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Psychosocial Characteristics of Children with and Without Toileting Dysfunction

Ellen Sejkora
University of Wisconsin-Milwaukee

PSYCHOSOCIAL CHARACTERISTICS OF CHILDREN WITH AND WITHOUT TOILETING DYSFUNCTION

by

Ellen K.D. Sejkora

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ABSTRACT

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by

Ellen K.D. Sejkora

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Toilet training is a stressful time for parents and families; however, pediatric providers are often uncertain of how to guide parents through this period because of limited systematic research in this area. The current study investigated the role of timing and method of toilet training, use of physician and community resources, and parent and child psychosocial variables to better understand normative toilet training and clarify the role of family, parent, and child characteristics in the toilet training process. The literature regarding early childhood development and normative toileting was reviewed, followed by a discussion of voiding dysfunction and relevant psychosocial and cultural patterns. Participants included 437 community parents (77% female, 82% White, 69% married) of children (48% female) between the ages of two- and six-years-old. A subclinical sample (n=27) and matched controls who did not experience toilet training challenges were identified from within the larger community sample. Data were gathered through an online retrospective survey including measures of demographics, family functioning, child behavior, child temperament, parenting style, parent stress, and open-ended questions about toilet training decisions and resources. Qualitative results indicated that parents used numerous methods of toilet training and half of parents did not consult their child's primary care provider during the process. Most children were toilet trained

by three-years-old. Five latent groups of children were identified in the current sample. Classes differed primarily along child behavior symptoms, temperamental activity, negative parenting behaviors, household conflict, and reported use of child-centered toilet training. The subclinical sample had significantly higher ADHD symptoms and were described as slightly more emotionally labile than the matched non-clinical group. The results of this study indicate that family-system variables likely influence how children are toilet trained. These findings support further consideration of the recommendations provided to parents prior to beginning their child's toilet training and highlight the need for additional attention to the family system during this process.

For my Sissy.

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PSYCHOSOCIAL CHARACTERISTICS OF CHILDREN WITH AND WITHOUT TOILETING DYSFUNCTION

Toilet training is associated with significant parental stress, though fewer than half of parents seek assistance from medical professionals when they encounter difficulties with toilet training (Bakker, van Gool, & Wyndaele, 2001). When parents do approach primary care providers for guidance, providers often report being uncertain of what advice to give (Polaha, Warzak, & Dittmer-McMahon, 2002). The uncertainty among providers is likely due to a dearth of substantive research on toilet training typically developing children (Vermandel, Van Kampen, Van Gorp, & Wyndaele, 2008). While several studies have addressed the psychosocial characteristics of children who toilet train successfully (Bakker, van Gool, & Wyndaele, 2001; Schonwald, Sherritt, Stadtler, & Brigemohan, 2004), the question remains whether certain toilet training methods are more effective for some groups of children or families. The confusion surrounding toilet training leaves parents unsure of how best to toilet train their children and pediatric providers unable to make empirically supported recommendations. For the purpose of the present study, toilet training refers to both the period of time during which a child acquires the skills necessary to use the toilet independently, as well as the strategies and processes parents use to facilitate their child's learning of independent toileting skills.

The current study aimed to expand upon the literature regarding normative toilet training by using a novel, mixed-methods approach to characterize common methods of toilet training and patterns of family relationships and parent and child psychosocial functioning. Second, the current study compared samples with or without significant toileting challenges along several key variables, including child temperament, child behavior problems, and family functioning. Voiding dysfunction in the current study is defined as either meeting criteria for a diagnosis of

enuresis or encopresis or a failure to toilet train, as established through a clinical assessment, within a developmentally appropriate timeframe. Additionally, children are defined as having significant toileting challenges within the current study if their parent endorsed experiencing challenges during toilet training, reported seeing a pediatrician for constipation or stool withholding, or are reported as having completed toilet training for urine or stool beyond the ages of five- or four-years-old respectively. The literature regarding early childhood development, voiding dysfunction, psychosocial and cultural patterns of toilet training, and toilet training methods is reviewed. An ecological systems-based perspective of the influences upon toilet training is also presented. Finally, the methods and analyses used to complete the study are outlined followed by the statistical results of this study and a discussion of relevant conclusions from the current study.

Normative Toileting

The development of volitional control over bladder and bowel movements is an integral component of toilet training and must be present for toilet training to occur (Bakker, van Gool, & Wyndaele, 2001; Doleys & Dolce, 1982). Physiologically, control of voiding requires sufficient neurological and muscular development before bladder and bowel movements can be regulated (Largo & Stutzle, 1977; Largo, Molinari, von Siebenthal, & Wolfensberger, 1999; Robson & Leung, 2006). As the bladder fills, stretch receptors within the epithelium are excited, triggering the urge to urinate (Berk & Friman, 1989). The child must then be capable of postponing voiding, followed by coordinated relaxation of the sphincter and contraction of the detrusor muscle within the bladder (Sillen, 2001). This reflex arc runs through the conus medullaris, where the reflex can be inhibited based on cortical signaling, allowing for volitional control of urination. Bowel movements require a similar level of coordination of anal and rectal muscles.

The development of control over these sphincter muscles corresponds to overall physical development, such that children who are generally delayed in physical growth or are born preterm are likely to have delayed acquisition of volitional bladder and bowel control (Sillen, 2001; Stein & Susser, 1967; c.f. Largo et al., 1999). Given this relationship, parents of children who were born preterm or who have other physical delays should anticipate that their children will be delayed with acquisition of toileting skills.

Chronologically, children are generally aware of their own urination at 15 months-old, verbally report urination or bowel movements between 18- and 24-months-old, and begin notifying caregivers of a need to urinate around 24-months-old (Berk & Friman, 1989). These toileting-relevant milestones occur at similar ages within cross-cultural samples of typically developing children (Largo & Stutzle, 1977; Oppel, Harper, & Rider, 1968; Robson & Leung, 2006). Despite the consistent progression of such skills in typically developing children, the mean age of completion of toilet training varies across samples, ranging from younger than 24 months-old (e.g. Oppel, Harper, & Rider, 1968), to 27 months-old (Bloom et al., 1993; Seim, 1989), to 48 months-old (Berk & Friman, 1989; Loening-Baucke, 1998). Given the consistency of physiological progression in otherwise typically developing children, the range of ages at which toilet training is completed is likely not due to differences in physical development.

On average, children attain control over nighttime bowel movements, followed by daytime bowel movements, diurnal bladder control, and finally nocturnal bladder control (Largo & Stutzle, 1977; Robson & Leung, 2006; Stein & Susser, 1987). Predictors of completing this progression later include stool toileting refusal, presence of constipation, and later age of initiation of training (Blum, Taubman, & Nemeth, 2003; Blum et al., 2004b). One of the most consistently identified predictors of the age of completion of toilet training is female genitalia,

such that biologically female children generally complete toilet learning at a younger age than male children (Bloom, Seeley, Ritchey, & McGuire, 1993; Oppel, Harper, & Rider, 1968; Schum et al., 2002; Stein & Susser, 1987). This difference in age at completion of toilet training is commonly attributed to increased anatomical complexity of urination in males.

Voiding Dysfunction

Bladder and bowel dysfunction can take several forms, all of which cause stress and strain within families. The primary forms of dysfunction include enuresis and encopresis, which require inappropriate voiding of the bladder or bowel respectively. For the purposes of the current proposal, the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5; American Psychiatric Association, 2013) definitions of enuresis and encopresis were used to define voiding dysfunction. Enuresis is characterized by repetitive urination either into bedding or clothes and can be voluntary or involuntary. Such behavior must occur at least twice weekly for three consecutive months or must significantly impair some area of functioning. Enuresis can be either diurnal, nocturnal, or both and can present as primary, meaning the child never achieved bladder control, or secondary, such that the child was urinating appropriately for some period of time, but has since stopped. Notably, a child must have both a chronological and developmental age of at least five years before enuresis can be diagnosed, suggesting that it may be normative for a child to lack full volitional control over their bladder until the age of five-years. Significantly delayed achievement of bladder control is sometimes referred to clinically as failure to toilet train, though this is not a clinical diagnosis.

The relationship between a failure to develop volitional bladder control and other psychopathology is unclear (Christophersen & Rapoff, 1978; Hein & Beerends, 1978; c.f. Couchells, Johnson, Carter, & Walker, 1981). Some researchers have linked enuresis to

Attention Deficit/Hyperactivity Disorder (Harris, 2004; Robson & Leung, 2006) and negative mood (Schonwald, Sherritt, Stadtler, & Bridgemohan, 2004). Nocturnal enuresis appears to run in families and is associated with higher conflict home environments and lower socioeconomic status (Dische et al., 1978; Hein & Beerends, 1978). Couchells and colleagues (2003), however, argue that children with and without enuresis are quite similar, though they state that children with enuresis tend to have more behavior problems relative to their same age peers and that mothers of children with enuresis tend to be more rule-oriented, and therefore may be less child-centered. Notably, teachers report significant worry about bullying of children with daytime wetting difficulties (Cooper et al., 2003), which may have its own influence upon a child's psychosocial development.

Regarding bowel movements, diagnosis of encopresis requires the child to be four years-old, developmentally and chronologically, suggesting that typically developing children are expected to attain volitional bowel control by four-years-old (APA, 2013). The primary feature of encopresis is repeated, inappropriate bowel movements into any place other than the toilet, and this can be voluntary or involuntary. At least one inappropriate bowel movement must occur each month for at least three months. Constipation is not a rule-out for encopresis, and the diagnosis should be given with specification of whether the child has constipation with overflow incontinence. Constipation, hard stools, and stool withholding are thought to be common causes of encopresis in otherwise healthy children (Blum, Taubman, & Nemeth, 2004; Christophersen, 1991; Fleischer, 1976). Experiencing constipation or hard stools may be a form of fear conditioning, similar to the type of conditioning that occurs with phobic responses, and may lead to stool withholding (Bernard-Bonnin, Haley, Belanger, & Nadeau, 1993; Blum, Taubman, & Nemeth, 2004). For example, the child may learn to associate pain with bowel movements and

develops anticipatory anxiety and avoidance of further bowel movements. Avoidance of bowel movements can lead to withholding behaviors, which can exacerbate constipation, leading to a cyclical worsening of bowel control problems.

Assessment of a children suspected of having encopresis should include a comprehensive history, including whether the child has ever experienced sexual abuse, given the slightly higher prevalence of encopresis within this group (Austin & Coplen, 2007; Boon & Singh, 1991; Maizels & Firlit, 1986; Robson & Leung, 2006). Additionally, a multidisciplinary assessment is recommended to consider possible neurological and anatomical abnormalities that may contribute to the child's difficulty with bowel control (Coehlo, 2011). Some clinicians have argued for distinction between retentive and non-retentive encopresis (see Howe and Walker, 1992 for review), though 80-90% of children with encopresis are retentive (Di Lorenzo & Benninga, 2004). Children with non-retentive encopresis tend to be more oppositional, with more behavior problems (Coehlo, 2011; c.f. Blum et al., 1997), or may have experienced excessively punitive toilet-training methods (Boon & Singh, 1991; Coehlo, 2011). The presence of oppositional behaviors along with encopresis is a negative predictor for treatment outcome, such that these children tend to fail to improve from traditional medical management (Stark, Spirito, Lewis, & Hart, 1989).

Prevalence of both enuresis and encopresis, based on prior diagnostic criteria, tends to decrease with age, beginning at about 10% of five year-old children (c.f. Niemczyk, Equit, Khatib, & von Gontard, 2014) and declining to about 1% of adolescents (Blum et al. 1997; Boon & Singh 1991; Christophersen, 1991; Cooper et al., 2003; Dische et al., 1978; Howe & Walker, 1992; Robson & Leung, 2006). Of note, the prevalence of voiding dysfunction broadly is higher among children and adolescents with neurodevelopmental disorders (Equit et al., 2013).

Nocturnal enuresis, or bed-wetting, may be slightly more prevalent than other forms of voiding dysfunction. There is a high rate of comorbidity, about 25%, between enuresis and encopresis (Austin & Coplen, 2007; Boon & Singh, 1991; Robson & Leung, 2006). This comorbidity is commonly attributed to the close physical proximity of the bladder and the rectum, as an overly full rectum may place pressure on the bladder, making bladder control more challenging (Robson & Leung, 2006).

Over the last forty years, the primary forms of treatment for both enuresis and encopresis have been behavioral, with minimal variation aside from improvements in technology (see Brooks et al., 2000; Christopheren & Rappoff, 1978; Howe & Walker, 1992; Issenman, Filmer, & Gorski, 1999; Klassen et al., 2006; and McGrath, Mellon, & Murphy, 2000 for reviews; Ritterband et al., 2008; 2013; Stark, Owens-Stively, Spirito, Lewis, Guevremont, 1990; Stark et al., 1997; van der Plas et al., 1996). One of the most well-known treatments for nocturnal enuresis is the "Dry-Bed" method (Azrin, Sneed, & Fox, 1973; Christophersen & Rapoff, 1978). In this method, an alarm is attached to the child's bed or underclothes. When the child urinates, the circuit of the alarm is completed and the alarm sounds, waking the child. Urine-alarm treatment methods are relatively inexpensive and require a mean of nine weeks to complete (Christophersen & Rapoff, 1978). Current research estimates that this method reduces symptoms of nocturnal enuresis in 80-90% of cases (Azrin, Sneed, & Foxx, 1974; Howe & Walker, 1992; Klassen et al., 2006; Mahoney, Van Wagenen, & Meyerson, 1971; Saldano, Chaviano, & Maizels, 2008; Vermandel et al., 2009).

Similar methods to the "Dry-Bed" method (Azrin, Sneed, & Foxx, 1973) have been used with diurnal enuresis, often with the addition of positive reinforcement contingent upon appropriate urination (Azrin & Foxx, 1974; Klassen et al., 2006; Maizels & Rosenbaum, 1985).

Medical interventions for enuresis have poor efficacy rates, with at least half of children relapsing once medication is discontinued, and generally require a longer course of treatment than urine-alarm methods (Christophersen & Rapoff, 1978; Howe & Walker, 1992; c.f. Issenman, Filmer, & Gorski, 1998). The most common reason for failure of any form of enuresis treatment, as with most pediatric interventions, is lack of parental compliance (see La Greca, Bearman, & Roberts 2003 for a review).

The common history of constipation in children with encopresis necessitates that treatment of any bowel impaction and chronic constipation must be included in treatment of encopresis (Allen, 1998; Christophersen, 1991; Di Lorenzo & Benninga, 2004; Galal, Chong, Williams, & Phillips, 2007; Issenman, Filmer, & Gorski, 1998; Stark et al., 1990; 1997), along with a consideration of physiological causes of constipation (Fleischer, 1976; Howe & Walker, 1992). Laxatives, such as Miralax (polyethylene glycol 3350) or Senekot (senna), are commonly used to remove impaction, though the initial cleansing dose of these medications must generally be given over holidays or weekends, as this causes frequent need for bowel movements (Galal et al., 2007). Following the initial dis-impaction, a lower, maintenance dose of the laxative is often continued to maintain healthy bowel functioning. Enemas may be used for initial dis-impaction (Di Lorenzo & Benninga, 2004; Galal et al., 2007; Loening-Bauke, 1998) and are viewed as an acceptable form of treatment by parents, though impaction is rarely severe enough to necessitate removal via enema (Bernard-Bonin et al., 1993).

Because of the co-occurrence of conditioned avoidance and history of constipation, a combination of medical and behavioral treatments is recommended (see Issenman, Filmer, & Gorski, 1992 and Di Lorenzo & Benninga, 2004 for reviews). A toilet-sitting schedule is often implemented, with the child rewarded for sitting on the toilet at designated times (Stark et al.,

1990; 1997). Children have stated that the toilet-sitting schedule was the most beneficial aspect of encopresis treatment (Bernard-Bonin, 1993). Bornstein and colleagues (1983) identified the utility of fading of tangible reinforcement for non-soiling and appropriate bowel movements as a treatment for encopresis in a single subject study. Austin and Coplen (2007; Levine & Bakow, 1976) estimate that behavioral modification treatments completely alleviate symptoms in about 75% of children with encopresis within one year (c.f. Bernard-Bonin et al., 1993).

Notably, many of the systematic studies of treatments for enuresis and encopresis were conducted in the early 1980s and 1990s, with few novel interventions developed recently (see Coehlo, 2011 for review). In existing research regarding voiding dysfunction, very few consistent behavioral, familial, or psychosocial risk factors have been identified. One of the few comprehensive studies of psychosocial aspects of toileting completed to date was conducted by Bemporad and colleagues in 1971. In their case study, Bemporad and colleagues argued that one the defining characteristics of children with encopresis treated by a psychiatrist is the dysfunction of their families. Specifically, their fathers "seemed to be intimidated by their domineering wives and either to dissociate themselves from the family or to react in a petulant, hostile manner. (p. 273)" The mothers of the encopretic children "seemed to be concerned with various forms of 'self-improvement,' often at the expense of running the household. (p. 276)" While Bemporad and colleagues address a variety of anecdotal features of the families in this study, they extrapolate beyond the available data and their conclusions have not been supported by other, more rigorous studies. The lack of equally comprehensive, updated studies is concerning, given that these early toileting studies form much of the basis for current toileting recommendations.

Historical and Cultural Trends in Toilet Training

Toilet training patterns varied widely over the past century and appear to be strongly influenced by cultural parenting trends. Namely, a trend toward later completion of toilet training in Western Europe and the United States was noted over the last thirty years (Berk & Friman, 1989; Doleys & Dolce, 1982; Holaday, 1981). Socioeconomic factors appear to be quite influential in determining when and how parents toilet train their children. There is limited information about possible variations in completion of toilet training based on race or ethnicity; however, Wald and colleagues (2009) reported that African American children completed toilet training about six months earlier relative to White children. Of note, Wald and colleagues did not disentangle the covariates of race and socioeconomic status in their sample and it is likely that differences in socioeconomic status heavily influenced these results. Specifically, lower income, working mothers tend to report expecting earlier completion of toilet training and a stronger tendency to use punishment during toilet training (Carlson & Asnes, 1974). When discussing these differences in toileting patterns, Wald and colleagues (2009) expressed concern about the lack of research focusing on normative toileting patterns, stating that the lack of norms makes it difficult to draw comparisons between racial, ethnic, or socioeconomic groups.

To demonstrate the effects that cultural and behavioral expectations can have on age of completion of toilet training, de Vries and de Vries (1977) studied the toilet training practices of one African tribe, which generally begins when the infant is between three and four weeks old. Within this tribe, mothers often return to fieldwork shortly after birth, placing infants in the care of older children, necessitating simplification of care for the infant. The method of training used within the tribe requires identification of the infants' individual toileting signals, rewards for successful on-command bladder and bowel movements, and no punishment for inappropriate

voiding until the infant is older than 12 months. Infants within this tribe are generally completely trained at six months-old. As noted by de Vries and de Vries (1977), this sample's earlier completion of toilet training may be motivated by the need of mothers to return to work earlier in a child's life.

Historically, the delay in initiation of toilet training has been attributed to the increasing convenience and affordability of disposable diapers, as well as widespread endorsement of child-centered toilet training (Brazelton, 1962). Some methods of toilet training encourage parents not to push their child toward control of voiding, but to wait until the child demonstrates some form of readiness. Bakker and Wyndaele (2000) also identified a decreased importance of staying dry during an afternoon nap in parents' assessment of a child's readiness and increasing tendency to wait until a more appropriate season (i.e. summer) or the initiation of schooling before attempting toilet training. Similarly, Blum, Taubman, and Nemeth (2004) attribute later completion of training to later initiation of training. Researchers over the last several decades point to a strong role of socioeconomic class as a determinant in the age of initiation of toilet training, such that non-Caucasian children, those in single-parent households, and those with lower socioeconomic status are toilet-trained earlier (Carlson & Asnes, 1974; Hauck, 1991; Hindley, 1968; Schum 2001, 2002; Wald et al., 2009; c.f. Oppel, Harper, & Rider, 1968). Hauck (1991) attributed this to a lack of resources for continued use of diapers in these households, specifically lack of availability of washing machines when using cloth diapers or the cost of continuing to use disposable diapers.

The overall trend toward later completion of toilet training among White or higher socioeconomic status children is concerning for several reasons. The presence of non-toilet trained children within childcare centers can promote disease transmission (Berk & Friman,

1989). Additionally, later toilet training may be associated with urinary tract infection, possibly due to poor hygiene associated with extended use of diapers. Later toilet training has also been linked to bladder dysfunction (Hellstrom, 2000; Largo, Molinari, von Siebenthal, Wolfensberger, 1996; c.f. Whitehead, 1983). Despite the potential health implications of the timing of toilet training, successful and normative toilet training is difficult to define (Stein & Susser, 1987). Clinical trials of treatments for voiding dysfunction as well as studies of normative toileting use widely varying definitions of completion of toilet training (see Vermandel, Van Kampen, Van Gorp, & Wyndaele, 2008 for a review), ranging from a specific number of accidents per month to parental definitions of success (e.g. Bloom et al., 1993; Doleys & Dolce, 1982). Bloom and colleagues (1993) argue that it may be simpler to define abnormal toileting than "normal" toileting.

Toilet Training Methods

The two primary methods of toilet training currently most commonly used are child-centered (Brazelton, 1962) and behavioral toilet training (Azrin & Foxx, 1971). Child-centered toilet training is based upon the premise that most children will naturally become motivated to toilet independently and that parents should follow their child's lead as they initiate toilet training (Brazelton, 1962). Behavioral toilet training has been used more commonly when children have cognitive deficits or voiding dysfunction and relies upon positive reinforcement strategies to increase rates of positive toileting behaviors (Azrin & Foxx, 1971). Vermandel and colleagues (2008) argue that child-centered and behavioral strategies are the most heavily researched toilet training methods, but that there is limited substantive data regarding their use in the community to establish which method is most effective (Russell, 2008). Furthermore,

popular toilet training methods seems to shift with cultural influences, such that later, child-centered methods have become more popular in the last twenty years (e.g. Wald et al., 2009).

While child-centered and behavioral toilet training are most common, infant toilet training has seen a resurgence among Western European and American households (Smeets, Lancioni, Ball, & Oliva, 1985). Infant toilet training is often justified by an observation that toilet training tends to occur as early as six months in other cultures (de Vries & de Vries, 1977; Smeets et al., 1985). Primarily, infant toilet training involves parental identification of infant voiding cues and the parent placing the child on the toilet (Smeets et al., 1985, Sun & Rugolotto, 2004). Parents condition the child to hold their stool until they are on the toilet, which can take several months. Flaskerud (2006) points out that this method has received a lot of attention in the media as a form of attachment parenting practiced by celebrities, which may partially explain its increasing popularity.

Although infant toilet training is popular among a subset of parents (Flaskerud, 2006), child-centered and behavioral methods are the most frequently studied methods (see Vermandel et al., 2008 for a review). The two methods have widely different origins, though they appear to be implemented together by many parents, particularly those with typically developing children (e.g. Hauck, 1991; Russell, 2008). It should be noted that the American Academy of Pediatrics currently endorses child-centered toilet training (Stadtler, Gorski, & Brazelton, 1999; AAP 1999a-c), though there has been discussion within the scientific community of whether this method is appropriate for all families (e.g. Blum et al., 2003; Christophersen 1991; Russell, 2008).

Child-Centered Toilet Training

In developing the child-centered toilet training method, Brazelton (1962) reviewed clinical records of over one-thousand children in New England, the majority of whom were male, White, and from upper middle-class homes. Of note, Brazelton reports that the mean age of completion of toilet training was 27-months, which is slightly older than other estimates from around the same time (e.g. Hindley, 1968). Like many others (e.g. Fleischer, 2004), Brazelton (1962) asserted that toilet training is an essential developmental task that can be a source of significant self-esteem if successful. Brazelton emphasized the need to achieve voluntary voiding control before beginning training, which he stated occurs by the time a child is 18-months-old. Brazelton identified the child's will as a significant factor in determining the timing of toilet training and argued that the child must have a desire to become like their parents to complete toilet training. Methodologically, Brazelton encouraged parents to introduce a child-size toilet to the child's environment around 18-months. He also emphasized that there should be verbal or behavioral compliance on the first use of this toilet and if this does not occur, parents should stop training and wait. After this initial visit, Brazelton encouraged parents to leave the child naked in their room with the child-sized toilet and that, under these circumstances, children will toilet-train themselves due to their own intrinsic motivation.

Brazelton (1962) also frequently discussed parental apprehension about toilet training, encouraging physicians to endorse child-centered toilet training to decrease this anxiety. Additionally, Brazelton encouraged parents to focus only upon day training initially, and to leave nap or night training until the child is about 30-months-old. Brazelton also identified that female children tended to be toilet trained several months earlier than male children, which was attributed to a stronger desire for cleanliness and organization among female children. One clear

strength of Brazelton's child-centered toilet training strategy is that he encouraged physicians to give advice that is highly tailored to each family's situation. Conversely, this approach also makes establishing the efficacy of child-centered toilet training difficult, as there is limited consistency in its implementation across families.

Brazelton (1962) warned that parents should not initiate training before the child displayed signs of readiness (AAP, 1999a-c; Brazelton et al., 1999; Doleys & Dolce, 1982; Gorski et al, 1999). Brazelton and colleagues' (1999) stated signs of readiness include many behavioral markers that were initially operationalized by behavioral toilet training proponents (Azrin & Foxx, 1971). Specifically, signs of readiness include voluntary control of bladder and bowel sphincters, compliance with instructions, and "sufficient neurological development to transfer some of the developmental energy required for walking and other gross motor tasks to be used in the mastery of toileting behavior (Brazelton, 1962, p. 1354)." The review article by Brazelton and colleagues (1999) also emphasized consideration of the unique needs of children with chronic health conditions, stating that parents of such children tend to ignore signs of readiness out of sympathy, further delaying toilet training in this population (Frauman & Brandon, 1996). Further, Brazelton and colleagues (1999) explicitly cautioned against behavioral toilet training, arguing that the strategies of this method, when implemented by community parents, may lead to physical abuse of the child (Schmitt, 1987), "compulsive parent pressure (p. 1354)," regression of the child's skills, and conditioning of non-desired behaviors.

Behavioral Toilet Training

One of the major areas of difference between child-centered and behavioral toilet training is the initial study sample. Whereas Brazelton (1962) studied upper middle-class, White, typically developing children, Azrin and Foxx (1971) explicitly focused upon training

institutionalized adults with intellectual disabilities. Furthermore, while Brazelton (1962) relied upon clinical observations, Azrin and Foxx (1971) used small sample, behavior analytic techniques. Both Azrin and Foxx (1971) and Brazelton (1962) emphasized the complexity of toilet training, though Azrin and Foxx (1971) characterized toilet training as an operant and social learning experience, generally reinforced by success.

In individuals with intellectual deficits, toilet training is a significant challenge and, until the development of behavioral toilet training, was only infrequently obtained by individuals in residential care facilities (Azrin & Foxx, 1971). Behavioral toilet training applied existing urine alarm technology to daytime urine and stool training under the close supervision of trained behavioral specialists. In this method, patients were restricted to the toileting areas for eight hours a day outside of mealtimes. They were provided with a higher than typical fluid intake to increase need for voiding and were given immediate tangible reinforcement for appropriate bowel and bladder movements in the toilet. In this initial application of behavioral toilet training, patients were prompted to use the toilet every thirty minutes and required to remain on the toilet for up to twenty minutes at a time. Furthermore, patients were praised every five minutes for remaining dry while they were not seated on the toilet. Fading of explicit prompts was used to train additional, related self-care tasks, such as dressing and undressing. Any accidents that occurred were punished using a verbal reprimand and then withdrawal of all reinforcement for a one-hour period.

One of the clear advantages of the behavioral toilet training method is that it allowed for toilet-training children and adults who may not have had the capacity for intrinsically motivated toilet training (Azrin & Foxx, 1971). This method also allowed for training more than one individual at a time and, in this initial study, was quite successful. All the participants were

completely dry during both day and night for at least four weeks, Azrin and Foxx's operational definition of completion, within several months of initiating training. A follow-up study that explicitly focused upon nighttime urinary training adults with intellectual disabilities using a urine alarm had similar success rates (Azrin, Sneed, & Foxx, 1973). Of note, this training method resulted in nighttime dryness for a four-week period with a mean of one night of training, suggesting that nighttime training was completed more quickly than daytime training. Connolly and McGoldrick (1976) applied highly similar procedures to children with profound intellectual disability and identified that, while these strategies resulted in improved toileting for all children in the study, only two children were completely toilet trained by the end of the study period. Mahoney, Van Wagenen, and Meyerson (1971) had significantly more success training eight children, five of whom had intellectual disabilities, and seven attained full daytime bladder control and maintained continence in their homes. Taken together, these studies of children and adults with intellectual disabilities indicate that individuals with profound intellectual deficits can be toilet-trained, but that the timing of this training may need to be substantially delayed to allow for sufficient development of related skills (Azrin & Foxx1971; Azrin, Sneed, & Foxx, 1973; Connolly & McGoldrick, 1976; Mahoney, Van Wagenen, & Meyerson, 1971).

Following their initial studies in samples of adults with intellectual disabilities, Foxx and Azrin (1973) adapted their training method for use with typically developing children. Using this method, Foxx and Azrin claim that, under strict circumstances, children can be toilet-trained in as little as two hours. Azrin and Foxx (1974) wrote a popular press book about toilet training for parents with typically developing children. Notably, they provided several explicit, behavioral signs of readiness for toilet training. Namely, the child should be able to raise and lower their own pants, the child voids three to five times per day, the child has some vocabulary including

basic toilet-related terms such as “wet” and “dry,” and the child should be somewhat compliant with parental commands.

In subsequent work focused upon signs of readiness for toilet training, Hoerner and McClellan (1981) expanded the signs of readiness to include attention span longer of at least five to ten minutes and the absence of significant family stressors. Kaerts, Vermandel, Lierman, Van Gestel, and Wyndaele (2012) tested the inter-observer reliability of traditional readiness signs and concluded that, while some of these signs are difficult to notice, clear behavioral signs can be observed reliably, making them appropriate signals for beginning toilet training. However, in a review of all research on signs of readiness, Kaerts and colleagues (2014) concluded that there is no consensus about which readiness signs are most meaningful in terms of reflecting true preparedness to begin training. The American Academy of Pediatrics (1999a-c) heavily emphasizes the importance of observing readiness before initiating toilet training in its statements for parents, clinicians, and day-care providers. Christophersen (1978) and Doleys and Dolce (1982) place similar emphasis on observing readiness before beginning any efforts toward toilet training.

Toileting Training Principles for Parents

In discussion of how medical providers should speak to parents about toilet training, two things are clear: there is no one method of toilet-training that will work for every child and parents require significant support and guidance through this period of development (Connell-Carrick, 2006; Polaha, Warzak, Dittmer-McMahon, 2002). Christophersen (1991) argues that Brazelton’s (1962) method is simple, but poorly defined and may only be appropriate for the most self-motivated children. Rather, Christophersen argues, behavioral toilet training (Azrin & Foxx 1971, Azrin, Sneed, & Foxx, 1973; Connelly & McGoldrick, 1976; Foxx & Azrin, 1973)

has more empirical support than child-centered toilet training and may not take as long. Christophersen (1991) does caution that strict behavioral toilet training may be too complicated for community parents to implement in full (Matson & Ollendick, 1977).

Halligan and Luyben (2009) established that waiting until children voided less often and providing children with small reinforcers, such as new underwear or treats, which reflects common approaches to toilet-training in the community (Hauck, 1991), is an effective toilet training method. Similarly, Polaha and colleagues (2002) argued that, while the AAP's current guidelines (1999a-c) are appropriate and are being endorsed by community pediatricians, adding specific behavioral reinforcers and other more intensive procedures would help to shorten the duration of toilet training. Luxem and Christophersen (1994; American Academy of Family Physicians, 2008) endorsed a hybrid approach to toilet training involving a supervised format of behavioral management strategies and argued that this form of toilet training should be considered for its broad applicability to many different family situations. Connell-Carrick (2006; Howell, Wysocki, & Steiner, 2010) encouraged providers to, rather than endorse a universal approach to toilet-training, inform parents that most children are toilet trained by 36-months-old and that toilet training can take between three and five months to complete.

Being a particularly complex aspect of parenting, parents have many questions about how and when to toilet train their children (Hauck, 1991; Smith, 1980), though they often do not view medical professionals as a valuable source of information (Bakker, Van Gool, & Wyndaele, 2001; Carlson & Asnes, 1974). Increasingly, celebrities, parenting blogs, and popular press books are a primary source of information for parents as they make decisions about raising their children (Connell-Carrick, 2006; Flaskerud, 2013). As Connell-Carrick (2006) observed, these sources vary widely in their accuracy and filtering through the enormous amounts of information

now available to parents requires a great deal of critical thinking and self-awareness. Compounding this stress is the social feedback associated with many parenting decisions, which Flaskerud (2013) described as increasingly polarized. This polarization extends to toilet training methods, with some schools of thought advocating for infant toilet training, initiating as early as six-months, and others advocating for a more "laid-back" approach to toileting and waiting for the child to show interest, which may not be until the child is five-years-old.

For example, one parenting blog "Kellymom," touts infant toilet training as the sixth essential component of attachment parenting (Boucke, 2016). Boucke points to other cultures, in which mothers "rely on intuition," rather than "'medlore[sic]'-maturational readiness theories based on opinion and commercialism rather than scientific proof," as the basis for infant toilet training. Boucke also states that there is a sensitive period during which infant toilet training is possible, lasting between birth and five to six months for a "normal, healthy infant." The author provides no information about infant toilet training beyond their own books on the subject and cites no scientific resources. When faced with information like this, Connell-Carrick (2006) encouraged parents to ask the following questions: "What are the unstated assumptions in this parenting advice? Is there evidence to support this advice? Is this assertion in alignment with the scientific community? What other viewpoints exist that contradict this parenting method? How do others see this parenting method (p. 822)?"

It is also possible to find directly contrasting information, such as the Huffington Post article by Dr. Hodges, who argues that infant toilet training is conditioning young infants to hold their bowel and bladder movements, which can increase risk for constipation and voiding dysfunction in the future (Hodges, 2012). Hodges has contributed articles to a variety of parenting websites, including Parents.com (Hodges, n.d.). While Hodges is reportedly a pediatric

urologist, increasing the perceived credibility of this information, Hodges also uses extreme language and makes strong claims that likely extend beyond scientific or medical knowledge, but may appeal to parents (Hodges, 2012, Hodges, n.d.).

Parenting resources can also normalize current cultural trends, such as the increasingly late age of initiation of toilet training (Blum, Taubman, & Nemeth, 2004). In one instance, Leong (n.d.) describes herself as a "laid back mom," and outlines in detail why she decided to wait until her son was almost four years old before seriously attempting toilet-training. Interestingly, she reports that their first attempt to toilet-train was discontinued after her son's third accident on the first day of training. This very short interval is directly contradictory to the belief in the medical community that it may take several months of continued training to completely toilet train a child (Robson & Leung, 1991; Stehbens & Silber, 1974). Leong's (n.d.) discussion of the challenges in toilet-training her son may validate the struggles many parents face, but it also may discourage parents from persevering through such challenges in favor of waiting until their child is older and can be toilet-trained more quickly.

One advantage to internet sources it that they can quickly provide information to populations of parents whose children have special healthcare needs. For example, a blog titled "Extended Potty Training" is described as "a blog for parents when potty training a child is taking waaaaaay [sic] too long" and provides resources specifically to parents whose children are having challenges with toilet-training (Extended Potty Training, n.d.). One post on this blog provides a link to a hospital page about encopresis, which the post defines for parents as "childhood soiling." The blog also makes recommendations for books for older children with soiling, discusses over the counter treatments for constipation, and addresses the guilt and shame that such parents often experience. While it can be difficult for parents to assess the credibility of

many online parenting resources, this is clearly an easily accessible information source for parents making challenging parenting decisions. Though monitoring the accuracy of the myriad internet sources is impossible, teaching parents how to critically evaluate resources and providing foundational empirical information may help parents to make more scientifically sound decisions (Connell-Carrick, 2006).

A Bioecological Perspective on Toilet Training

Given that toilet training is an essential part of development and increasing a child's independence, it is appropriate to view this process through a developmental lens. Additionally, knowing that the timing and methods used for toilet training have shifted markedly across cultures and over the past 100 years, considering the broader sociological and environmental influences on this developmental task may be necessary. The bioecological model, with its nested environmental influences (Bronfenbrenner, 1977, 1999), is an appropriate theoretical framework for considering the combined impact of the numerous socioecological factors related to toilet training. See Figure 1 for a visualization of the bioecological model as it relates to toilet training. Specifically, at the center of the bioecological model is the individual child and their characteristics, including age, sex, temperament, and physical development. As these relate to toilet training, the child must have reached a level of physical and neurological development to be able to voluntarily control bowel movements. The temperament and behavior of the child during toilet training, for example, refusing to use the toilet for stooling or being frightened of novel toilets, will influence parents' toilet training decisions and will in turn be influenced by these parenting decisions (Bronfenbrenner, 1999).

Just beyond the influence of the child in their own development are the proximal influences of microsystem variables (Bronfenbrenner, 1977). Such variables include parenting

style, family structure, family relationships, and the child's interactions with other caregivers including those at school or daycare. These settings all interact with one another, creating the next level of influence around the child, mesosystems. Regarding toileting, much of toilet training is influenced by caregivers, including school or daycare professionals, medical doctors, and parents. The characteristics of these variables may strongly alter the course of toilet training. For example, if a parent is highly stressed or is parenting in an unpredictable manner, they may have difficulty using consistent toilet training strategies, possibly making toilet training take longer.

Beyond the immediate setting of the child, exosystems are those societal influences that change the contexts in which the child functions (Bronfenbrenner, 1977). More specifically, public schools in the area may have policies about whether children need to be toilet trained before they can start kindergarten, which may influence the practices of caregivers before the child begins school. The mass media is an important factor at this level that can influence many settings in which a child functions. For example, if a method of toilet training has been frequently covered in the mass media, much as infant toilet training has recently (Flaskerud, 2013), this may become a more common practice among parents. The final level of influence is the macrosystem (Bronfenbrenner, 1977), which encompasses the somewhat intangible cultural values about child development. As an example, some cultures or subcultures expect children to be more independent at younger ages, and while this is not always an overtly stated expectation, this core cultural value will influence the ways that adults parent their children, encouraging them to be more or less independent.

The Current Proposal

Although a large-scale study of the fit of the bioecological model of toilet training is not feasible, the current study was the first systematic evaluation of multiple levels of environmental influence upon toilet training. At present, while effective behavioral treatments for voiding dysfunction have been identified, there is no clear consensus as to what method of toilet training is most appropriate for whom, and this conclusion will likely be strongly influenced by the complicated context in which toilet training occurs (Russel, 2008; Vermandel, Van Kampen, Van Gorp, & Wyndaele, 2008). It is most likely that child-centered (Brazelton, 1962) and behavioral toileting (Azrin & Foxx, year) approaches each lead to successful completion of toilet training for particular children and families. The current study evaluated a more comprehensive set of toilet training-related psychosocial variables than was previously considered. Specifically, the current study examined child behavior and temperament, parenting style, parent stress, family relationships and conflict, as well as parent-reported toilet training methods and resources as each related to successful completion of toilet training among community children.

Aim 1. The current study was the most comprehensive qualitative examination of the toilet training practices of parents within the community to date. The proposed study aimed to characterize the toilet training methods currently in use in the general population. Furthermore, the current study sought to identify what resources parents use when toilet training typically developing children and what role general pediatric medical providers have over the course of toilet training.

Aim 2. The current study aimed to identify bioecological systems variables that may be associated with the occurrence of challenges during toilet training. *Hypothesis 1: The current study proposed that, within a community sample, two latent groups of children would be*

differentiated via latent variable mixture modeling (LVMM; see Berlin, Parra, & Williams, 2014 and Berlin, Williams, & Parra, 2014 for reviews). Group one would likely be characterized by fewer child behavior problems, easier child temperament, more positive parenting behaviors, lower parent stress, lower family conflict, absence of challenges during training, and shorter duration of training. Group two would likely be characterized by more child behavior problems, more challenging child temperament, fewer positive parenting behaviors, higher parent stress, higher family conflict, experiencing challenges during training, and a longer duration of training. *Hypothesis 2:* A subset of children whose parental responses indicated subclinical but significant challenges with toilet training, such as those for whom toilet training was completed after four-years-old for stool or who sought medical treatment for stool withholding, were compared to a matched sample of children with no challenges. *These two groups were compared along variables included in the LVMM to assess whether the samples would show the same patterns of difference as were identified by the LVMM as a reflection of clinical relevance.*

Methods

Participants

Respondents to the online survey included 437 parents and their youngest child within the selected age range recruited from the community by students in an advanced undergraduate psychology course. Inclusion criteria included having a child between 2- and 6-years-old and being English-speaking. Within the community sample, 77% (*n*=330) respondents were mothers. The majority of respondents (82%, *n*=358) identified as White, and married (69%, *n*=301) with a mean age of 33.04 years (*SD*=6.77). See Table 1 for full demographic characteristics of the community sample. The focus children were 52% (*n*=227) male and 48% (*n*=208) female with a mean age of 4.97 years (*SD*=1.39). Six percent (*n*=27) of the community sample was identified as having significant toileting challenges. Criteria for this subclinical group included reporting that the child had challenges with toilet training, demonstrated stool withholding or urological symptoms, was treated by a medical provider for constipation, or completed toilet training after the age of 5-years-old for urine or 4-years-old for stool. Within the subclinical group, 59% (*n*=16) were male and 41% (*n*=11) were female with a mean age of 5.2 years (*SD*=1.5). The majority of the subclinical group reportedly had difficulties with appropriate bowel movements. See Table 2 for the demographic characteristics of the subclinical group and the matched community sample.

Procedure

Participants were recruited from the community over four semesters. Potential respondents were approached by students in an advanced undergraduate psychology course. All students were required to complete training in research ethics prior to recruiting participants. Alternate assignments were provided for those students who could not participate in recruitment.

Parents provided informed consent before beginning an online survey. Initially, parents indicated that they are at least eighteen years-old and aware that the student who recruited them would not be penalized if they chose not to participate. Online data collection was completed as part of a larger study, but measures pertinent to the current proposal included: demographics; the Family Relationships Index (FRI; Moos & Moos, 1994); a measure of parent stress (Karvounides et al., 2016); the Pediatric Symptom Checklist-17 (PSC-17; Gardner et al., 1999); a measure of child temperament (Buss & Plomin, 1984); and a series of questions regarding the child's history of toilet training and whether any difficulties were encountered during the toilet-training process.

Measures

The data collected from the community for the current proposal were part of a larger online study. Only the measures containing the variables of interest are presented. Sample means, standard deviations, and internal consistency of all scores are presented in Table 3.

Demographic Information. Participants provided basic demographic information (e.g. gender, age, marital status, education level) about both themselves and the focus child. Parents were asked how many children they have, focus child birth-order, and how many children they have successfully toilet trained.

Family Functioning. The Family Relationships Index (FRI; Moos & Moos, 1994) is a subset of 27 items from the family environment scale that measure the degree of family cohesion, conflict, and expressiveness. Parents reported how often each item happened in their family on a scale from one ("Not at all") to five ("A lot"). Nine items are summed to calculate each scale and higher scores indicate more cohesion, more expression of opinions, or more conflict for each scale respectively. Scores on this subset of items have been tied to risk for psychopathology within the families of cancer patients (Edwards & Clarke, 2004) and are a

significant predictor of happiness (North, Holohan, Moos, & Cronkite, 2008). Within the current sample, the internal consistency of each scale was adequate (Table 3).

Child Behavior Problems. Problematic child behaviors were assessed using the Pediatric Symptom Checklist-17 (Gardner et al., 1999), which is a 17-item parent-report measure that yields overall scores for internalizing and externalizing behaviors and attention problems. Parents reported how often each of the listed challenges is a problem for their child on a scale from zero (Never) to two (Often). Five items were summed for the internalizing and attention problems scores respectively and prior research indicates that a cut-off score of five on these scales indicates clinically significant difficulties (Borowsky, Mozayeny, & Ireland, 2003; Gardner et al., 1999). Seven items were summed to calculate the externalizing scale and a cut-off score of seven is recommended. Higher scores on all three scales reflect a greater amount of problems in that area. Within the current sample, the three subscales demonstrated adequate to strong internal consistency (Table 3).

Child Temperament. The Emotionality, Activity, and Sociability Inventory (Buss & Plomin, 1984) is a 20-item parent-report measure of child temperament, with scales measuring the degree of emotionality, activity level, and sociability/shyness of the child. Parents responded to each item on a scale from one to five with one being "not characteristic or typical of your child" and five being "very characteristic or typical of your child." Six of the items, four within the sociability/shyness scale and two within the activity scale, were reverse scored before being added into the scale scores. Five items were summed to yield the emotionality and activity scale scores. Ten items were summed to yield the shyness/sociability scale. Factor analysis supports the use of a combined scale for sociability and shyness (Boer & Westenberg, 1994). Within the current sample, the three subscales demonstrated strong internal consistency (Table 3).

Parenting Style. The Parents as a Social Context Questionnaire (PASCQ; Skinner, Wellborn, & Regan, 1986) is a 30-item parent self-report measure of six domains of parenting. Each domain has five questions to which parents responded on a scale from one (Not at all true) to four (Very true). The responses within each domain were summed to yield the following subscales: warmth, rejection, structure, chaos, autonomy support, and coercion. Note, while these scales appear bipolar, prior work supports using these as discrete unipolar dimensions of parenting (Egeli, Rogers, Rinaldi, & Cui, 2015). Two broader scales were calculated by summing items from the warmth, structure, and autonomy support scales to yield a positive parenting scale and the rejection, chaos, and coercion scales to yield a negative parenting scale (Skinner, Johnson, & Snyder, 2005). The positive and negative parenting subscales demonstrated strong internal consistency in the current sample (Table 3).

Parent Stress. The Stress Numeric Rating Scale (SNRS; Karvounides et al., 2016) was used to assess overall parental stress. The scale is a four-item self-report measure and parents are asked to separately rate their current, typical, highest, and lowest stress level over the past seven days. Responses were given on a scale from zero (no stress) to ten (worst possible stress). Prior work established the factor loading and internal consistency of these items and a summed stress score was calculated by adding responses for each item (Defenderfer et al., unpublished manuscript). Total scores range from zero to forty, with higher scores reflecting greater stress levels. The total score demonstrated strong internal consistency in the current sample (Table 3).

Toilet training History. Parents responded to a series of forced-choice questions about when they began toilet training their child for stool and urine, how long it took for the child to be completely toilet trained for urination and stooling, and whether they had any difficulty with toilet training. Parents were also given open-ended questions regarding what method they used

for toilet training, what role their child's pediatrician had in toilet training, and how they decided when to start toilet training their child.

Data Analyses

Missing Data. Participants were removed from the dataset and not included in any analyses if their responses indicated that they opened the survey and provided consent but did not provide any demographic data. In the full sample (N=437), 323 participants had full responses to all measures included in the study. To attain a sufficiently large sample for subsequent analyses, any remaining missing data from participants with at least 75% complete data (n=62) were imputed using Bayesian multiple imputation, which allows missing data to be a function of observed covariates and outcomes (Little & Rubin, 2002).

Qualitative Data. Qualitative responses were coded using the Delphi method (Jones & Hunter, 1995). Using this method, a team of research assistants independently identified possible themes within the responses. The team then collectively developed a codebook based on these possible themes and then each member independently indicated whether each theme was present in each response individually. Following independent coding, responses with lower than majority agreement was reviewed and discussed until consensus is reached. Overall agreement for qualitative coding for the current study was initially 74% and, after discussion of discrepant codes, agreement on all thematic codes was 100%. Qualitative data was then evaluated using descriptive statistics. Chi-square analyses were used to identify differences in frequency of endorsement of themes by child gender, challenges in toilet training, age at initiation of training, and duration of training. Qualitative themes identified in the current study are found in Table 4.

Hypothesis One. A sample of 385 parents had sufficiently complete data for use testing hypothesis one after Bayesian multiple imputation. A form of exploratory modeling known as

latent variable mixture modeling (LVMM; see Berlin, Parra, & Williams, 2014 and Berlin, Williams, & Parra, 2014 for reviews) was used to examine how the continuous (i.e. child temperament, child behavior problems, family functioning, parenting style, parent stress) and categorical response variables (i.e. toilet training method, decision to start training, presence of toilet training challenges) clustered according to latent groups (Figure 2). An exploratory approach to modeling was used, such that the goodness of fit of models with increasing numbers of class compared to the null model with only one class (Henson, Reise, & Kim, 2007). The goodness of fit of these models was evaluated using the Akaike Information Criteria (AIC; Akaike, 1987) and Bayesian Information Criteria (BIC; Schwarz, 1978) with smaller AIC and BIC values indicating better model fit. Generally, a decrease in BIC value of 10 or greater is considered a significant improvement in model fit (Kass & Raftery, 1995; Raftery, 1995). Entropy of the model overall was used as an indication of classification accuracy, where higher levels of entropy indicate greater accuracy (Berlin, Williams, & Parra, 2014). Entropy of individual class indicators was used to measure the contribution of each indicator to the classification of the overall model. The Bootstrap Likelihood Ratio Test (BLRT; McLachlan & Peel, 2000) and Lo-Mendell-Rubin test (Lo, Mendell, & Rubin, 2001) were used to evaluate whether the most meaningful model was a significant improvement upon the model estimating one fewer class. Generally, the BIC and BLRT are considered preferred indicators of model fit when available (Nylund, Asparouhov, & Muthen, 2007).

Hypothesis Two. To assess the clinical utility of the variables incorporated into the LVMM, a sub-clinical sample (n=27) was identified from within the community sample based upon qualitative responses reflecting need for referral to specialists or completion of training after the cut-off age for DSM diagnosis of encopresis (4 y.o) or enuresis (5 y.o). A subsample of

27 parents was identified from within the community sample that closely matched the sub-clinical sample on child gender, child age, presence of co-morbid chronic conditions, racial identity, parent gender, and parent marital status. Characteristics of these samples are presented in Table 2. A repeated measures MANOVA was used to assess the significance of differences in the means of the two groups along parenting style, parent stress, child temperament, family relationships and conflict, and child behavior. Chi-square statistics were used to identify differences in timing and method of toilet training between the sub-clinical and community group.

Results

Initiation and Duration of Toilet Training

Parent responses indicated that 91% (*n*=397) of children began toilet training for urine by age 36-months (3-years-old). Toilet training for stool followed a similar pattern, with 94% (*n*=410) of children reportedly beginning toilet training for stool by age 42-months (3.5-years-old). The AAP recommendation of starting toilet training between 18- and 24-months-old appeared to be followed by about one-third (29%, *n*=126) of parents in the present sample. Similarly to toilet training for urine, about one-quarter (23%, *n*=101) of parents reported initiating stool training before their child was 24-months-old. Full data regarding the frequency of age of initiation of toilet training for both urine and stool in the current sample are presented in Figure 3.

The duration of training was more variable than the age at initiation of training. Of note, completion of toilet training was self-defined in the current sample. Full data are presented in Figure 4. Twenty-two percent (*n*=96) of parents reported that it took longer than 8 weeks to complete their child's toilet training for urine. Within the current sample, 12% (*n*=52) of parents reported that they had not yet completed their child's toilet training for urine. About half of parents (55%, *n*=240) reported that their child completed toilet training for urine within five weeks. As with initiation of toilet training for urine, toilet training for stool followed a similar pattern (Figure 4) of highly variable training duration.

Overall, thirty-five percent (*n*=152) of parents endorsed experiencing challenges with toilet training, with "challenges" being self-defined by parents in the current sample. There was a marginally significant difference in reports of challenges with toilet training based upon child gender (X^2=3.332, *p*=0.068), such that a slightly higher proportion of male children were

reported to have challenges during toilet training. Children whose parents reported challenges during toilet training were more likely to take significantly more time to complete toilet training (X^2=76.685, p<0.001). There was no significant difference in age at initiation in training by presence or absence of challenges (X^2=8.358, p=0.302).

Of note, there were no significant differences by gender with regard to age at initiation of toilet training for urine (X^2=9.784, p=0.201) or stool (X^2=12.683, p=0.080). There were also no significant differences by gender with regard to duration of toilet training for urine (X^2=6.719, p=0.666) or stool (X^2=3.263, p=0.953). There was no significant difference in duration of training by age at initiation of training (X^2=62.847, p=0.482). Due to the high degree of similarity between start time and duration of urine and stool toilet training, subsequent analyses focused solely upon initiation and duration of urine training. Furthermore, much of the prior work on normative toilet training focused primarily upon urine training and did not differentiate between training for stool or urine (e.g. Brazelton, 1962; Robson & Leung, 1991, see Vermandel et al., 2008 for a review).

Qualitative Toilet Training Results

Full frequency data regarding the qualitative responses are presented in Table 4. When asked how parents toilet trained their children, diverse methods were described. Namely, seventeen different components of toilet training were referenced by parents. The most common approaches included positive reinforcement, implementing a toileting schedule, frequently taking their child to the bathroom, using a child-size toilet or toilet insert, and quickly transitioning their child to regular underwear (Table 4). All aspects of parental responses were coded and parents often (41%, n=177) reported using more than one strategy in their approach to toilet training. One parent described using a high degree of positive social reinforcement: “I used a lot of

positive reinforcement and I would let her go on the potty when she said that she needed to go. If she used the bathroom then I would get really excited and tell her good job." Other parents described use of stickers or tangible reinforcement, for example one parent wrote,

> Read her a book about going to the Potty[sic], in fact, the book is title[sic] "Potty" Then ask her if she would like to sit on the potty every few hours when we are home with her, reward with a single mini marshmellow[sic] if she sits and 2 marshmellows[sic] if she goes.

Use of a child size toilet or toilet insert was reported by 16% of parents (*n*=68).

Providing frequent opportunities to use the bathroom was described as a toilet training method by 16% (*n*=69) of parents in the current sample (Table 4). Responses in this category included references to taking the child to the bathroom every hour or more often. Some parents reported setting a timer for 15- or 20-minute intervals for a period of time. Implementing a toileting routine was also described by fifteen percent of parents (*n*=64). For example, one parent provided the following response, "Developed a routine of going to the bathroom when she woke up in the morning, before meals, before & after her afternoon nap, before bed at night. The rest of the day, let her figure out the feeling/sensation/urge to go to the bathroom." Twelve percent of parents (*n*=50) described quickly switching their child from diapers to traditional underwear or allowing the child to pick out their own new underwear during their toilet training process.

Eight percent (*n*=34) of parents reported using either transitional diapers or pull-ups during toilet training (Table 4). Another 8% (*n*=34) of parents reported that they allowed their child to go without bottoms or entirely nude during toilet training. Seven percent (*n*=31) of parents stated that their child was highly self-motivated to toilet training. For example, one

parent wrote, “Daniel tiger song, she decided for herself.” Six percent (*n*=28) of parents described frequently asking their child if they needed to use the bathroom during toilet training, though they did not necessarily report taking their child to the bathroom at this time. Four percent (*n*=19) of parents described using books related to toileting or providing explanation of toileting during the training period. Three percent (*n*=12) of parents made references to waiting for their child to ask to use the bathroom while they were toilet training. Ten parents (2%) in the current sample described taking a period of several days or a long weekend to complete toilet training. Nine parents (2%) in the current sample described providing a male child with something to aim at in the toilet while teaching them how to urinate while standing. Cheerios appeared to be a common choice for targets. Less than one percent (*n*=3) of parents described using any form of punishment during training, relying solely upon their child’s daycare provider, or a vague reference to using numerous strategies.

In reference to how they decided when to start toilet training, parents described ten different factors: child interest, child readiness, child’s age, parent motivation, school requirements, advice from other family members, child disliking diapers, change in family circumstances, consultation with the child’s medical provider, or same age peers being toilet trained (Table 4). About one-third (33%, *n*=149) of parents said that they waited until their child showed some interest in toileting. For example, one parent provided the following response, “She started talking about it and wanted to sit on the toilet.” Thirty percent (*n*=131) of parents reported waiting until their child was “ready,” though few parents in the current sample provided any examples of signs of readiness in their responses. A typical response reflecting this theme was, “When she was ready.” Eleven percent (*n*=46) of parents cited their child’s age as the primary motivator for beginning toilet training. Seven percent (*n*=32) of parents said that they

were primarily interested in toilet training their child for personal reasons, such as, "… I wanted to start the process," or "When I got sick of their 'crap.'[emphasis in original text]" Six percent (*n*=26) of parents said that their child needed to be toilet trained in order to attend school. Within the current sample, 5% (*n*=23) of parents reported getting advice or input from other family members about when to toilet train. For example, one parent said, "We asked our parents what age my wife and [I] started toilet training."

Four percent (*n*=17) of parents said that they decided to begin toilet training after their child began expressing dislike of diapers or diaper changes (Table 4). For example, one parent wrote, "When he would rip his diaper off because he hated being wet." Fifteen parents (4%) in the current sample said they decided to being toilet training their child due to changes in family circumstances. This was often the impending birth of another child or a caregiver returning to work. Eleven parents (3%) in the current sample reported speaking with their child's pediatrician or primary care provider about when to begin toilet training. Six parents (1%) said that they decided to toilet train their child after they learned that their child's peers were toilet trained. Full statistics are provided in Table 4.

Parental responses identified eight primary resources for information during toilet training (Table 4). The most commonly reported resource was the internet (41%, *n*=170). This category broadly included parenting websites, blogs, and social media. About one-third (27%, *n*=110) of parents reported going to their parents or other family members for guidance about toilet training. Twenty-seven percent (*n*=109) of parents reported speaking with their friends who had children about toilet training. Eighteen percent (*n*=75) of parents stated that they relied upon parenting books as a resource during toilet training. Fifteen percent (*n*=60) of parents in the current sample reported using no resources at all during toilet training. Eleven percent (*n*=43) of

parents reported using their child's primary care provider as a resource during toilet training. Ten percent (*n*=42) of parents reported relying upon their experience toilet training other children when toilet training the focus child. Seventeen parents (4%) in the current sample said that they relied upon their child's daycare provider as a resource during toilet training.

When asked specifically what role their child's pediatrician or primary care provider had in toilet training their child, parents primarily (56%, *n*=208) said pediatricians were not involved in the process (Table 4). Fourteen percent (*n*=51) of parents said that their child's medical provider offered "advice" about toilet training. One parent wrote that the following regarding the role of the pediatrician, "No[sic] much. Just provided general guidelines early on." Ten percent (*n*=36) of parents said their child's medical provider had a minimal role in toilet training but responses were too vague to characterize more specifically. For example, some parents simply responded "some," or "minimal." Five percent (*n*=20) of parents respectively said that their child's provider gave encouragement throughout the process. Four percent (*n*=17) said that their child's primary care provider advocated for a child-centered approach to toileting. Sixteen parents (4%) said that their child's provider explicitly encouraged them to initiate toilet training. Eleven parents (3%) said that they sought help from their child's medical provider to address challenges they faced with toilet training. One parent provided a more detailed response than others, writing the following (all spelling and grammar errors are transcribed from the original response):

> The question was addressed at earlier visits, perhaps 18mo visit.
> but I don't recall for surethe specific of dr guidance. typically
> provider will confirm what I have look at. for potty training I
> believe provider encouraged it was ok to try or start if we felt child

> was ready and offered guidance that some kids learn quickly and others take time. parent needs to choose a plan and be consistent for time period chosen. if not working stop and wait a couple of months before trying again. Also provider offered guidance that it is not uncommon, especially for boys, to take up to 4yrs old to complete potty training.

This response likely provides a more accurate reflection of the type of advice given by pediatric providers when discussing toilet training. Specifically, this response provides some of the language endorsed by the AAP (i.e. waiting until the child is ready and that toilet training can be highly variable). Of note, the reported statement by the pediatrician that it is not uncommon for boys to be over four years-old before completing toilet training is inaccurate and does not reflect current scientific understanding of epidemiological patterns of toilet training (see Vermandel et al., 2009 for a review).

Differences in Frequency of Qualitative Codes by Gender. Chi-square analyses are presented in Table 5 and Table 6. The only significant difference by gender for any qualitative codes was a higher endorsement of using something to aim at in the toilet among male children. Two marginally significant gender differences were found such that male children were more likely to be trained using numerous unspecified methods and parents of female children were more likely to cite child interest as a factor in deciding when to start training.

Differences in Frequency of Qualitative Codes by Report of Challenges. Chi-square analyses are presented in Tables 7 and 8. Parents who reported that their child had challenges during toilet training were significantly more likely to report use of positive reinforcement during toilet training (Table 7). Parents who reported having difficulties with toilet training their

child were less likely to report that their child was highly motivated to toilet train. The only parents in the current sample to report using multiple strategies (n=4) were also parents who reported having challenges with toilet training. Parents who reported difficulties with their child's toilet training were proportionately less likely to say that their child toilet trained him or herself (Table 7). No differences were found between groups for the decision of when to start toilet training. Regarding resources used during toilet training, parents who encountered challenges were more likely to report using parenting books (Table 8), speaking with their friends with children, speaking with their child's pediatrician, and were less likely to report using no resources. There were no differences regarding pediatrician involvement aside from parents who encountered challenges during toilet training being more likely to ask the pediatrician to help address challenges.

Differences in Frequency of Qualitative Codes by Age at Initiation of Training. Tables 9-11 present the full results of chi-square analyses regarding differences in endorsement of qualitative themes by age at initiation of toilet training. There was a significant difference in use of punishment during training by age at initiation of training (Table 9), though this code occurred so infrequently in the current sample that this finding should be interpreted with caution. Parents who reported beginning toilet training their child at younger ages were also more likely to report using pull-ups during training (Table 9) and that they were motivated to start training after learning that their child's peers had started training (Table 10). Parents who reported beginning toilet training their child earlier were also more likely to report beginning training due to a school requirement of being toilet trained (Table 10) and to rely upon daycare as a resource or to use no resources at all during training.

Children whose parents relied upon daycare providers were also disproportionately more likely to start toilet training their child before age 3-years (Table 10). Children whose parents reported using no resources at all during toilet training were also significantly more likely to toilet train before age 2.5-years (Table 10). No significant differences were identified regarding the role of the medical provider by age at initiation of training (Table 11). There was no difference in report of challenges during training by age at initiation of toilet training.

Differences in Frequency of Qualitative Codes by Duration of Training. Full results are presented in Tables 12-14. Parents who reported that their child took longer to toilet train were also more likely to report using reinforcement during training (Table 12). Children who reportedly completed training more quickly were more likely to be self-motivated to train and to have switched quickly from diapers to traditional underwear. Parents of children who took between four and six weeks to toilet train also reported greater use of psychoeducation strategies during toilet training. Parents of children who took between three and six weeks to train were more likely to rely upon input from other family members regarding when to start (Table 13). Parents whose children reportedly completed toilet training more quickly were more likely to report not using any resources during training (Table 13). No significant differences in the role of pediatric medical providers were noted based upon duration of training (Table 14).

Summary of Qualitative Results

Within the community, parents reported a wide variety of methods of toilet training, most of which they decided to implement without the guidance of a professional. It appears as though about one-in-three children are currently trained in accordance with AAP toilet training guidelines, based upon methods and suggested start date. The vast majority of children begin training by age three, which is somewhat older than the AAP's recommended start of 18- to 24-

months-old. Most parents decided to begin toilet training their child due to personal motivations, or a child's interest in independent toileting. Generally, parents reported that they primarily spoke with other parents or family members when they were deciding when and how to toilet train their child. Very few parents reported speaking with their child's pediatrician either before beginning toilet training or to address challenges. Furthermore, about half parents reported not seeking any information at all when they encountered challenges with toilet training. See Table 4 for full information regarding the definition and frequency of all qualitative codes.

There were no meaningful differences in the timing, method, duration, or course of toilet training between male and female children. Parents whose children had difficulty toilet training were more likely to use reinforcement during training. Additionally, these children were also reportedly less intrinsically motivated to begin toilet training. Parents of children with difficulty toilet training also tended to use more resources during toilet training relative to parents whose children completed toilet training without challenges.

Hypothesis One

Latent variable mixture models with one through six classes were run including the following parent-reported standardized, continuous class indicators: internalizing, externalizing, attention, conflict, cohesion, positive parenting, negative parenting, activity, emotionality, sociability, parent stress, age at start of training, and duration of toilet training. Six categorical indicators reflecting the most clearly behaviorally- or child-centered-oriented toilet training strategies were also included: use of reinforcement; frequent opportunities for toileting; child self-trained; waited to start until the child was ready; started once the child was interested; and began toilet training due to child's age. The categorical indicator of presence or absence of toilet training challenges was also included in the LVMM. Table 15 presents fit indices and entropy of

each model. The information criteria indices (Akaike, Bayesian) tended to indicate greater model fit as the number of classes increased. The four-class model, however, had slightly weaker overall classification accuracy (entropy) than the three- or five-class models. The loglikelihood value of the six-class model failed to replicate and was dropped from subsequent consideration. The five-class model demonstrated significant (BIC decrease>10; Kass & Raftery, 1995; Raftery, 1995) improvement in model fit over the three-class model and higher classification accuracy than any other models (entropy=0.82). The BLRT comparing the five-class to the four-class model was also significant (p<0.001).

The class profiles of the two-, three-, and five-class models were compared to understand the meaningfulness of the identified classes. Profiles are presented in Figures 5-7. The five-class model had the highest overall classification entropy, the lowest AIC and BIC, and maintained meaningful profile differences. BLRT was replicated and suggested that the five-class model had significantly improved fit over the four-class model. Therefore, the five-class model was an appropriate conceptualization for the current data set.

Regarding variable specific entropy in the five-class model, internalizing and externalizing behaviors, attention symptoms, negative and positive parenting behaviors, conflict, and cohesion were most influential in determining classification accuracy of the model as a whole (Table 16). Figure 7 presents patterns of the five classes along all class indicators in the current sample. Table 17 presents the significance of differences in probability of endorsing categorical class indicators included in the LVMM.

Class one (n=135, 35%) was characterized by low overall child behavior problems, higher reported positive parenting, lower emotional lability of the child, lower conflict and higher cohesion, and no differences regarding rates of toileting challenges, toilet training

methods, age at initiation of training, or duration of training. Class two (*n*=21, 5%) was characterized by similarly low child behavior problems, higher reported negative parenting, higher conflict, lower cohesion, lower parent stress, more endorsement of children training themselves and waiting until the child was ready before beginning toilet training. Class three (*n*=113, 29%) was characterized by being close to the sample mean on most measures, though these children were somewhat lower on activity and sociability scales, had slightly shorter duration of toilet training, and were least likely to have toilet training challenges. Class four (*n*=98, 25%) was characterized by primarily higher attention problems, higher activity levels, a slightly longer duration of toilet training, less use of reinforcement, and a slightly higher rate of toileting challenges than the other classes. Class five (*n*=18, 4%) was similar to class two with regard to higher likelihood of the child reportedly self-training, but also had much higher reports of all child behavior problems, more emotional lability in the child, higher reports of family conflict, and higher parent stress. Class five differed from class two in that parents of children in class five were less likely to report waiting until the child was ready to begin toilet training.

Of note, several subtle differences in endorsement of categorical indicators by class were significant (Table 17). When comparing class one (easy temperament) with class three (average children and families), parents in class one were more likely to report giving their child frequent opportunities to toilet and higher use of routines. Additionally, parents in class one were also more likely than parents in class three to report that their children toilet trained themselves and to wait until their child was ready to begin toilet training. When compared to parents in class four (high activity and inattention), individuals in class one were more likely to endorse use of reinforcement during toilet training than members of class four. Parents whose children were in class one were also more likely to report waiting until their child was ready to begin toilet

training (Table 17). Members of class one were less likely than members of class four to report use of a routine during toilet training and less likely to report that children toilet-trained themselves. Comparing children in class three (average children and families) with those in class four (high activity and inattention), children in class three were less likely to have toilet trained themselves and more likely to have parents who said that they waited until their child was ready to toilet train.

Summary of Results for Hypothesis One

Latent variable mixture modeling did not support the hypothesized two class model, instead identifying five significantly different classes in the current model (Figure 7). Class one represented an overall more positive family environment without any challenging traits in the child. Class two represented a challenging family environment with an easier-to-parent child and higher reports of the child toilet training themselves and waiting to begin toilet training until the child was ready. Class three represented children and families who were closer to the sample mean in most ways and were less active and sociable than other children in the study. Class four represented children with characteristics similar to ADHD, with higher rates of attention problems and higher temperamental activity levels. Class five was comprised of children with significant behavioral and temperamental challenges in stressful family settings. The children in class five were also reportedly somewhat more likely to toilet train themselves. Of note, the two largest profiles, reflecting about two-thirds of children in the present sample, did not appear to be at risk for toilet training challenges.

Hypothesis Two

A *post hoc* power analysis indicated an achieved power of 0.948, given an overall small effect size (f=0.15), total sample of 54 (27 "subclinical" and 27 "community"), and 11 outcome

variables, which is adequate for the conducted analysis. A single MANOVA was run using a repeated measures design including scores for Internalizing, Externalizing, Attention Challenges, Negative Parenting, Positive Parenting, Parent Stress, Emotionality, Sociability/Shyness, Activity, Family Conflict, and Family Cohesion. Partial-eta squared was used as an effect size indicator for each outcome variable. Full MANOVA results are in Table 18. Overall, the model showed significant differences across outcome variables based upon group membership ($F(11,16)=4.320$, $p=0.004$, partial $\eta^2 = 0.748$) and accounted for 75% of the variability across groups.

A significant difference by group was identified for the mean number of attention symptoms reported by parents ($F(1,26)=7.578$, $p=0.011$, partial $\eta^2 = 0.226$; Table 18). The group of parents whose children likely had subclinical toileting challenges tended to endorse a larger number of symptoms of attention challenges in their children and this difference accounted for about 22% of the variability between groups. A difference between groups was noted for reported parent stress, such that parents of children in the subclinical group tended to report higher stress overall ($F(1,26)=4.180$, $p=0.051$, partial $\eta^2 = 0.138$). Similarly, a marginal difference by group was found for the degree of temperamental emotionality reported by parents, such that children in the subclinical group were reported as being more emotionally reactive ($F(1,26)=3.767$, $p=0.063$, partial $\eta^2 = 0.127$). No significant differences between groups were found for any other outcome variables (Table 18).

Differences in Age at Initiation of Toilet Training and Duration of Training between Subclinical and Matched Groups. Differences between the subclinical and community groups for categorical outcomes were analyzed using chi-square tests. There was a significant difference in the endorsed age at initiation of toilet training for both urine ($X^2=22.01$, $p=0.009$). Specifically,

parents of children in the subclinical group were significantly more likely to endorse beginning toilet training at younger ages. The matched community group showed more variability in age at initiation of training. Of note, the matched community sample used in these analyses appeared not to follow the larger trend of starting urine and stool training at the same age. Specifically, the matched community sample endorsed relatively earlier initiation of training for stool than for urine. No significant difference was found for age at initiation of toilet training for stool such that the subclinical and matched community sample endorsed similarly early starting. The subclinical sample also showed a significantly longer duration of toilet training for stool (X^2=47.25, p<0.001). The most frequent duration reported by the subclinical sample was 8 weeks or more to complete stool toilet training, while the matched sample most frequently endorsed that stool training was completed in one week or less.

Differences between Subclinical and Matched Groups along Qualitative Toilet Training Variables. Regarding differences in toilet training method, initiation of training, and resources used during training between the subclinical and community samples, several significant differences were observed (Table 19). Disproportionately more parents in the subclinical group than in the community group endorsed using a routine during toilet training. The implementation of a routine may have been due to having experiencing challenges during training and may not necessarily increase the risk of experiencing challenges during training. Similarly, parents within the subclinical group were more likely to endorse using a child-size toilet or toilet insert than parents in the community group. Parents within the subclinical group were less likely to report seeking input from other parents while deciding when to start toilet training than parents in the community group (Table 21). Parents in the subclinical group were, however, more likely to seek input from a pediatrician when faced with challenges during toilet training. Additionally, parents

in the subclinical group were less likely to report not seeking any resources when faced with challenges. No other significant differences were identified between the groups for method (Table 19), timing (Table 20), or resources (Table 21) sought related to toilet training.

Summary of Results for Hypothesis Two

Overall, the subclinical and community samples demonstrated modest differences in attention symptoms, emotionality, and parent stress. The only statistically significant difference was in attention symptoms, such that children in the subclinical sample reportedly had more symptoms of inattention than children in the matched community sample. Several differences were identified between the samples relating to the method, timing, and course of toilet training. Children in the subclinical sample reportedly began training younger, took longer to train for stool, and were more likely trained using a toileting routine or child-size toilet insert than children in the community sample. During toilet training, parents in the subclinical sample were reportedly less likely to consult with other parents. Parents in the subclinical sample were also more likely to consult their child's pediatrician. Parents of children in the matched community sample were more likely to decide not to seek information during toilet training than those in the subclinical sample.

Discussion

The purpose of the current study was to identify patterns of toilet training methods in the community and to assess whether different patterns of child and family characteristics were associated with different toilet training methods or different rates of toilet training challenges. Parents involved in the current study described numerous specific methods of toilet training, some of which related strongly to child centered toilet training (AAP, 1999a-c; Brazelton, 1962; Stadtler, Gorski, & Brazelton, 1999) or behavioral toilet training (Azrin & Foxx, 1971), and some of which appeared to be driven primarily by family necessity. Additionally, family logistics and parent personal desires appeared to be strong drivers of when typically developing children are toilet trained. Only about one-in-three children is toilet trained at the recommended age (18- to 24-months-old) and using the recommended approach of waiting until the child is ready before beginning training (AAP, 1999a).

Within the current sample, five profiles were identified with regard to child, family, and toilet training specific factors. One profile was comprised of children with easy temperaments and positive family environments. Another profile was comprised of largely average children in average families. A third profile appeared to reflect children with high level of ADHD symptoms. Two profiles identified children with high conflict households and higher rates of negative parenting behaviors. Parents of children within both high conflict groups were more likely to report that their child largely toilet-trained him or herself. Parents in one of the high conflict groups whose children had lower reported rates of behavior problems were more likely than any other group to report waiting to begin toilet training until their child was ready.

Considering a smaller sample of children who likely had more significant, though subclinical, challenges with toilet training, child behavioral symptoms remained a highly

relevant factor. Specifically, children within the subclinical group had significantly higher rates of attention symptoms than a sample of demographically similar children without toileting challenges. Furthermore, parents of children who had challenges during toilet training tended to report higher levels of overall stress relative to parents of children without toilet training challenges. Such findings highlight the need for pediatric providers to consider multiple levels of influence, including family system variables, when providing toilet training recommendations.

Qualitative Findings

The current study was the only study to the author's knowledge to examine toilet training patterns using an open-ended assessment of parent-reported strategies. Based upon the responses of actual parents in the community, there are highly variable toilet training strategies currently in use and parents report using a wide variety of resources to help them make decisions about how and when to toilet train their child. The timing of completion of toilet training parallels several findings identifying the typical age of completion at 24- to 36-months-old (Bloom et al., 1993; Oppel, Harper, & Rider, 1968; c.f. Berk & Friman, 1989). The current study did not support prior work identifying an earlier age of completion among female children (c.f. Schum et al., 2002). Only about one-third of children complete toilet training around the age recommended by the AAP (1999a) or using recommended child-centered strategies (Brazelton, 1962). Furthermore, it appears as though pediatric primary care providers are not significantly involved in toilet training for most families. Parents of children who had challenges with toilet training were more likely to seek input from medical providers. Most parents, particularly those whose children toilet trained quickly or without challenges, denied use of any resources at all. It is unclear how these parents knew how to toilet train their children. It may be that these parents who deny use of resources are relying upon prior childcare experiences, though they may be

making instinct-driven or impulsive decisions about training. Regardless of how children are toilet trained, however, relatively few parents reported encountering challenges during the process.

It should be noted that many parents in the community reported making personalized or family-specific decisions about when to toilet train their child. Some parents described a desire to lessen their caregiver burden in preparation for changing family situations, such as the birth of another child. Other parents simply wanted to be done changing diapers. There were no differences in the duration of training or report of challenges based upon how parents decided when to start training. The lack of meaningful differences in child outcome by reported motivation for starting training should encourage pediatric providers to promote family-specific decisions about toilet training. As highlighted by previous work (Connell-Carrick, 2006; Hauck, 1991; Flaskerud, 2013), parents are faced with numerous sources of potential information about all parenting decisions and choosing what information to attend to can be challenging. To date, most parenting interventions focus upon increasing adherence to individual parenting recommendations (e.g. Forster et al., 2004; Hiscock & Wake, 2002). However, interventions focused upon improving parents' ability to engage in critical analysis of information and increasing health literacy overall may help parents to make more informed decisions about any aspect of their child's health and well-being.

Results of Hypothesis One

The proposed two-class latent variable mixture model was not supported by the current study. The association between toilet training and family systems variables appears to be more complex than was initially hypothesized. Rather, a five-class model best conceptualized patterns identified within the current sample. These samples differed primarily by the degree of child

behavior problems, report of negative parenting behaviors, and conflict or cohesion within the household. Two classes of children, those whose families were close to the average along many dimensions (Class 3), and those children with very positive family environments and easier temperaments (Class 1), had the shortest duration of toilet training and the lowest probability of endorsing toilet training challenges.

Children in Class Two and Class Five, both of whom had high conflict homes with higher negative parenting behaviors, were most likely to have reportedly toilet trained themselves. The measure of family conflict used in the current study included items reflecting physical and verbal aggression between family members, indicating a significant level of conflict within these two profiles. It is likely that this tendency to report that a child toilet trained him or herself reflects higher chaos in the household. For example, a parent with higher stress levels in a higher conflict home environment may not be able to consistently implement any type of toilet training strategy (child-centered or behavioral) and may feel as though their child "just did it themselves." High conflict homes are also a risk factor for difficulties with emotional and social processing, disruption in the biological stress response (Repetti, Taylor, & Seeman, 2002), and clinically significant psychopathology more broadly (Weintraub, 1987).

The high conflict profiles diverged with regard to waiting to start toilet training until after the child was ready. Interestingly, parents who described easier temperament children without behavior problems in high conflict homes with more negative parenting behaviors were also those parents most likely to describe waiting until their children were ready before beginning training. This higher conflict, lower child behavior problems profile endorsed more themes related to child-centered toilet training (Brazelton, 1962) than other profiles. This finding is the opposite of what was hypothesized. It is possible that these parents were more likely to be

identified as in need of guidance by pediatricians, potentially due a longstanding pattern of conflict within the household, and were more likely to be advised to use a child-centered toilet training approach.

The group likely reflecting ADHD symptoms (Class 4) was the only group that was more likely to have challenges with toilet training and a slightly longer duration of training. Other work identified that children with higher rates of ADHD symptoms are at-risk for a wide variety of other challenges in later childhood and adolescence such as encopresis (Austin & Coplen, 2007; Boon & Singh, 1991; Robson & Leung, 2006), substance use disorders (Molina & Pelham, 2003), and externalizing behavior disorders (Biederman et al., 1996). It is likely that features associated with ADHD, namely impulsivity and difficulty with sustained attention, make it difficult for children to remain engaged in basic toilet training tasks. Of note, toilet training challenges generally occur earlier in life than a child can be diagnosed with ADHD and the utility of toilet training challenges as a predictor for development of ADHD should be explored.

Results of Hypothesis Two

The subclinical and matched samples differed significantly in their report of ADHD symptoms, which supports prior work identifying a high rate of comorbid ADHD among children with voiding dysfunction (Harris, 2004; Robson & Leung, 2006). The difference between the level of ADHD symptomology within the subclinical group and the matched community group parallels the identification of Class 4 in the LVMM analyses. Parents of children with subclinical toilet training challenges were also more likely to report higher levels of stress. This finding is consistent with prior work identifying that toilet training is one of the highest stress developmental periods for parents (Bakker, van Gool, & Wyndaele, 2001).

However, few other significant differences were noted, which may be due to the small sample size available in the current study.

Clinical Implications

The findings of the current study highlight the need for further involvement on the part of pediatric primary care providers and mental health providers during toilet training of typically developing children. The child-centered orientation of the AAP (1999a-c; Brazelton et al., 1999) may be appropriate for most children without behavior problems within positive, supportive family environments. However, the finding that over half of parents felt that their child's primary care provider had no role at all in their child's toilet training highlights an area for improvement. At present, the AAP's recommendations do not appear to be relayed consistently to parents, which likely influences how parents make decisions about their child's toilet training. In addition to increasing the frequency with which pediatric providers discuss toilet training with their patients' families, it may be necessary to develop a more family-centered approach to toilet training.

For the broader community, certain aspects of child-centered toilet training may be beneficial, as this method may alleviate parental stress to have their child toilet trained at a certain age and allow for flexibility. Brazelton (1962) initially proposed this method to prevent punitive toilet training stemming from unrealistic expectations and to encourage pediatricians to provide parents with family-specific toilet training recommendations. Specifically, informing parents that 1) children vary somewhat in their physiological and cognitive development and 2) these variations in development are normal and can influence a child's readiness to toilet train may decrease social pressure to toilet train children at the same age as their peers. Of note, several parents in the current sample specifically cited their children's peers' completion of toilet

training as one of their motivators for beginning toilet training their child. This type of comparison-based parenting may not be appropriate for each child, but likely reflects how many parents in the community make these decisions.

One aspect of the empirical understanding of toilet training that was not reflected in parent responses was identification of signs of readiness to train (Brazelton et al., 1999; Kaerts et al., 2012). While there is disagreement of which signs are most predictive of successful toilet training, the scientific community has identified several overt behavioral signs that can be detected reliably by parents (Kaerts et al., 2012). These commonly identified signs of readiness, which include physical ability to manipulate clothing, remaining dry during daytime naps, and comprehension of toilet-related vocabulary, should be relayed to parents early in the toilet training process. The 18-month well-child appointment (AAP, 2010a) may be an appropriate time to provide this information to parents as preemptive guidance to help parents more consistently identify whether their child is ready to toilet train.

There is also clearly a subset of children who have significant difficulties with toilet training. While these parents are more likely to discuss toilet training with their child's pediatrician, it is not always clear what recommendations medical providers give for these children. The progression from subclinical toilet training challenges to true voiding dysfunction is not known at this time, but some of the treatments of encopresis or enuresis may be very appropriate for children with subclinical difficulties. Specifically, implementation of a toileting routine with reinforcement for appropriate voiding, may be broadly beneficial for children who have challenges with toilet training. However, parents will likely need instructions for implementing these strategies appropriately so that the general approach remains positive and does not become punitive. If recommendations about implementing a basic behavior

management strategy could be provided in the context of general pediatrics visits, development of clinically significant voiding dysfunction could potentially be prevented for some children.

Unfortunately, the structure of pediatric visits, at present, often places too many demands upon pediatric providers with too little time (Cooper, et al., 2006; Yarnall et al., 2003). Integrated pediatric primary care may be one way to increase access to psychosocial supports without adding to the burden of pediatric medical providers (see Blount, 2003 for a review). A consultative model in which pediatricians identify a challenge with toilet training and then either have a warm handoff with a pediatric mental health provider or refer a parent to an in-clinic mental health provider may help to better meet the needs of families. Pediatric psychologists and other mental health professionals are specifically trained in implementation of behavior management strategies for a broad array of needs and may help to provide empirically based, family-oriented recommendations to help parents address their child's toilet training challenges.

Family-Centered Toilet Training

The demographic characteristics of households in the United States today are very different from the time in which child-centered toilet training (Brazelton, 1962) was developed and this technique may not reflect the current needs of parents. For example, the number of children in single-parent households (Mather, 2010) or who are regularly cared for in a daycare setting (National Center for Education Statistics, 1996) has increased steadily in recent decades. In contrast to these changes, Brazelton and colleagues (1999) specifically warn against involvement of professional daycare settings in toilet training, though they provide no evidence that toilet training in a daycare setting is harmful. This advice presents a barrier to following child-centered toilet training that may be insurmountable for many families. As reflected by responses from parents in the general community, there are several reasons why parents feel

compelled to begin toilet training their children and a wide variety of strategies to choose from. Many of the reasons that parents give for beginning toilet training are logistical and reflect changing needs within the family or a need to decrease caregiver burden. Some children in the community are toilet trained by their daycare providers and they do not necessarily show increased rates of toilet training challenges than their peers who are trained in their homes.

For many families, it may not be possible for them to wait until their child is ready to begin toilet training. In single-parent households where a child attends day-care full-time, the child may need to be trained in accordance with the child-care facility's practices. Child-care for a child who is not toilet trained is often more expensive, leading to a potential financial need for families to toilet train their children by a certain age. Children generally need to be toilet trained before they begin attending school, creating another age-based motivator to toilet train a child potentially before they are ready to train. Many of the identified signs of readiness could be impacted by cognitive or physical differences in a child with special healthcare needs, making it more challenging for parents of children with special needs to identify when their child is ready to toilet train. In these scenarios, providing the current standard AAP (2010a-c) guidance at 18-, 24-, and 30- months would not be appropriate. Rather, many of these families would benefit from clear advice about how to use various toilet training strategies based upon their current situation.

A family-centered approach to toilet training may be an appropriate alternative to child-centered toilet training. Initially, potentially at 18-months, pediatric medical providers could ask whether parents are interested in toilet training their child, for whatever reason. If a parent indicates interest in toilet training, the medical provider could give information about use of a child-size toilet, effective reinforcement strategies, ignoring unwanted behaviors, and

implementing a toileting routine. Many of these recommendations are already implemented by parents in the community and could be made more effective with a small amount of guidance. If a parent is not interested in toilet training, pediatricians could provide education about observable signs of readiness to watch for in their child and state an intention to follow-up at the next well-child check. If a practice setting prohibits this approach due to time constraints, an integrated approach could be beneficial, and a mental health provider could be consulted if parents indicate interest in toilet training the child.

At the next well-child check (24-months; AAP, 2010b), pediatricians could either ask how toilet training was going or whether parents were interested in toilet training. If the parent reports challenges with toilet training, a mental health provider could be consulted, or a referral made to an outside pediatric psychologist for a brief assessment and behavioral intervention. If a parent is not interested in toilet training, further anticipatory guidance can be provided including psychoeducation about the normative timeframe for toilet training and the natural variation within the population. This approach could continue until the child reaches an age at which they must be toilet trained before attending school.

This method of toilet training differs from the current AAP endorsed approach (Stadtler, Gorski, & Brazelton 1999) in that it includes explicit education about signs of readiness and basic behavior management strategies. Based upon responses of parent within the community, most parents already choose to use some form of behavioral intervention during toilet training. Providing psychoeducation about these approaches could make them more effective and prevent escalation to punishment. Furthermore, a family-centered approach would acknowledge the diverse needs and circumstances of families in the community and encourage parents to take the approach to toilet training that best meets the needs of their family. One of the strengths of child-

centered toilet training is that it does not put pressure upon parents to toilet train their child quickly or by an arbitrary age. A family-centered approach could offer parents support while toilet training a child at a younger age if necessary but would not push a parent to toilet train their child too soon. Additionally, the previously outlined approach to toilet training could help connect families to behavioral specialists and mental health providers before a child develops clinically significant voiding dysfunction, offering ample time for less intensive, preventive interventions.

Limitations

The current study is limited by the nature of the data collection process, as all information was gathered via self-report questionnaire and as such, some correlation between variables is anticipated from this fact alone. Furthermore, the data gathered in the current study regarding toilet training is largely retrospective, limiting the conclusions that can be drawn about the directionality of some of the identified relationships. For example, parents of children who experienced challenges with toilet training were significantly more likely to use toileting routines. This approach is a common recommendation in the treatment of voiding dysfunction and it is likely that the challenges with toilet training emerged first, the parent then sought assistance, and someone recommended using a routine to address the challenges. The current study does not have sufficient information regarding the time course of toilet training in the present sample to address questions of this nature.

The current study had missing data due to drop out over the course of the survey. While the data was evaluated using Bayesian multiple imputation, which is a relatively robust approach to missing data particularly in a large sample (Little & Rubin, 2002), there is always some error

involved in imputing missing data. As such, results of the study should be interpreted cautiously, and future work should seek to replicate the findings of this study.

Similarly, the subclinical and matched samples are relatively small and the findings of modest differences between the two groups in attention challenges, emotionality, and parent stress, should be replicated by another study to ensure that the findings are not an artifact of the small sample. The current study is limited by the lack of inclusion of a true clinical sample of children with diagnosed voiding dysfunction. While the nature of the qualitative responses from parents reflect common patterns observed within clinical samples, such as evaluation by tertiary specialty providers and medical treatment of constipation and stool withholding, the subclinical sample should not be viewed as a true clinical sample. It is possible that the subclinical group present within the community is meaningfully different from parents who seek treatment for their child's toileting from specialty care providers. Future studies should replicate the findings of the current study with inclusion of a true clinical sample.

Future Directions

Toilet training among typically developing children is a relatively poorly understood phenomenon and there are numerous potential avenues for future research. Future work should consider differences in the method of toilet training, utilization of resources, and involvement of medical providers among more socioculturally diverse samples. The current findings, based on a relatively highly educated, predominantly White, married, female sample are likely not representative of broader toilet training practices. Given that African American children tend to be toilet trained younger (e.g. Wald et al., 2009), much more work is needed to understand variations in toilet training within diverse sociocultural groups.

The current sample reported limited discussion of toilet training with pediatric medical providers. This finding directly contradicts the checklists for well-child medical visits at 18-, 24-, and 30-months, each of which prompt providers to recommend waiting until a child is ready before beginning toilet training and to assess whether a child is toilet trained (AAP, 2010a-c). Prospective work should examine whether providers actually discuss toilet training at these well-child visits. It is possible that medical providers do, in fact, discuss toilet training at these appointments and parents do not accurately recall the content of the visit. It may also be that providers do not discuss toilet training with parents unless asked due to time, uncertainty regarding advice (Polaha et al., 2002), or lack of interest from parents. Future work should also consider the impact of guidance from medical providers on actual toilet training behaviors. Toilet training may be an area where parents feel more comfortable following their own instincts or the advice of fellow parents rather than that of medical providers.

Ultimately, the utility and evidence base for child-centered toilet training (Brazelton et al., 1962) needs further examination. It appears as though about one-third of parents are following current AAP recommendation to wait until their child is ready before beginning training, but most parents encounter no challenges with toilet training despite not following this guidance. Additionally, when parents encounter challenges, they appear to implement behavioral interventions, an approach supported by a large body of empirical work regarding treatment of clinically significant voiding dysfunction (e.g. Stark et al., 1990; Stark et al.., 1997). Children who have challenges with toilet training are highly likely to be those children who are not intrinsically motivated to complete toilet training and may not demonstrate overt readiness. Based on the current model, parents would be advised to wait until their child is ready, potentially until the child is approaching kindergarten, at which time the parent and child would

be under increased pressure to complete toilet training quickly. This approach could delay access to supportive interventions until the child is approaching school age and may contribute significantly to family stress as well as social stigma. While the original intent of child-centered toilet training was to encourage pediatric medical providers to give parents highly individualized toilet training recommendations based on the needs of families (Brazelton, 1962), this does not appear to occur on a regular basis and the appropriateness of the current AAP recommendation may warrant consideration. A randomized controlled study evaluating the relative efficacy of child-centered toilet training and family-centered toilet training should be conducted to establish a clear empirical basis for future toilet training recommendations.

Conclusion

Within the community, most children are toilet trained without difficulty and with minimal need for involvement of pediatric medical providers, regardless of how or when they are toilet trained. Parents reported using numerous methods to toilet train children and decided to start toilet training their child based upon highly family-specific factors. Many parents reported relying upon input from their own parents or their instincts when making decisions about toilet training, and that does not appear to have any negative impact upon toilet training for most children. Children without behavior problems, with easy temperaments, and with parents who use clear consistent parenting strategies in cohesive households are probably not going to have significant challenges with toilet training. However, children with more difficult temperaments early in life or from higher conflict homes may warrant extra attention from pediatric providers as they approach ages at which children are typically toilet trained. A more family-centered approach to toilet training that includes psychoeducation about basic behavior management strategies may be more broadly appropriate in the general community.

Primarily, children are toilet trained by 36-months old, though the AAP recommends beginning the process at about 18-months-old depending upon "child readiness" (Brazelton et al., 1999; Stadtler, Gorski, & Brazelton, 1999). This period, between 18- and 36-months, could be the appropriate time for pediatricians and other medical providers to begin trying to identify children at heightened risk for toileting difficulties. These time points may also be opportunities for pediatric medical providers to educate parents about different options for toilet training and overt signs of readiness. To identify those children and their parents who are more likely to have challenges, pediatric providers must be routinely monitoring aspects of the family environment that may not directly relate to medical care.

Multidisciplinary care environments may allow for better identification of children at risk for toilet training challenges and early intervention. A more integrated approach to pediatric primary care would decrease the burden upon pediatricians to cover all aspects of child development during well-child checks and may increase access to personnel with specialty training in implementation of behavior management strategies. The high comorbidity between ADHD and both subclinical and clinically-significant toileting challenges likely reflects the shared risk patterns common to many childhood behavior problems and general psychopathology. Identifying children fitting common patterns of risk may increase opportunities for early intervention more broadly and could connect children in need of psychosocial support to services at a younger age.

Further work is needed to clarify the role of family characteristics and involvement of pediatric medical providers in toilet training. It remains unclear what impact the advice of pediatricians has on toilet training methods and outcomes and additional consideration should be given to how this process can be streamlined to prevent clinically significant voiding dysfunction

and excessive parental stress. Ultimately, while toilet training ends successfully for most children, it is highly influenced by numerous child, parent, and family characteristics and more research is needed to fully understand this complex developmental phenomenon.

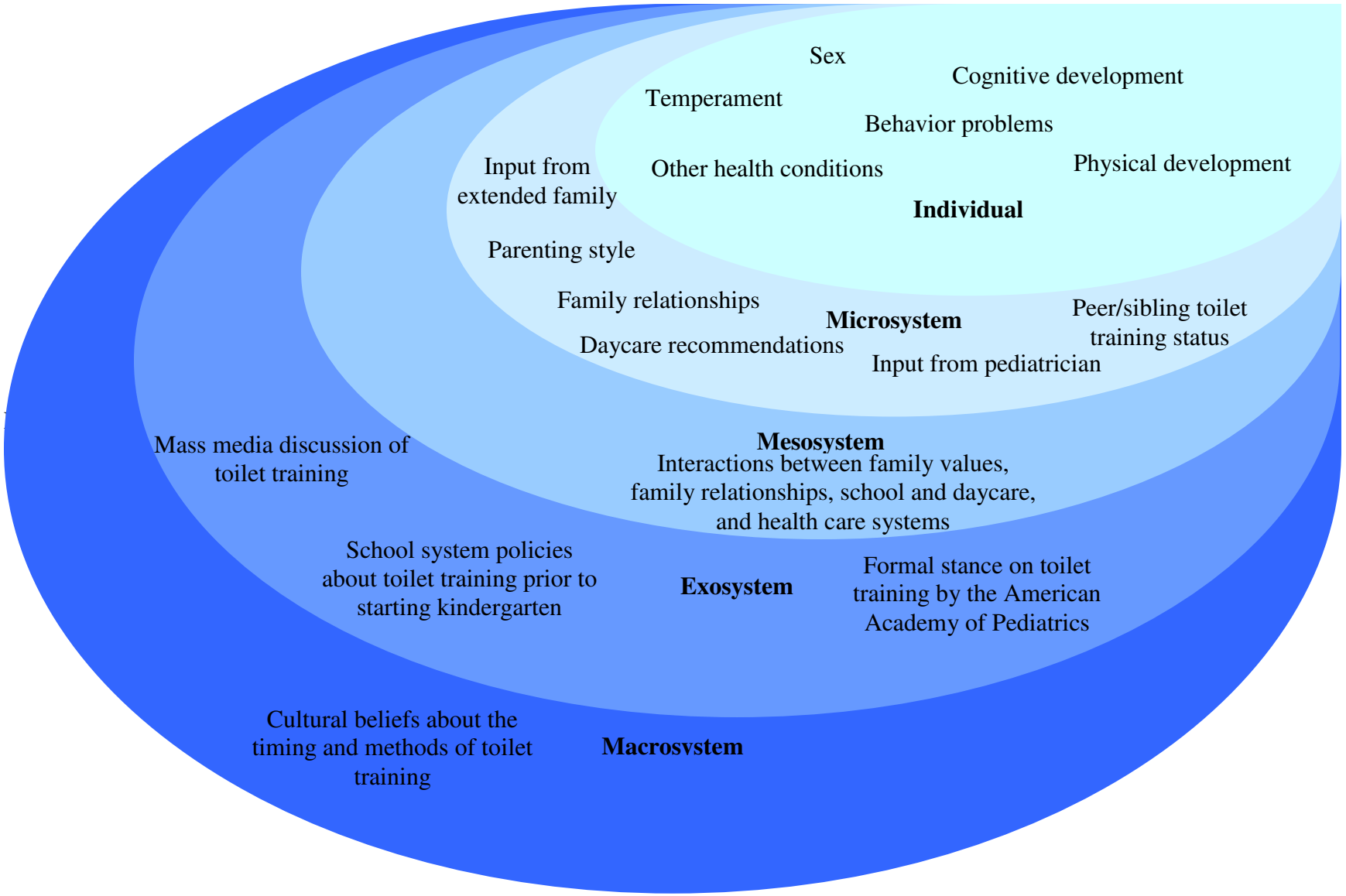

Figure 1. Relevant toilet training variables as they correspond to levels of influence in the ecological systems model of development.

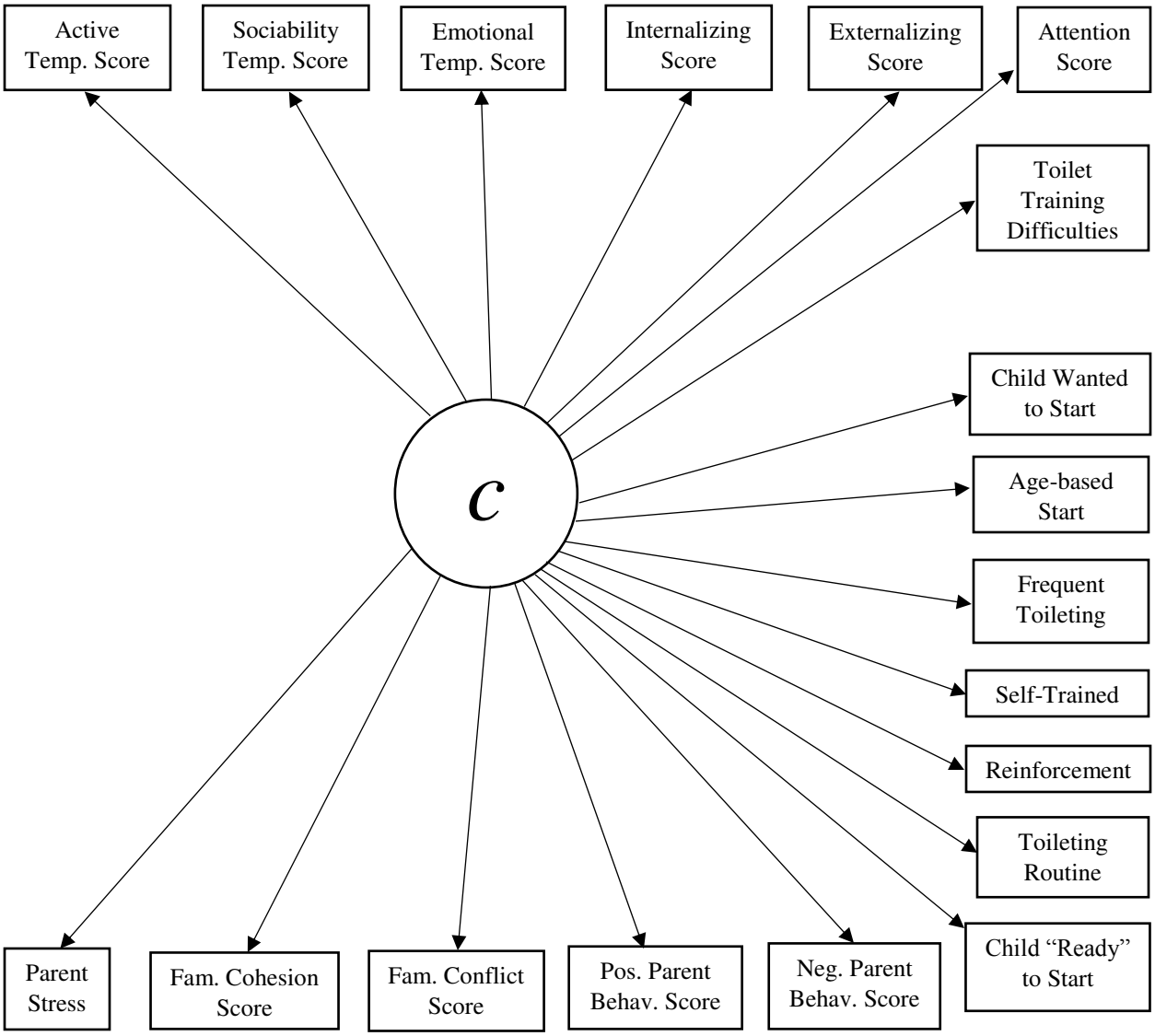

Figure 2. Proposed latent class indicators for latent variable mixture modeling.

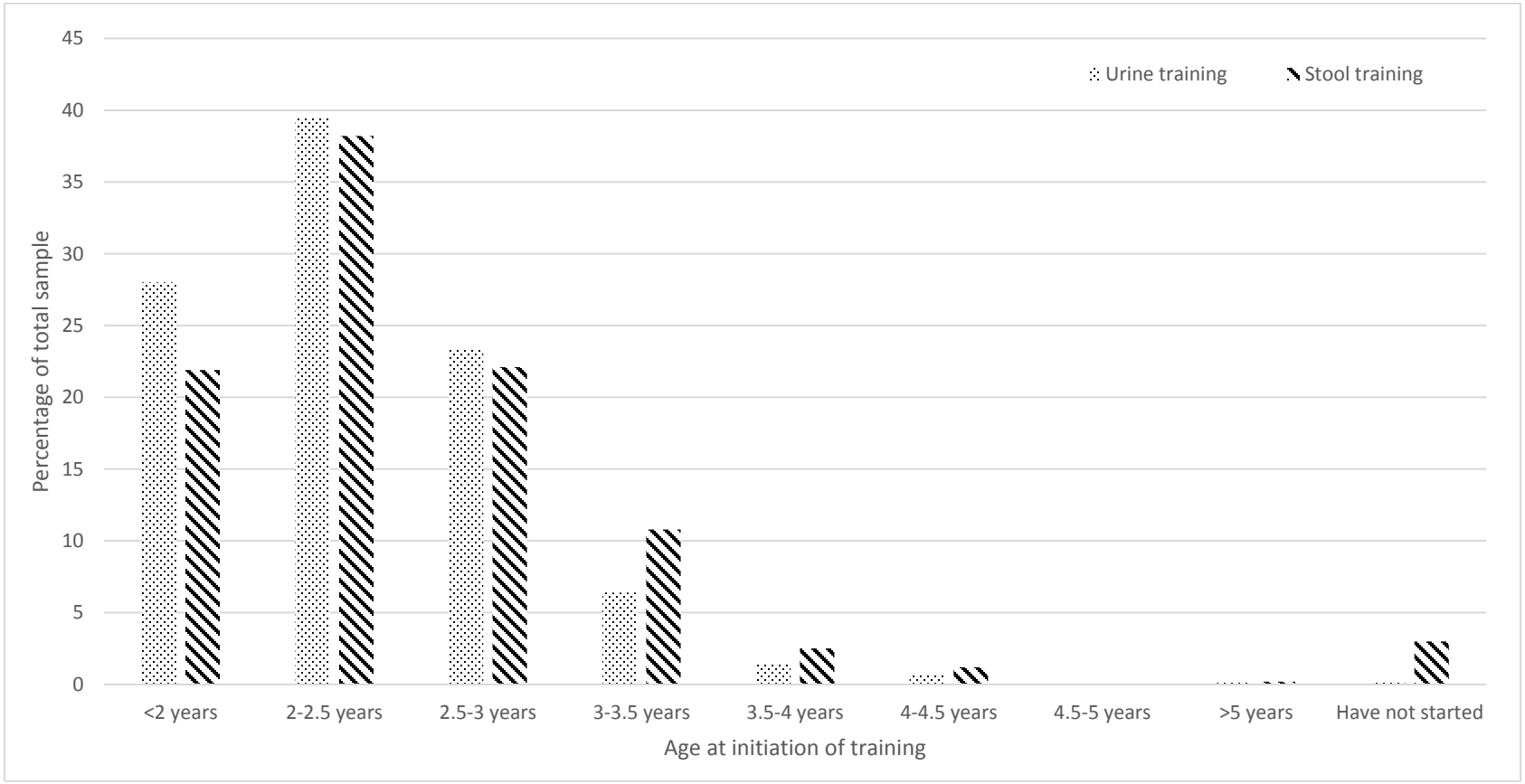

Figure 3. Frequency of reported age at initiation of toilet training in a community sample (*N*=437).

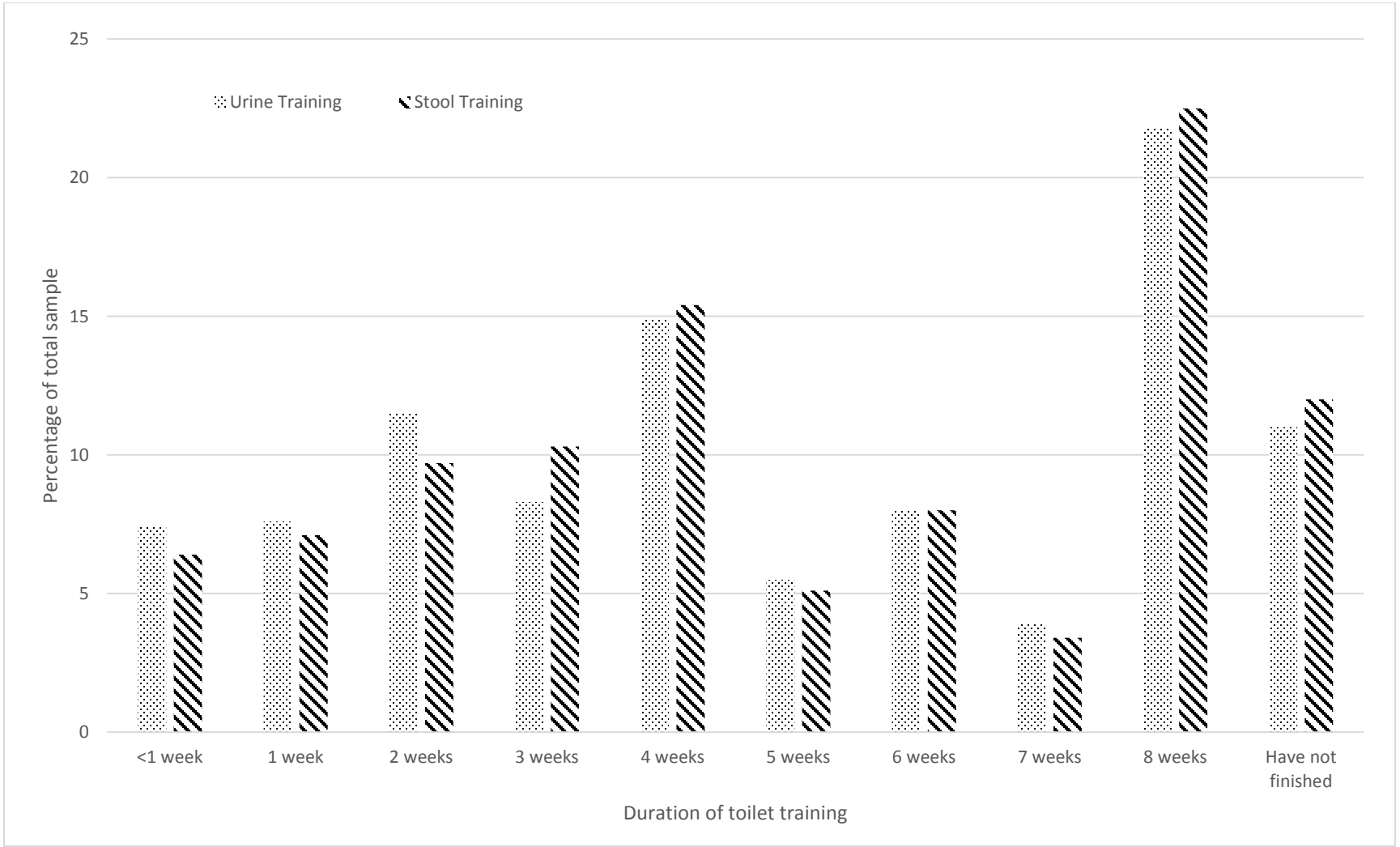

Figure 4. Frequency of reported duration of toilet training in a community sample (*N*=437).

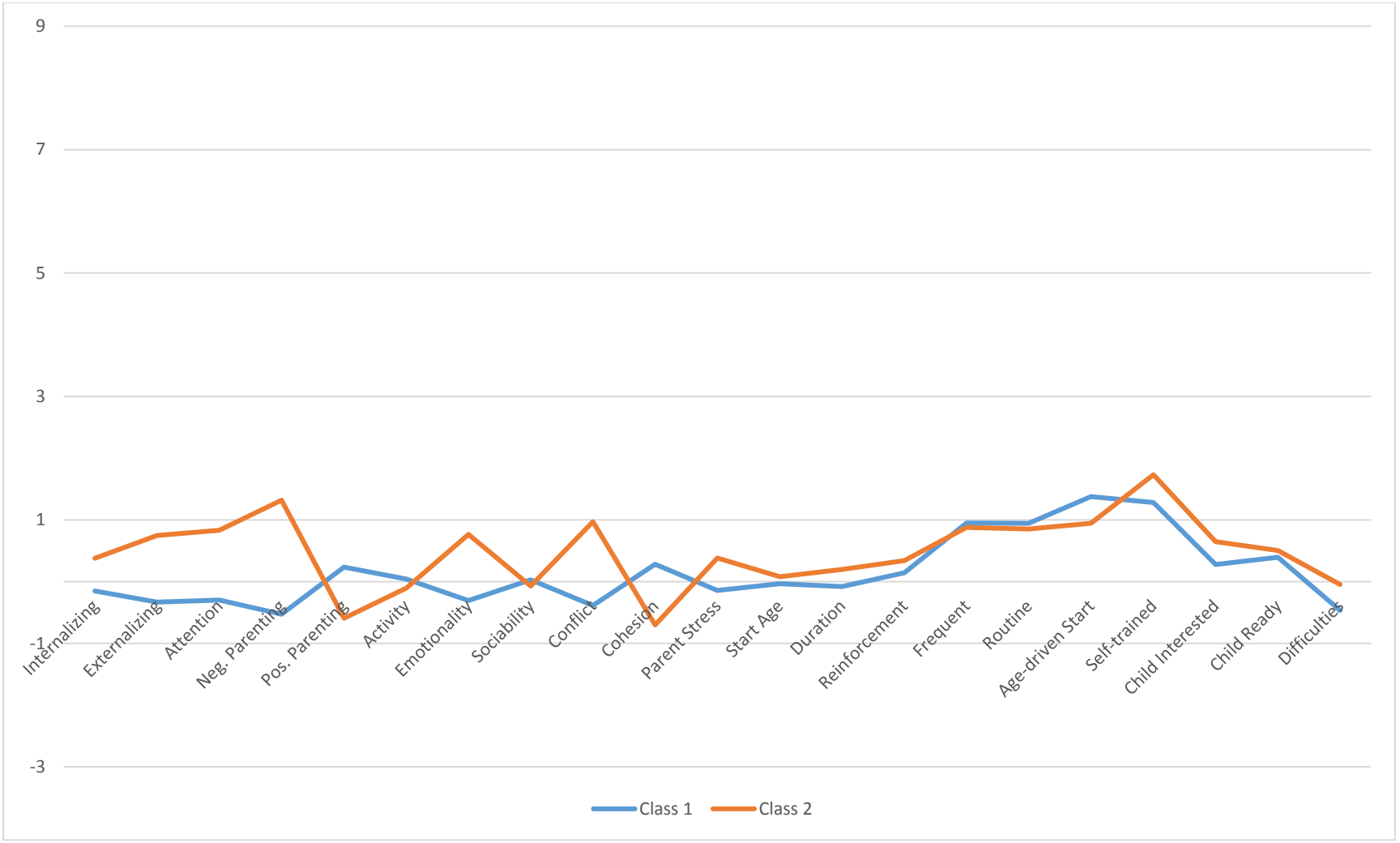

Figure 5. Latent class profile for two-class latent variable mixture model. Note: Class 1 *N*=278, Class 2 *N*=107.

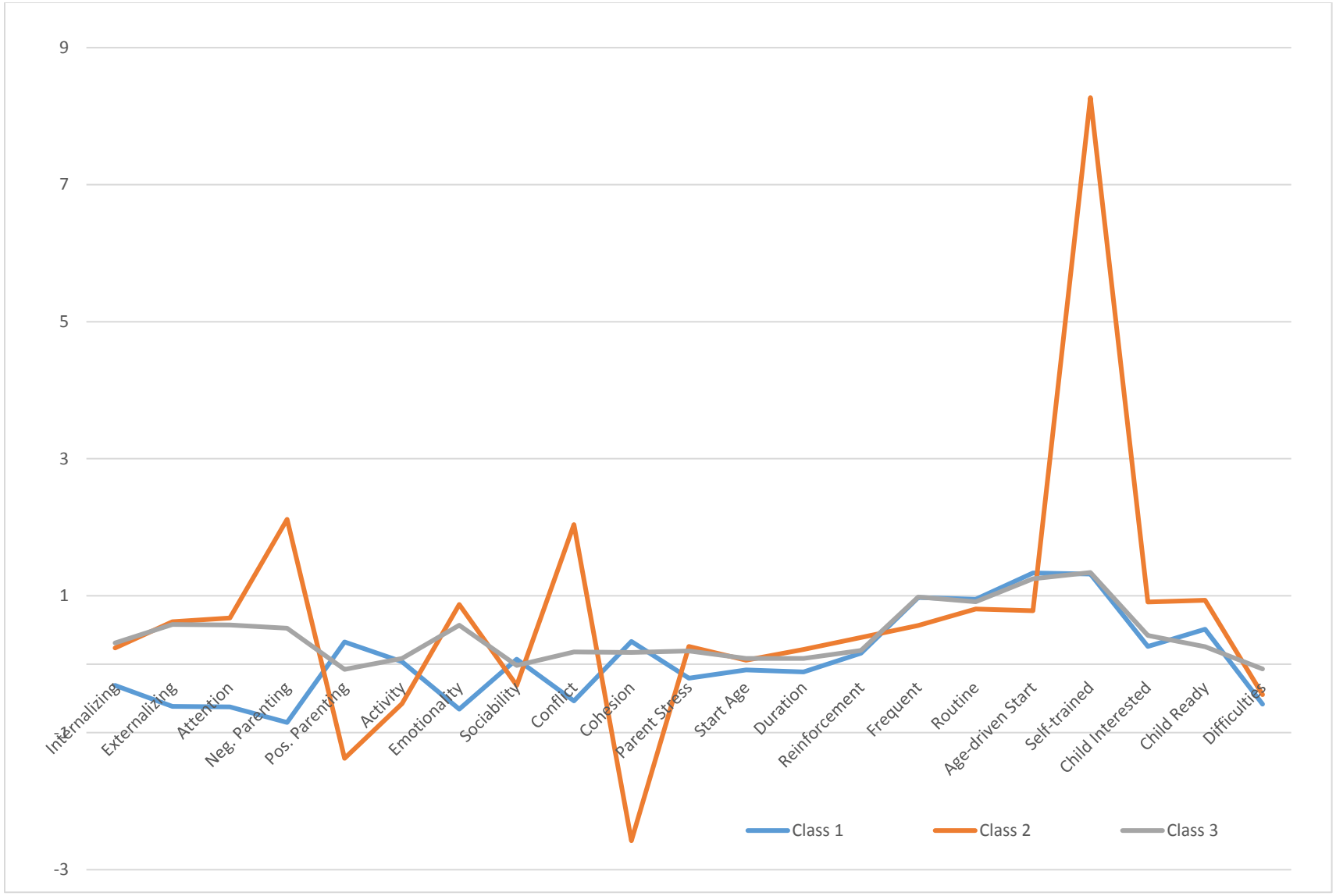

Figure 6. Latent class profile for three-class latent variable mixture model (Class 1 *N*=188, Class 2 *N*=34, Class 3 *N*=163).

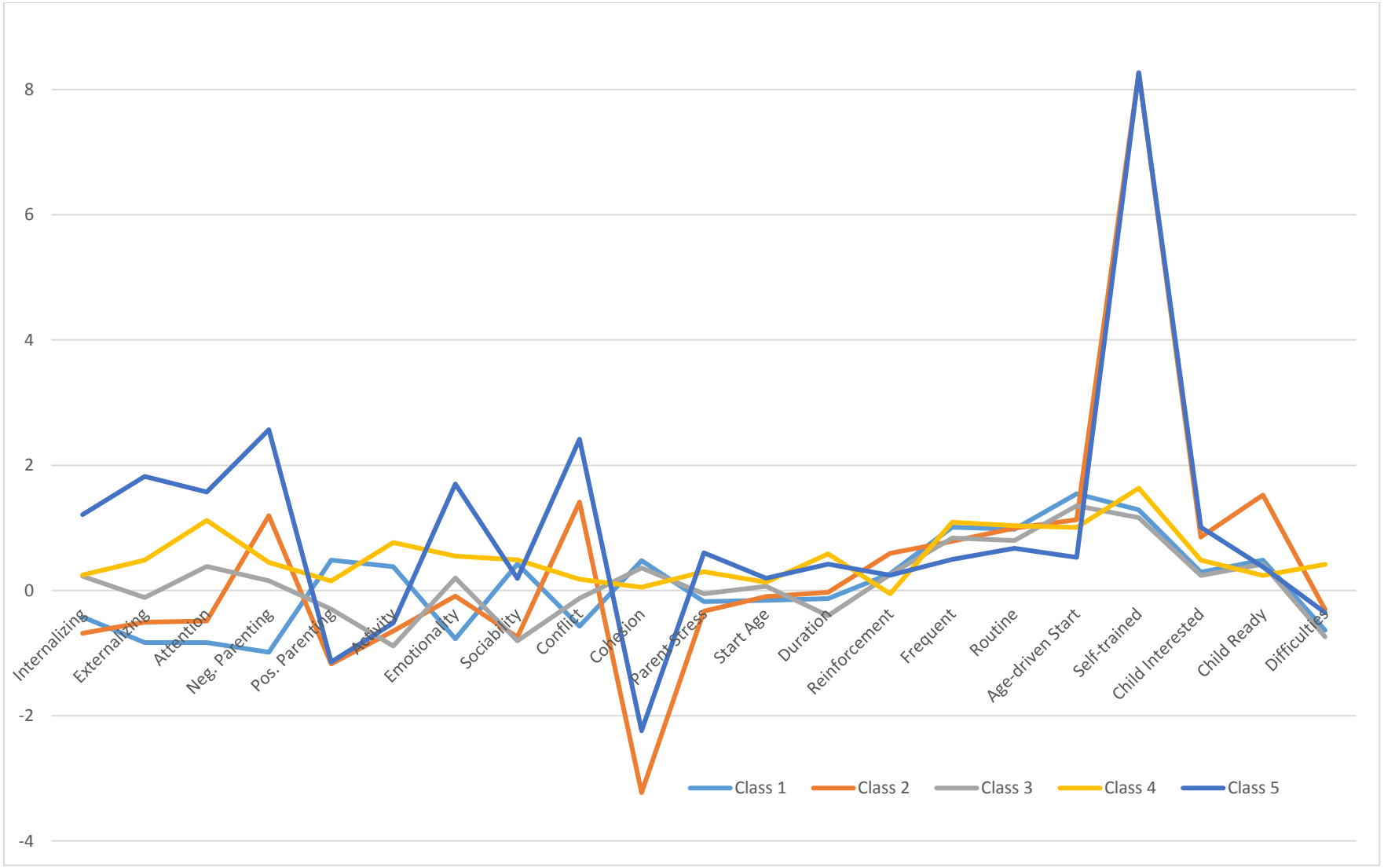

Figure 7. Latent class profile for five-class latent variable mixture model.
Note: Class 1 *N*=135, Class 2 *N*=21, Class 3 *N*=113, Class 4 *N*=98, Class 5 *N*=18.

Table 1. Frequency data for demographic characteristics of the community sample (*N*=437).

Variable		Percentage	*N*
Parent Gender	Female	77	330
	Male	23	101
Marital Status	Married	69	301
	Single, never married	21	91
	Divorced	8	36
	Separated	1	6
	Widowed	<1	1
Education	Some College	33	147
	Bachelor's Degree	31	136
	High School Graduate	13	56
	Master's Degree	12	50
	Doctoral Degree	4	15
	Some Graduate School	4	15
	Some High School	1	5
Race or Ethnic Identity	White	82	358
	Latinx	6	28
	Mixed Race	3	13
	Middle Eastern	2	10
	Black	2	9
	Asian	2	9
	Other	1	6
	Native American	<1	3
Number of Children	Two	39	167
	One	33	144
	Three	21	90
	Four	7	28
	Five	1	5
Child Gender	Male	52	227
	Female	48	208
Child Birth Order	Only Child	32	138
	Oldest Child (but not only)	30	131
	Youngest Child	29	128
	Middle Child	9	39
Child Chronic Condition	No	87	379
	Yes	13	57

Note: Some percentages may not sum to 100 due to rounding error and the total *N* may vary due to intermittent missing responses.

Table 2. Demographic data for the subclinical and matched community samples (*N*=54).

Variable		Subclinical Sample Percentage (*N*)	Matched Community Sample Percentage (*N*)
Child Gender	Male	59 (16)	63 (17)
	Female	41 (11)	37 (10)
Parent Gender	Female	76 (19)	85 (23)
	Male	24 (6)	15 (4)
Race or Ethnicity	White	85 (23)	85 (23)
	Latinx	7 (2)	7 (2)
	Black	4 (1)	4 (1)
	Middle Eastern	4 (1)	4 (1)
Child birth order	Oldest	37 (10)	33 (9)
	Youngest	37 (10)	44 (12)
	Only	26 (7)	22 (6)
Child chronic condition	Yes	30 (8)	22 (6)
	No	70 (19)	78 (21)
Parent Marital Status	Married	88 (23)	70 (19)
	Divorced	8 (2)	11 (3)
	Single, never married	4 (1)	19 (5)

Table 3. Descriptive statistics and internal consistency of surveys used in the current study (*N*=385).

Variable	Mean	Minimum	Maximum	Std. Dev.	Cronbach's alpha
Total Stress	20.42	4	40	7.44	0.87
Internalizing	6.77	5	14	1.60	0.69
Externalizing	7.19	5	13	1.77	0.78
Attention	11.29	7	19	2.72	0.78
Negative Parenting	26.16	3	60	7.52	0.88
Positive Parenting	54.29	4	60	6.29	0.86
Activity	20.13	10	25	3.28	0.71
Emotionality	12.36	5	25	4.39	0.83
Sociability	35.56	15	50	6.42	0.82
Conflict	2.09	0	9	1.93	0.70
Cohesion	7.91	0	9	1.55	0.66

Table 4. Frequency of reports of qualitative coding categories in the full sample (*N*=436).

Code Description	Percentage (*N*)
Describe in detail the method or process you used for toilet training.	
Positive **reinforcement**	41 (177)
Child size toilet or insert	16 (68)
Frequent trips to the bathroom (i.e. <30 minute intervals)	16 (69)
Established toileting **routine** or schedule	15 (64)
Rapid transition to **regular underwear**	12 (50)
Modeling of appropriate toileting by a parent or older sibling	10 (45)
Purchased **training underwear** or pull-ups	8 (34)
Kept the child **naked** for extended period	8 (34)
Child was **self-trained**	7 (31)
Parental **prompting** for toileting	6 (28)
Provided **psychoeducation** about toileting	4 (19)
Waited for the **child to request** using the bathroom	3 (12)
Trained the child over a period of **several days**	2 (10
Gave male child something to **aim** at in toilet	2 (9)
Used **multiple strategies**	<1 (4)
The child's **daycare** provider was primarily responsible	<1 (4)
Punishment of non-desired toileting behaviors	<1 (3)
How did you decide when to start toilet training?	
Child was **interested** in toilet training	33 (149)
Child **demonstrated readiness**	30 (131)
Child's age	11 (46)
Parent motivated to begin training	7 (32)
Requirement for child to begin **school**	6 (26)
Input from other family members	5 (23)
Child was **upset** about diapers	4 (17)
Family circumstances were changing	4 (15)
Consulted child's primary care provider	3 (11)
Child's peers were toilet trained	1 (6)
What resources did you go to for information while toilet training this child?	
Internet or social media	41 (170)
Family members	27 (110)
Other **friends** with children	27 (109)
Parenting **books**	18 (75)
None	15 (60)
Child's **primary care provider**	11 (43)
Experience with toilet training other children	10 (42)
Child's **daycare** provider	4 (17)
What role did your pediatrician/family practice doctor have around deciding to start toilet training or during the process?	
None	56 (208)
Gave **advice** about strategies	14 (51)
Minimal or limited role throughout the process	10 (36)
Provided general **encouragement**	5 (20)
Recommended using a **child-centered** approach	4 (17)
Recommended **starting training**	4 (16)
Addressed **challenges** during training	3 (10)

Table 5. Chi-square analyses reflecting differences in endorsement in themes about toilet training method and influences in starting training by child gender.

Theme		Female	Male	Chi-Square
Toilet Training Method				
Reinforcement	Yes	83	94	0.13
	No	125	132	
Child size toilet or insert	Yes	38	30	2.05
	No	170	196	
Frequent opportunities	Yes	34	34	0.14
	No	174	192	
Toileting routine	Yes	32	31	0.24
	No	176	195	
Regular underwear	Yes	25	25	0.10
	No	183	201	
Modeling	Yes	18	27	1.26
	No	190	199	
Pull-ups	Yes	20	14	1.76
	No	188	212	
Child naked	Yes	12	22	2.36
	No	196	204	
Prompting for toileting	Yes	17	11	1.96
	No	191	215	
Psychoeducation	Yes	10	9	0.18
	No	198	217	
Child request	Yes	6	6	0.02
	No	202	220	
Several days of training	Yes	5	5	0.03
	No	203	221	
Used multiple strategies	Yes	0	4	3.73[a]
	No	208	222	
Daycare provider	Yes	2	2	0.01
	No	206	224	
Punishment	Yes	2	1	0.44
	No	205	225	
Toilet Training Method Continued				
Child self-trained	Yes	17	14	0.64
	No	191	212	
Something to aim at	**Yes**	**1**	**8**	**4.99***
	No	**207**	**218**	
Influences on Decision to Start Training				
Child was interested	Yes	77	65	3.79[a]
	No	127	160	
Child demonstrated readiness	Yes	63	68	0.96
	No	141	157	
Child's age	Yes	20	26	0.34
	No	184	199	
Parent motivated to train	Yes	18	27	1.26
	No	190	199	
Requirement for school	Yes	14	12	0.44
	No	190	213	
Input from family	Yes	15	8	3.08
	No	188	217	
Child upset about diapers	Yes	6	11	1.07
	No	198	214	
Family circumstances changing	Yes	5	10	2.24
	No	199	212	
Consulted medical provider	Yes	5	6	0.02
	No	198	219	
Child's peers were trained	Yes	2	4	0.49
	No	202	221	

Note: p^a<0.06, p*<0.05

Table 6. Chi-square analyses reflecting differences in endorsement of themes about resources used during toilet training and the role of medical providers by child gender.

Theme		Female	Male	Chi-Square
Resources Used				
Internet	Yes	80	89	0.93
	No	113	128	
Family members	Yes	53	57	0.07
	No	140	160	
Friends with children	Yes	46	66	3.46
	No	150	151	
Parenting books	Yes	32	42	0.47
	No	161	175	
No resources	Yes	30	30	0.24
	No	163	187	
Primary care provider	Yes	16	27	1.83
	No	176	190	
Daycare provider	Yes	7	10	0.26
	No	186	206	
Prior Experience	Yes	14	28	3.55
	No	179	189	

Theme		Female	Male	Chi-Square
Role of Pediatrician				
No role	Yes	100	107	0.32
	No	73	88	
Advice about strategies	Yes	22	29	0.36
	No	151	166	
Minimal role	Yes	15	20	0.27
	No	158	175	
General encouragement	Yes	8	12	0.42
	No	165	183	
Advocate child-centered	Yes	7	10	0.24
	No	166	185	
Recommended starting	Yes	6	10	0.61
	No	167	185	
Addressed Challenges	Yes	3	7	1.19
	No	170	188	

Table 7. Chi-square analyses reflecting differences in endorsement of themes about method of toilet training and influences to start training by report of challenges during training.

Theme		Challenges	None	Chi-Square
Toilet Training Method				
Reinforcement	**Yes**	**78**	**77**	**9.19****
	No	**98**	**179**	
Child size toilet or insert	Yes	26	42	0.20
	No	129	235	
Frequent opportunities	Yes	19	49	2.21
	No	136	228	
Toileting routine	Yes	24	40	0.77
	No	131	237	
Regular underwear	Yes	13	36	2.10
	No	142	241	
Modeling	Yes	14	31	0.50
	No	141	246	
Pull-ups	Yes	15	19	1.09
	No	140	258	
Child naked	Yes	16	18	2.01
	No	139	259	
Prompting for toileting	Yes	8	20	0.70
	No	147	257	
Psychoeducation	Yes	4	15	1.90
	No	151	262	
Child request	Yes	3	9	0.64
	No	152	268	
Several days of training	Yes	2	8	1.12
	No	153	269	
Used multiple strategies	**Yes**	**4**	**0**	**7.22****
	No	**151**	**277**	
Daycare provider	Yes	1	3	0.21
	No	154	274	
Punishment	Yes	1	2	0.01
	No	154	275	

Theme		Challenges	None	Chi-Square
Toilet Training Method Continued				
Child self-trained	**Yes**	**6**	**25**	**3.96***
	No	**149**	**252**	
Something to aim at	Yes	2	7	0.75
	No	153	270	
Influences on Decision to Start Training				
Child was interested	Yes	46	96	1.00
	No	107	180	
Child demonstrated readiness	Yes	49	81	0.86
	No	104	194	
Child's age	Yes	20	25	1.70
	No	133	251	
Parent motivated to train	Yes	11	21	0.03
	No	142	255	
Requirement for school	Yes	9	17	0.01
	No	144	259	
Input from family	Yes	7	16	0.30
	No	146	259	
Child upset about diapers	Yes	9	8	2.30
	No	144	268	
Family circumstances changing	Yes	2	13	3.94
	No	150	261	
Consulted medical provider	Yes	2	9	1.52
	No	151	256	
Child's peers were trained	Yes	1	5	0.96
	No	152	271	

Note: $p^{*}<0.05$, $p^{**}<0.01$, $p^{***}<0.001$

Table 8. Chi-square analyses reflecting differences in endorsement of themes about resources used during toilet training and the role of medical providers by report of challenges during training.

Theme		Challenges	None	Chi-Square
Resources Used				
Internet	Yes	71	98	3.01
	No	81	160	
Family members	Yes	48	62	2.78
	No	104	196	
Friends with children	**Yes**	**50**	**58**	**5.35***
	No	**102**	**200**	
Parenting books	**Yes**	**37**	**37**	**6.47***
	No	**115**	**221**	
No resources	**Yes**	**12**	**47**	**8.27****
	No	**140**	**211**	
Primary care provider	**Yes**	**24**	**19**	**7.16****
	No	**128**	**238**	
Daycare provider	Yes	7	10	0.12
	No	145	247	
Prior Experience	Yes	12	30	1.45
	No	140	228	

Theme		Challenges	None	Chi-Square
Role of Pediatrician				
No role	Yes	73	134	1.86
	No	68	93	
Advice about strategies	Yes	23	27	1.45
	No	118	200	
Minimal role	Yes	15	21	0.19
	No	126	206	
General encouragement	Yes	8	12	0.03
	No	133	215	
Advocate child-centered	Yes	5	12	0.60
	No	136	215	
Recommended starting	Yes	4	12	1.26
	No	137	215	
Addressed Challenges	**Yes**	**9**	**1**	**11.62*****
	No	**132**	**226**	

Note: $p^{*}<0.05$, $p^{**}<0.01$, $p^{***}<0.001$

Table 9. Chi-square analyses reflecting differences in endorsement of themes about toilet training method by age at initiation of training.

Theme		<2yrs	2-2.5yrs	2.5-3yrs	3-3.5yrs	3.5-4yrs	4-4.5yrs	>5yrs	Chi-Square
Reinforcement	Yes	48	61	50	15	2	1	0	8.33
	No	74	111	52	13	3	2	1	
Child size toilet or insert	Yes	21	33	6	6	1	1	0	11.08
	No	101	139	96	22	4	2	1	
Frequent opportunities	Yes	19	31	12	6	0	0	0	9.53
	No	103	141	90	22	5	3	1	
Toileting routine	Yes	20	21	19	4	0	0	0	4.10
	No	102	151	83	24	5	3	1	
Regular underwear	Yes	13	16	16	4	0	0	0	11.72
	No	109	156	86	24	5	3	1	
Modeling	Yes	20	21	19	4	0	0	0	4.10
	No	102	151	83	21	5	3	1	
Pull-ups	**Yes**	**4**	**12**	**17**	**0**	**1**	**0**	**0**	**18.53****
	No	**118**	**160**	**85**	**28**	**4**	**3**	**1**	
Child naked	Yes	9	18	6	1	0	0	0	3.78
	No	113	154	96	27	5	3	1	
Prompting for toileting	Yes	7	12	7	1	0	1	0	4.67
	No	115	160	95	27	5	2	1	
Psychoeducation	Yes	5	7	6	1	0	0	0	1.12
	No	117	165	96	27	5	3	1	
Child request	Yes	4	5	1	0	1	0	0	8.40
	No	118	167	101	28	4	3	1	
Several days of training	Yes	2	3	2	3	0	0	0	9.57
	No	120	169	100	25	5	3	1	
Used multiple strategies	Yes	1	2	0	1	0	0	0	3.32
	No	121	170	102	27	5	3	1	
Daycare provider	Yes	0	1	3	0	0	0	0	6.26
	No	122	171	99	28	5	3	1	
Punishment	**Yes**	**0**	**1**	**0**	**1**	**1**	**0**	**0**	**32.16*****
	No	**122**	**171**	**102**	**27**	**4**	**3**	**1**	
Child self-trained	Yes	9	12	8	2	0	0	0	0.86
	No	113	160	94	26	5	3	1	
Something to aim at	Yes	3	5	1	0	0	0	0	2.08
	No	119	167	101	28	5	3	1	

Note: p*<0.05, p**<0.01, p***<0.001

Table 10. Chi-square analyses reflecting differences in endorsement of themes about influences to start toilet training and resources sought by age at initiation of training.

Theme		<2yrs	2-2.5yrs	2.5-3yrs	3-3.5yrs	3.5-4yrs	4-4.5yrs	>5yrs	Chi-Square
Influences on Decision to Start Training									
Child was interested	Yes	41	57	36	7	0	1	0	4.43
	No	80	114	65	20	5	2	1	
Child demonstrated readiness	Yes	32	62	28	8	1	0	0	8.90
	No	88	109	73	19	4	3	1	
Child's age	Yes	7	22	9	6	1	1	0	10.29
	No	114	149	92	21	4	2	1	
Parent motivated to train	Yes	9	10	7	2	2	1	0	11.75
	No	112	161	94	25	3	2	1	
Requirement for school	**Yes**	**5**	**7**	**6**	**6**	**0**	**1**	**0**	**34.22*****
	No	**116**	**164**	**95**	**21**	**5**	**2**	**1**	
Input from family	Yes	8	9	6	0	0	0	0	2.57
	No	112	162	95	27	5	3	1	
Child upset about diapers	Yes	7	7	3	0	0	0	0	2.86
	No	114	164	98	27	5	3	1	
Family circumstances changing	Yes	5	6	3	1	0	0	0	3.13
	No	115	165	96	26	5	3	1	
Consulted medical provider	Yes	3	3	5	0	0	0	0	3.71
	No	118	167	96	27	5	3	1	
Child's peers were trained	**Yes**	**0**	**3**	**2**	**0**	**0**	**1**	**0**	**24.85*****
	No	**121**	**168**	**99**	**27**	**5**	**2**	**1**	
Resources Used During Training									
Internet	Yes	51	69	38	10	2	0	0	3.92
	No	63	97	57	18	2	2	1	
Family members	Yes	35	39	25	9	1	0	0	3.71
	No	79	127	70	19	3	2	1	
Friends with children	Yes	29	43	27	10	0	0	0	4.38
	No	85	123	68	18	4	2	1	
Parenting books	Yes	17	33	16	8	1	0	0	4.29
	No	97	133	79	20	3	2	1	
No resources	**Yes**	**11**	**33**	**13**	**1**	**0**	**2**	**0**	**21.47****
	No	**103**	**133**	**82**	**27**	**4**	**0**	**1**	
Primary care provider	Yes	12	14	13	3	1	0	0	3.11
	No	102	151	82	25	3	2	1	
Daycare provider	**Yes**	**4**	**4**	**6**	**2**	**0**	**0**	**0**	**26.56*****
	No	**110**	**161**	**89**	**26**	**4**	**2**	**1**	
Prior Experience	Yes	8	21	12	1	0	0	0	5.21
	No	106	145	83	27	4	2	1	

Note: p*<0.05, p**<0.01, p***<0.001

Table 11. Chi-square analyses reflecting differences in endorsement of themes about the role of pediatric medical providers in toilet training by age at initiation of training.

Theme		<2yrs	2-2.5yrs	2.5-3yrs	3-3.5yrs	3.5-4yrs	4-4.5yrs	>5yrs	Chi-Square
Role of Pediatrician									
No role	Yes	60	85	44	12	4	2	0	6.27
	No	43	64	38	14	1	0	1	
Advice about strategies	Yes	13	18	14	5	1	0	0	2.67
	No	90	131	68	21	4	2	1	
Minimal role	Yes	8	16	9	2	0	0	0	1.88
	No	96	133	73	24	5	2	1	
General encouragement	Yes	6	8	3	3	0	0	0	2.95
	No	97	141	79	23	5	2	1	
Advocate child-centered	Yes	7	4	6	0	0	0	0	5.44
	No	96	145	76	26	5	2	1	
Recommended starting	Yes	6	7	3	0	0	0	0	2.28
	No	97	142	79	26	5	2	1	
Addressed Challenges	Yes	2	3	2	3	0	0	0	8.46
	No	101	146	80	23	5	2	1	

Table 12. Chi-square analyses reflecting differences in endorsement of themes about toilet training method by duration of toilet training.

Theme		<1wk	1wk	2wks	3wks	4wks	5wks	6wks	7wks	8wks+	Chi-Square
Reinforcement	**Yes**	**4**	**13**	**17**	**14**	**27**	**12**	**20**	**6**	**47**	**20.45***
	No	**28**	**20**	**33**	**22**	**38**	**12**	**15**	**10**	**48**	
Child size toilet or insert	Yes	3	7	5	2	15	2	8	2	15	11.05
	No	29	26	45	34	50	22	27	14	80	
Frequent opportunities	Yes	6	5	15	5	7	3	5	2	15	9.86
	No	26	28	35	31	58	21	30	14	80	
Toileting routine	Yes	3	7	10	5	7	1	3	3	20	10.89
	No	29	26	40	31	58	23	32	13	75	
Regular underwear	**Yes**	**7**	**8**	**9**	**5**	**6**	**0**	**2**	**1**	**9**	**17.61***
	No	**25**	**25**	**41**	**31**	**59**	**24**	**33**	**15**	**86**	
Modeling	Yes	5	4	7	3	8	3	1	1	3	15.70
	No	27	29	43	33	57	21	34	15	92	
Pull-ups	Yes	2	2	3	5	4	1	3	0	12	9.86
	No	30	31	47	31	61	23	32	16	83	
Child naked	Yes	5	4	6	2	2	1	2	1	10	10.90
	No	27	29	44	34	63	23	33	15	85	
Prompting for toileting	Yes	1	1	2	2	3	2	3	0	9	6.33
	No	31	32	48	34	62	22	32	16	86	
Psychoeducation	**Yes**	**2**	**1**	**1**	**0**	**4**	**3**	**4**	**0**	**0**	**18.04***
	No	**30**	**32**	**49**	**36**	**61**	**21**	**31**	**16**	**95**	
Child request	Yes	0	0	0	2	3	0	1	1	4	7.37
	No	32	33	50	34	62	24	34	15	91	
Several days of training	**Yes**	**5**	**2**	**1**	**0**	**1**	**0**	**1**	**0**	**0**	**32.70*****
	No	**27**	**31**	**49**	**36**	**64**	**24**	**34**	**16**	**95**	
Used multiple strategies	Yes	0	0	0	0	0	0	0	4	0	14.41
	No	32	33	50	36	65	24	35	16	91	
Daycare provider	Yes	0	0	0	2	1	0	0	0	1	10.97
	No	32	33	50	34	64	24	35	16	94	
Punishment	Yes	0	0	1	1	0	0	0	1	0	13.04
	No	32	33	49	35	65	24	35	15	95	
Child self-trained	**Yes**	**10**	**2**	**3**	**2**	**6**	**1**	**1**	**1**	**4**	**33.15*****
	No	**22**	**31**	**47**	**34**	**59**	**23**	**34**	**15**	**91**	
Something to aim at	Yes	0	1	1	0	2	1	2	0	2	6.07
	No	32	32	49	36	63	23	33	16	93	

Note: p*<0.05, p**<0.01, p***<0.001

Table 13. Chi-square analyses reflecting differences in endorsement of themes about influences to start toilet training and resources sought by duration of toilet training.

Theme		<1wk	1wk	2wks	3wks	4wks	5wks	6wks	7wks	8wks+	Chi-Square
Influences on Decision to Start Training											
Child was interested	Yes	12	15	15	12	23	7	8	3	28	7.30
	No	20	18	35	23	42	16	26	13	66	
Child demonstrated readiness	Yes	11	10	15	7	21	4	7	5	37	20.42
	No	21	23	35	27	44	19	27	11	57	
Child's age	Yes	1	2	6	4	5	3	3	3	14	6.47
	No	31	31	44	31	60	20	31	13	80	
Parent motivated to train	Yes	3	1	3	1	7	3	5	1	6	7.57
	No	29	32	47	34	58	20	29	15	88	
Requirement for school	Yes	3	4	3	4	1	1	4	0	4	10.81
	No	29	29	47	31	64	22	30	16	90	
Input from family	**Yes**	**0**	**2**	**1**	**4**	**4**	**4**	**0**	**3**	**3**	**20.74***
	No	**32**	**31**	**49**	**31**	**60**	**19**	**34**	**13**	**91**	
Child upset about diapers	Yes	0	1	5	0	2	1	0	0	4	12.29
	No	32	32	45	35	63	22	34	16	90	
Family circumstances changing	Yes	2	1	3	1	2	0	0	2	4	20.70
	No	30	32	47	33	63	22	34	14	90	
Consulted medical provider	Yes	1	0	0	1	2	1	3	1	2	10.43
	No	31	33	50	34	63	22	30	15	91	
Child's peers were trained	Yes	1	0	0	0	2	1	1	0	0	7.47
	No	31	33	50	35	63	22	33	16	94	
Resources Used During Training											
Internet	Yes	7	16	13	14	27	13	12	7	41	13.02
	No	22	14	35	20	33	9	19	9	52	
Family members	Yes	3	6	14	9	13	8	9	7	32	14.44
	No	26	24	34	25	47	14	22	9	61	
Friends with children	Yes	6	10	11	7	15	5	9	5	24	4.65
	No	23	20	37	27	45	17	22	11	69	
Parenting books	Yes	1	5	5	6	10	5	6	3	24	10.49
	No	28	25	43	28	50	17	25	13	69	
No resources	**Yes**	**8**	**2**	**12**	**5**	**12**	**4**	**3**	**3**	**5**	**18.57***
	No	**21**	**28**	**36**	**29**	**48**	**18**	**28**	**13**	**88**	
Primary care provider	Yes	2	3	3	3	6	1	6	1	11	6.20
	No	27	27	45	31	53	21	25	15	82	
Daycare provider	Yes	1	1	1	2	2	1	2	0	3	4.37
	No	28	29	47	32	58	21	29	16	89	
Prior Experience	Yes	3	1	4	3	6	2	5	1	10	4.32
	No	26	29	44	31	54	20	26	15	83	

Note: p*<0.05, p**<0.01, p***<0.001

Table 14. Chi-square analyses reflecting differences in endorsement of themes about the role of pediatric medical providers in toilet training by duration of training.

Theme		<1wk	1wk	2wks	3wks	4wks	5wks	6wks	7wks	8wks+	Chi-Square
No role	Yes	15	18	26	16	32	12	13	8	46	8.03
	No	9	7	15	13	21	10	17	7	38	
Advice about strategies	Yes	5	0	4	6	8	3	3	3	11	8.10
	No	19	25	37	23	45	19	27	12	73	
Minimal role	Yes	0	2	3	4	3	1	6	3	11	12.25
	No	24	23	38	25	50	21	24	12	73	
General encouragement	Yes	1	2	1	1	3	1	1	1	6	2.25
	No	23	23	40	28	50	21	29	14	78	
Advocate child-centered	Yes	2	1	2	0	2	0	0	1	4	8.84
	No	22	24	39	29	51	22	30	14	80	
Recommended starting	Yes	0	1	2	2	3	2	1	0	2	5.02
	No	24	24	39	27	50	20	29	15	82	
Addressed Challenges	Yes	0	1	1	1	1	0	0	0	5	6.33
	No	24	24	40	28	52	22	30	15	79	

Table 15. Fit indices for latent variable mixture modeling of parent-reported child and family characteristics.

Model	Loglikelihood	AIC	BIC	Entropy	BLRT	LMR
One class	-8601.99	17271.98	17406.39	N/A	---	---
Two classes	-8387.93	16887.86	17109.24	0.79	---	---
Three classes	-8285.63	16727.26	17035.62	0.79	---	---
Four classes	-8214.32	16628.62	17023.94	0.78	---	---
Five classes	-8147.81	16539.37	17021.66	0.82	133.26	133.26
Six classes	N/A	N/A	N/A	N/A	---	---

Note: AIC, Akaike Information Criteria; BIC, Bayesian Information Criteria; BLRT, Bootstrap likelihood ratio test; LMR, Lo-Mendell-Rubin

Table 16. Variable specific entropy of class indicators in the five-class latent variable mixture model.

Class Indicator	Entropy
Internalizing	0.198
Externalizing	0.273
Attention	0.300
Negative parenting	0.324
Positive parenting	0.219
Activity	0.272
Emotionality	0.255
Sociability/Shyness	0.236
Conflict	0.272
Cohesion	0.307
Parent Stress	0.159
Age at initiation	0.148
Duration of training	0.187
Reinforcement	0.028
High frequency	0.028
Toileting routine	0.027
Age-based start	0.028
Child self-trained	0.028
Start due to interest	0.028
Start due to readiness	0.028
Difficulty training	0.036

Table 17. Significance of differences in probability of endorsement of categorical class indicators by probabilistic class membership.

Comparison Groups	Reinforcement	Frequent	Routine	Age-based	Self-Trained	Child Interested	Child Ready	Difficulties
Class One v. Class Two	1.805	0.667	1.032	0.472	---	2.766	6.620	1.814
Class One v. Class Three	0.980	0.732*	0.722*	0.705	0.798	0.913**	0.892**	0.823
Class One v. Class Four	0.559**	1.159	1.107*	0.376	1.878	1.422**	0.645*	6.735
Class One v. Class Five	0.954	0.395	0.575	0.158	---	3.672	0.825	1.685
Class Two v. Class Three	0.543	1.097	0.700	1.496	---	0.330	0.135	0.454
Class Two v. Class Four	0.310	1.737	1.073	0.798	---	0.514	0.097	3.712
Class Two v. Class Five	0.529	0.592	0.558	0.335	1.000	1.328	0.125	0.914
Class Three v. Class Four	0.571	1.584	1.534	0.534	2.352	1.557*	0.723*	8.178
Class Three v. Class Five	0.974	0.540	0.797	0.224	---	4.021	0.925	2.014
Class Four v. Class Five	1.706	0.341	0.520	0.420	---	2.582	1.280	0.246

Note: Differences between classes for reports of child self-training were so large for some classes that MPlus produced an error message and did not calculate difference ratio.
$p^*<0.05$, $p^{**}<0.01$

Table 18. MANOVA findings comparing the matched community and subclinical samples on family systems variables (*N*=54).

Variable	Subclinical *M*(*SD*)	Community *M*(*SD*)	*F*	*p*	*Partial eta*^{2}
Positive parenting	55.63 (3.47)	54.43 (4.82)	0.77	0.386	0.029
Negative parenting	26.74 (5.60)	26.87 (5.00)	0.01	0.925	0.000
Internalizing	7.41 (2.11)	7.64 (1.49)	0.17	0.681	0.007
Externalizing	7.33 (1.69)	7.68 (1.55)	0.96	0.337	0.036
Attention	**13.02 (2.97)**	**11.33 (1.78)**	**7.58**	**0.011**	**0.226**
Parent Stress	21.69 (7.63)	17.73 (8.20)	4.18	0.051	0.138
Conflict	1.95 (1.35)	2.53 (1.95)	1.496	0.232	0.054
Cohesion	8.29 (1.05)	8.11 (1.61)	0.183	0.672	0.007
Emotionality	14.23 (4.78)	12.23 (3.87)	3.767	0.063	0.127
Activity	19.31 (4.11)	19.03 (2.61)	0.057	0.813	0.002
Sociability	34.03 (7.29)	35.19 (7.36)	0.279	0.602	0.011

Table 19. Frequency of endorsement of toilet training method themes in the subclinical and community samples with chi-square statistics (*N*=54).

Variable		Subclinical	Matched Community	Chi-Square	*p* value
Reinforcement	Yes	11	11	0.000	1.00
	No	16	16		
Child size toilet or insert	Yes	9	6	0.83	0.362
	No	18	21		
Frequent opportunities	Yes	3	7	1.96	0.161
	No	24	20		
Toileting routine	**Yes**	**8**	**1**	**6.53**	**0.011**
	No	**19**	**26**		
Regular underwear	Yes	4	5	0.13	0.715
	No	23	22		
Modeling	Yes	3	2	0.22	0.639
	No	24	25		
Pull-ups	Yes	1	2	0.35	0.552
	No	26	25		
Child naked	Yes	5	4	0.13	0.715
	No	22	23		
Prompting for toileting	Yes	1	1	0.00	1.000
	No	26	26		
Psychoeducation	Yes	1	0	1.02	0.313
	No	26	27		
Child request	Yes	0	1	1.02	0.313
	No	27	26		
Several days of training	Yes	0	1	1.02	0.313
	No	27	26		
Used multiple strategies	Yes	2	0	2.08	0.150
	No	25	27		
Daycare provider	Yes	1	0	1.02	0.313
	No	26	27		

Note: Themes reflecting punishment, child self-training, and providing the child with something to aim at were dropped from chi-square analyses as they were not present in this smaller subsample.

Table 20. Frequency of endorsement of themes regarding motivation to start toilet training in the subclinical and matched community samples with chi-square statistics (*N*=54).

Variable		Subclinical	Matched Community	Chi-Square	*p* value
Child was interested	**Yes**	**3**	**15**	**7.48**	**0.006**
	No	**24**	**12**		
Child demonstrated readiness	Yes	6	11	2.15	0.143
	No	21	16		
Child's age	Yes	3	3	0.00	1.000
	No	24	24		
Parent motivated to train	Yes	1	2	0.35	0.552
	No	26	25		
Requirement for school	Yes	2	2	0.00	1.000
	No	25	25		
Input from family	**Yes**	**0**	**5**	**5.51**	**0.019**
	No	**27**	**22**		
Child upset about diapers	Yes	2	0	2.08	0.150
	No	25	27		
Family circumstances changing	Yes	1	1	0.00	1.000
	No	26	26		
Consulted medical provider	Yes	1	1	0.00	1.000
	No	26	26		

Note: Theme reflecting starting training due to peers being toilet trained was dropped from chi-square analysis as it was not present in this subsample.

Table 21. Frequency of endorsement of themes regarding resources sought during toilet training and the role of the child's pediatrician in the subclinical and matched community samples with chi-square statistics (*N*=54).

Variable		Subclinical	Matched Community	Chi-Square	*p* value
Resources Used					
Internet	Yes	11	11	0.00	1.000
	No	16	16		
Family members	Yes	4	5	0.13	0.715
	No	23	22		
Friends with children	Yes	6	6	0.00	1.000
	No	19	19		
Parenting books	Yes	10	5	2.31	0.129
	No	17	22		
No resources	Yes	3	6	1.20	0.273
	No	24	21		
Child's primary care provider	**Yes**	**11**	**4**	**4.52**	**0.033**
	No	**16**	**23**		
Prior experience	Yes	7	20	1.03	0.311
	No	4	23		
Child's daycare provider	Yes	26	1	0.00	0.956
	No	24	1		
Role of Pediatrician					
No role	**Yes**	**21**	**27**	**6.29**	**0.012**
	No	**6**	**0**		
Gave advice about strategies	Yes	5	4	0.02	0.902
	No	22	23		
Minimal role	Yes	3	5	1.79	0.181
	No	24	22		
General encouragement	Yes	4	1	1.75	0.187
	No	23	26		
Recommended child-centered	Yes	0	1	1.11	0.293
	No	27	26		
Recommended starting	Yes	3	2	0.01	0.933
	No	24	25		

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CURRICULUM VITAE

Ellen K.D. Sejkora

EDUCATION

University of Wisconsin-Milwaukee, Milwaukee, WI 2013-2019
Ph.D. (expected) in Psychology, Clinical Psychology Track
Dissertation: *Psychosocial Characteristics of Children With and Without Toileting Dysfunction*
Advisor: W. Hobart Davies, Ph.D.
Successfully defended May 6, 2018

Ohio State University - Nationwide Children's Hospital, Columbus, OH 2018-2019
APA Accredited Predoctoral Internship in Professional Psychology
Pediatric Psychology Track

University of Wisconsin-Milwaukee, Milwaukee, WI 2013-2015
M.S. in Psychology, Clinical Psychology Track
Thesis: *Predicting Parental Health-Related Quality of Life: A Cumulative Risk Model*
Advisor: W. Hobart Davies, Ph.D.

Ohio Wesleyan University, Delaware, OH 2009-2013
B.A. in Psychology and Neuroscience, *cum laude*
Honors Thesis: *Empathy Development Following Negative Life Experiences: The Role of Coping and Memory Processes*
Advisor: Sarah Bunnell, Ph.D.

ACADEMIC AWARDS AND HONORS

Distinguished Dissertator Fellowship, a merit-based research fellowship from the University of Wisconsin-Milwaukee Graduate School 2017-2018

Distinguished Graduate Student Fellowship, a merit-based research fellowship from the University of Wisconsin-Milwaukee Graduate School 2016-2017

Leadership and Education on Neurodevelopmental Disorders Fellow, an award sponsoring additional interdisciplinary training in the area of neurodevelopmental disorders and chronic illnesses, funded by the Health Resources & Services Administration Maternal and Child Health Bureau 2015-2016

University of Wisconsin-Milwaukee Graduate Student Travel Award 2014-2016

Chancellors Graduate Student Award, a merit-based award from the University of Wisconsin-Milwaukee Graduate School for incoming graduate students with the highest undergraduate GPA 2013-2015

Psychology Department Honors, a merit-based award from Ohio Wesleyan University for students with outstanding academic performance in psychology 2013

Harry Bahrick Professional Development Award, a merit-based award from the Psychology Department for the student who shows the most promise for a future academic career, Ohio Wesleyan University 2013

Ohio Wesleyan University Trustees Award 2009-2013

Leland F. and Helen Schubert Scholarship, a merit-based award from Ohio Wesleyan University Honors Program 2009-2013

Dean's List, Ohio Wesleyan University (6 semesters) 2009-2013

CLINICAL EXPERIENCE

Nationwide Children's Hospital – Internship in Professional Psychology 2017- present
Pediatric Psychology Track
Pediatric Psychology Resident (12-month Internship: 40hours/week)

Inpatient Consultation\/Liaison
Provide consultative services including: diagnostic assessments; general psychosocial screening; post-partum depression screening; development of behavior management plans; cognitive-behavioral and acceptance-based psychosocial interventions address adjustment to diagnosis, coping with hospitalization, pain management, parent and sibling coping, procedural anxiety, and disruptive behaviors. Consult with medical team members to support care coordination, acted as medical team liaison and patient advocate. Participate in psychosocial rounds for Sickle Cell Disease, Rehabilitation, Complex Care, Hematology/Oncology, and Palliative Care teams.
Inpatient unit rotations: neonatal intensive care, pediatric intensive care, complex care, advanced illness management, cardiac intensive care, burn, rehabilitation, pulmonology, solid organ transplant, hematology/oncology/bone marrow transplant, neurosurgery, gastroenterology, and general medicine.
Supervisors: Amy Baughcum, Ph.D., Nicole Dempster, Ph.D., Lauren Garbacz, Ph.D., Molly Gardner, Ph.D., Amy Hahn, Ph.D., Ashley Kroon Van Deist, Ph.D., Kathy Lemanek, Ph.D., Rose Schroedl, Ph.D., Natalie Truba, Ph.D., and Sarah Verlee, Ph.D.

Outpatient Multidisciplinary Clinics
Conduct routine screening and assessment of common childhood difficulties in an **integrated primary care clinic**. Coordinate medication and behavioral management of ADHD. Provide psychoeducation for parents and develop behavioral interventions to address oppositional behaviors, food selectivity, cessation of breast feeding, depression, anxiety, and toileting challenges. Upcoming rotations will include providing procedural support and ongoing psychosocial services in an outpatient **multidisciplinary burn follow-up clinic**.
Supervisors: Cody Hostutler, Ph.D. and Sarah Verlee, Ph.D.

Outpatient Pediatric Psychology Services
Provide outpatient therapy services to youth and their families with a wide range of acute and chronic illnesses including Type 1 Diabetes, epilepsy, chronic pain and headaches, feeding difficulties, and cerebral palsy. Facilitate care coordination for patients and families managing complex medical diagnoses requiring involvement of multiple medical

specialties. Utilize empirically supported interventions including biofeedback, mindfulness, behavioral activation, cognitive therapy, motivational interviewing, and acceptance/commitment interventions.
Supervisors: Cathy Butz, Ph.D., Lauren Garbacz, Ph.D., Kristen Trott, Ph.D., Natalie Tuba, Ph.D., and Heather Yardley, Ph.D.

Assessment
Conduct neuropsychological assessment for patients with craniofacial anomalies, genetic conditions, congenital cardiac defects, and epilepsy. Write integrated reports incorporating results from various sources and administered tests. Future rotations will include conducting psychoeducational assessments for children and adolescents between 8- and 16-years-old presenting for concerns with learning, memory, or attention.
Supervisors: Ari Rabkin, Ph.D. and Kristen Trott, Ph.D.

Children's Hospital of Wisconsin – Pediatric Psychology Practicum 2016-2018
Pediatric Psychology Extern (Two 9-month Practica; 20 hours/week)

Hematology/Oncology/Transplant Service
Conducted brief screening with patients in interdisciplinary sickle cell and acute lymphoblastic leukemia clinics. Provided acceptance-based interventions to patients adjusting to new diagnoses and conducted routine pre- and post-bone marrow transplant cognitive evaluations. Implemented cognitive behavioral interventions for procedural anxiety, depression, sleep problems, treatment adherence, and family stress in both inpatient and outpatient settings.
Supervisors: Kristen Bingen, Ph.D., Jenny Hoag, Ph.D., and Jeffrey Karst, Ph.D.

Herma Heart Institute
Assisted with brief assessments and behavioral interventions for pediatric heart transplant patients in an interdisciplinary cardiac rehabilitation clinic focused on increasing physical activity. Conducted routine developmental testing of preschool-aged heart failure and heart transplant patients.
Supervisors: Cheryl Brosig, Ph.D. and Ashley Shields, Ph.D.

Outpatient Gastroenterology Clinics
Conducted multidisciplinary intake assessments for children with possible feeding disorders and comorbid neurodevelopmental and medical conditions. Provided behavioral feeding interventions, fed therapeutic meals in a one-to-one outpatient setting using behavioral strategies in an **interdisciplinary feeding and swallowing clinic**. Provided coordinated psychosocial and medical interventions with advanced practice nurses and implemented brief behavioral interventions to treat enuresis or encopresis in an **outpatient toileting clinic**.
Supervisors: Andrea Begotka, Ph.D., Alan Silverman, Ph.D., and Meghan Wall, Ph.D.

Intensive Inpatient Feeding Program
Fed therapeutic meals using behavioral strategies to children being fully- or partially-weaned from g-tubes or g-j-tubes. Assisted in development of treatment plans prior to inpatient stays and provided parent guidance during therapeutic meals using parent-child interaction therapy procedures.
Supervisor: Alan Silverman, Ph.D.

Psychiatry Consultation/Liaison Service
Conducted inpatient PTSD screenings for pediatric trauma patients and provided brief cognitive behavioral therapy for procedural anxiety. Conducted diagnostic assessments for conversion disorder cases in an inpatient setting. Provided supportive interventions for parents of infants in the neonatal intensive care unit.
Supervisor: Patricia Marik, Psy.D.

UWM Psychology Clinic 2014-2017
Graduate Student Therapist (Three 9-month Practica; 15hrs/wk)

Child Neuropsychology Specialty Clinic
Conducted psychodiagnostic and neurocognitive assessments for child and adolescent clients referred for concerns regarding academic skills, ADHD, memory, and intrauterine substance exposure. Assisted with interdisciplinary autism diagnostic. Completed training in administration of the Autism Diagnostic Observation Schedule and the Autism Diagnostic Interview.
Supervisors: Bonita Klein-Tasman, Ph.D. and Kristin Smith, Ph.D.

Supervision Practicum
Provided supervised supervision of child psychoeducational and adult psychodiagnostic assessments for second year clinical psychology graduate students. Participated in group supervision, live observed test administration, and received feedback regarding supervision style.
Supervisors: Hanjoo Lee, Ph.D. and Kristin Smith, Ph.D.

Assessment Practicum
Conducted child and adult psychodiagnostic and learning disability assessments using a range of cognitive, achievement, personality, behavioral, and projective measures. Wrote integrated reports, acted as liaison between family and members of school-based IEP teams.
Supervisors: Bonita Klein-Tasman, Ph.D. and Hanjoo Lee, Ph.D.

Outpatient Therapy Practicum
Provided evidence-based treatments for child anxiety (Coping Cat; Modular Cognitive Behavioral Therapy for Childhood Anxiety Disorders) and depression (Behavioral Activation with Adolescents) as well as adult anxiety or depression (Mastery of Your Anxiety and Panic; Dugas Protocol for GAD; Unified Protocol for Transdiagnostic Treatment of Emotional Disorders) with members of the community.
Supervisors: Bonita Klein-Tasman, Ph.D. and Christopher Martell, Ph.D., ABPP

TRAINING WORKSHOPS

Ethical Dilemmas in Transgender Health Care 2017
Society of Pediatric Psychology Annual Conference, Atlanta, GA
Presented by: Diane Chen, Ph.D., Laura Edwards-Leeper, Ph.D.,
Terry Stancin, Ph.D., ABPP, & Amy Tishelman, Ph.D.

Death and Dying: Practical Skills for Working with Bereaved Children and Adolescents 2017
Society of Pediatric Psychology Annual Conference, Atlanta, GA
Presented by: Amanda Thompson, Ph.D.

Autism Diagnostic Observation Schedule: Module 1-4 2016
Waisman Center Autism and Neurodevelopmental Disorders Clinic
Presented by: Lindsay McCary, Ph.D.

Surviving Cancer Competently Intervention Program-Newly Diagnosed Training 2015
Children's Hospital of Philadelphia
Presented by: Anne Kazak, Ph.D.

RESEARCH EXPERIENCE

PEER-REVIEWED PUBLICATIONS

*Previous name: Defenderfer

Davies, W.H., **Sejkora, E.K.D.,** Erato, G.A., & Bernacki, J. (In Press). Parental prevention discussions about The Choking Game: Thematic elements. *Children & Society.*

Igler, E.C., **Sejkora, E.K.D.,** Austin, J.E., & Davies, W.H. (In Press). Friendship changes following a friends' school absence after serious illness or injury. *Journal of Child Health Care.*

Igler, E.C., **Sejkora, E.K.D.,** Greenley, R., Plevinsky, J., Bugno, L., Carreon, S., & Davies, W.H. (In Press). Development and initial validation of the communication about medication by providers-parent scale. *Global Pediatric Health.*

Davies, W.H., Wright, N.E., Guendel, B.J., & **Defenderfer, E.K.** (In Press). Evaluation of a model program to prevent alcohol use at teen parties. *Journal of Child & Adolescent Substance Abuse.*

Defenderfer, E.K., Bauer, K., Igler, E., Uihlein, J., & Davies, W.H. (2018). The phenomenology of pain dismissal in adolescence. *Clinical Journal of Pain, 34,* 162-167.

Lang, A.C., Igler, E.C., **Defenderfer, E.K.,** Bauer, K., Uihlein, J., Davies, W.H., & Brimeyer, C. (2018). Evaluating Differential Effects of Specific Pain Dismissal Interactions with Physicians. *Clinical Journal of Pain.* DOI: 10.1097/AJP.0000000000000586.

Defenderfer, E.K., Rybak, T.J., Berlin, K.S., & Davies, W.H. (2017). Predicting parent health-related quality of life: Evaluating conceptual models. *Quality of Life Research, 26,* 1405-1415. DOI: 10.1007/s11136-016-1491-3

Igler, E.C., **Defenderfer, E.K.,** Lang, A.C., Bauer, K., Uihlein, J. & Davies, W.H. (2017). Gender differences in the experience of pain dismissal in an adolescent sample. *Journal of Child Health Care, 21,* 381-391.

Defenderfer, E.K., Austin, J.E., & Davies, W.H. (2016). The Choking Game on YouTube: An Update. *Global Pediatric Health.* DOI: 2333794X15622333

Defenderfer, E.K., Davies, W.H., Brie, N., Raicu, A.M., & Klein-Tasman, B. (2016). Toilet fear in childhood as early behavioral indicator of later childhood anxiety disorders. *Children's Health Care, 46,* 366-378. DOI: 10.1080/02739615.2016.1193808

Hainsworth, K.R., Jastrowski Mano, K.E., Stoner, A., Anderson Kahn, K., Ladwig, R., Davies, W.H., **Defenderfer, E.,** & Weisman, S.J. (2016). "What does weight have to do with it?" Parent perceptions of weight and pain in a pediatric chronic pain population. *Children*, *3,* 29. DOI: 10.3390/children3040029

(Under Review)

Defenderfer, E.K., Tonne, K., & Davies, W.H. Marital status as a moderator of family stress in the context of pediatric chronic illnesses.

Erato, G.A., **Sejkora, E.K.D,** & Davies, W.H. Mindfulness and resilience as predictors of positive parenting and child behaviors among children with chronic illnesses.

Igler, E.C., Austin, J.E., **Defenderfer, E.K.,** & Davies, W.H. Friends' perspective: Friendship changes following serious illness and acceptability of a message to promote social support.

Igler, E., Lang, A., Balistreri, K., **Sejkora, E.K.D.,** Drendel, A., & Davies, W.H. Parent perceptions of dismissive provider reactions to pediatric chronic pain reports.

Sejkora, E.K.D., Igler, E.C., & Davies, W.H. Parent reported toilet training practices and the role of pediatric primary care providers.

(In Preparation)

Sejkora, E.K.D., Erato, G.A., Igler, E.C., & Davies, W.H. Family experience of pediatric chronic illness: Room for growth.

Sejkora, E.K.D., Erato, G.A., Schwarz, G.N., & Davies, W.H. Measurement comparability of quality of life measures in a community setting.

Sejkora, E.K.D., Davies, W.H., & Berlin, K.S. The role of family systems variables in normative toilet training: A latent variable mixture modeling approach.

Sejkora, E.K.D., Silverman, A., & Davies, W.H., Addressing challenges with normative toilet training: Leveraging the opportunities of integrated primary care.

Litvin, R., **Sejkora, E.K.D.,** Berlin, K.S., Kamody, R.C., & Davies, W.H. Parental perception of child-focused communication by pediatric healthcare providers.

CONFERENCE PRESENTATIONS

Invited Oral Symposia

Davies, W.H., **Defenderfer, E.K**., Klein-Tasman, B.P., Stancin, T., Smith, K., & Tran S.T. (2016, August). Ethical issues in child and adolescent psychology. Invited symposium at the meeting of the American Psychological Association, Denver, CO.

Hazen, R.A., Fehr, K., Peterson, C.C., Morris, N.K., Tran, S.T., **Defenderfer, E**., Przeworski, A., & Davies, W.H. (2015, October). *Understanding the family perspective in the medical setting: Ethical and clinical implications*. Concurrent symposium presented at the Society of Developmental and Behavioral Pediatrics, Las Vegas, NV.

Oral Presentations

Sejkora, E.K.D., Igler, E.C., Brimeyer, C., & Logan, D. (2019, April). *Real Pain? Patterns and clinical implications of provider pain dismissal in adolescents and emerging adults*. Accepted for presentation at the Society of Pediatric Psychology Annual Conference, New Orleans, LA.

Caiozzo, C., Chan, S.F., **Defenderfer, E.**, Karst, J., Bingen, K., & Hoag, J. (2017, April). *The Experience of Sibling Bone Marrow Donation: A Longitudinal Study.* Presented at Hematology-Oncology/Bone Marrow Transplant Special Interest Group Meeting at the Society of Pediatric Psychology Annual Conference, Portland, OR.

International Poster Presentations

Rudman K., **Defenderfer E.K.**, Santos M., Simpson P., Brimeyer C., Jastrowski Mano K., Weisman S., & Hainsworth K.R. (2015, June). *Parents of youth with chronic pain: Does their child's co-morbid obesity further exacerbate their own health-related quality of life?* Presented at the 10th International Symposium on Pediatric Pain, Seattle, WA.

Stoner, A. M., Jastrowski Mano, K. E., **Defenderfer, E.**, Davies, W. H., Herzig, P., Santos, M., Weisman, S. J., & Hainsworth, K. R. (2015, June). *Longitudinal analysis of weight-based differences in daily functioning in a pediatric chronic pain population.* Presented at the 10th International Symposium on Pediatric Pain, Seattle, WA.

National Poster Presentations

(* indicates mentored undergraduate student co-author)

Igler, E.C., Lang, A., **Sejkora, E.K.D,** Uihlein, J., & Davies, W.H. (2019, April). *Parental perception of dismissive provider-child interactions in chronic pain: The influence of provider gender.* Accepted for presentation at the Society of Pediatric Psychology Annual Conference, New Orleans, LA.

Sejkora, E.K.D., Igler, E.C., & Davies, W.H. (2019, April). *Common toilet training challenges and parental solutions*. Accepted for presentation at the Society of Pediatric Psychology Annual Conference, New Orleans, LA.

Defenderfer, E.K., Igler, E.C., Lim, P., & Davies, W.H. (2018, April). *Toilet training challenges as an early manifestation of childhood behavior problems.* Presented at the Society of Pediatric Psychology Annual Conference, Orlando, FL.

Igler, E.C., **Defenderfer, E.K.**, Lang, A.C., Brimeyer, C.T., Uihlein, J., & Davies, W.H. (2018, April). *The association of stress and reaction to physician-generated pain dismissal.* Presented at the Society of Pediatric Psychology Annual Conference, Orlando, FL.

Caiozzo, C., Chan, S.F., **Defenderfer, E.**, Karst, J., Bingen, K., & Hoag, J. (2017, April). *The Experience of Sibling Bone Marrow Donation: A Longitudinal Study.* Presented at the Society of Pediatric Psychology Annual Conference, Portland, OR.

Chan, S.F., Caiozzo, C., **Defenderfer, E.K.**, & Hoag, J. (2017, April). *Promoting Sleep Hygiene and Physical Activity on a Pediatric Inpatient Unit: The Role of Healthcare Providers.* Presented at the Society of Pediatric Psychology Annual Conference, Portland, OR.

Defenderfer, E.K., Igler, E., Austin, J.E., & Davies, W.H. (2017, April). *Parent Compliance with AAP Toilet Training Recommendations and the Role of Primary Care Providers.* Presented at the Society of Pediatric Psychology Annual Conference, Portland, OR.

Igler, E.C., **Defenderfer, E.K.,** Plevinsky, J.M., Greenley, R..N., Bugno, L.T., & Davies, W.H. (2017, April). *Development and psychometric properties of communication about medication by providers- Parent (CAMP-P) Version.* Presented at the Society of Pediatric Psychology Annual Conferences, Portland, OR.

Lang, A.C., Igler, E.C., **Defenderfer, E.K.,** Uihlein, J.A., & Davies, W.H. (2017, April). *Reactions to Different Physician Pain Dismissal Topographies.* Presented at the Society of Pediatric Psychology Annual Conferences, Portland, OR.

*Sowinski, B., Igler, E.C., Austin, J., **Defenderfer, E.K.,** & Davies, W.H. (2017, April). *Healthy friends' acceptance of a potential standardized messaging to promote social support for children diagnosed with a chronic illness.* Presented at the Society of Pediatric Psychology Annual Conference, Portland OR.

Igler, E.C., **Defenderfer, E.K.,** Lang, A.C., Uihlein, J., & Davies, W.H. (2017, March). *Gender differences in the experience of perceived pain dismissal in adolescence.* Presented at the Association of Women in Psychology Annual Conference, Milwaukee, WI.

Brimeyer, C., **Defenderfer, E.K.,** Anderson, K., Ladwig, R., *Erato, G.A., Weisman, S., & Hainsworth, K. (2016, April). *The Interrelationships Between Obesity, Sleep, and Global Health in Children and Adolescents with Chronic Pain*. Presented at the Society of Pediatric Psychology Annual Conference, Atlanta, GA.

Defenderfer, E.K., Davies, W.H., *Raicu, A.M., Brei, N.G., & Klein-Tasman, B.P. (2016, April). *History of Toilet Fears in Early Childhood as a Predictor of Childhood Anxiety Disorders*. Presented at the Society of Pediatric Psychology Annual Conference, Atlanta, GA.

Hainsworth, K., Jastrowski Mano, K., Stoner, A., Anderson Kahn, K., Ladwig, R., Davies, W.H., Madrid, P., *Wentz, K., **Defenderfer, E.**, & Waisman, S.J. (2016, April). *"What's weight got to do with it?" Parental Perspectives on the Relationship Between Chronic Pain and Obesity.* Presented at the Society of Pediatric Psychology Annual Conference, Atlanta, GA.

*Wentz, K., **Defenderfer, E.K.**, Igler, E., *Erato, G.A., & Davies, W.H. (2016, April). *Parenting Styles and Behavioral Problems in Children with Chronic Illnesses*. Presented at the Society of Pediatric Psychology Annual Conference, Atlanta, GA.

Austin, J., Nashban, C., Doering, J., **Defenderfer, E.K.**, & Davies, W.H. (2015, April*). Is Parental Functioning Associated with the Likelihood of Bed-sharing?* Presented at the Society of Pediatric Psychology Annual Conference, San Diego, CA.

Defenderfer, E.K., & Davies, W.H. (2015, April). *Comparability of Parent Quality of Life Measures in a Community Sample.* Presented at the Society of Pediatric Psychology Annual Conference, San Diego, CA.

Defenderfer, E.K., & Davies, W.H. (2015, April). *Predictors of Parental Health-Related Quality of Life: A Cumulative Risk Model.* Presented at the Society of Pediatric Psychology Annual Conference, San Diego, CA.

Bauer, K., **Defenderfer, E.K,** Davies, W.H., Anderson Kahn, K.A., Hainsworth, K.R., & Weisman, S.J. (2014, March). *Characteristics and Sequelae for Adolescents whose Pain is Dismissed by a Parent.* Presented at the Society of Pediatric Psychology Annual Conference, Philadelphia, PA.

Defenderfer, E.K., Hainsworth, K.R., Ladwig, R.J., Weisman, S.J., Tran, S.T., Medrano, G.R., & Davies, W.H. (2014, March). *Longitudinal Predictors of Parent Health-Related Quality of Life during Treatment for Complex Pediatric Chronic Pain.* Presented at the Society of Pediatric Psychology Annual Conference, Philadelphia, PA.

Karas, K., Davies, W.H., Bernacki, J., Evans, J., **Defenderfer, E.K.**, Tran, S.T., Medrano, G.R., Anderson Kahn, K., & Weisman, S.J. (2014, March), *Developmental Patterns of an Integrated Profile System for the Pain Stages of Change Questionnaire*. Presented at the Society of Pediatric Psychology Annual Conference, Philadelphia, PA.

Litvin, R., **Defenderfer, E.K.,** & Davies W.H. (2014, March). *Parents' Perceptions of Child-Focused Communication by Pediatricians Predicts Satisfaction with Care*. Presented at the Society of Pediatric Psychology Annual Conference, Philadelphia, PA.

Defenderfer, E., Bunnell, S., & Leavy, R.L. (2012, May). *Empathy Development Following Negative Life Experiences: The Role of Coping and Memory Processes.* Presented at the Midwest Psychological Association Annual Meeting, Chicago, IL.

RESEARCH EXPERIENCE

University of Wisconsin-Milwaukee
Graduate Student Research Assistant
Child Stress and Coping Lab 2013-present
Organized qualitative coding teams for numerous community health-related research projects; supervised undergraduate senior thesis projects on pain and psychosocial variables. Developed quantitative data collection program for community project regarding normative toileting patterns in young children. Assisted in validation of several measures including measures of toilet-related fears and physician communication related to medication adherence. Managed hiring and supervision of undergraduate research assistants. Created and maintained project databases and instructed undergraduate assistants in basic statistical analyses and research presentation. Collected and entered data using statistical programs SPSS, MPlus, and R. Presented 14 posters and two symposia; published six manuscripts, 11 manuscripts under review or in preparation.
Supervisor: W. Hobart Davies, Ph.D.

Children's Hospital of Wisconsin
Graduate Student Research Assistant
Hematology/Oncology/Transplant 2014-2017
Assisted with development of a clinical intervention pilot study focused on increasing physical activity among hospitalized pediatric cancer patients. Organized literature reviews for grant applications; collected longitudinal pediatric cognitive and emotional functioning data as part of an interdisciplinary clinic. Collected, entered, and cleaned data in Redcap and SPSS. Presented two posters and one oral presentation.
Supervisors: Jennifer Hoag, Ph.D., Kristen Bingen, Ph.D., Jeffrey Karst, Ph.D.

The Jane B. Pettit Pain Management Clinic 2013-2016
Designed and implemented new electronic data collection instruments and procedures for longitudinal studies of psychosocial functioning and chronic pain; supervised undergraduate research assistants; coordinated longitudinal psychosocial data collection. Maintained project databases, conducted statistical analyses using SPSS. Presented four posters; published two manuscripts.
Supervisor: Keri Hainsworth, Ph.D.

Ohio Wesleyan University
Undergraduate Research Assistant
Child Memory Lab 2011-2013
Designed a mixed-methods senior honors thesis focused on the influence of coping style and experience of highly stressful events upon narrative construction among young adults. Collected narrative data and prepared questionnaires. Coded video recordings, assisted with development of qualitative coding protocol using grounded theory approach. Presented one poster.
Supervisor: Sarah Bunnell, Ph.D.

FUNDING

Family Systems Influences in Toilet Learning Among Children With and Without Voiding Dysfunction 2018
Awarded to: Ellen K. Defenderfer
American Psychological Association; Dissertation Research Award: $1000

Family Systems Influences in Toilet Learning Among Children With and Without Voiding Dysfunction 2016
Awarded to: Ellen K. Defenderfer
University of Wisconsin-Milwaukee; Summer Graduate Research Fellowship: $3500

STATISTICS TRAINING

Introduction to Latent Variable Mixture Modeling 2017
Society of Pediatric Psychology Annual Conference, Orlando, FL
Presented by: Kristoffer Berlin, Ph.D., Betty Lai, Ph.D., David Barker, Ph.D., Christopher Cushing, Ph.D., & Bridget Armstrong, Ph.D.

Introduction to Structural Equation Modeling 2014
American Psychology Association Conference, Washington, DC
Presented by: Barbara M. Byrne, Ph.D.

EDITORIAL SERVICE

Clinical Journal of Pain, *Ad hoc* Review

Children's Health Care, *Ad hoc* Review

Journal of Pediatric Psychology, Mentored Review

TEACHING EXPERIENCE

Adjunct Professor- Department of Psychology 2016-2017
Mount Mary University
Chair: Laurel End, Ph.D.
Course: Psychopathology (PSYCH 325; Enrollment 47-50)

Teaching Assistant- Department of Psychology 2013-2016
University of Wisconsin-Milwaukee
Chair: W. Hobart Davies, Ph.D.
Courses: Child Psychology (PSYCH 260; Enrollment 236-250)
Graduate Clinical Assessment Practicum (PSYCH 790; Enrollment 7)
Survey: Clinical Research Methods (PSYCH 660; Enrollment 48)
Psychology of Women (PSYCH 320; Enrollment 42)

SERVICE

TO THE PROFESSION

Student Representative for Research 2017- present
Pediatric Psychology Consultation/Liaison Special Interest Group

Programming Committee Member 2016-2018
Society of Pediatric Psychology Student Advisory Board

Campus Representative 2015-2017
Society of Pediatric Psychology

TO THE INSTITUTION

Reviewer for the UW-System Symposium for Undergraduate Research 2014
University of Wisconsin-Milwaukee

Psychology Department Faculty Selection Committee - Student Representative 2012-2013
Ohio Wesleyan University

Psychology Department Student Board 2011-2012
Ohio Wesleyan University

TO THE COMMUNITY

Afterschool childcare program volunteer at Hope House Milwaukee 2013-2014

Up 'til Dawn-St. Jude Children's Research Hospital – Campus board president 2011-2013
Ohio Wesleyan University

Wish-granter for the Make-a-Wish Foundation of the Greater Columbus Area 2009-2011

PROFESSIONAL MEMBERSHIPS

American Psychological Association - Student Affiliate	2013-present
Society of Pediatric Psychology - Student Affiliate	2013-present
Psi Chi – Member	2013-present

REFERENCES

W. Hobart Davies, Ph.D.
Email: hobart@uwm.edu
Phone: (414) 229-6594

Bonita Klein-Tasman, Ph.D.
Email: bklein@uwm.edu
Phone: (414) 229-3060

Heather Yardley (Lemkuhl), Ph.D.
Email: heather.yardley@nationwidechildrens.org
Phone: (614) 722-4700