**

1. You must drink 6 ounces of water at each meal or you do not earn your sticker.
2. You must drink water before you can have juice or milk. If you do not drink water, then you cannot have juice or milk.
3. You may only have water between meals. If you do not want water, then you cannot have anything to drink right now.
**Water and constipation**

- Water is removed from stool in the large intestine and rectum to make stool solid.

- When children do not have a bowel movement each day, more water is removed, which makes stool harder and more difficult to pass. This is a sign of constipation.

- Sometimes so much water is absorbed that stool becomes impacted.

*Drinking water and other clear fluids is important for keeping your child’s stool soft, comfortable, and easy to pass!*

**Water and general health**

- 60-70% of the human body is made of water

- Water serves many purposes like regulating body temperature, protecting joints and organs, and transporting oxygen to cells.

- Humans lose water each day through urination, sweat, digestion, bowel movements, and breathing.

- Dehydration is when the body does not have enough water to perform all necessary bodily functions. Signs of dehydration include: thirst, headaches, constipation, dry mouth, dry skin, bright/dark yellow urine.

*Drinking water is also important to making sure your child has enough internal water to perform all of the above bodily functions and prevent dehydration!*
## DIET DIARY

### BREAKFAST

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<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
<th>Amount Left</th>
<th>Amount Consumed</th>
<th>Fiber</th>
<th>Fluid</th>
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<th>Food &amp; Beverage</th>
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<th>Amount Left</th>
<th>Amount Consumed</th>
<th>Fiber</th>
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Total Fiber =

### DINNER

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Date:___________

Water and Clear Fluid Goals 230
SNACK

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Fiber **Goal:** _____g

Total Fiber Today: _____g

Fluid **Goal:** _____ ounces

Total Clear Fluid Today: _____ounces

Exceeded juice recommendations: yes  no

Exceeded milk recommendations: yes  no
Addendum to Session 4 (Toilet sits)

Goals: 1. Review graphs and behavior modification techniques
       2. Provide feedback about diet diaries for past week

Supplies needed: fluid graphs, diet diary forms (7 for each parent), special water stickers

I. Graphs

   “We are going to start today again by reviewing graphs. Remember that the graphs you receive today reflect the amount of clear fluid your child drank in the week before clear fluid goals were prescribed.”

II. Feedback about diet diaries

   A. Positive praise should be provided to the group for continuing to complete daily diet diaries.

   B. Include comments about changes you notice such as whether children are meeting the 6 ounce goal at meals and whether you notice more water. For example:

      “I can see in Mrs. Gulliver’s diet diary that her son drank 6 ounces of water at each meal. Great job!”

   C. Make verbal comments about problematic areas, such as continuing to document how much fluid was consumed at a particular meal and whether parents noted whether age-based recommendations for juice and milk were exceeded.

III. Review use of behavior modification techniques

   “We would like to take some time to review whether you all used the techniques taught in the last group session to help your child drink more water and less juice and milk. We’d also like to know whether those techniques worked or whether you have any questions about their use. If you do have questions, it is helpful to provide specific examples if you feel comfortable sharing as this will aid in the group problem-solving together.”

   Provide praise when parents describe successful use of techniques. Encourage parents to help each other problem-solve why a particular technique might not have resulted in a child drinking water and intervene where appropriate.
IV. Homework

“Your child’s goals with respect to drinking clear fluids and water will remain the same this week. To review, your child can earn stickers for telling you what he or she drank during the day, for meeting his or her clear fluid goal, and for drinking 6 ounces of water at each meal. We have more special stickers for you to use if your child drinks an entire water bottle and/or drinks 6 ounces of water at each meal. Don’t forget that you have enough of the special stickers so that you can put them on your child’s water bottle!”

V. Join child’s group

A. Review homework goals and number of stickers needed to earn prize at next group session.

B. Assist parents and children in documenting the information from the snack report card onto the diet diary. Ensure that parents provide positive praise.
Addendum to Session 5 (Achieving Fiber and Fluid Goals)

Goals: 1. Review graphs  
2. Provide feedback about diet diaries  
3. Inform parents of their child’s new clear fluid goals  
4. Review importance of 2:1 for fluid:fiber  
5. Teach parents new ways to make water taste better and more fun to drink

Supplies: Fun ways to drink water handout, special stickers (water, water bottle, and super water), and diet diary forms (7 for each parent)

I. Review graphs

“Today you’ll notice that the fluid graph you receive contains an additional line. This line represents your child’s clear fluid goal and will help you see visually whether your child met his or her goal on a daily basis and also whether his or her weekly average for clear fluid was consistent with his or her goal. The line is also helpful in problem-solving. More specifically, if your child exceeded his or her goal on a particular day, why? Did you utilize a specific technique learned in group? Alternatively, on days where your child did not achieve his or her goal, what got in the way? Is it possible to take the strategies that led to successful days and apply them to overcome days where the same barriers might come up?”

II. Feedback about diet diaries

A. Positive praise should be provided to the group for continuing to complete daily diet diaries.

B. Include comments about changes you notice such as whether children are meeting their meal-based water goals and water bottle goals.

C. Make verbal comments about problematic areas, such as continuing to document how much fluid was drunk at a particular meal and whether parents noted whether age-based recommendations for juice and milk were exceeded.

III. New fluid goals

“Today your children will also be receiving new clear fluid goals. Your child’s clear fluid goal will still be twice his or her fiber goal, but the prescribed number of fluid ounces will increase because the prescribed number of grams of fiber increases. The calculation this time is two times your child’s age +10. So, for example, a 6 year-old child has a new fiber goal of 16 grams and a new clear fluid goal of 32 fluid ounces. Let’s calculated your child’s new clear fluid goal now”

Help parents calculate their child’s new clear fluid goal
“It is very important that you continue to help your children drink twice as much fluid as they are eating fiber at each sitting as the increased fiber will continue to add more bulk to your child’s stool.

Your child’s meal-based water goals are going to increase also to reflect the increase in their daily clear fluid goal

1. **Younger child group**
   a. Your child now needs to drink 6 ounces of water at each meal. Remember, this is ¾ of a cup and is still much less than what your child drinks at snack each group session.

2. **Older child group**
   a. Your child now needs to drink 8 ounces of water at each meal. Remember, this is equivalent to one cup and is slightly less than what your child drinks at snack each group session.

Your child will continue to have their water bottle goal.

3. **Younger child group**
   a. Your child needs to continue to drink ½ of a water bottle each day to earn his or her sticker.

4. **Older child group**
   a. Remember, your child needs to drink an entire water bottle each day to earn his or her sticker.

IV. Review behavior modification techniques

“You all have done a very good job helping your children drink more water. This week will most likely be challenging because your children will need to drink even more water. We are going to briefly review the techniques you have learned to help your children with this task and talk about how some need to be modified due to larger fluid goals. Then we are going to tell you about some fun ways to make water taste better and more fun to drink so it will hopefully become something your child enjoys drinking once you are no longer participating in the group treatment and are no longer using a sticker chart.”
A. Positive reinforcement

Similar to the past two weeks, you will be providing your child with stickers for achieving his or her clear fluid goal, for drinking water at all meals, and for drinking from his or her water bottle.

B. Positive praise

Remember to continue providing lots of positive praise when your children drink water. This is especially important this week since their goals have increased.

C. Differential attention

This technique involves paying attention when your child drinks water or other clear fluids and removing attention if your child displays a behavior that is not compatible with drinking water. Remember you can also provide attention to others in the environment that are drinking water so your child remembers what he or she needs to do in order to get your attention.

D. Goal setting

Remember, your children’s meal-based water goals have increased by 2 ounces. It’s also very important to remember to provide children with special water stickers each time they achieve their meal-based goal immediately after the goal is achieved.

E. Modeling

This technique involves you and your family drinking water in front of your child who is currently participating in the group behavioral intervention. Don’t forget to make comments about your liking for water and provide positive praise to others for their good water drinking behavior.

F. Rules and consequences

“We provided you with ideas for at least three rules you could use to help your child increase his or her daily intake of water and we’ll repeat them now.

1. You must drink at least (6 or 8, younger and older child groups respectively) ounces of water at each meal. If you do not drink (6 or 8) ounces, then you cannot put a special water sticker on your sticker chart, which means you might not have enough stickers to earn a prize at group.
2. You can only have water between meals. If you do not want to drink water, then you cannot have anything to drink.

3. You can only have juice or milk after you drink water. If you do not drink water, then you cannot have juice or milk.

V. Fun ways to drink water

“Similar to how we have talked about fiber mix-ins, we are also going to talk about water mix-ins. Children like sweet flavors and drinks with bright colors. The purpose of the water mix-ins is to turn water different colors and to make the water have a sweeter taste without adding lots of sugar.

Your children will taste each of the water mix-ins today during a fun group activity. They will complete an activity sheet to rate how much they liked each type of water and the type of water that they liked best. You’ll be able to take this sheet home to use as a guide for the types of water mix-ins you can use in your home to help your child drink enough water to meet his or her clear fluid goals.

A. Fruit water

“The first type of water your children will taste today is what we have labeled fruit water. Fruit water looks clear, just like regular water, but tastes like fruit when you drink it. To make this type of water, you should slice fresh fruit and place it in a pitcher of water. For some fruits like lemons or oranges you can squeeze some of the fruit juice directly into the water and then let the rest of the fruit slice soak. For other fruits like grapes or apples, you should slice the fruit and then let it soak. The longer the fruit soaks, the stronger the fruit taste. This is a nice alternative to purchasing fruit flavored water that can be costly.”

B. Cool water

“The second type of water your children will taste today is what we have labeled cool water. Cool water is made from Kool-Aid and the type of Kool-Aid we used today is sugar-free. In addition to making Kool-Aid in a large pitcher, it is also available in single serve pouches that can be mixed into bottled water or a single serving glass.”

C. Fun water

“The third type of water your children will taste today is what we have labeled fun water. The fun water we made contains Crystal Light drink mix. There are a variety of flavors of Crystal Light available. Most varieties are sugar free. Similar to Kool-Aid, Crystal Light also has single serving portions available in what they call “Crystal Light To-Go.” These single packets get
added to a water bottle that you then shake up and drink. Some grocery stores, like Kroger, have a store brand of flavored drink mix that may be cheaper.”

D. **Wacky water**

“The fourth type of water your children will taste today is what we have labeled **wacky water**. Wacky water tastes like regular water but does not look like regular water because it contains food coloring. You can make wacky water in any drink glass. You should be cautious about making wacky water in your child’s water bottle as it may turn the plastic different colors.”

E. **Sport water**

“The final type of water your children will taste today during the mystery water taste test is what we have labeled **sport water**. Sport water contains Gatorade drink mix. Similar to Crystal Light, there are a variety of flavors for Gatorade as well as grocery store brand versions that tend to be cheaper. Gatorade also has single portion drink mix available for their Propel water.”

F. **Super water**

A sixth type of water your children will taste today is what we have labeled **super water**. Super water is water that contains Benefiber/Fibersure. This water is extra special because drinking it helps children achieve both their fluid and fiber goals at the same time. Because the Benefiber/Fibersure does not have a taste, you can make this a “water sneak.” You could also add Fibersure/Benefiber to any of the other types of water we have discussed today. If your child does drink super water, then you should give him or her a special super water sticker that can be placed either on the sticker chart, on your child’s water bottle, or some other special place.

G. **Bubble water**

A seventh type of water your children will taste today is what we have labeled **bubble water**. Bubble water is carbonate or seltzer water that has no added sugar.

H. **Ice cubes**

“A final way to make drinking water fun is to modify ice cubes. One thing you can do is to make fun-shaped ice cubes. We are giving each of you a fun-shaped ice cube tray today, but you can find more shapes at home stores.

Another way to make ice fun is to place a piece of fruit in the ice cube slot and then fill the tray with water. This way, when the ice melts, there is a fruit
surprise that can also keep adding flavor to the water. You can also add color and other tastes to the ice cubes like freezing lemonade.”

IX. Homework

“Your children will have the same goals with respect to fluid for the next two weeks but they will be modified to reflect their new fluid goals. First, your children need to continue to communicate what they drank each day and should receive a sticker for completing this goal. Second, they can also earn stickers for achieving their clear fluid goal. Third, your children can earn special water stickers if they drink (6 or 8) ounces of water at each meal. Finally, children can earn special water bottle stickers for meeting their water bottle goal. Don’t forget that children should be provided with super water stickers accordingly.”

IX. Join child’s group

A. Review each child’s new fluid goal.

B. Review homework goals and number of stickers needed to earn prize at next group session.

C. Assist parents and children in documenting the information from the snack report card onto the diet diary. Ensure that parents provide positive praise.
Water Mix-Ins

**Fruit Water:** Slice fresh fruit, drop into a pitcher of water, & refrigerate overnight

**Cool water:** Add Kool-Aid or similar store brand mix to pitcher of water and chill or shake single-size mix packets into water bottles

**Fun water:** Add Crystal Light drink mix to a pitcher of water and chill or shake single-size mix packets into water bottles

**Wacky water:** Add 3-5 drops of food coloring to water to turn it wacky colors

**Sports water:** Add Gatorade drink mix to a pitcher of water and chill

**Super water:** Add 1-2 tablespoons of Benefiber or Fibersure to water and stir

**Bubble water:** Instead of regular water, provide flavored, sugar-free seltzer or mineral water
ICE CUBE RECIPES

Fun-Shaped Ice Cubes
Use your child’s new ice cube tray or Ice Tubes Singles to create ice cubes in exciting shapes!

Flavored Ice Cubes
Instead of regular water, pour any sugar-free water-based drink into an ice cube tray (e.g., use lemonade!). When the ice cube melts, it will add flavor to your child’s drink!

Colored Ice Cubes
Add food coloring to water prior to pouring it into your ice cube trays for brightly colored ice cubes.

Fruit-Surprise Ice Cubes
When making ice cubes, place a piece of frozen fruit into the slot and then fill with water. Your child will have a fun, fruit surprise once the ice cube melts!

Mix-and-Match
Combine any of the recipes above to create new types of ice cubes. For example, try making a fun-shaped, flavored, colored ice cube with a fruit surprise!
Addendum to Session 6 (Maintaining Gains)

Goals: 1. Review graphs and diet diaries and provide feedback  
2. Discuss importance of children drinking fluids when sick  
3. Review techniques for maintenance of gains made during group treatment

I. Review graphs

“Please take this time to review your child’s graph. Remember that there are three lines: the blue line reflects your child’s daily clear fluid intake, the pink line reflects your child’s weekly average clear fluid intake, and the yellow line reflects your child’s clear fluid goal. Remember to use the lines as a way to gauge your child’s progress and to problem-solve how you can continue to increase the amount of clear fluid your child drinks each day.”

II. Feedback about diet diaries

A. Positive praise should be provided to the group for continuing to complete daily diet diaries.

B. Include comments about changes you notice such as whether children are meeting the 8 ounce goal at meals and whether you notice more water.

C. Make verbal comments about problematic areas, such as continuing to document how much fluid was drunk at a particular meal and whether parents noted whether age-based recommendations for juice and milk were exceeded.

III. Sick days

“Today we are going to talk about different barriers that may make maintaining treatment gains hard if you do not do some pre-problem problem-solving. The first barrier is your child getting sick. When children are sick, their appetite and level of thirst often decrease. However, it is very important that they continue to eat and especially continue to drink so they do not become constipated again.

Providing your child with sports drinks on sick days is one way to keep nutrients, electrolytes, and fluids up when he or she may not want to eat. You can add Benefiber/Fibersure to the drink to also help your child maintain a high-fiber diet.

We taught you earlier to break your child’s clear fluid goal into three smaller fluid goals for each meal of the day. When your child is sick, even that smaller goal may be too much fluid at once. You may need to generate even smaller goals and provide that amount once an hour. Positive praise and positive reinforcement regarding drinking fluids are especially important when your child is sick.”
II. Vacations

“A second potential barrier to maintaining your child’s clear fluid goal is vacation. Similar to sick days, if you plan ahead vacations will not be a barrier to your child achieving his or her clear fluid goal.

If you are planning a vacation, make sure to pack your child’s water bottle. Water bottles can be easily stored in accessible spots in most cars and, as you know, fit well into backpacks. If you forget to pack your child’s water bottle, you can always ask where to find water fountains or ask concession stand workers for water in a cup if you do not want to pay for bottled water. Remember that drinking water will help your child stay full of energy during all day activities and days in the sun if you are vacationing in the summer.”

III. Maintaining clear fluid gains

“For the past five weeks of group you and your children have been working very hard to drink lots of clear fluid each day. It is very important that you continue to help your children drink high enough quantities of clear fluid to achieve their clear fluid goal. Techniques that you learned to help your child drink water during group should be continued even when the group stops. It is also important that you continue to provide your children with lots of positive praise and reinforcement for drinking clear fluids and water and using their water bottles.

Many parents ask us about whether they should continue to use sticker charts and privileges at home to help children continue to achieve their goals. The answer is yes! You can create goal sheets similar to what we provided to your family during the group treatment on the computer or make creating charts an art project to do with your children.

As was mentioned earlier, you will be returning to our outpatient clinic for two follow-up sessions where we will check on whether your child’s treatment gains with respect to clear fluid have been maintained. The first of these is in two weeks. If your child is doing well, then we will talk about how to decrease the amount of rewards your child receives for drinking water. If your child is struggling, then we will problem-solve with your family on how to generate a behavior change plan similar to what was used in group that can be applied in your home to help your child continue to increase his or her clear fluid intake.”
Treatment Integrity Forms
Instructions

In order to maintain the integrity of the enhanced behavioral intervention, treatment integrity forms should be completed by raters after each session. Raters should watch tape-recorded sessions and then place a check mark in each box if that item was discussed or occurred during the treatment session.
Session 1

☐ Role of water in digestion

☐ Self-monitoring
  ○ How to measure fluids if unsure
  ○ Documenting the type of fluid (100% fruit juice, milk)
  ○ Tricky items

☐ Snack time report card

☐ Prompting children to help with telling parents what they drank each day

☐ Assist parents in completing first diet diary entry using the snack time report card
Session 2

☐ Provide feedback on diet diaries
  o Adherence to fluid guidelines for self-monitoring
  o Adherence to clear fluid and meal-based water goals

☐ Assist parents in completing diet diary entry using the snack time report card
Session 3

☐ Review graphs and how to use them to problem-solve and promote treatment success

☐ Provide feedback on diet diaries
  o Adherence to fluid guidelines for self-monitoring
  o Adherence to clear fluid and meal-based water goals

☐ Prescribe children’s clear fluid goals

☐ Teach parents how to distinguish clear and non-clear fluids

☐ Pass handout

☐ Review age-based recommendations for milk and juice

☐ Pass out handout

☐ Discuss providing preferred drinks to children in moderation

☐ Use of water bottles/IceTubes to increase children’s water intake

☐ Importance of cleaning water bottles/handout

☐ Teach parents how to plan meals to facilitate clear fluid goal achievement

☐ Behavior modification techniques to increase water intake

☐ Assist parents in completing diet diary entry using the snack time report card
Session 4

☐ Review clear fluid graphs

☐ Provide feedback on diet diaries
  o Adherence to fluid guidelines for self-monitoring
  o Adherence to clear fluid and meal-based water goals

☐ Review parental use of behavior modification techniques and problem-solve as appropriate

☐ Assist parents in completing diet diary entry using the snack time report card
Session 5

☐ Review clear fluid graphs
  o Note new line representing child’s clear fluid goal

☐ Provide feedback on diet diaries
  o Adherence to fluid guidelines for self-monitoring
  o Adherence to clear fluid and meal-based water goals

☐ Prescribe new clear fluid and meal-based water goals

☐ Review how to apply behavior modification techniques to new clear fluid and meal-based water goals

☐ Water mix-ins & ice cube recipes

☐ Special shaped and frozen fruit ice cubes

☐ Assist parents in completing diet diary entry using the snack time report card
Session 6

- Review clear fluid graphs
  - Note new line representing child’s clear fluid goal

- Provide feedback on diet diaries
  - Adherence to fluid guidelines for self-monitoring
  - Adherence to clear fluid and meal-based water goals

- Strategies for helping children to maintain gains on sick days and when on vacation

- Assist parents in completing diet diary entry using the snack time report card
Appendix C

Summary of Changes Specific to Fluid-Based Content

Session One

Parent Group

<table>
<thead>
<tr>
<th>NEI</th>
<th>EI</th>
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</thead>
<tbody>
<tr>
<td><strong>Psychoeducation</strong></td>
<td><strong>Psychoeducation</strong></td>
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<tr>
<td>• Water, digestion, and constipation</td>
<td>• Water, digestion, and constipation</td>
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<tr>
<th><strong>Self-monitoring</strong></th>
<th><strong>Self-monitoring</strong></th>
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<tr>
<td>• Food and fluid offered vs. consumed</td>
<td>• Food and fluid (including specifying brand name and type) offered vs. consumed</td>
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<tr>
<td>• Group leaders perform fiber counts</td>
<td>• Group leaders perform fiber and clear fluid counts</td>
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<table>
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<tr>
<th><strong>Behavior modification:</strong></th>
<th><strong>Behavior modification:</strong></th>
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<tbody>
<tr>
<td>• parents taught contingency management, positive praise, and positive reinforcement (all modeled during group)*</td>
<td>• parents taught contingency management, positive praise, and positive reinforcement (all modeled during group)* and parents rehearse positive praise)*</td>
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Child Group

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<th><strong>Snack</strong></th>
<th><strong>Snack time</strong></th>
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<tr>
<td>• Water drinking rule</td>
<td>• Water drinking rule</td>
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<tr>
<td>• Group leaders use positive praise, differential attention, and positive reinforcement for drinking water</td>
<td>• Group leaders use positive praise, differential attention, and positive reinforcement for drinking water</td>
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<tr>
<td>• Group leaders complete snack time report card</td>
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<tr>
<th><strong>Homework/treatment goal</strong></th>
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<tr>
<td>• Communicate foods and fluids consumed during the day with parents</td>
<td>• Communicate foods and fluids consumed during the day with parents</td>
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<td>• Behavioral rehearsal of this goal by reviewing snack report card with parents</td>
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Session Two

**Parent Group**

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<td>Daily diet diaries</td>
</tr>
<tr>
<td>• Review/provide feedback regarding parental adherence to guidelines for self-monitoring</td>
<td>• Review/provide feedback regarding parental adherence to guidelines (including new guidelines for documenting fluids) for self-monitoring</td>
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**Child Group**

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Session Three

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<td>• Review/provide feedback regarding parental adherence to guidelines (including new guidelines for documenting fluids) for self-monitoring</td>
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<td>• Provide clear fluid graph for data recorded during week 2 of treatment</td>
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<td>• Relationship of high fiber and fluid diet to decreased symptoms of encopresis</td>
<td>• Relationship of high fiber and fluid diet to decreased symptoms of encopresis</td>
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<td>• Clear versus non-clear fluids</td>
<td>• Clear versus non-clear fluids</td>
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<td>• Meal planning for fiber and fluids</td>
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<tr>
<td>Self-monitoring</td>
<td>Self-monitoring</td>
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<tr>
<td>• Parents perform fiber counts and document their child’s fiber goal.</td>
<td>• Parents perform fiber and clear fluid counts, document their child’s fiber and clear fluid goals, and note whether</td>
</tr>
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Behavior modification
- Differential attention, modeling, and shaping (emphasis on eating fiber foods)

**Child Group**

**NEI**

**Psychoeducation**
- Review water, digestion, and constipation

**Activity**
- Fiber collage (younger child group)
- Fiber bingo (older child group)
- Meal planning- emphasis on including fiber foods at each meal and snack

**Snack**
- Water drinking rule
- Group leaders use positive praise, differential attention, and positive reinforcement for drinking water

**EI**

**Psychoeducation**
- Review water, digestion, and constipation
- **Discuss additional benefits of drinking water to general health**
- **Rules about drinking juice and milk**

**Water bottle and Ice Tubes**
- Children receive water bottle and learn how it can be used to help them achieve clear fluid goals
- Presented with Ice Tubes

**Activity**
- Fiber and fluid collage (younger child group)
- Fiber and fluid bingo (older child group)
- Meal planning- emphasis on including fiber foods and clear fluids at each meal and snack

**Snack**
- Water drinking rule
- Group leaders use positive praise, differential attention, and positive reinforcement for drinking water (including sticker for drinking 6 ounces)
- Group leaders complete snack time report card

*children exceeded age-based recommendations for juice and milk.*

Behavior modification
- Differential attention, modeling, and shaping (emphasis on eating fiber foods and drinking clear fluids)
- Use of positive praise and positive reinforcement for drinking water
- Rules for fluid type and quantity
**Goals**
- Communicate foods and fluids consumed during the day with parents
- Age-based fiber and clear fluid goals

**Homework/treatment goal**
- Communicate foods and fluids consumed during the day with parents
  *(behavioral rehearsal of this goal)*
- Age-based fiber and clear fluid goals
- Meal-based and water bottle goals

---

**Session Four**

**Parent Group**

- **NEI**
  - **Daily diet diaries**
    - Review/provide feedback regarding parental adherence to guidelines for self-monitoring
  - **Graphs**
    - Provide clear fluid graph for data recorded during week 2 of treatment
  - **Problem-solve**
    - Difficulties in children achieving clear fluid goals
  - **Self-monitoring**
    - Parents perform fiber counts and document their child’s fiber goal.

- **EI**
  - **Daily diet diaries**
    - Review/provide feedback regarding parental adherence to guidelines *(including new guidelines for documenting fluids)* for self-monitoring
  - **Graphs**
    - Provide clear fluid graph for data recorded during week 2 of treatment
    - **Third line added to graph representing child’s clear fluid goal**
  - **Problem-solve**
    - Difficulties in children achieving clear fluid goals, *use of behavior modification techniques to help increase children’s daily water intake, and adherence to AAP guidelines for juice and milk*
  - **Self-monitoring**
    - Parents perform fiber and clear fluid counts, document their child’s fiber and clear fluid goals, and *note whether children exceeded age-based recommendations for juice and milk.*

---

**Child Group**

- **NEI**
  - **Review**
    - Achievement of clear fluid goals

- **EI**
  - **Review**
    - Achievement of clear fluid goals
    - Use of water bottle
Snack
- Water drinking rule
- Group leaders use positive praise, differential attention, and positive reinforcement for drinking water

Goals
- Communicate foods and fluids consumed during the day with parents
- Age-based fiber and clear fluid goals

Snack time
- Water drinking rule
- Group leaders use positive praise, differential attention, and positive reinforcement for drinking water (including sticker for drinking 6 ounces)
- Group leaders complete snack time report card

Homework/treatment goal
- Communicate foods and fluids consumed during the day with parents (behavioral rehearsal of this goal)
- Age-based fiber and clear fluid goals
- Drink 6-ounces water at breakfast, lunch, and dinner

Session Five

Parent Group

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Daily diet diaries
- Review/provide feedback regarding parental adherence to guidelines for self-monitoring

Graphs
- Provide clear fluid graph for data recorded during week 4 of treatment

Problem-solve
- difficulties in children achieving clear fluid goals

Graphs
- Provide clear fluid graph for data recorded during week 4 of treatment
- Third line included on graph to reflect the child’s clear fluid goal

Problem-solve
- difficulties in children achieving clear fluid goals, use of behavior modification techniques to help increase children’s daily water intake, and adherence to AAP guidelines for juice and milk
Goals
• New age-based fiber and fluid goals for children

Psychoeducation
• Fiber add-ins

Child Group

Goals
• New age-based fiber and fluid goals

Psychoeducation
• Fiber mix-ins

Activity
• Tasting fiber mix-ins
• Poop group jeopardy or Poop group Candyland

Snack
• Water drinking rule
• Group leaders use positive praise, differential attention, and positive reinforcement for drinking water

Homework/treatment goal
• Communicate foods and fluids consumed during the day with parents
• New age-based fiber and clear fluid goals

Goals
• New age-based fiber and fluid goals for children
• New meal-based water goal of eight fluid ounces

Psychoeducation
• Fiber add-ins
• Water add-ins
• Applying behavior modification techniques to new clear fluid goals

Enhanced

Goals
• New age-based fiber and fluid goals
• New meal-based water goals
• Continue with water bottle goal

Psychoeducation
• Fiber mix-ins
• Clear fluid mix-ins
• Superwater

Activity
• Tasting fiber mix-ins
• Mystery water taste test
• Fun with Ice Cubes

Snack time
• Water drinking rule
• Group leaders use positive praise, differential attention, and positive reinforcement for drinking water (including sticker for drinking 8 ounces)
• Group leaders complete snack time report card

Homework/treatment goal
• Communicate foods and fluids consumed during the day with parents (behavioral rehearsal communication of fluid and food consumed during snack)
Water and Clear Fluid Goals

- New age-based fiber and clear fluid goals
- **Drink 8-ounces water at breakfast, lunch, and dinner**

### Session Six

**Parent Group**

- **NEI**
  - Daily diet diaries
  - Review/provide feedback regarding parental adherence to guidelines for self-monitoring

- **EI**
  - Daily diet diaries
  - Review/provide feedback regarding parental adherence to guidelines (including new guidelines for documenting fluids) for self-monitoring
  - Provide feedback on how fluid intake pattern can be modified to reflect fluid prescriptions

**Graphs**

- Provide clear fluid graph for data recorded during week 4 of treatment

- **NEI**
  - Provide clear fluid graph for data recorded during week 4 of treatment
  - Third line included on graph to reflect the child’s clear fluid goal

- **EI**
  - Provide clear fluid graph for data recorded during week 4 of treatment
  - Third line included on graph to reflect the child’s clear fluid goal

**Problem-solve**

- Difficulties in children achieving clear fluid goals

- **NEI**
  - Difficulties in children achieving clear fluid goals

- **EI**
  - Difficulties in children achieving clear fluid goals and use of behavior modification techniques to help increase children’s daily water intake

**Barriers to maintaining treatment gains**

- How to maintain high-fiber diet on vacation
- How to maintain high-fiber diet when children are sick

- **NEI**
  - How to maintain high-fiber diet on vacation
  - How to maintain high-fiber diet when children are sick

- **EI**
  - How to maintain high-fiber, high clear fluid diet on vacation
  - How to maintain high-fiber, high clear fluid diet when children are sick

**Follow-up appointments**

- 2 appointments scheduled
- Children should continue to work on fiber and fluid goal

- **NEI**
  - 2 appointments scheduled
  - Children should continue to work on fiber and fluid goal

- **EI**
  - 2 appointments scheduled
  - Children should continue to work on fiber and fluid goal
  - Continue to use special stickers for drinking 8 ounces of water at meals, for drinking an entire water bottle, and for drinking Superwater
<table>
<thead>
<tr>
<th>Child Group</th>
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<th>EI</th>
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<tr>
<td>Review</td>
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<td>• Progress during break with respect to meeting new fiber and clear fluid goals</td>
<td></td>
<td>• Progress during break with respect to meeting new fiber and clear fluid goals</td>
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<tr>
<td></td>
<td></td>
<td>• Use of water mix-in strategies and Superwater</td>
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<td>• Continued use of water bottles</td>
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<td>Maintaining gains</td>
<td>• Need to continue working on fiber and clear fluid goals</td>
<td>• Need to continue working on fiber and clear fluid goals</td>
</tr>
<tr>
<td></td>
<td>• How to maintain high-fiber diet on vacation and when sick</td>
<td>• How to maintain high-fiber, <strong>high clear fluid</strong> diet on vacation and when sick</td>
</tr>
<tr>
<td>Activity</td>
<td>• Continuation of Poop Group Jeopardy</td>
<td>• Poop Group Jeopardy or Poop Group Candyland</td>
</tr>
<tr>
<td></td>
<td>• Other educational games to review material learned during the group treatment</td>
<td></td>
</tr>
</tbody>
</table>
Appendix D

Demographics Questionnaire

Encopresis Clinic Demographics Questionnaire

Background information

1. I am the child’s (check all that apply)
   - Natural parent
   - Adopted parent
   - Foster parent
   - Grandparent
   - Step parent
   - Legal guardian
   - Other (describe):

2. Your gender:
   - Female
   - Male

3. Your age (years): _______________________

4. Your ethnic background (check all that apply):
   - White/European American
   - Black/African American
   - Spanish/Hispanic/Latino
   - Middle Eastern
   - Asian/Pacific Islander/Asian Indian
   - Native American Indian/Alaskan Native
   - Other:

5. Your child’s ethnic background (check all that apply):
   - White/European American
   - Black/African American
   - Spanish/Hispanic/Latino
   - Middle Eastern
   - Asian/Pacific Islander/Asian Indian
   - Native American Indian/Alaskan Native
   - Other:
6. Your current marital status:
   - Never married
   - Now married
   - Separated
   - Divorced
   - Living with a Partner
   - Widowed

7. What is your family’s current annual income?
   - Less than $10,000
   - $10,000-$24,999
   - $25,000-$49,999
   - $50,000-$74,999
   - $75,000-$99,999
   - $100,000 or more

8. How many people currently live in your home? Please write “mother”, “step-father,” “son,” “stepdaughter”, etc (do NOT write individual names):

   Age
   1. ____________________________  ____
   2. ____________________________  ____
   3. ____________________________  ____
   4. ____________________________  ____
   5. ____________________________  ____
   6. ____________________________  ____

9. Where is your child during most of his or her day?
   - At home with a family member
   - At home with a sitter
   - Daycare (half-time)
   - Daycare (full-time)
   - Pre-kindergarten (hours/week): ________
   - Kindergarten (hours/week): ________
   - Elementary school-list grade:
   - Other:
10. What is the highest level of education achieved by the child’s:

<table>
<thead>
<tr>
<th>Mother</th>
<th>Father</th>
</tr>
</thead>
<tbody>
<tr>
<td>8th grade or less</td>
<td>8th grade or less</td>
</tr>
<tr>
<td>Part of high school</td>
<td>Part of high school</td>
</tr>
<tr>
<td>High school graduate</td>
<td>High school graduate</td>
</tr>
<tr>
<td>Part of college/university</td>
<td>Part of college/university</td>
</tr>
<tr>
<td>Vocational training</td>
<td>Vocational training</td>
</tr>
<tr>
<td>4-year college</td>
<td>4-year college</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>Graduate degree</td>
</tr>
<tr>
<td>Other: ____________________</td>
<td>Other: ____________________</td>
</tr>
</tbody>
</table>

11. What are the occupations for:

<table>
<thead>
<tr>
<th>Mother/caregiver: ____________________</th>
<th>Part-time: ___ Full-time: ___</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father/caregiver: ____________________</td>
<td>Part-time: ___ Full-time: ___</td>
</tr>
</tbody>
</table>

**Encopresis history**

12. Does your child currently soil (with stool) his/her underpants or clothes?

   - Yes
   - No

*If you answered “No,” please skip to Question 19*

13. At what age did soiling begin (after toilet training)? _______

14. Has soiling been constant since this time?

   - Yes
   - No

   a. If no, when did he/she soil stop?: _______

15. When does your child soil (check all that apply)?

   - Waking hours at home
   - While participating in activities
   - At school
   - While asleep
16. Have you ever had to pick your child up from daycare/school due to soiling accidents?
   - Yes  
   - No
   a. If yes, how many times in the past six months?
      - 1-2  
      - 3-4  
      - 5-6  
      - 7 or more

17. Have you ever had to pick up your child from a social activity, sport, etc. due to a soiling accident?
   - Yes  
   - No
   a. If yes, how many times in the past six months?
      - 1-2  
      - 3-4  
      - 5-6  
      - 7 or more

18. Are there any social activities (i.e. slumber parties), recreational activities (i.e., swimming), etc. that you do not let your child participate in due to fears that he/she will have a soiling accident?
   - Yes  
   - No
   a. If yes, which social activities, sports, etc.? Please list all below.
      1. ____________________________  
      2. ____________________________  
      3. ____________________________  
      4. ____________________________  
      5. ____________________________  
      6. ____________________________

19. Does your child withhold his/her stool?
   - Yes  
   - No

20. How long has he/she been withholding stool?
   - Always  
   - Not always, just since age ______
21. Does your child currently (check all that apply):

- Wear underwear:
  - AM
  - PM
  (please circle what applies)
- Wear pull-ups:
  - AM
  - PM
  (please circle what applies)
- Hide soiled underwear
- Clog the toilet on occasion due to large stools
- Know when he/she has to have a bowel movement
- Afraid of the toile/potty chair

22. Has your child been diagnosed with constipation?

- Yes; age: __________
- No

  a. If yes, who was the first person to make this diagnosis?

    - Pediatrician
    - PCP
    - GI specialist
    - ER physician
    - Other: __________

23. Is there anyone else in the family with problems of constipation?

- Yes
- No

  a. If yes, what is/are their relationships to your child?

24. Has your child seen any of the following due to his/her problems with stooling (check all that apply):

- Pediatrician
- Gastroenterologist
- Psychologist
- Social Worker
- Other

25. Has your child received any of the following evaluations?

- Rectal exam
- X-ray of the stomach
- Barium enema evaluation

26. Has your child been given an enema in the past?

- Yes
- No
a. If yes, about how many?
   - 1-2
   - 3-4
   - 5-6
   - 7 or more

b. Please use this scale to describe your child's experience with enema(s):

Very distressed | Very Calm

27. Has your child been given suppositories in the past?
   - Yes
   - No

a. If yes, please use this scale to describe your child's experience with suppositories:

Very distressed | Very Calm

b. Please use this scale to describe your experience with administering an suppository to your child and/or being present while your child was receiving a suppository:

Very distressed | Very Calm

28. Has your child been prescribed medication for his/her problems with stooling?
   - Yes
   - No
29. If yes, which medications (check all that apply):
   - Milk of Magnesia
   - Glucolax
   - Miralax
   - Ducolax
   - Senokot
   - Other (please list):

30. Have you ever used any of the following behavioral strategies to help your child with his/her problems with stooling (check all that apply):
   - Toilet sits
   - Sticker charts
   - Rewards
   - Taken away privileges/toys
   - Other (please list):

31. Has your child been diagnosed with any of the following (check all that apply):
   - ADHD
   - Anxiety
   - Depression
   - Oppositional Defiant Disorder

**Current bowel functioning**

32. How often is your child currently having a bowel movement?
   - _______ (times per day)
   - _______ (times per week)

33. When your child’s problems with bowel movements were at their worst, how often was your child having a bowel movement:
   - My child’s problems are at their worse now
     - _______ (times per day)
     - _______ (times per week)

34. How often is your child currently soiling?
   - _______ (times per day)
   - _______ (times per week)
35. When your child’s problems with soiling were at their worst, how often was your child soiling?
   o My child’s problems with soiling are at their worst now
     ________________ (times per day)
     ________________ (times per week)

36. Is your child currently taking medications for his/her problems with stooling?
   o Yes  o No
   a. If yes, please describe (dose/frequency)
   b. How long has your child been on this medication regimen?
     ________________ (months or years)
   c. Who prescribed this medication? ________________

37. Are you currently using any of the following behavioral strategies to help your child with his/her problems with stooling (check all that apply):
   o Toilet sits  o Taken away privileges/toys
   o Sticker charts  o Other (please list):
   o Rewards

38. What has been most successful for your family with respect to helping your child with his/her problems with bowel movements?
   __________________________________________________
   __________________________________________________
   __________________________________________________
   __________________________________________________
   __________________________________________________

39. What has been most stressful for you with respect to your child’s problems with his/her bowel movement functioning?
   __________________________________________________
   __________________________________________________
   __________________________________________________
40. Are there other concerns that we should know about with respect to your care?
Appendix E

Modified Diet Diary for Sessions One and Two

Date: __________

<table>
<thead>
<tr>
<th>DIET DIARY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BREAKFAST</strong></td>
</tr>
<tr>
<td>Food &amp; Beverage</td>
</tr>
<tr>
<td>-</td>
</tr>
<tr>
<td>-</td>
</tr>
<tr>
<td>Total =</td>
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</tbody>
</table>

| **SNACK** |
| Food & Beverage | Amount Served | - | Amount Left | = | Amount Consumed | Fiber | Fluid |
| - | - | = | | |
| - | - | = | | |
| Total = | |

| **LUNCH** |
| Food & Beverage | Amount Served | - | Amount Left | = | Amount Consumed | Fiber | Fluid |
| - | - | = | | |
| - | - | = | | |
| Total = | |

| **SNACK** |
| Food & Beverage | Amount Served | - | Amount Left | = | Amount Consumed | Fiber | Fluid |
| - | - | = | | |
| - | - | = | | |
| Total = | |

| **DINNER** |
| Food & Beverage | Amount Served | - | Amount Left | = | Amount Consumed | Fiber | Fluid |
| - | - | = | | |
| - | - | = | | |
| Total = | |
## SNACK

<table>
<thead>
<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
<th>Amount Left</th>
<th>=</th>
<th>Amount Consumed</th>
<th>Fiber</th>
<th>Fluid</th>
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Total =

Total Fiber Today: _____ g  
Total Clear Fluid Today: _____ ounces
# Modified Diet Diary for Sessions 3-7

Date: __________

## DIET DIARY

### BREAKFAST

<table>
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<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
<th>Amount Left</th>
<th>Amount Consumed</th>
<th>Fiber</th>
<th>Fluid</th>
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<tr>
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Total =

### SNACK

<table>
<thead>
<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
<th>Amount Left</th>
<th>Amount Consumed</th>
<th>Fiber</th>
<th>Fluid</th>
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Total =

### LUNCH

<table>
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<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
<th>Amount Left</th>
<th>Amount Consumed</th>
<th>Fiber</th>
<th>Fluid</th>
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</table>

Total =

### SNACK

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<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
<th>Amount Left</th>
<th>Amount Consumed</th>
<th>Fiber</th>
<th>Fluid</th>
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</tbody>
</table>

Total =

### DINNER

<table>
<thead>
<tr>
<th>Food &amp; Beverage</th>
<th>Amount Served</th>
<th>Amount Left</th>
<th>Amount Consumed</th>
<th>Fiber</th>
<th>Fluid</th>
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</table>

Total =
## Water and Clear Fluid Goals

### SNACK

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<th>Amount Served</th>
<th>Amount Left</th>
<th>Amount Consumed</th>
<th>Fiber</th>
<th>Fluid</th>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fiber Goal: _____ g

Total Fiber Today: _____ g

Fluid Goal: ______ ounces

Total Clear Fluid Today: ____ounces

Exceeded juice recommendations: yes  no

Exceeded milk recommendations: yes  no
Appendix G

Modified Client Satisfaction Questionnaire-8 (CSQ; Larsen, Attkisson, Hargreaves, & Nguyen, 1979)

CLIENT EVALUATION OF SERVICES

Multi-Specialty Encopresis Clinic

Please help us improve our program by answering some questions about the services you have received. We are interested in your honest opinion, whether they are positive or negative. *Please answer all of the questions.* We also welcome your comments and suggestions. Thank you very much, we really appreciate your help.

**CIRCLE YOUR ANSWER**

1. How would you rate the quality of service you have received?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>Good</td>
<td>Fair</td>
<td>Poor</td>
</tr>
</tbody>
</table>

2. Did you get the kind of service you wanted?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No, definitely not</td>
<td>No, not really</td>
<td>Yes, generally</td>
<td>Yes, definitely</td>
</tr>
</tbody>
</table>

3. To what extent has our program met your needs?

<table>
<thead>
<tr>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost all of my needs have been met</td>
<td>Most of my needs have been met</td>
<td>Only a few of my needs have been met</td>
<td>None of my needs have been met</td>
</tr>
</tbody>
</table>

4. If a friend’s child was in need of similar help, would you recommend our program to him or her?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No, definitely not</td>
<td>No, not really</td>
<td>Yes, I think so</td>
<td>Yes, definitely</td>
</tr>
</tbody>
</table>
5. How satisfied are you with the amount of help you have received?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quite dissatisfied</td>
<td>Indifferently or mildly dissatisfied</td>
<td>Mostly satisfied</td>
<td>Very Satisfied</td>
</tr>
</tbody>
</table>

a. Specific to understanding more about your child’s condition (encopresis)?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quite dissatisfied</td>
<td>Indifferently or mildly dissatisfied</td>
<td>Mostly satisfied</td>
<td>Very Satisfied</td>
</tr>
</tbody>
</table>

b. Specific to medications?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quite dissatisfied</td>
<td>Indifferently or mildly dissatisfied</td>
<td>Mostly satisfied</td>
<td>Very Satisfied</td>
</tr>
</tbody>
</table>

c. Specific to learning about how to increase fiber in your child’s diet?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quite dissatisfied</td>
<td>Indifferently or mildly dissatisfied</td>
<td>Mostly satisfied</td>
<td>Very Satisfied</td>
</tr>
</tbody>
</table>

d. Specific to generating a toilet sitting schedule?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quite dissatisfied</td>
<td>Indifferently or mildly dissatisfied</td>
<td>Mostly satisfied</td>
<td>Very Satisfied</td>
</tr>
</tbody>
</table>

6. Have the services you received helped you to deal more effectively with your child’s problems:

<table>
<thead>
<tr>
<th>4</th>
<th>3</th>
<th>3</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, they helped a great deal</td>
<td>Yes, they helped, somewhat</td>
<td>No, they really didn’t help</td>
<td>No, they seemed to make things worse</td>
</tr>
</tbody>
</table>
7. In an overall, general sense, how satisfied are you with the service you have received?

<table>
<thead>
<tr>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very</td>
<td>Mostly</td>
<td>Indifferently or mildly</td>
<td>Dissatisfied</td>
</tr>
</tbody>
</table>

8. If you were to seek help again for your child, would you come back to our program?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No, definitely not</td>
<td>No, I don’t think so</td>
<td>Yes, I think so</td>
<td>Yes, definitely</td>
</tr>
</tbody>
</table>

9. What was the most helpful part of your participation in the group treatment for encopresis?

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

10. What was the least helpful part of your participation in the group treatment for encopresis?

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

11. Would you suggest that any changes be made to the format of the group treatment for encopresis?

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
Appendix H

Fluid Knowledge Questionnaire-Pre

Please complete the following questionnaire about what your child drinks.

1) On a typical day, how much **water** does your child drink? ________________

2) How much water do you think your child **should** drink each day? At least:
   - o 10-20 ounces (1 ¼ - 2 ½ cups)
   - o 21-30 ounces (2 ½ - 3 ¼ cups)
   - o 31-40 ounces (3 ¼ - 5 cups)
   - o 41-50 ounces (5 – 6 ¼ cups)
   - o 51-60 ounces (6 ¼ - 7 ½ cups)
   - o 61-70 ounces (7 ½ - 8 ¾ cups)
   - o 71-80 ounces (8 ¼ - 10 cups)
   - o 81-90 (10 – 11 ¼ cups)

3) Which of the following is true about your child when he or she is offered water:
   - Always refuses
   - Sometimes refuses
   - Never refuses

4) On a typical day, how much **juice** does your child drink? ________________

5) How much juice do you think your child **should** drink each day?
   - o No limitations
   - o 8-12 ounces (1- 1 ½ cups)
   - o 13-20 ounces (1 ½ - 2 ½ cups)
   - o 21-30 ounces (2 ½ - 3 ¾ cups)
   - o 1-3 ounces (Less than ½ cup)
   - o 4-6 ounces (½ - ¾ cup)

6) Which of the following is true about your child when he or she is offered juice:
   - Always refuses
   - Sometimes refuses
   - Never refuses

7) On a typical day, how much **milk** does your child drink? ________________

8) How much milk **should** your child drink each day? ________________
   - o No limitations
   - o 8 ounces (1 cup)
   - o 16 ounces (2 cups)
   - o 24 ounces (3 cups)
   - o 32 ounces (4 cups)
   - o 40 ounces (5 cups)

9) Which of the following is true about your child when he or she is offered milk:
   - Always refuses
   - Sometimes refuses
   - Never refuses

**PLEASE CONTINUE TO NEXT PAGE**
10) Which of the following techniques could you use to change the type of fluid your child drinks? Please circle all that apply.

a. Positive reinforcement (providing something positive after child does a behavior you like)

b. Negative reinforcement (removing something your child does not like after he or she does a behavior you like)

c. Positive punishment (providing something negative after your child does a behavior you do not like)

d. Negative punishment (removing something your child wants or likes if he or she does a behavior you do not like)

e. Time-out (removing your child from a specific environment for a set time because he or she did something you do not like)

f. Shaping (providing your child with positive consequences for each step he or she takes towards doing a specific behavior that you like)

g. Goal-setting (providing your child with a description of the behavior that you want him or her to do, which could include how much of that behavior and/or how long you want the behavior to last)

h. Self-monitoring (writing down every time your child does something that you like and/or something that you do not like)

i. Extinction (removing all attention when your child does something you do not like)

j. Liquid fading (slowly increasing the amount of a fluid that your child does not like in a fluid that your child likes until he or she drinks 100% of the fluid he or she did not originally like)

k. Differential attention (paying attention when your child does a behavior you like and removing attention when your child does something you do not like)

l. Ignoring (not paying attention to your child when he or she does something you do not like)

m. Rule setting (altering your child about the consequences of doing or not doing a specific behavior)

n. Token system (providing child with a token each time he or she does a behavior you like and then later allowing child to trade tokens for a larger prize)

o. Modeling (you or someone else performs the behavior you want your child to do for him or her)

p. Positive praise (verbally telling your child that you like something he or she did)
11) How **likely** are you to use each of the following techniques to increase the amount of water your child drinks? Please use the following rating scale:

<table>
<thead>
<tr>
<th>Technique</th>
<th>1</th>
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</tbody>
</table>
12) How **confident** are you that you could successfully use each of these techniques to increase the amount of water your child drinks? Please use the following scale to provide a rating in the space provided next to each technique:

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<thead>
<tr>
<th></th>
<th>1 Not confident at all</th>
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<th>5 Very confident</th>
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<td>c) Positive punishment</td>
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<td>d) Negative punishment</td>
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<tr>
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<tr>
<td>k) Differential attention</td>
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<td>m) Rule setting</td>
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<tr>
<td>n) Token system</td>
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</table>
Appendix I

Fluid Knowledge Questionnaire-Post

Please complete the following questionnaire about what your child drinks.

1) On a typical day, how much **water** does your child drink? ________________

2) How much water do you think your child **should** drink each day? At least:
   - 10-20 ounces (1 ¼ - 2 ½ cups)
   - 21-30 ounces (2 ½ - 3 ¾ cups)
   - 31-40 ounces (3 ¼ - 5 cups)
   - 41-50 ounces (5 - 6 ¾ cups)
   - 51-60 ounces (6 ¼ - 7 ½ cups)
   - 61-70 ounces (7 ½ - 8 ¾ cups)
   - 71-80 ounces (8 ¼ - 10 cups)
   - 81-90 ounces (8 ¾ - 10 ¼ cups)

3) Which of the following is true about your child when he or she is offered water:
   - Always refuses
   - Sometimes refuses
   - Never refuses

4) On a typical day, how much **juice** does your child drink? ________________

5) How much juice do you think your child **should** drink each day?
   - No limitations
   - 1-3 ounces (Less than ½ cup)
   - 4-6 ounces (½ - ¾ cup)
   - 8-12 ounces (1- 1 ½ cups)
   - 13-20 ounces (1 ½ - 2 ½ cups)
   - 21-30 ounces (2 ½ - 3 ¾ cups)

6) Which of the following is true about your child when he or she is offered juice:
   - Always refuses
   - Sometimes refuses
   - Never refuses

7) On a typical day, how much **milk** does your child drink? ________________

8) How much milk **should** your child drink each day? ________________
   - No limitations
   - 8 ounces (1 cup)
   - 16 ounces (2 cups)
   - 24 ounces (3 cups)
   - 32 ounces (4 cups)
   - 40 ounces (5 cups)

9) Which of the following is true about your child when he or she is offered milk:
   - Always refuses
   - Sometimes refuses
   - Never refuses

**PLEASE CONTINUE TO NEXT PAGE**
10) Which of the following techniques could you use to change the type of fluid your child drinks? Please circle all that apply.
   
   a. Positive reinforcement  
   b. Negative reinforcement  
   c. Positive punishment  
   d. Negative punishment  
   e. Time-out  
   f. Shaping  
   g. Goal-setting  
   h. Self-monitoring  
   i. Extinction  
   j. Liquid fading  
   k. Differential attention  
   l. Ignoring  
   m. Rule setting  
   n. Token system  
   o. Modeling

**PLEASE CONTINUE TO NEXT PAGE**
11) How **likely** are you to use each of the following techniques to increase the amount of water your child drinks? Please use the following rating scale:

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<td>j) Rule setting</td>
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<tr>
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Appendix J

Child Treatment Outcome Questionnaire

ID#: _______________

1) Provider (check one):
   - Developmental Behavioral Pediatrician
   - Clinical Psychologist

2) Did this child make demonstrate improvement with respect to bowel movement functioning as a function of his/her participation in the group treatment? Please use the treatment goals listed below as a basis to guide your decision.
   - Adherence to dietary recommendations (fiber and fluid)
   - Compliance with prescribed toilet sits
   - Placement of bowel movements in the toilet
   - Character and frequency of stools

   □ Yes
   □ No
Appendix K

Comparison of Mean Daily Intake of All Fluid Types and Fiber Across Treatment for

The Sample As A Whole and By Treatment Group

<table>
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<tr>
<th>Fluid Type</th>
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