Chapter 8

Encopresis and Enuresis

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 The endpoint of the alimentary process involves elimination of waste, specifically urine and feces. Two of the most common presenting complaints in primary medical care for children involve disordered elimination, specifically enuresis (urine) and encopresis (feces). Prevalence estimates for encopresis range as high 2% of 5 year old children for encopresis and 25% of 6 year old children for enuresis (Friman & Jones, 1998). These disorders usually occur independently but can co-occur. There is a broad range of medical conditions that can cause encopresis and enuresis but these causes are rare (they are real, however, and need to be ruled out prior to going forward with behavioral assessment and treatment). The vast majority of cases are functional and their comprehensive assessment readily yields the identity of functionally relevant variables that can either be modified through behavioral intervention or manipulated to bring about modifications in behavior related to elimination. A range of definitions for the two disorders exists and a unifying theme involves the inappropriate deposit of waste in terms of location, timing, or frequency. For example, the Diagnostic and Statistical Manual (DSM) of the American Psychiatric Association ( APA, 1994) defines encopresis as (a) repeated passage of feces into inappropriate places, (b) at least once a month for at least 3 months, (c) by a child of at least 4 years of age (mental age of 4 if developmentally delayed), and (d) “the fecal incontinence cannot be exclusively due to the physiological effects of a substance (e.g., laxatives) or a general medical condition except through a mechanism involving constipation.” (p. 106). The DSM further classifies encopresis in terms of whether it is associated with constipation or not and whether afflicted children have previously been fully continent for an extended period, in which case the term ‘secondary’ is used, or if continence has never been achieved in which case the term ‘primary’ is used.

 The DSM diagnostic conditions for enuresis include repeated voiding of urine into clothing or bed at least twice a week for at least 3 months. If the frequency is smaller than that but the voiding is a cause significant distress or impairment to social, academic or occupational functioning, it satisfies diagnostic criteria. The child must be at least five years of age or exhibit that level of developmental ability if developmental delays are present. The condition cannot be directly due to the physiological effects of a substance (e.g., diuretics) or a general medical condition. As with encopresis, the DSM further classifies enuresis into primary and secondary cases. Additionally, the DSM subdivides enuresis into 3 sub-types, nocturnal, diurnal, and combined nocturnal and diurnal. Enuresis has a well established genetic basis. Approximately 75% of afflicted children have a first-degree biological relative who has had the disorder, and it is more prevalent in monozygotic than dizygotic twins.

A Biobehavioral Perspective on Encopresis and Enuresis

 The elimination disorders are complex from a behavior analysis standpoint because physiology plays such a prominent role in their etiology and course. Diagnostic assessment yields information on behavioral and physiological variables and effective treatment typically takes both into account. For example, the bladder in enuretic children is often over responsive to filling. Treatment therefore often involves reducing this hyper responsivity through bladder “stretching” exercises. As another example, the majority of cases of encopresis involve constipation. Effective treatment almost always involves the ingestion of substances that soften stools (e.g., increased fiber in the diet, stool softening medications) (Friman, 2004; Friman & Jones, 1998; Houts, 1991; Levine, 1982; Mellon & Houts, 1995; Mellon & McGrath, 2000).

 The increased understanding of the interplay between physiological processes in the onset and course of incontinence has resulted in a virtual revolution in professional and lay interpretations of the relevant conditions and the contemporary view is now biobehavioral. For example, as noted by Friman (2004) in a discussion of functional encopresis (FE)…“functional encopresis has been misunderstood, misinterpreted, and mistreated for centuries. During the last half of the twentieth century, however, and particularly towards its end, a fuller, bio-behavioral understanding of FE’s causal conditions was obtained and an empirically supported approach to its treatment established. The bio-behavioral understanding and approach to FE is dramatically different than the psychogenic understanding and approach of history. The bio-behavioral approach addresses the physiology of defecation primarily and addresses the psychology of the child as a set of variables that are not causal but can be critical to active participation in treatment.” (p.51 ). Similar comments about contemporary understanding of enuresis are also increasingly available (e.g., Friman & Jones, 1998; Houts, 1991; Mellon & McGrath, 2000). Consistent with the contemporary biobehavioral approach to incontinence, the discussions of encopresis and enuresis that follow will begin with a brief description of physiological factors and then proceed psychological and behavioral assessments, biobehavioral treatment, and end with a description of the role of functional assessment and analysis.

ENCOPRESIS

Medical Assessments and Treatment

 There are multiple physiological factors associated with encopresis the most important of which are colonic motility, constipation, and fecal retention. There are multiple dietary behavioral variables that contribute to these factors and the most important of these are (1) insufficient roughage or bulk in the diet; (2) irregular diet; (3) insufficient oral intake of fluids; (4) medications that may have a side-effect of constipation; (5) unstructured, inconsistent, and/or punitive approaches to toilet training; and (6) toileting avoidance by the child. Because the physiological variables are so central to the condition the initial goal of assessment should involve thorough medical examination. Among the many goals of this examination should be the determination of the extent of stool retention. Chronic retention can lead to fecal impaction, which results in enlargement of the colon. Colon enlargement results in decreased motility of the bowel system and, occasionally, in involuntary passage of large stools and frequent soiling due to seepage of soft fecal matter. The seepage is often referred to as paradoxical diarrhea because the children retain large masses of stool and thus are functionally constipated, but their colon allows passage of soft stool around the mass which results in diarrhea. Parents, unaware of these processes can improvidently administer medication for diarrhea to their already constipated children thus slowing their bowel motility even more (Friman, 2004; Friman & Jones, 1998).

Another very important reason for the medical examination involves ruling out medical causes for soiling. There are rare anatomic and neurologic problems which can lead to fecal retention and soiling. Anatomic problems include a variety of malformations and locations of the anus which are detectable on physical exam and require medical management (Hatch, 1988). Hirschsprung’s disease or congenital aganglionosis is a disorder in which the nerves that control the muscles in the wall of part or all of the colon are absent, causing severe constipation (Chrisophersen & Mortweet, 2001; Levine, 1982). Its incidence is approximately 1 in 25,000, and it usually causes severe symptoms in infancy (Levine, 1975). Thus the clinical presentation itself should prevent the astute clinician from mistaking one for the other. The possible exception is ultra short segment Hirschsprung’s disease which has a more subtle clinical picture. However, the existence of this condition is controversial and, even if it does exist, proper collaboration between physician and behavioral psychologist should ensure timely diagnosis.

Psychological Assessments for Encopresis.

 As indicated earlier, historically incontinence and especially encopresis was first viewed as a problem in the character or personality of the individual and thus it was common to treat the condition with social disapproval or even more extreme forms of punishment (Henoch, 1889). Initially assessment and clinical interpretations stemmed primarily from a psychodynamic perspective and psychopathological interpretations were common. However, as we have noted, the primary causal variable for soiling is fecal retention. And in most cases, retention is not caused by characterological or psychopathological problems and encopresis is not associated with significant increases in other psychological problems (Friman, Mathews, Finney, & Christophersen, 1988; Gabel, Hegedus, Wald, Chandra, & Chaponis, 1986). However, encopresis can be associated with some behavioral problems, especially oppositional behavior and thus this class of behavior should be assessed (e.g., Landman & Rappaport, 1985).

Behavioral Treatment for Encopresis

 There have been a wide number and variety of strictly behaviorally oriented treatments for encopresis which are not explicitly based on functional assessment or analysis such as those using simple instructions and positive reinforcement for appropriate voiding (Ashkenazi, 1975; Ayllon, Simon, & Wildman, 1975), contracting and self management (Plachetta, 1976), using negative reinforcement or overcorrection (Crowley & Armstrong, 1977; Rolider, & Van Houten, 1985) or exclusionary time out (O’Brien, Ross & Chistophersen, 1986). Encopresis has been treated in adults with intellectual disabilities (Smith, 1994), in school situations (Dixon,& Saudargas,1980; George, Coleman, & Williams, 1977) and in outpatient therapy contexts (Boon & Singh, 1991; Friman & Jones, 1998; Gelber, & Meyer, 1964;. Neale, 1963; Ritterband et. al., 2003).

The current bio-behavioral treatments for encopresis focus on immediate medical assessment and treatment of the condition. This typically will involve dietary, fluid and activity changes (often referred to as cathartic treatments), practice at sitting on the toilet several times a day, and reinforcement for maintaining a voiding schedule and especially for successful defecation in the toilet. Although it is clear from the literature that parental reaction to the condition can be a crucial maintaining variable there are few reports we are aware of specifically describing simple socially mediated encopresis (Conger, 1970). However, it should be no surprise that having the parents involved in a positive program for appropriate defecation together with medically reduced discomfort should result in regular continence . Indeed these are the results of several large scale studies incorporating these general procedures (Stark, Owens-Stively, Spirito, Lewis, & Guevremont, 1990; Stark et al., 1997).

Functional Behavioral Analysis

 A behavioral analysis of the processes involved in encopresis addresses the role of physiological activity in the normal functioning of the Colon, rectum and associated smooth muscles and sphincters. The typical child is taught to recognize the need to void and is taught to accomplish this in increasingly independent and appropriate ways. If anatomical or physiological problems develop, these may result in inadvertent association (Pavlovian) of bowel motility (movement of feces to the rectum) or the process of voiding with discomfort or pain. It is also possible that early experience of voiding can be associated with extreme emotional distress, embarrassment, or other or social unpleasantness. In retentive encopresis, this may negatively reinforce the voluntary (operant) avoidance of the normal elimination process, which can then in turn, lead to a decrease in the colon’s motility, constipation and possible eventual impacted bowel. From a functional analytic viewpoint then, the establishment of the encopretic condition could be due to escape or avoidance of so-called “automatic” or sensory consequences or avoidance of prior mediated social aversives associated with voiding.

If medical causes are less relevant, encopresis may have socially mediated causes. To reveal possible socially mediated causes of encopresis, assessment from a functional analytic viewpoint should gather information on the toileting history of the child and current frequency of soiling. It is pertinent in this process to provide support to the child and parents in a matter of fact approach emphasizing the problem as a medical condition that many children have. Assessment of any and all behaviorally related information (antecedent and consequences of inappropriate voiding) may reveal environmental events that may have had influence on toilet refusal. Therefore, the current reactions to the problem by the parents, other adults, or peers, are central to such an analysis especially if their attention and general upset is indeed a maintaining variable for the problem. It should also be determined if tangible consequences are associated with maintaining the problem, or if issues with incontinence function to allow the child to escape certain contexts, or people..

Essentially, the environmental causal variables for attaining a regular schedule for defecation once the bowel is stabilized in retentive encopresis, or sooner in non-retentive encopresis will depend upon the accuracy of identifying those environmental variables that are associated with toilet refusal or soiling as opposed to the possible physiological events that are associated with appropriate defecation such as discomfort or pain.

A Case Study for the Treatment of Encopresis

 Steege and Harper (1989) reported a case study of John, an 11-year-old boy, who had a history of non-compliance with a series of previously well-designed outpatient based treatment efforts and who was exhibiting an average of 2.5 soiling accidents per day. Extensive and repeated medical examinations, including rectal manometry, did not reveal organic pathology. Various treatments including: (a) fleet enemas; (b) suppositories; (c) milk of magnesia; (d) positive reinforcement for the nonoccurrence of soiling accidents; (e) positive reinforcement for the occurrence of appropriate bowel movements; (f) diet modification (high fiber); and (g) positive practice, were implemented within the home environment over the next six months. John's parents kept accurate records of his appropriate bowel movements and soiling accidents. However, his parents reported that he was soiling 1.5 times/ week while averaging two appropriate bowel movements/day. At that time, his parents reported that he was becoming very resistive by refusing enemas, tantrum behaviors, crying to the earlier treatment procedures, particularly the use of cathartics. In addition, he was hiding his soiled underwear, thus making detection of soiling accidents difficult.

 The maintenance of accidents after extensive medical treatment and John’s clear resistance to these procedures such as tantrums, crying, and hiding of soiled underwear were clearly escape from the treatment. Whereas there were possible medical reasons for soiling, the role of socially mediating variables was unclear. Perhaps the social reinforcement for appropriate elimination was not sufficient to overcome the apparent inconvenience of soiling, or perhaps soiling functioned to maintain parental attention in general.

 In order to address theses issues, the authors used a treatment package that eliminated enema use and enabled monitoring of soiled or clean underwear. The method incorporated positive reinforcement procedures (points earned daily and cashed in for items previously agreed upon as desirable by John) including Differential Reinforcement of Appropriate Behavior (DRA) (successful voids) and Differential Reinforcement of Other Behavior (DRO)(Clean underwear at checks), self-evaluation, positive practice (shower and wash underwear after accidents) milk of magnesia, and a high fiber diet. Numbered underwear was used to increase the frequency of appropriate bowel movements and to eliminate hiding of soiled underwear

 Following treatment in a hospital inpatient setting, the effectiveness of the procedures was reviewed with John and his parents. Next the specific treatment procedures were reviewed and explained to them. The acceptability of the treatment was measured by: (1) parental statements regarding the applicability of the treatment package to the home environment; (2) child and parental understanding of the components of the treatment packages (evaluated initially by asking the parents to verbally rehearse the treatment procedures); and (3) child and parental compliance with the treatment regimen during a three day home visit phase wherein the treatment was implemented in the home environment. John returned to the hospital for 5 further days of treatment and then returned home. (Note that the return to hospital before commencing outpatient treatment at home probably acted as an establishing operation (EO) for behaviors of both John and his parents that lead to program success in order to avoid the relative inconvenience of hospitalization.) The mean weekly frequency of the target behaviors was measured for 20 weeks following discharge, with additional follow-up contacts conducted at six and twelve months post-discharge.

 After an increase in bowel movement frequency and one instance of soiling on the third day at home, John was able to have on average 3 successful bowel movements per day with no soiling and this performance maintained for a year. ( See Figure one.)

ENURESIS

Medical Assessment and Treatment

 Acquisition of urinary continence is a complex physiological process (Muellner, 1951; Vincent, 1974). Normal continence is attained through appropriate voluntary elimination via sphincter release upon the lowering of the bladder neck when it is full and preventing micturation by contraction of pelvic floor muscles which raises the top of the bladder. Continence involves an appropriate bladder capacity, and the development of stimulus control of a full bladder over prevention of micturation until an appropriate situation for urination is present. This involves becoming aware of the need to urinate to avoid the emergency condition of “urgency” where micturation is eminent, as well as the inhibition of urination while awake or sleeping. Incontinence can result from physical anomalies, neurological anomalies, and in their absence the lack of training oneself to recognize full bladder stimulation and act upon it.

There are numerous well-known potential physiopathologic causes of enuresis including urinary tract infection, urinary tract anomaly, bladder instability, occult spina bifida, epilepsy, diabetes mellitus, and sleep apnea. Most of these causes can be ruled out by complete history, physical exam, and urinalysis. When unanswered questions remain, other more elaborate laboratory examinations such as voiding cystourethrogram or polysomnographic evaluation are available (Friman & Jones, 1998; Gross & Dornbusch, 1983).

Pharmacological treatments have typically involved tricyclic antidepressants such as Imipamine which reduces premature contractions of the bladder following partial filling and thereby increases functional bladder capacity (Stephenson, 1979).Imipramine, in doses between 25 and 75 mg given at bedtime, produces initial reductions in wetting in a majority of children, often within the first week of treatment (Blackwell & Currah, 1973). However, any increase in continence appears only while the child is on the drug and both short and long term studies show enuresis usually recurs when tricyclic therapeutic agents are withdrawn . The permanent elimination of enuresis produced with imipramine is reported to be 25%, ranging from 5% to 40% (Blackwell & Currah, 1973; Houts, Berman, & Abramson, 1994). More recently, desmopressin (DDAVP), an intranasally administered vasopressin analogue, has been shown to reduce nocturnal enuretic episodes in children, but once removed only 25% of children remain continent (Norgaard, Pedersen, & Djurhuus, 1985). Although it is unknown if it is due to its renal effects of increasing urine concentration and therefore lessening nocturnal bladder volume or some other feature. It is important to understand that medications do not teach continence skills per se but may be used for short term continence success as part of a comprehensive training intervention, for example, to aid in achieving continence for an overnight camping experience or sleep over.

Behavioral Treatments for Enuresis

 There has been a proliferation of behaviorally oriented studies concerning nocturnal enuresis and to a lesser extent diurnal enuresis which are not explicitly based on functional assessment or analysis. Children and adolescents have been reported to have been successfully treated with different versions of the original Mower (1938) wet alarm pad (Finley et al., 1973; Finley, Wansley & Blenkarn, 1977; Friman, & Vollmer, 1995; Taylor & Turner 1975), the operant-oriented “dry-bed” methods (Azrin, & Foxx, 1974; Azrin, , Sneed, & Foxx, 1974; Barman et al.,1981; Bollard & Nettblbeck,1981; Bollard & Woodroffe, 1977) bladder training, (Averink, Melein, & Duker 2005; Harris & Purohit 1977; Kimmel & Kimmel, 1970; Paschalis, Kimmel & Kimmel, 1972) progressive awakenings (Singh, Phillips,& Fischer 1976), token systems (Popler,1976); and bibliotherapy (Van Londen et al. 1995). Enuresis treatments have also been widely reported for differing populations such as seniors (Adkins & Mathews, 1997; Schnelle, et al., 1983; Spangler, Risley, & Bilyew, 1984), persons with intellectual disabilities (Azrin, & Foxx, 1971; Azrin, Bugle, & O'Brien, 1971; Mahoney, Van Wagenen, & Meyerson, 1971; Phibbs & Wells, 1982), children with autism (LeBlanc et al., 2005) and persons with acquired brain injury (Papworth ,1989.) The current bio-behavioral treatment approach (Friman, & Jones,1998; Houts, 1991) is the result of development over the years of more and more information regarding the underlying mechanisms of incontinence simultaneously with the empirical demonstrations of environmental influences via Pavlovian and operant processes. The interested reader is referred to several cogent reviews that best describe these developments (Bollard & Nettblbeck, 1981;.Fielding, 1982; Finley et al, 1973**;** Lovibond, 1963; Morgan 1978; Mountjoy, Ruben, & Bradford, 1984).

Psychological Assessment of Enuresis

 Enuresis has been recognized for centuries (Mountjoy, Ruben & Bradford, 1984) but only recently have bio-behavioral analyses become the predominant assessment and treatment. Mower (1938) is most often cited as the beginning of the behavioral analysis of enuresis with his introduction of a wet alarm bed pad device for treating nocturnal enuresis. (Although Mountjoy et al. (1984) reported on a U.S. patent office award for a wet alarm as early as 1905). Treatment involved having the enuretic child sleep on a pad which could detect moisture and set off an alarm sound awakening the child so that urination could be stopped and completed in the toilet. Mower and Mower (1938) proposed a Pavlovian conditioning explanation as the underlying behavioral mechanism in which an unconditioned stimulus (UCS), a bell or buzzer sound was paired with a currently neutral stimulus (NS) the physiological stimulation of the full bladder, such that the full bladder eventually came to cause awakening as a conditioned stimulus (CS) and thereby preventing bed wetting (CR). Subsequently, Lovibond (1963); Martin and Kubly’s (1955) explanation was that ” As time goes on it is also hoped that the somewhat more temporarily removed response of sphincter control will become associated with bladder tension, thus allowing the child to sleep through the night dry”(1963, p.17).

 However, Place (1954) challenged the Pavlovian explanation on the grounds that conditioning should not remain in tact after removal of the alarm (respondent extinction). That is, a formerly neutral stimulus (NS) such as the feeling of a full bladder, when presented over several conditioning trials just before an unconditioned stimulus (UCS) such as a bell or pad alarm, may acquire the automatic control of that UCS over its associated unconditioned response (awakening and awareness of full bladder and pelvic floor muscle tension). Thus after several appropriate pairings the alarm may indeed come to elicit the now conditioned response (CR) of muscle contraction. However, as in all respondent preparations, the CS will eventually loose its ability to elicit the CR unless it is occasionally paired with the UCS. Therefore, once the alarm is discontinued there is no reason for the awareness and appropriate muscle contraction to continue.

 Lovibond (1963) provided an explanation and demonstration of the extant wet alarm procedures in terms of Konorski’s (1948) type II, variety III conditioned reflex which was essentially a description of a behavior acquired because it allowed escape from an aversive event (negative reinforcement or the strengthening of a behavior because its consequences reduce, eliminate, or prevent an aversive situation). In this conceptualization, the relaxation of the Bladder sphincter causes the onset of the alarm which is an aversive stimulus that is escaped from and eventually avoided, through contraction of the sphincter. Lovibond demonstrated the superiority of this explanation by citing Crosby’s (1950) study. In this study Crosby compared the Mower apparatus with a similar device that delivered shock as well as to his own twin alarm pad which upon urination, provided an obnoxious horn for 1 second and the regular awakening alarm buzzer delayed by one minute. The delayed alarm was associated with requiring the child or an attendant to re-set it. Indeed, it did appear that the CR was sphincter contraction.

 By the end of the 1960’s there were three possible explanations for how bell and pad procedures worked: classical conditioning of sphincter contraction, operant punishment of sphincter relaxation, and operant escape of the alarm through sphincter contraction (Peterson, Wright & Hanlon, 1969). Common to all however, was the approximately 35% relapse rate following treatment. That is respondent extinction seemed to play a role in the non-maintenance of bladder control once the aversive bell or horn was eventually no longer present. Soon thereafter researchers found that intermittent reinforcement (having the alarm sound for only some occurrences of urinating rather than all occurrences resulted in greatly reduced relapse (Finley et al,1973).

 With a marked deviation from the classical conditioning emphasis, Azrin, Sneed & Foxx (1974) reported on their “dry-bed training” treatment for enuresis. In two experiments they demonstrated that (a) a second alarm in the parents’ room to awaken them was more effective than just an alarm in the enuretic child’s room, and that (b) an alarm only in the parents’ room was sufficient to stop wetting in a few days. Thus, because there was no UCS, no Pavlovian conditioning component was present. There was only an operant escape / avoidance arrangement, where the child’s wetting receives social disapproval and the child must clean up and practice lying on the bed and counting to 50, before going to the bathroom. One night of intensive training involved practicing getting up and attempting to urinate in the toilet, ingestion of extra fluids before sleep, hourly awakenings to go to the toilet, having the child inhibit urination for 1 hour if possible, and returning to bed and verifying that it is dry. The dry bed method reduced accidents sharply and kept them at zero rates compared to the alarm only method which did not show significant reductions over the 2-3 weeks of the study. The Azrin et al. (1974) study complimented two now classical publications in which overcorrection procedures, increased fluid intake and intensive initial practice sessions were successful in toilet training adults with intellectual disabilities (Azrin & Foxx, 1971) and as a toilet training method for parents of typical children (Azrin & Foxx, 1974).

 Functional Behavioral Analysis

 The theoretical explanation of successful enuresis treatment shifted from a Pavlovian model that sought to rectify aberrant or underdeveloped physiological reflexes controlling the urinary process through use of alarms to an operant model encompassing diverse environmental events that provided aversive consequences to be avoided via negative reinforcement. and other consequences that strengthened appropriate voiding via positive reinforcement. Aversive consequences were social disapproval and overlearning or positive practice overcorrection (required mass repeating of a correct behavior for each occurrence of the undesirable behavior). Positive consequences were social and tangible consequences for following a schedule, voiding in the toilet, and maintaining a dry bed. These treatments have evolved with physiological relevant interventions such as increasing bladder capacity and resistance to urgency cues, training discrimination of subtle cues that signal eminent urination, and awakening procedures to form the current bio-behavioral approach.

 An important aspect of this development is seen in Fielding’s (1980, 1982) work which focused attention on the overall developmental process of continence as it occurs in most children with respect to the crucial role of the environment in that development. Fielding observed differences in the effectiveness of the wet bed alarm treatment alone, and together with retention control training (RTC) (Kimmel & Kimmel, 1971) for children with nocturnal enuresis as opposed to both diurnal and nocturnal enuresis . Fielding (1980) found that alarm training alone was effective for noctural alone enuretics, but that alarm plus RCT was better. Alarm plus RTC was also better for day and night enuresis, but was not as effective as with nocturnal alone enuretic children. Children who wet day and night responded more slowly and had higher relapse rates. Bladder capacity was not associated with success and thus Fielding questioned if diurnal and noctural enuresis were products of different variables. Fielding (1982) followed up on these findings and reported on diurnal and nocturnal enuretic children versus normal controls with respect to their associated posturing with respect to Bladder volume, “urgency” and accidents. Enuretic children appeared to void sooner, showed less overall urgency behaviors (such as crossing the legs and squeezing them together, holding ones genital area, etc.), and often had accidents within minutes of toileting. Fielding postulated a developmental process in children in which awareness of the need to void and inhibition of micturation before strong urgency behaviors occur develops slowly over years and in coordination with parental prompts to void after relevant “urgency” behaviors are observed by parents. For enuretic children self awareness and inhibition, and finally adequate emptying of the bladder are not under appropriate stimulus control of their distended bladder nor their associated urgency behavioral posturing. Enuresis then could result from a lack of appropriate discrimination of any of several crucial points in the micturation process of bladder distention, accompanying postural movements and parental discriminations of these postures during normal daily child rearing ,. Although we are not aware of any subsequent research, it is clear that recent procedures for dealing with diurnal enuresis would affect this postulated development of self awareness in the enuretic child through reinforcement of regular toileting scheduling based on baseline frequency of voiding, monitoring of dry pants (and therefore heightened observation by parents) and reinforcement for appropriate voiding.

 Specific behavior analytic examples are available of functional environmental variables related to urinary continence. For example, in terms of operant consequences, Friman and Volmer (1995) reported on the reduction of urinary accidents in a 15 year old girl by use of a wet pad alarm. They described the effects of their procedure as negative reinforcement. Hansen (1979) reported on successful use of a twin alarm bed pad using a fading procedure for stopping night wetting in two children over 200 days and with no accidents at a one year follow-up.

 With respect to antecedent events, Hagopian et al. (1993) reported on successful reduction in urinary accidents in a 9 year old boy with Profound Mental Retardation. Their intervention involved frequent sitting on the toilet and pouring 5 oz. of warm water over the genitals to prompt urination. In a recent demonstration of stimulus control of context and environment over urination, Tarbox, Williams and Friman (2004) reported a case study involving continence of an adult male diagnosed with Severe Mental Retardation. They demonstrated through a reversal design, that diapers exert stimulus control over accidents. ( There is no consequence for discriminating the need to urinate, nor for inhibiting urination, while wearing a diaper, and diaper wearing increases uninhibited urination). Therefore, to attain continence, diapers should be completely removed. This long known but undemonstrated issue has relevance for keeping children in diapers and similar functioning clothing longer than necessary as well as for maintaining continence in adults as they age or with disabilities, for the convenience of care givers.

 Case Study of Enuresis.

 Lassen and Fluet (1979) combined conditioning, a modification of overlearning and a token economy based on naturally occurring reinforcers to treat successfully a 10-year-old girl, Sally, who had a lifetime history of nocturnal enuresis. Previous conditioning alone, psychiatric treatment and medication (Tofranil) had not been successful. The treatment for enuresis began after treatment of a token system for a variety of behaviors that Sally’s parents had been unsuccessful at getting her to complete such as chores and homework. Baseline data showed that she wet the bed 12 out of 14 nights. A structured point system for earning rewards that were relevant for Sally was demonstrated to increase chore completion and homework assignments. Prior complaining and admonitions on the pert of the parents for Sally not completing these tasks had no effect on these behaviors. This would indicate that inadvertant parental attention or control through disruption of family life may have been maintaining sally’s non performance of these behaviors. The physical consequences (accidents) for not engaging in these behaviors was apparently not significant enough to counteract their non-completion through avoidance. Parental concern and attention also may have been directly maintaining incontinence.

 A bell and pad conditioning procedure was instituted and. Sally was instructed that when the bell was triggered she was to turn off the alarm, go to the bathroom, wash her face with cold water and void. She was then to wake her mother who was to observe her change her sheets and reset the alarm. Sally received points for following the procedure and for each dry night. When this procedure did not result in significant dry nights the therapists discovered that Sally’s mother was actually helping her change the sheets upon awakening. This was stopped and Sally stayed dry for 15 of 19 nights and then 17 nights in a row. At this point, Young and Morgan’s (1972) bladder training procedure to decrease relapse was added in which Sally drank 16 oz. of fluid within an hour before bedtime. Sally then wet five out of seven nights. Due to this relapse, Sally was instructed to drink only 6 oz. of fluid during the hour before bedtime. She was dry for 10 consecutive nights with this amount and remained dry for the next 10 nights after her fluid intake was increased to 10 oz. and finally 12oz. Sally remained dry throughout this over learning variation. The fluid intake, points and bell and pad were discontinued at this time with Sally having been dry 30 consecutive nights. Three, six and twelve month follow-up contacts with the parents indicated no relapse.

CONCLUSION

 Enuresis and encopresis have significant physiological dimensions that exert a functional influence on the development of continence skills. Additionally, a broad range of environmental events affect these physiological dimensions as well as the development of the continence skills. Therefore, we have endorsed the biobehavioral approach to both problems. It is simply not possible to identify a single causal variable for the typical cases of encopresis and enuresis. Both are multiply determined. However, a functional perspective on the multiple determinative sources appears optimal to us because it leads so directly to interventions that are functionally relevant to the causes and expressions of incontinence. Presently, there is little research on the role functional assessment and analysis can play in the assessment of incontinence except in rare cases typically involving extreme developmental disability and a constellation of behavior problems of which incontinence typically is only one member. That functional assessment would be relevant for cases of encopresis that do not include constipation or stool retention seems self evident. At present, there is no literature describing what the cause of these cases and professionals working them up typically resort to hypothetical constructs that are popular in their orientation to psychology (e.g., aberrant family dynamics, psychopathology, PTSD). From a scientific perspective, however, at present very little can be said about cause. Research into function could fill this gap.

That a functional perspective would be useful for secondary cases of enuresis and encopresis also seems self evident. Some children acquire continence skills and then appear to ‘lose’ those skills. Physiological variables have not been implicated, at least not persuasively, and thus information from functional assessments and analyses could yield variables with a determinative role and thus lead to more effective treatments.

 However, even in the routine cases of encopresis of enuresis, a functional perspective is highly relevant and valuable, and, as we have indicated, under employed at present. For example, resistance, passive and active, plays a significant role in encopresis and diurnal enuresis. For some children, cessation of an ongoing activity is much more costly than for others. For example, a child with low social status on the play ground who has been invited to play a game pays a much higher social cost for leaving the game to use the toilet than does a high status child who is regularly invited to play. Incontinent children are, other things being equal, lower in social status than continent children. Therefore, social variables may play a role. As another example, children who are the ‘architect and victim’ (Patterson, 1982) of coercive family processes may resist toileting as a more general pattern of resistance to authority. Research into such resistance has not been explored in association with incontinence, at least not to our knowledge.

 Even nocturnal enuresis is associated with a range of functional variables that have yet to be explored. For example, we are aware of no research on the seasonal expression of enuresis. Yet, other things being equal, rising to use the bathroom on a cold winter’night is much more aversive than doing so on a warm summer one. As another example, allowing children to wear pull ups or pampers to bed reduces the aversive properties of accidents and may reduce motivation to achieve continence skills thereby (e.g., Tarbox et al., 2004). There are many other examples. More generally, there is a dearth of research into social and automatically generated consequences for incontinence and pursuing that research more vigorously could not only enhance understanding and treatment of it but also underscore the value of a behavior analytic perspective on child biobehavioral problems.

**Resources for elimination disorders (This will be a table)**

There are a variety of web sources with information regarding products and information in general

<http://www.AllegroMedical.com>   (this has products such as bed alarms etc)
<http://www.bedwettingstore.com>  (again has products such as alarms and pads for the bed etc)
<http://www.paediatrics> warehouse.com
<http://www.bed-wetting-prevention.com>  (has some info on what to use and how to use it etc)
<http://www.keea.org.nz>    (organization giving facts, resources etc)
<http://www.soilingsolutions.com>  (treatments and resources for encopresis)

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Table 1. A Sample Bio-behavioral Treatment Plan from Friman, 2004 A Bio-behavioral, Bowel and Toilet Training Treatment for Functional Encopresis. In W. Odonohue, J. Fisher, and S. C. Hayes (Eds.) Cognitive Behavior Therapy: Applying Empirically Supported Techniques in Your Practice. New York: John Wiley

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| --- |
| 1. Refer to appropriately trained physician for evaluation.
2. Demystify bowel movements and problems and eliminate all punishment.
3. Completely evacuate bowel. Procedures are prescribed and overseen by physician.
4. Establish regular toileting schedule. Ensure that child’s feet are on a flat surface during toileting.
5. Establish monitoring and motivational system.
6. Require child participation in clean up.
7. Teaching appropriate wiping and flushing.
8. Implement dietary changes that include regularity of meals and increases in fluid and fiber intake.
9. Utilize facilitative medication. What, when, and how much to be established by physician.
10. Establish method for fading facilitative medication.
 |

Figure 1

