THE RELATIONSHIP BETWEEN PRE-TREATMENT RISK FACTORS AND RESPONSE TO TREATMENT IN A RESIDENTIAL TREATMENT FACILITY

by

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A DISSERTATION

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ABSTRACT

Objective: Examine the relationship between age, trauma history, gender, previous placement history, and presence of internalizing symptoms/diagnoses, and response to treatment in a residential treatment facility (RTF) and (2) whether pre-treatment risk factors predict post-treatment placement and length of treatment.

Method: Pre-treatment data were collected from the medical charts of 209 clients (ages 6 to 15, mean age 9.62) admitted to the Short Term Treatment and Evaluation Program (STTEP) and the Intensive Residential Treatment (IRT) Program at Brewer-Porch Children’s Center (BPCC). Participants’ weekly point earnings and restraints/seclusions from the first 10 weeks of treatment, length of treatment, and discharge placement were examined.

Results: Latent growth mixture modeling (LGMM) was utilized to examine trajectories for the data. Based on unconditional models, a two-trajectory solution was deemed the best solution for point-earning data and restraint/seclusion data. Results indicated that older age, being female, and presence of internalizing symptoms/diagnoses predicted higher weekly point earning. More previous hospitalizations, being a younger client, and greater trauma history predicted higher weekly restraints/seclusions. Additionally, being female and have an internalizing disorder diagnoses predicted less restrictive post-treatment placement.

Discussion: Results suggest that older clients respond better to treatment, as do those with fewer hospitalizations and less trauma history. Interestingly, being female and the presence of internalizing symptoms predicted greater point earning and discharge to a less restrictive setting. Future studies should continue to examine predictors of response to treatment in RTF settings.
DEDICATION

This dissertation is dedicated to the wonderful staff and clients at Brewer-Porch Children’s Center. Without your inspiration, insight, and encouragement, none of this would have been possible.
<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>ACES</td>
<td>Adverse Childhood Experiences Study</td>
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<tr>
<td>ADHD</td>
<td>Attention-Deficit/Hyperactivity Disorder</td>
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<tr>
<td>AIC</td>
<td>Akaike Information Criterion</td>
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<td>BIC</td>
<td>Bayesain Information Criterion</td>
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<td>BPCC</td>
<td>Brewer-Porch Children’s Center</td>
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<tr>
<td>CI</td>
<td>Confidence Interval</td>
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<td>DHR</td>
<td>Department of Human Resources</td>
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<td>DSM</td>
<td>Diagnostic Statistician Manual</td>
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<td>IED</td>
<td>Intermittent Explosive Disorder</td>
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<td>IRT</td>
<td>Intensive Residential Treatment</td>
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<tr>
<td>LGMM</td>
<td>Latent growth mixture model</td>
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<tr>
<td>LMR-LRT</td>
<td>Lo-Mendell-Rubin likelihood ration test</td>
</tr>
<tr>
<td>M</td>
<td>Mean: the sum of a group of numbers divided by the number of observations</td>
</tr>
<tr>
<td>N</td>
<td>Number of participants</td>
</tr>
<tr>
<td>ODD</td>
<td>Oppositional Defiant Disorder</td>
</tr>
<tr>
<td>p</td>
<td>Probability of obtaining a test statistic as extreme or more extreme than the observed value</td>
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<tr>
<td>PTSD</td>
<td>Post-traumatic stress disorder</td>
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<tr>
<td>Acronym</td>
<td>Definition</td>
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<tr>
<td>RTF</td>
<td>Residential treatment facility</td>
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<tr>
<td>SD</td>
<td>Standard Deviation</td>
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<tr>
<td>SED</td>
<td>Severe Emotional Disturbance</td>
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<tr>
<td>STTEP</td>
<td>Short-Term Treatment and Evaluation Program</td>
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<tr>
<td>ULGMM</td>
<td>Unconditional latent growth mixture model</td>
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<tr>
<td>$\beta$</td>
<td>Beta</td>
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<td>$\chi^2$</td>
<td>Chi-Squared</td>
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1. INTRODUCTION

This study aimed to examine the relationship between specific pretreatment factors (age, gender, trauma history, previous placement history, and presence of internalizing symptoms/diagnoses) and treatment outcomes in a residential treatment facility (RTF). Specifically, this study had three main aims: to examine the relationship between pre-treatment factors and participants’ response to treatment using weekly point earnings for behavior and weekly restraints/seclusions during the first 10 weeks of treatment; to determine the relationship between pre-treatment factors and length of treatment; and to examine the relationship between pre-treatment factors and treatment outcomes, such as final week point earnings and post-treatment placements. Previous research has shown a relationship between the above-mentioned individual pre-treatment factors and response to treatment in an RTF; however, no research study to date has examined multiple risk factors simultaneously to determine the unique impact of a risk factor in relation to response to treatment in a RTF. This introduction will present an overview of how RTFs are structured and the relationship between the abovementioned pre-treatment factors and response to treatment.

While the public mental health sector has trended towards community-based mental health care rather than inpatient or residential treatment for children and adolescents with serious emotional disturbances (SED), the number of youth and adolescents placed in residential care facilities has steadily increased since 1980 (Connor, Doerfler, Toscano, Volungis, & Steingard, 2004). In 1982, it was estimated that 29,000 youth resided in residential treatment facilities...
(Gilliland-Mallo & Judd, 1986). By 1990, the number of youth in residential treatment facilities had increased to 65,000 (Chamberlain, Ray, & Moore, 1996), and by 1997, that number had increased to an estimated 118,000 (Spencer, Shelton, & Frank, 1997). That number increased to over 200,000 youth in RTFs being funded with federal funding by 2004, with even more youth receiving services without funding (GAO, 2008).

While it is clear that communities are relying more on RTFs for community mental health treatment, relatively limited research is available on the efficacy of RTFs, and more importantly, very little is known about factors that affect response to treatment in these settings.

*Residential Treatment Model of Care*

A residential treatment facility (RTF) is defined as a 24-hour facility not licensed as a hospital which provides mental health services to clients with serious emotional and behavior problems for extended periods of time in a residential setting, rather than in a community-based program. Services provided in residential treatment facilities include individual and group therapy, educational services, psychological assessments, basic living skills, and psychiatric services (Tuma, 1989; Frensch & Cameron, 2004).

Typically, youth referred to RTFs are exhibiting dangerous and impulsive behaviors that have not been successfully managed in outpatient settings such as community mental health centers, therapeutic foster care, day treatment programs, or other non-secure settings, where clients attend therapy or psychiatric services while still residing in the community (Frensch & Cameron, 2002; Lieberman, 2004). Along the continuum of care, RTFs are considered less restrictive treatments than acute care facilities or inpatient facilities, which are typically licensed as hospitals and provide psychiatric, nursing, and mental health services 24 hours a day in a hospital setting for clients exhibiting particularly dangerous behaviors, such as active
hallucinations or suicidal behaviors (Delaney, 2006). Typically, lengths of stay in inpatient settings are short, usually less than two weeks, with average length being 4.5 days, and serve to stabilize patients using psychopharmacological means before discharging clients to less restrictive settings (Glick, Sharfstein, & Schwartz, 2011). In contrast, RTFs are considered longer placements which utilize pharmacological, therapeutic, and educational interventions over the course of treatment, usually over the course of many months to years, with goal of the program being re-entry into a community setting (Case, Olfson, Marcus, & Seigel, 2007). Typically, youth referred to RTFs are referred after multiple failed outpatient placements; however, RTFs also serve as an important step-down program for clients being discharged from acute psychiatric care facilities (Kapp, Rand, & Damman, 2015).

While actual treatment can vary widely between facilities, RTFs tend to utilize the same basic model of treatment, which includes a combination of psychoeducational and peer-cultural models. Using these models, the general goal of treatment tends to be to integrate clients’ daily activities in the facility in order to promote skill acquisition, mastery of developmental skills, and internal stability and well-being of the youth (Hooper, Murphy, Devaney, & Hultman, 2000). Additionally, the majority of clinicians working with these clients are social workers, who tend to utilize a strength-based approach to treatment, which may work well for some clients but not others (Frensch & Cameron, 2002).

Trends in Residential Treatment

As noted earlier, there has been a dramatic increase in the number of youth receiving services through RTFs. This increase is due to a wide variety of factors; however, most concerning is that during the same time period, the number of inpatient psychiatric care facilities
and the number of beds available in inpatient facilities has decreased, resulting in greater reliance on residential treatment settings for addressing the needs of SED youth. Additionally, the community-based agencies referring youth to facilities and paying for the treatments have increasingly implemented treatment models that rely on a psychoeducational approach to treatment with trained therapists and staff providing treatment, rather than the often more expensive inpatient treatment in a hospital setting (Frank & Dewa, 1992; Kapp, Rand, & Damman, 2015).

Some have expressed concerns regarding whether the decision to place a child in a residential treatment facility is the best therapeutic option for a child or if the decision is made because of a lack of alternatives (Warner & Pottick, 2003). Given greater reliance on RTFs, the variety of presenting problems among youth being admitted to residential treatment facilities has increased as well. In turn, there is a significant need to better understand the new population of residential treatment facilities and to determine whether current treatment approaches address the diverse needs of these clients (Dale, Baker, Anastasio, & Purcell, 2007).

In addition to concerns regarding specific treatment approaches, there are also concerns regarding the referral process to a RTF. Clients are typically referred to a RTF by child welfare agencies or community mental health agencies as a “last resort” for youth whose behaviors have not been successfully managed in the community (Kapp, Rand, & Damman, 2015). Specifically, it has been suggested that placement criteria are inadequate for determining the best treatment setting for clients. Very few criteria have been suggested to rationally differentiate between clients in need of short-term, long-term, or intermediate treatment and to determine which diagnoses, etiologies, and prognoses link to the best treatment outcome in each setting (Durlak & Wells, 1998).
Symptoms and Treatment Mismatch

While relatively little is known about the characteristics of youth in residential settings, there are some limited data available. Typically, youth are referred to a residential treatment setting due to behavioral issues in the community, specifically behavioral issues in the home and/or school environment. Youth in residential treatment settings have a higher prevalence of family problems, school problems, skill deficits, aggression, and delinquent behaviors than youth in the general population (Warner & Pottick, 2003). In a nationwide survey assessing the characteristics of youth in residential treatment settings, it was reported that 49% of youth admitted to RTFs had a diagnosis related to disruptive behavior problems, including Conduct Disorder (CD), Attention Deficit/Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD), and Intermittent Explosive Disorder (IED); 31% of youth had diagnoses of anxiety or affective disorders, and 16% had been diagnosed with a depressive disorder. Unsurprisingly, 92% of clients had more than one psychiatric diagnosis, and a large majority of clients were prescribed at least one psychiatric medication (Connor, Doerfloer, Toscano, Volungis, & Steingard, 2004). Similarly, researchers examining current symptoms in this population found that 40% of youth were in the clinical range for internalizing symptoms on the Child Behavior Checklist, and 60% of clients were in the clinical range for externalizing symptoms (Baker, Kurland, Curtis, Alexander, & Papa-Lentini, 2007).

Recently, concerns have been raised regarding the match between the presenting symptoms of those in RTFs and the treatment protocol. Opponents of this model raise concerns regarding the “one size fits all” approach to treatment, which primarily addresses clients’ behavioral problems, such as aggression and risk-taking behaviors, while entirely ignoring
internalizing symptoms such as anxiety and depression. Some opponents of the residential treatment model of care have even suggested that these facilities need to move past this model of treatment and work to develop more specific, empirically supported treatments which target the specific needs of each individual client (Connor, Doerfler, Toscano, Volungis, & Steingard, 2004). Overall, research has suggested that between 20 percent and 40 percent of youth who enter residential treatment facilities do not show signs of improvement, and some clients even show adverse responses to treatment (Leichtman, Leichtman, Cornsweet, & Neese, 2001). For example, researchers have found that residential treatment may have unintended negative effects on anxiety and hyperactivity, meaning that clients with these symptoms show an increase in symptom severity at discharge (Lyons, Terry, Martinovich, Peterson, & Bouska, 2001).

As noted earlier, one possibility is that the lack of improvement seen in RTFs might be the result of a mismatch between client’s mental health needs and services provided to the client, specifically for clients with internalizing symptoms (Lyons, Libman-Mintzer, Kisiel, & Shallcross, 1998). Lyons and colleagues (1998) reported they observed that the same service plan was provided to all youth entering a residential treatment facility, regardless of the child’s specific needs. While the researchers noted their study was limited to one facility, they did acknowledge that treatment practices across facilities are likely similar elsewhere.

**Clinical Factors and Response to Treatment**

To date, a limited body of research has looked at treatment outcomes related to specific referral problems. One area of interest related to treatment outcomes in this population has been exposure to trauma, as traumatized youth account for a significant portion of youth in residential treatment facilities; some research has suggested that up to 71% of youth in residential treatment
facilities have been exposed to at least one trauma (Jaycox, Ebener, Damesek, & Becker, 2004). Of the youth with trauma exposure, it is estimated that 92% of those youth have experienced multiple traumas, with the average number of traumas experienced being 5.8 (Briggs, Greenson, Layne, Fairbank, Knoverek, & Pynoos, 2012). In fact, researchers have found increased levels of anger, post-traumatic stress disorder (PTSD) symptoms, and depression at discharge in youths in these settings who have experienced multiple traumas (Collin-Vesina, Daigneault, & Herbert, 2013; Zelechoski, et. al., 2013).

In another study examining the types of trauma in youth in residential treatment settings, it was determined that 36% of youth experienced physical or sexual abuse only, 20% experienced sexual abuse only, 9% experienced sexual abuse and neglect, and 36% of youth experienced sexual abuse, physical abuse, and neglect (Baker, et. al., 2007). Consistent with this research, Hussey and Guo (2002) determined that the most prevalent type of traumatic exposure in youth in residential treatment settings was neglect, with 69% of youths in these facilities having experienced it; following neglect, physical abuse was the most prevalent form of trauma (63%). Lastly, sexual abuse was experienced by 47% of this population. In addition to abuse and neglect, researchers have examined many other forms of trauma, including traumatic loss (62% have experienced), impaired caregiver (60%), domestic violence (58%), community violence (31%), and school violence (20%; Briggs et. al., 2012).

As seen in non-residential treatment settings, gender differences in prevalence of trauma have been reported in youth in residential treatment settings as well. Researchers found that girls are more likely to have experienced physical abuse (60%) and sexual abuse (64%) than were boys (43% and 27%, respectively; Connor et al., 2004). Further, Collin-Vezina and colleagues (2013) reported that girls were more likely to experience both sexual and physical abuse (46%)
than were boys (18%), and girls also were more likely to exhibit trauma symptoms than were boys.

In addition to research documenting the prevalence of trauma exposure in residential treatment settings, some research has even suggested that trauma exposure is the single greatest predictor of improvement in residential treatment, with more trauma exposure being linked to less improvement over the course of treatment and more clinical psychopathology at discharge than youth without previous trauma exposure (Boyer, Hallion, Hammel, & Button, 2009). Some research has even suggested that youth with trauma exposure have been shown to display similar levels of psychopathology at discharge as they showed at admission and have not shown clinical global improvements during their stay in a RTF (Connor et al., 2002). Even more concerning, for some youth, being placed in a residential treatment setting can be retraumatizing due to the placement often being unexpected and sudden, and because the youth are often required to live with unfamiliar people in an unfamiliar setting (Lovelle, 2005).

While youth are often referred to a RTF due to behavioral issues, many of these youth experience significant internalizing symptoms as well. These youth with internalizing problems often do not receive treatment for these problems while in a residential treatment setting (Pauschardt, Remschmidt, & Mattejat, 2010). Interestingly, youth with high levels of internalizing problems at admission have shown a decrease in internalizing symptoms at discharge, while youth with moderate levels of internalizing symptoms have not shown a decrease in these symptoms in response to treatment at a RTF (Pauschardt, Remschmidt, & Mattejat, 2010).

Beyond how internalizing problems change over the course of treatment, these problems at admission can also be useful in predicting treatment outcomes for youth in residential
treatment. Lower preadmission internalizing symptoms predict better treatment outcomes and more successful placements at two-year follow up (Dunnen et. al, 2012). Similarly, research has suggested that less vulnerable youth, meaning those without trauma exposure, and those with fewer or with no internalizing symptoms are more likely to improve in residential treatment, while those with significant internalizing psychopathology at admission showed less improvement in a residential treatment setting overall (Conner et. al., 2002).

Non-Clinical Factors and Response to Treatment

In addition to psychiatric problems present at pretreatment, some research has examined other significant factors related to treatment outcome. Age at placement, number of prior placements, and gender have all been demonstrated to have a significant relationship to treatment outcome. With regard to age at time of placement, research has been mixed regarding whether the relationship between age and treatment outcome is positive or negative. Some research has demonstrated that younger children tend to have more positive treatment outcomes than older children, perhaps because early intervention in the timeline of behavioral problems positively affects long-term behavioral and emotional problems (Dunnen et. al., 2012). However, other research has suggested a negative relationship between age of placement in a residential treatment setting and treatment outcome, meaning that younger children show less improvement in a residential treatment setting than do older children. Researchers have suggested that youth who exhibit significant enough behavioral and emotional symptoms to require a residential treatment placement at an early age may actually have more significant and pervasive psychopathologies than youth who do not require a residential treatment placement until later in childhood and into adolescence (Cathcart-Shabat, Lyons, & Martinovich, 2008). Based on a
review of the present literature, it would appear that more evidence supports that theory that children who require residential treatment at a younger age are exhibiting more significant psychopathology than children who require placement at an older age.

A significant number of youth in RTFs are in the custody of a child welfare agency, suggesting that youth who are receiving treatment in a residential treatment facility at an early age may have more problematic home environments and are more likely to have experienced significant trauma, abuse, or neglect than were older children (Connor, et. al., 2004). This finding may confound the relationship between age and treatment outcome; however, and to our knowledge, little research has been conducted examining no study has examined response to treatment when considering multiple pretreatment indicators simultaneously.

Research has also suggested a relationship between the number of prior psychiatric placements a youth has received and treatment outcome. Youth with a greater number of placements prior to entering a residential treatment facility tend to show less improvement at a residential treatment facility than youth with fewer placements (Cathcart-Shabat, Lyons, & Martinovich, 2008). These placements can vary widely from therapeutic foster care and group home settings, to psychiatric hospitalizations and inpatient treatment settings, to other residential treatment settings. Perhaps, youth with multiple treatment placements, specifically psychiatric hospitalizations and inpatient treatment, have more significant psychopathologies, which result in less improvement in residential treatment facilities as compared to youth with fewer prior placements. In addition, youth with multiple placements may be less responsive to treatment for a variety of reasons. To our knowledge, no study has examined treatment outcomes as they relate to types of prior treatment settings while considering other pre-treatment factors such as age, gender, and symptomatology.
Finally, gender also appears to be related to treatment outcomes. According to national survey data from 2010, 63% of youth in residential treatment are male and 37% of youth in these facilities are female. This latter percentage has increased from 31% in 1999. Boys in residential treatment facilities also tend to stay in treatment about one month longer than do girls (12.4 months compared to 11.5 months; Sternberg, et. al., 2013). While boys continue to account for the majority of youth in residential treatment facilities, research has suggested that girls in residential treatment facilities tend to demonstrate more significant psychopathology than boys at admission and also at discharge (Brack, Huefner, & Handwerk, 2012). Girls also show more significant internalizing symptoms at admission and discharge, including anxiety symptoms, depression symptoms, and suicidal ideation, than do boys. Additionally, both the youth and caregivers have rated girls’ internalizing symptoms as being more significant than boys’ internalizing symptoms, suggesting the stability of these differences (Brack, Huefner, & Handwerk, 2012).

*Brewer-Porch Children’s Center*

While these past studies have provided some limited data on the characteristics of children in RTFs and how such characteristics relate to treatment outcome, there are still many unanswered questions in this area. In order to add to this literature, the current study examined data obtained from Brewer-Porch Children’s Center (BPCC), a RTF serving children and adolescents from across the state of Alabama. BPCC is part of the University of Alabama College of Arts and Sciences and is located in Tuscaloosa, Alabama. The Alabama Legislature established BPCC in 1970 to provide a model treatment program for Alabama’s special needs children, adolescents, and their families. BPCC serves approximately 46 residential clients at a
time in its Intensive Residential Treatment (IRT) and Short Term Treatment and Evaluation Program (STTEP). Children and adolescents are placed in this facility through a number of public agencies: through child protection agencies, public mental health agencies, acute inpatient psychiatric hospitals, and school districts. BPCC operates largely based on the psychoeducational model, which focuses on a highly structured environment, a well-trained staff, and group and individual therapy that focuses on social skills, safety skills, basic living skills, and coping skills.

In both the IRT program and STTEP, clients receive weekly individual and group therapy sessions, as well as educational services and basic living skills training. Additionally, both programs utilize the same points-based system to monitor clients’ behavior throughout the day. The IRT program, however, is considered an intensive treatment program, with the average length of stay being 9-18 months. The goal of this treatment program is re-integration into the client’s home community.

In the STTEP program, clients are in treatment for a shorter period of time, typically 60-90 days. STTEP provides a thorough evaluation of clients in a residential setting during this time. This program serves children who are often at risk of disrupting less restrictive placements or who have required multiple hospitalizations but have not been admitted into a long-term residential treatment facility.

Current Study

The overarching goal of the present study was to explore the relationship between pretreatment factors, such as age, gender, trauma history, previous placement history, and presence of internalizing symptoms (or diagnoses), and treatment outcomes for children treated
Within this overarching goal, the first aim of the present study was to examine the relationship between pretreatment factors and response to treatment. In order to examine this, we examined behavioral data from each client’s stay at BPCC. Whenever clients engage in inappropriate, dangerous behavior, such as physically attacking a peer or staff member or attempting to run away, staff will physically restrain or seclude the client. If restraints or seclusions occur frequently, this indicates that a client is not behaving in a manner that is conducive to therapy and is not responding positively to the treatment; however, if restraints and seclusions occur less frequently, this indicates that a client is responding better to treatment. We examined the relationship between pretreatment factors and weekly restraints and seclusions throughout the first 10 weeks of treatment.

In addition to these data, we also examined trajectories of behavioral data collected over the first 10 weeks of treatment. Throughout each client’s stay at BPCC, behavioral data in the form of a points system is collected. These data are recorded every 15 minutes from 7 AM to 11 PM each day throughout each client’s stay. We examined each client’s behavioral points earned per week during his or her stay at BPCC to examine how pretreatment variables predict point trajectories. For these analyses, data from STTEP and IRT were combined.

The second aim of the present study was to examine the relationship between pretreatment factors and length of stay in a residential treatment facility. The average length of stay for clients placed in BPCC’s IRT program is 9-18 months, and 60-90 days for BPCC’s STTEP program. Longer lengths of stay may be related to a client being less responsive to treatment, while shorter lengths of stay may be related a better response to treatment. For these analyses, data from STTEP and IRT were examined separately.
The third aim of the study was to examine the relationship between pretreatment factors and post-treatment outcomes. Ideally, after completing a residential treatment program, clients will be referred to a less restrictive treatment setting, such as a therapeutic foster home or returning to live with a legal guardian; however, clients may be also be referred to another intensive residential treatment setting or a more restrictive setting, such as an inpatient facility. This study specifically hypothesizes the following:

1) Aim 1 Trajectory Hypotheses for Behavioral Data: Based on clinical experience at BPCC and previous research, it was expected that five point trajectories and four restraint/seclusion trajectories would emerge. It was predicted that specific risk factors (high trauma score, age, gender, previous hospitalizations, and presence of internalizing symptoms/diagnoses) would relate to treatment trajectory.

a. Consistent high responders: It was hypothesized that there will be a set of participants who will consistently respond well to treatment, as evidenced by consistently high point earnings throughout the first 10 weeks of treatment. It was predicted that this group would consist of participants with the least number of risk factors, such as little to no previous trauma, fewer number of previous hospitalizations, no internalizing symptoms/diagnoses present, and being younger or female. It was also expected that a similar pattern would emerge with restraint and seclusion trajectories, where participants with the least number of risk factors would consistently earn little to no restraints or seclusions throughout their treatment.

b. Consistent low responders: It was hypothesized that there would be a set of
participants who would consistently respond poorly to treatment, as evidenced by consistently low point earnings throughout the first 10 weeks of treatment. It was hypothesized that this group would consist of participants with the greatest number of risk factors, including high rates of previous trauma, high number of previous hospitalizations, presence of internalizing symptoms/diagnoses, younger clients, and female clients. Similarly, it was predicted that there would be a group of participants who consistently responded poorly to treatment, as evidenced by a high number of restraints and seclusions throughout their treatment. These participants were expected to have similar characteristics as those mentioned above.

c. Increasing responders: It was hypothesized that there would be a set of participants who initially responded poorly to treatment then showed an increase in response to treatment, as evidenced by low point earnings initially followed by an increase in number of points earned weekly. It was hypothesized that this group would consist of participants who would initially be highly reactive upon entering a treatment setting, then adjusted to the expectations of a residential treatment facility. It was hypothesized that this group would consist of highly traumatized, younger clients without a significant number of previous hospitalizations, who were initially very reactive to a highly structured treatment environment; however, these participants were be able to adapt to this structured environment.

Similarly, it was predicted that there would be a group of participants who initially responded poorly to treatment then showed an increase in response to
treatment, as evidenced by high number of restraints/seclusions initially followed by a decrease in number of restraints/seclusions. It was hypothesized that this group would consist of highly traumatized, younger clients, and male clients without a significant number of previous hospitalizations, who were initially very reactive to a highly structured treatment environment.

d. Decreasing responders: It was hypothesized that there would be a set of participants who initially responded well to treatment then showed a decrease in response to treatment, as evidenced by high point earnings followed by a decrease in number of points earned weekly. Anecdotally, BPCC staff recognizes a group of clients who initially respond very well to treatment then show a sharp decrease in points earning, which staff calls “honeymooning.” These clients are often older clients, especially males, with some trauma history, little to no internalizing symptoms, and few previous hospitalizations.

It was hypothesized that this pattern would emerge with regard to restraints/seclusion as evidenced by no to low number of restraints/seclusions initially followed by an increase in the number of restraints/seclusions. These clients were expected to be similar to the participants described above: older clients, and male clients, those with some trauma history, little to no internalizing symptoms, and few previous hospitalizations.

e. Moderate stable responders: It was hypothesized that there would be a set of participants who responded in a consistent manner, although this group would not earn a high number of points. It was hypothesized this group would consist of participants with some risk factors, but not as many as other groups. For example,
it was predicted that this group would not have significant trauma history or previous hospitalizations; however, they would have significant internalizing symptoms and would be older.

2) Aim 2 length-of-stay hypotheses:
   
a. It was predicted that each risk factor (younger children, female clients, trauma, presence of internalizing symptoms/diagnoses, and number of previous placements) would uniquely predict length of treatment stay, with longer treatment stays being related to presence of a particular risk factor. Additionally, it was expected that clients with more risk factors (younger children, female clients, clients with more placements and trauma history, and internalizing symptoms/diagnoses) would have longer lengths of stay in treatment.

b. It was predicted that there would be a significant interaction between gender and age to uniquely predict treatment outcome, whereby younger girls would have more positive treatment outcomes than younger boys; however, older boys would have more positive treatment outcomes than older girls. As stated earlier, girls who have behavioral problems have more significant behavioral problems than boys do. However, these behavioral problems are not often reported until adolescence; therefore, it was expected that younger girls would have fewer behavioral problems than younger boys and would respond to treatment better than younger boys. In order to examine this, we looked at the interaction between age and gender in the logistic regression models.

3) Aim 3 post-treatment placement hypotheses:
   
a. It was predicted that each risk factor (younger children, female clients, trauma,
presence of internalizing symptoms/diagnoses, and number of previous placements) would uniquely predict post-treatment placement. Additionally, it was expected that clients with more risk factors (younger children, female clients, clients with more placements and trauma history, and internalizing symptoms/diagnoses) would be more likely to discharge to an equally restrictive or more restrictive setting.

Figures 1 and 2 show hypothesized trajectories for point earnings and restraint/seclusions, respectively.
2. METHOD

Participants and Procedure

For the current study, eligible participants consisted of 209 current and discharged children and adolescents from the BPCC residential treatment program from August 2013 until March 2017. Of these 209 participants, 177 have discharged from the facility, so we examined their post-treatment outcomes. The remaining 32 participants were still in treatment at the time of data analysis. Because of this, their data was used in analyses involving response to treatment in the first 10 weeks of treatment but not in analyses involving post-treatment outcomes. Additionally, 36 clients were in treatment at the time the points-based system began; however, they had already been in treatment for some time, so their points earnings could not be used but their restraints/seclusion data could be. All children admitted to BPCC’s residential treatment programs have a psychiatric diagnosis or diagnoses and previous IQ testing. Moderate or more severe intellectual disability excludes children from treatment at BPCC.

Discharges prior to 4 weeks are rare, and clients who remain in treatment for less than four weeks were not included in this study. Clients may discharge from BPCC prematurely for a variety of reasons, including leaving against medical advice and requiring discharge to an acute psychiatric facility; however, clients who remain at BPCC for at least four weeks receive enough therapeutic intervention to make examining the effects of therapeutic intervention possible. However, participants who discharged against medical advice, such as clients whose parents...
obtain custody and withdraw them from treatment, were not utilized in analyses examining treatment outcomes, such as length of treatment and post-treatment placement. One participants’ post-treatment data were not considered for this reason. Participants’ age, gender, trauma history, previous placement history, and psychiatric diagnoses and symptoms from each client’s intake and referral forms were analyzed for this study.

Table 1 summarizes pre-treatment characteristics for clients in each treatment program. Because the data analysis plan involved combining data from the participants in the STTEP program and the IRT program, independent samples t-tests and chi-square tests were conducted to determine if significant differences emerged between the two groups. Differences were noted in the presence of mood disorders, ADHD, and PTSD ($p < .05$) with greater rates of diagnosis in IRT than STTEP; however, for the purpose of this study, the presence of mood and anxiety disorders were combined, and when that occurred, no differences were noted. Additionally, there was a significant difference in the prevalence of neglect, sexual abuse, and the prevalence of Department of Human Resources (DHR) involvement between the two groups ($p < .05$) with these problems being greater in IRT than STTEP. Prevalence of neglect and sexual abuse and DHR involvement were considered as part of the total trauma score calculated for each client, and once the total trauma scores were compared, no significant difference between groups emerged.

In addition to pretreatment information, reports of restraints and seclusions, staff behavioral ratings from each client’s stay, length of stay, and discharge placement were also entered and analyzed.
Measures

Pre-treatment information. Prior to admission, referral sources complete a referral form for each client. From this referral form, participants’ psychological symptoms, including internalizing symptoms, were entered as either (0) not present, (1) present. Figure 3 shows the specific symptoms from the referral form.

At the time of admission, these referral sources also completed an intake interview. From these forms, we collected information regarding pretreatment history, trauma history, and demographic information. Each client’s age and gender were used in descriptive analyses and analyses examining the relationship between these variables and response to treatment and post-treatment outcome. We also collected data regarding clients’ previous treatment history, specifically the number of previous inpatient/residential placements.

Information from intake interviews regarding each client’s diagnostic status was also collected. A variable was coded based on the number of Diagnostic and Statistical Manual of Mental Disorders (DSM) disorders in each of the following categories, with one variable per diagnostic category: Mood Disorder, Anxiety Disorder, Behavior Disorder, Thought Disorder, and other disorders. For these variables, (0) represented no diagnosis reported, (1) represented diagnosis in this category. As discussed earlier, internalizing diagnoses are often missed in this population; therefore, a diagnosis of an internalizing disorder or symptoms of an internalizing disorder were coded as a 1 for analyses.

Lastly, from the referral information, we collected information regarding trauma history including abuse and neglect history. In one of the largest studies of its kind, the Adverse Childhood Experiences Study (ACES) studied the relationship between adverse childhood
experiences including these forms of trauma and a variety of mental health and physical health outcomes in over 17,000 patients. Each patient received an ACES score, which is an adverse event score. We based our trauma score on this model (Anda, Brown, Felitti, Bremner, Dube, & Giles, 2007). Research from the ACES study and other studies have suggested that suspected trauma and indicated trauma have the same psychological effects on children; therefore, we treated suspected and indicated trauma the same in terms of data entry. We collected binary data (0 = none indicated, 1 = indicated) regarding each of the following types of trauma: physical abuse, sexual abuse, neglect, witness to abuse/domestic violence, witness to community violence (i.e., witnessing a neighborhood shooting), parental drug/alcohol use, and other trauma.

Additionally, data regarding participants’ involvement with DHR was collected and analyzed. Involvement with DHR may suggest a concern regarding parenting practices and was therefore an important pre-treatment factor to consider in relationship to participants’ response to treatment. Data regarding DHR was coded as follows: (0) no current or previous DHR involvement or past DHR involvement, (1) current or past DHR involvement with some parental involvement or DHR acting as legal guardian for the participant with no parental involvement. This variable was added to the trauma score for analyses. We then calculated a total trauma score by combining the binary scores from all of the trauma types, including DHR involvement.

In-Treatment Information. Beginning in August 2013, BPCC implemented a points-based rewards system for clients’ behavior. From 7 AM to 11 PM every day, clients can earn one point every 15 minutes for respectful, responsible, on-task, and safe behavior. Clients earn these points throughout their placements at BPCC. The number of points earned each week was used to assess clients’ response to treatment over the first 10 weeks of their stay.

Additionally, BPCC utilizes restraints and seclusions with clients who are engaging in
dangerous behavior towards themselves or others. Number of restraints and seclusions per week was collected for the first 10 weeks of participants’ stays. Number of restraints and seclusions per week ranged from 0 to 10 per week.

Post-Treatment Information. Upon leaving BPCC, children and adolescents can be discharged to a number of placements, including returning to legal guardians with behavioral services put in place, entering therapeutic foster care, referral to a less restrictive group home setting, referral to another intensive residential treatment setting, or referral to an acute psychiatric setting. For this variable, zero (0) represented referral to a less restrictive setting and one (1) represented referral to an equally or more restrictive setting. Additionally, we examined the length of stay at BPCC. This information was collected from each client’s medical charts. Data from participants still in treatment at the time of this study were not utilized in analyses examining post-treatment measures.

Data Analysis

Latent growth mixture models (LGMMs) were analyzed using Mplus (version 6.11) to identify latent trajectories of participants’ point earnings over time. Mplus allows for the accommodation of missing data with full information maximum likelihood estimation, which means that all participants’ data throughout treatment were utilized. In order to develop the number of trajectories, we first utilized unconditional LGMMs, which are models with no predictors that estimated up to six trajectories for the data based on our prediction of five trajectories (i.e., one above and one below our prediction of five trajectories).

In order to make decisions about the number of trajectories to retain, decisions were made based upon fit indices, prior research, interpretability, and parsimony (Jung and Wickrama,
2008). Specifically, we examined common fit indices for LGMMs: Entropy is used as a measure of how much trajectories differ from one another. Values of entropy range from 0 to 1, and higher values indicate greater distinction between trajectories. Akaike’s Information Criterion (AIC) and sample-size adjusted Bayesian Information Criterion (BIC) were also used as a measure of likelihood, where smaller numbers indicate greater fit. The Lo-Mendell-Rubin likelihood ratio test (LMR-LRT) was used to compare the proposed model with a model with one fewer trajectories; therefore, if a value of this test is significant ($p < .05$), it indicates that the proposed model is a better fit than a model with one fewer trajectory. Finally, we used posterior probabilities to determine the amount to which participants were appropriately assigned to each trajectory. Posterior probability values range from 0 to 1, and higher values indicate a higher likelihood of correct assignment.

After determining the best fitting model(s) from the unconditional LGMM, we ran conditional LGMM models, which used our above-mentioned risk factors as predictors entered simultaneously. This procedure is very similar to statistical analysis techniques suggested by La Greca and colleagues (2013), which examined the relationship between individual characteristics in children and response to a traumatic event over time. We utilized this procedure for predicting trajectories of point earnings and trajectories of restraints and seclusions.
3. RESULTS

Data were first analyzed for outliers by examining standardized $z$ scores (e.g., between -3.29 and +3.29). A small number of outliers ($n = 2$) were identified and were subsequently changed to raw scores reflecting a $z$ score of 3.29. Distributional properties were also examined. Overall, using $z$ score calculations for skewness and kurtosis (i.e., these values divided by their standard errors), some measures (i.e., length of treatment in weeks, number of previous placements) showed significant positive skew and kurtosis (i.e., $z$ score values $> 2.58$) in the overall sample. These variables were subsequently analyzed by psychiatric unit. For the IRT unit, the only variable that showed positive skewness and kurtosis was number of previous placements, while both length of treatment in weeks and number of previous placements showed significant positive skewness and kurtosis for STTEP.

Treatment Trajectory Analyses

Points Earning Trajectories. Table 2 includes a summary of the fit statistics for the unconditional LGMMs with one to six trajectories for weekly point earnings. Initially, we hypothesized five trajectories based on theory and clinical experience. With regard to fit, the 6-trajectory model had the lowest AIC and BIC scores (reflecting the best fit). The 5-trajectory model also had relatively low AIC and BIC scores, suggesting that the 5-trajectory solution was a good fit based on these indices. At the same time, other indices for the 5- or 6-trajectory solutions were not as positive with other trajectory solutions having higher values of entropy.
(i.e., 2 trajectory and 3 trajectory solutions) and better values of LMR-LRT and posterior probabilities. Comparatively, the three-trajectory model had the highest value of entropy, an AIC and sample-size adjusted BIC comparable to the 5-trajectory solution, and a much lower LMR-LRT. Similarly, the 2-trajectory solution also showed strong properties. Because the three-trajectory model and two-trajectory models were deemed to be the best solutions based on fits indices, we decided to examine these models in addition to our initially hypothesized 5-trajectory solution; however, in examining the percentage of participants in each of the five trajectories within the five-trajectory solution, there was a trajectory that had no participants in it based on the analyses. This would indicate that five-trajectory solution is not an appropriate model for this data. Based on these results, we considered that the three-trajectory or two trajectory solution might be the preferred solution.

Predictors of points earning trajectories for the three-trajectory model. We next ran a conditional LGMM for the three-trajectory solution that contained the same pretreatment factors discussed above, entered simultaneously. Table 3 includes a summary of the fit statistics for a conditional LGMM with three trajectories.

When the pretreatment variables were added to the model, the size and meaning of the trajectories remained stable, indicating that this model is likely an appropriate solution (high entropy, low AIC and sample-size adjusted BIC). With the pretreatment variables entered, the three point earnings trajectories were: decreasing point earning (22.54%, n = 39), high point earning (73.34%, n = 127), and increasing point earning (4.04%, n = 7). For each trajectory group, the number of points earned during week one (i.e., the intercept) and the change in weekly point earnings (i.e., the slope) are listed in Table 4. Significant values indicate that the intercept
and/or slope for the given trajectory is significantly different from zero. A graphical representation of each trajectory is depicted in Figure 4.

Based on the very small sample size of the increasing trajectory \((n = 7)\) in the three-trajectory model, it was determined that a two-trajectory solution may be a more appropriate fit. Examining the functional form of this model supported these finding. The increasing point earning trajectory and the high point earning trajectory appeared very similar (see Figure 4).

*Predictors of points earning trajectories for the two-trajectory model.* We next ran a conditional LGMM for the two-trajectory solution that contained the same pretreatment factors discussed above, entered simultaneously. Table 5 includes a summary of the fit statistics for a conditional LGMM with two trajectories.

When the pretreatment variables were added to the model, the size and meaning of the trajectories remained stable, indicating that this model is likely an appropriate solution (high entropy, low AIC and sample-size adjusted BIC). With the pretreatment variables entered, the two point earnings trajectories were: decreasing point earning (24.85\%, \(n = 43\)) and high point earning (75.14\%, \(n = 130\)). For each trajectory group, the number of points earned during week one (i.e., the intercept) and the change in weekly point earnings (i.e., the slope) are listed in Table 6. Significant values indicate that the intercept and/or slope for the given trajectory is significantly different from zero. A graphical representation of each trajectory is depicted in Figure 5.

Next, odds ratios were examined to determine which pretreatment factors predicted the likelihood being a member of one of either two trajectories. Because the final solution to this model had two trajectories, we were able to directly compare these two trajectories to one another. As seen in Table 7, child age, gender, and presence of internalizing symptoms/diagnoses
differentiated the two trajectories (marginal significance, \( p < 0.1 \)). Specifically, the odds of being in the high point earning trajectory relative to the decreasing point earning trajectory were one-and-a-half times higher for girls compared to boys. Similarly, the presence of internalizing symptoms/diagnoses increased the likelihood of being a member of the high point earning trajectory by 50%. Lastly, the odds of being in the high point earning trajectory rather than the decreasing point earning trajectory was one-and-a-half times greater for each additional year of age. No other pretreatment factor differentiated the high point earning trajectory from the decreasing point-earning trajectory.

Overall, the results of these analyses suggest that older children, girls, and those with internalizing symptoms/diagnoses responded best to treatment, as evidenced by higher consistent point earning. Younger children, boys, and those without internalizing symptoms/diagnoses did not respond as well to treatment, as evidenced by decreasing point earning. Interestingly, trauma history and previous treatment history did not predict point earning trajectory status during the first ten weeks of treatment.

*Seclusion and Restraint Trajectories*

Table 8 includes a summary of the fit statistics for the unconditional LGMMs for weekly restraints/seclusions with one to five trajectories. Initially, we predicted four trajectories based on fit indices and theory, so we include an unconditional model with five trajectories to have at least one trajectory above and one below our hypothesized 5-trajectory solution. With regard to fit, the four-trajectory model had comparatively high AIC and sample-size adjusted BIC with relatively lower entropy when compared to the other trajectory models. While the five-trajectory model had the lowest AIC and BIC and the highest entropy, the five-trajectory solution had one
trajectory with no members and another trajectory only had two members, so a five-trajectory solution was deemed an inappropriate fit.

Based on the findings of the unconditional LGMM, the two- and three-trajectory model fits were both deemed to be possible solutions. The two-trajectory model had higher AIC and sample size adjusted BIC and lower LMR-LRT, while the three-trajectory model had higher entropy and lower posterior probabilities. Because both the two-trajectory model and three-trajectory model were both deemed to be possible solutions, we tested both models further (as described below) before confirming or discarding either model.

When the pretreatment variables were added to the three-trajectory model, the size and meaning of the trajectories remained stable, indicating that this model is likely an appropriate solution (high entropy, low AIC and sample-size adjusted BIC). Table 9 includes summary of fit statistics for a conditional LGMM with three trajectories.

Trajectories for the three-trajectory model: With the pretreatment variables entered, the three restraint/seclusion trajectories were: low restraint/seclusions (87.75%, \( n = 179 \)), high restraint and seclusion group (5.88%, \( n = 12 \)), and increasing restraint/seclusion (6.37%, \( n = 13 \)). Based on the very small sample sizes of the high restraint/seclusion group and increasing restraints group (\( n = 12 \) and \( n = 13 \), respectively) in the three-trajectory model, it was determined that the two-trajectory model was a better fit. Based on the functional form, the increasing restraint/seclusion and high restraint/seclusion had very similar slopes and intercepts, also suggesting that a two-trajectory solution was a more appropriate fit.

Predictors for trajectories for the two-trajectory model. We next ran a conditional LGMM for the two-trajectory solution that contained the same pretreatment factors discussed above, entered simultaneously. When these variables were added to the model, the size and
meaning of the trajectories remained stable, indicating that this model is likely an appropriate solution. Table 10 includes a summary of the fit statistics for a conditional LGMM with two trajectories.

With the pretreatment variables entered, the two restraint/seclusion trajectories were: low restraint/seclusions (91.19%, $n = 186$) and high restraint and seclusion group (8.81%, $n = 18$). For each trajectory group, the number of restraints/seclusions required during week one (i.e., the intercept) and the change in weekly restraints/seclusions (i.e., the slope) are listed in Table 11. Significant values indicate that intercept and/or slope for the given trajectory is significantly different from zero. A graphical representation of each trajectory is depicted in Figure 6.

Next, odds ratios were examined to determine which pretreatment factors predicted the likelihood of being a member of one of either two trajectories. Because the final solution to this model had two trajectories, we were able to directly compare these two trajectories to one another. As seen in Table 12, child’s age and trauma history, were significant ($p<0.05$) and previous treatment history was marginally significant ($p < 0.1$). More specifically, the odds of being in the low restraint/seclusion trajectory were about one-and-a-half times greater for every year a child ages. Additionally, the odds of being in the high restraint/seclusion trajectory increased one fold for each additional trauma reported. Similarly, the odds of being in the high restraint/seclusion category increased one fold for each previous treatment reported. Gender and presence of internalizing symptoms/diagnoses did not significantly differentiate the high restraint/seclusion trajectory from the low restraint/seclusion category.

Overall, the results of these analyses suggest that younger children, children with more extensive trauma histories, and children with greater previous hospitalizations respond worse to treatment, as evidenced by more restraints and seclusions. Older children and children with less
trauma history respond best to treatment, as evidenced by fewer restraints and seclusions. For restraints and seclusions, age and the presence of internalizing symptoms/diagnoses did not significantly differentiate between high restraints/seclusion and low restraint/seclusion trajectories.

Interestingly, gender and presence of internalizing symptoms/diagnoses predicted point earning trajectories but not restraint/seclusion trajectories, while trauma history and previous treatment history predicted restraint/seclusion trajectories but not point earning trajectories. Only age predicted both outcome variables.

*Length of Treatment Analyses by Program*

Given that the length of treatment variable was a count dependent variable, one-sample Kolmogorov-Smirnov tests were run to examine distributional properties. For the STTEP unit, the one-sample Kolmogorov-Smirnov test was significant for the Poisson test ($p < .05$), suggesting the distribution did not adhere to a Poisson distribution. Similarly, for the IRT unit, the one-sample Kolmogorov-Smirnov test was significant for the Poisson test ($p < .05$), suggesting the distribution did not adhere to a Poisson distribution. In addition, Poisson regression assumes a similar mean and variance for the dependent variable, which was not the case for STTEP ($M = 12.91$; variance = .46) or IRT ($M = 66.55$; variance = 1367.16). Given these findings, Poisson regression was deemed inappropriate for the data. In turn, standard linear regression was utilized. Although the number of previous placements predictor was not normally distributed, the assumptions of linear regression do not require predictors to be normally distributed. Regression does require that residuals in the model are random, normally distributed variables with a mean of 0. This assumption was not violated for regression analyses.
Our first analyses examined the relationship between each risk factor (younger clients, female clients, trauma, presence of internalizing symptoms/diagnoses, and number of previous placements) and length of treatment in weeks. Because the length of treatment differed significantly between the programs \((p < .05)\), the analyses were conducted separately for IRT and STTEP. See Table 13 for correlations among measures within each unit.

Linear regressions were conducted to predict length of treatment in weeks based on each of the risk factors. For IRT, none of the risk factors proved to be significant \((ps > .05)\). Similarly, for STTEP, none of the risk factors were significant \((ps > .05)\).

**Post-Treatment Placement Analyses**

Logistic regression analyses were utilized to examine the relationship between each risk factor (younger clients, female clients, trauma, presence of internalizing symptoms/diagnoses, and number of previous placements) and discharge placement. Because discharge placement differed significantly between the programs \((p < .05)\), the analyses were conducted separately for IRT and STTEP. For IRT, a test of the full model against a constant-only model was statistically significant, indicating that the predictors as a set reliably distinguished between clients discharged to a less restrictive setting versus an equally/more restrictive setting \(\chi^2 (6) = 16.45, p < .05\). Nagelkerke’s \(R^2\) of 0.29 indicated a small relationship between the predictor variables and discharge placement. Prediction success overall was 90.4%. In relation to specific predictors, gender \((\beta = 2.57)\) and internalizing disorders \((\beta = -1.98)\) were significant predictors, indicating that males were more likely to be discharged to an equal/more restrictive setting and those with internalizing disorders were more likely to be discharged to a less restrictive setting. While gender was significant across all models (i.e., internalizing disorders, internalizing symptoms,
and internalizing disorders OR symptoms), internalizing symptoms and internalizing symptoms OR internalizing diagnosis were not significant, suggesting that it was only an internalizing disorder that was associated with less restrictive placement.

For STTEP, an analysis of the data revealed that all children within the unit were discharged to a less restrictive setting, so regression analyses could not be conducted given that the dependent variable was a constant.
4. DISCUSSION

The overarching goal of the present study was to explore the relationship between pretreatment factors, such as age, gender, trauma history, previous placement history, and presence of internalizing symptoms/diagnoses, and treatment outcomes for children treated at BPCC.

*Treatment Trajectories*

Within this overarching goal, the first aim of the present study was to examine the relationship between pretreatment factors and response to treatment over the course of treatment. In order to examine this, we examined behavioral data in response to treatment from the first 10 weeks of each client’s stay at BPCC.

First, we examined the relationship between weekly point earnings and pretreatment factors. We identified two latent trajectories of point earnings (decreasing point earning and high point earning). We were able to identify a number of pretreatment factors that significantly differentiated these trajectories. Older children, girls, and participants with internalizing symptoms/diagnoses responded best to treatment, as evidenced by higher consistent point earning during the first ten weeks of treatment. In contrast, younger children, boys, and children with fewer internalizing symptoms/diagnoses responded worse to treatment, as evidenced by decreasing point earning. Interestingly, previous hospitalizations and previous trauma history did not predict point earnings in either trajectory.
A large percentage of children (over to 75%) had a pattern that reflected high point earnings, meaning that a large percentage of children responded well to treatment as usual. Interestingly, the presence of internalizing symptoms/diagnoses also predicted better response to treatment, possibly suggesting that internalizing symptoms/diagnoses may attenuate children’s behavioral problems that are often associated with losing points. Perhaps, being more anxious relates to children’s greater concern for their point earning over time.

A smaller percentage of children (22.54%) had a pattern that reflected decreasing point earning over time, meaning that this percentage of children did not respond as well to treatment, as evidenced by decreasing point earning over time. While the percentage of children in this trajectory is smaller than the trajectory of children who are consistently high point earners, these youth are of substantial clinical and financial concern, as they are likely to chronically display decreasing response to treatment over time. Overall, the results of these analyses suggest that these decreasing responders tend to be younger, male, and not presenting with internalizing symptoms/diagnoses. The reasons this group of clients does not respond as well to treatment is unclear. As discussed earlier, girls are less likely to have significant behavioral issues, as compared to boys, and point earnings are a function of behavioral problems. Additionally, it may be that in the same way that the presence of internalizing symptoms/diagnoses predicted higher point earning trajectory status, the presence of other psychological variables not examined in this study (e.g., ADHD symptoms/diagnoses) predict worse point earnings over time. Further, because this group of clients tends to be younger, they may not be responding as well to the point earning system, which involves clients earning points to “buy” toys at a point store usually once per week, rather than immediate rewards. This reward system may not be as appealing to younger clients who may not be able to delay gratification that long. If lack of interest in the
point system is the reason behind younger clients being less interested in earning points, therapists may wish to explore other rewards systems with these clients in order to encourage more appropriate behavior throughout treatment.

After examining point earnings through the course of treatment, we examined the relationship between weekly restraints and seclusions and pretreatment factors. Overall, identifying clients who are at high risk of requiring multiple restraints and conclusions may be particularly relevant to BPCC, as restraints/seclusions create a more substantial resource drain on the facility, as multiple staff members are required to be involved in restraints and seclusions, thus taking them away from the group. Additionally, restraints/seclusions can pose a safety risk to staff, as staff may be required to restrain a very combative child. Identifying those clients who are at a risk of requiring frequent restraints/seclusions could help BPCC determine how many clients with these characteristics to enroll at one time, how to allocate staff resources, and which clients may need early therapeutic intervention to prevent events from escalating to the point of restraint or seclusion.

Using LGMM, two trajectories appeared to best capture children’s restraints and conclusions over the course of the first ten weeks of treatment: low restraint/conclusions and high restraint/seclusions. We were able to identify a number of pretreatment factors that significantly differentiated these trajectories. Several aspects of these findings are noteworthy.

First, a large percentage of children (close to 91%) had a pattern that reflected low restraints and seclusions, meaning that a large percentage of children do not require restraints and seclusions frequently. These children typically were typically older, had fewer hospitalizations, and fewer traumas, as evidenced by a lower trauma score.

The percentage of participants in the high restraint/seclusion trajectory (9%) was
relatively small. Nevertheless, those youth are of substantial clinical and financial concern, as they are likely to require restraints and seclusions throughout their treatment. These children tended to be younger, had more previous hospitalizations, and tended to have a more significant trauma history. These factors may suggest relative behavioral instability, which if targeted earlier could be addressed at the beginning of treatment, rather than after multiple weeks of treatment.

Interestingly, the presence of internalizing symptoms/diagnoses and gender predicted trajectory classification in the point earning analyses, but not in the restraint/seclusion analyses, while trauma symptoms and previous treatments predicted classification in restraint/seclusion analyses, but not in the point earning analyses. Only age predicted classification in both the point earning analyses and restraint/seclusion analyses.

In order to fully synthesize the results of these two trajectories outcomes, it is beneficial to discuss findings based on each pretreatment factor separately. Regarding age, trajectory analyses suggest that older clients respond better to treatment with regard to requiring fewer restraints/seclusions and earning more points. With regard to gender, girls appear to respond better to treatment, as evidenced by high point earning. Interestingly, gender does not predict restraint/seclusion trajectory. It appears that factors such as previous trauma history and previous hospitalizations predict the use of restraints/seclusions more than gender does.

In relation to past hospitalizations, more hospitalizations predicted more restraints/seclusion but not better or worse point earning. This could be because children who have had more hospitalizations have more severe behavioral issues, which warranted those hospitalizations. Children with more severe behavioral problems would be more likely to require restraints/seclusion. However, it would appear that the point system is equally rewarding for children with many hospitalizations and those with few hospitalizations.
As predicted, increased trauma history predicted more restraints/seclusions. Surprisingly, trauma history did not predict less point earning. It appears that entering a treatment facility may provoke some trauma response, as evidenced by needing more restraints/seclusions; however, point earning potential, and thus, a child’s typical ability to earn points, is not impacted by trauma history. These clients may be acting out periodically in a manner that is unsafe and requires more frequent staff intervention, but overall, they are able to maintain an appropriate level of behavior and earn points.

Interesting results emerged with regard to the presence of internalizing symptoms/diagnoses. With regard to point earning, children with internalizing symptoms/diagnoses were more likely to be in the high point earning group, which may indicate that children with internalizing problems are attending to their point earning and more concerned about their point earning consistently over time, as opposed to children with no internalizing symptoms or diagnoses. Interestingly, the presence of internalizing symptoms/diagnoses did not predict trajectories for restraints/seclusions. This may indicate that children with internalizing symptoms/diagnoses require as many restraints as those without. It is likely, however, that the presence of psychological symptoms predict restraints/seclusions. For example, it may be that the presence of externalizing symptoms predict restraint/seclusion trajectories, since these restraints and seclusions occur in response to dangerous and impulsive behavior. Future research could examine the relationship between externalizing symptoms and response to treatment.

To our knowledge, this is the first study to use LGMM to examine children’s response to treatment in a RTF. This statistical approach is well suited to examining children’s patterns of response to treatment because this person-centered statistical approach can be useful to in examining the natural heterogeneity and variability found in RTF populations (Bonanno and
Mancini, 2012). For example, person-centered analyses could be used to understand other aspects of children’s response to treatment, such as depression, anxiety, and trauma responses to treatment and whether there may be patterns of pretreatment factors present that may predict these emotional responses to treatment in addition to the behavioral responses to treatment measured here. Such trajectory predictions could help guide therapeutic interventions tailored to clients’ specific needs.

**Length of Stay Outcomes**

The second aim of the present study was to examine the relationship between pretreatment factors and length of stay at a residential treatment facility. For these analyses, we examined IRT and STTEP separately because IRT has an average length of treatment of approximately 9 months, while STTEP has an average length of treatment of 60-90 days. In examining length treatment in both programs, correlations between individual pretreatment variables and length of treatment and linear regressions revealed no significant findings based on pretreatment factors, which was surprising. This could be related to the variability in length of stay. For the STTEP program, children tend to stay 90 days, regardless of behavior. If children continue to exhibit behavior that cannot be managed within the community as they approach 90 days, they are discharged to a more restrictive setting, but they are not likely to stay in the program longer. Similarly, for the IRT program, clients stay an average length of 9 months, and if they are not making adequate progress, they may be discharged to another facility, but the length of stay is roughly similar amongst all clients. This may have greatly decreased the variability in the length of treatment.
Post-Treatment Outcomes

The third aim of the study was to examine the relationship between pretreatment factors and post-treatment outcomes. Logistic regressions were utilized, and because discharge placement differed significantly between the programs ($p < .05$), the analyses were conducted separately for IRT and STTEP. Results indicated that males were more likely to discharge to more restrictive settings, which was in line with our hypothesis.

Interestingly, clients with diagnoses of internalizing disorders prior to treatment were more likely to discharge to a less restrictive setting. It is possible that when children are admitted to a RTF with a diagnosis of an internalizing disorder, these children are less disruptive, earn more points, and are thus deemed for less restrictive setting regardless of whether their internalizing problems have been resolved.

Within the STTEP program, no statistically significant differences in discharge placement were noted. Analysis of the data revealed that all children within the unit were discharged to a less restrictive setting, so regression analyses could not be conducted given that the dependent variable was a constant. This may be a result of the mechanism of referral to STTEP as compared to IRT, as well the amount of time parents and agencies have to find a discharge placement for a child in IRT as compared to STTEP. With regard to referral, children referred to IRT are referred from a multi-needs team, which means that these children have already received services through a variety of sources prior to entering residential treatment. Anecdotally, these children are more likely to have a variety of agencies involved in their care. And if these children are involved with DHR, they have been in their care for longer.

With regard to STTEP, anecdotally, these children are more likely to have their families
involved in their treatment, thus they are more likely to discharge to a less restrictive setting in general. Additionally, because children in STTEP are in treatment for a shorter period of time, there is less time to find a variety of discharge placements; therefore, some clients may be discharged to settings that are not what BPCC would have chosen for them.

Future Directions and Limitations

Overall, this study had several strengths and novel findings. This study was able to identify multiple pretreatment factors that predicted positive and negative responses to treatment. These findings may have important treatment, safety, and financial consequences. Primarily, these results could help indicate clients who may require more intensive therapeutic intervention. Additionally, results from this study can inform decisions regarding staffing and housing clients at pretreatment.

However, there are important limitations in this study. For example, there may not have been enough power in the current study to detect smaller differences between trajectories. Based on research and the clinical application of LGMM, our sample size of 209 was deemed to be an appropriate sample size for such analyses; however, if we were able recruit more participants, we may have seen more differences emerge within the trajectories.

Additionally, measuring treatment time in weeks may not have been sensitive enough to differences in length of treatment between individual clients with regard to length of treatment. Future research could examine the relationship between pretreatment variables and length of treatment in days.

This study primarily examined the relationship between pretreatment variables and behavioral responses to treatment, both positive behavioral responses (earning points for good
behavior) and negative behavioral responses (restraints and conclusions) because children are referred to residential treatment due to severe behavioral and emotional issues. While we examined behavioral responses to treatment, we did not examine emotional responses to treatment. An interesting follow-up to the current study would be an examination of emotional responses to treatment. For example, future research could examine clients’ and therapists’ reports of internalizing symptoms and therapists’ reports of behavioral symptoms throughout treatment to further determine how effective RTF settings are in addressing a range of mental health issues.

Additionally, this study examined the effects of the presence of internalizing symptoms on treatment outcomes, but did not examine the severity of internalizing symptoms. In part, this was due to the nature of the data collection. Data were collected from intakes and referral forms, which only ask about the presence of internalizing symptoms, not the severity of any reported internalizing symptoms. Future studies should seek to integrate psychometrically sound instruments into a standard pre-treatment battery to more rigorously examine treatment effects over time.

Overall, the present study provides useful insight into the pretreatment factors that impact response to treatment within RTFs. As predicted, age, gender, trauma history, previous hospitalizations, and presence of internalizing symptoms all uniquely predicted various aspects of response to treatment, including point earning and restraint/seclusion trajectories and post-treatment discharges. While this study can provide useful insights into how clients respond to treatment, future studies could extend this work by examining the relationship between the severity and type of psychological symptoms and response to treatment.
5. REFERENCES


retention in adolescent substance abuse treatment, *Journal of Trauma Stress, 17*(2), 113-121.


Zelechowski, A.D., Sharma, R., Beserra, K., Miguel, J.L., DeMarco, M., & Spinazzola, J.
Table 1
Sample Characteristics by Program

<table>
<thead>
<tr>
<th></th>
<th>STTEP</th>
<th>IRT</th>
<th>T-Test X² Test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>9.4 (SD = 1.94)</td>
<td>9.81 (SD = 2.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>68.6%</td>
<td>63.3%</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>31.4%</td>
<td>36.4%</td>
<td></td>
</tr>
<tr>
<td><strong>Previous Diagnoses Prevalence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mood Disorder</td>
<td>26.5%</td>
<td>50.5%</td>
<td>p &lt; 0.5</td>
</tr>
<tr>
<td>Anxiety Disorder</td>
<td>9.8%</td>
<td>16.8%</td>
<td></td>
</tr>
<tr>
<td>ADHD</td>
<td>76.3%</td>
<td>88.34%</td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td>PTSD</td>
<td>7.8%</td>
<td>18.7%</td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td>Thought Disorder</td>
<td>0%</td>
<td>3.7%</td>
<td></td>
</tr>
<tr>
<td>Behavior Disorder</td>
<td>88.2%</td>
<td>75.7%</td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td><strong>Average Number of Diagnoses at Intake</strong></td>
<td>2.21 (SD=0.82)</td>
<td>2.39 (SD=0.81)</td>
<td></td>
</tr>
<tr>
<td><strong>Trauma Prevalence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Abuse</td>
<td>50%</td>
<td>59.8%</td>
<td></td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td>26.5%</td>
<td>43%</td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td>Neglect</td>
<td>46.1%</td>
<td>64.5%</td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td>Domestic Violence</td>
<td>47.1%</td>
<td>32.7%</td>
<td></td>
</tr>
<tr>
<td>Parental Drug Use</td>
<td>26.5%</td>
<td>56.1%</td>
<td></td>
</tr>
<tr>
<td>Community Violence</td>
<td>3.9%</td>
<td>1.9%</td>
<td></td>
</tr>
<tr>
<td>Assaulted</td>
<td>0%</td>
<td>.9%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>29.4%</td>
<td>36.4%</td>
<td></td>
</tr>
<tr>
<td><strong>Average Trauma Score</strong></td>
<td>2.34 (SD=1.63)</td>
<td>2.99 (SD=1.4)</td>
<td></td>
</tr>
<tr>
<td><strong>Range of Trauma Scores</strong></td>
<td>0-6</td>
<td>0-6</td>
<td></td>
</tr>
<tr>
<td><strong>Prevalence of DHR Involvement</strong></td>
<td></td>
<td></td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td>No DHR Involvement</td>
<td>31.4%</td>
<td>4.7%</td>
<td></td>
</tr>
<tr>
<td>Past DHR Involvement</td>
<td>24.5%</td>
<td>5.6%</td>
<td></td>
</tr>
<tr>
<td>Current DHR Involvement</td>
<td>29.4%</td>
<td>29.9%</td>
<td></td>
</tr>
<tr>
<td>DHR as Custodian</td>
<td>14.7%</td>
<td>59.8%</td>
<td></td>
</tr>
<tr>
<td><strong>Placement History</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prevalence of Inpatient Treatment</td>
<td>7.5%</td>
<td>78.4%</td>
<td></td>
</tr>
<tr>
<td><strong>Average Number of Inpatient Treatment</strong></td>
<td>2.11 (SD=2.1)</td>
<td>2.67 (SD=1.85)</td>
<td></td>
</tr>
<tr>
<td><strong>Total N</strong></td>
<td>102</td>
<td>107</td>
<td></td>
</tr>
</tbody>
</table>
Fit Indices for Unconditional Latent Growth Mixture Model with 1-6 Trajectories for Point Earning

*Table 2*

<table>
<thead>
<tr>
<th>Number of Trajectories</th>
<th>Entropy</th>
<th>AIC</th>
<th>Sample-Size Adjusted BIC</th>
<th>LMR-LRT</th>
<th>Posterior probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N/A</td>
<td>1999.45</td>
<td>22003.44</td>
<td>N/A</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>0.85</td>
<td>21787.73</td>
<td>21793.29</td>
<td>0.064</td>
<td>0.26 – 0.74</td>
</tr>
<tr>
<td>3</td>
<td>.90</td>
<td>21754.57</td>
<td>21761.70</td>
<td>0.094</td>
<td>0.01 – 0.74</td>
</tr>
<tr>
<td>4</td>
<td>0.72</td>
<td>21750.44</td>
<td>21759.13</td>
<td>0.74</td>
<td>0.01 – 0.66</td>
</tr>
<tr>
<td>5</td>
<td>.82</td>
<td>21726.82</td>
<td>21737.08</td>
<td>0.46</td>
<td>0.01 – 0.66</td>
</tr>
<tr>
<td>6</td>
<td>0.91</td>
<td>17810.38</td>
<td>17809.95</td>
<td>0.54</td>
<td>0.00 – 0.69</td>
</tr>
</tbody>
</table>
Table 3
Fit Indices for Conditional Latent Growth Mixture Model for Point Earning with Three Trajectories

<table>
<thead>
<tr>
<th>Entropy</th>
<th>AIC</th>
<th>Sample Size Adjusted BIC</th>
<th>LMR-LRT</th>
<th>Posterior probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.904</td>
<td>17826.175</td>
<td>17825.763</td>
<td>0.6096</td>
<td>0.04 – 0.73</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>Intercept</td>
<td>Slope</td>
</tr>
<tr>
<td>----------------</td>
<td>----</td>
<td>-----</td>
<td>-----------</td>
<td>--------</td>
</tr>
<tr>
<td>Decreasing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Point Earners</td>
<td>39</td>
<td>22.54</td>
<td>407.52**</td>
<td>-9.844*</td>
</tr>
<tr>
<td>High Point</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earners</td>
<td>127</td>
<td>73.34</td>
<td>442.59**</td>
<td>1.59</td>
</tr>
<tr>
<td>Increasing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Point Earner</td>
<td>7</td>
<td>4.05</td>
<td>431.51**</td>
<td>1.93</td>
</tr>
</tbody>
</table>

* $p<0.05$
** $p<0.001$
Table 5  
*Fit Indices for Conditional Latent Growth Mixture Model for Point Earning with Two Trajectories*

<table>
<thead>
<tr>
<th>Entropy</th>
<th>AIC</th>
<th>Sample Size Adjusted BIC</th>
<th>LMR-LRT</th>
<th>Posterior probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.838</td>
<td>17856.57</td>
<td>17856.27</td>
<td>0.07</td>
<td>0.26 – 0.75</td>
</tr>
</tbody>
</table>
Table 6
Latent Growth Mixture Models: Two-Trajectory Solution for Point Earning

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
<th>Intercept</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreasing</td>
<td>43</td>
<td>22.54</td>
<td>407.52**</td>
<td>-7.951*</td>
</tr>
<tr>
<td>Point Earners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Point</td>
<td>130</td>
<td>73.34</td>
<td>411.398**</td>
<td>-1.579</td>
</tr>
<tr>
<td>Earners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p<0.05  
** p<0.01
Table 7
Latent Growth Mixture Models for Point Earnings: Odds Ratios for the Conditional Two-Trajectory Solution

<table>
<thead>
<tr>
<th>Client Characteristics</th>
<th>High Point Earning (95% CI)</th>
<th>Decreasing Point Earning (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.24 (1.03 – 1.48)*</td>
<td>-0.213 (0.03 – 0.39)*</td>
</tr>
<tr>
<td>Female</td>
<td>1.84 (0.87 – 3.90)*</td>
<td>-0.611 (-0.13 – 1.36)*</td>
</tr>
<tr>
<td>Presence of Internalizing Symptoms/Diagnoses</td>
<td>0.797 (0.34 – 1.84)*</td>
<td>0.227 (-1.06 – 0.61)*</td>
</tr>
<tr>
<td>Trauma History</td>
<td>0.876 (0.70 – 1.105)</td>
<td>0.132 (-0.36 – 0.1)</td>
</tr>
<tr>
<td>Previous Treatment History</td>
<td>1.168 (0.94 – 1.45)</td>
<td>-0.156 (-0.062 – 0.37)</td>
</tr>
</tbody>
</table>

* p<0.10
** p<0.05
<table>
<thead>
<tr>
<th>Number of Trajectories</th>
<th>Entropy</th>
<th>AIC</th>
<th>Sample Size Adjusted BIC</th>
<th>LMR-LRT</th>
<th>Posterior probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N/A</td>
<td>9913.34</td>
<td>9916.79</td>
<td>N/A</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>0.994</td>
<td>9222.68</td>
<td>9227.48</td>
<td>0.084</td>
<td>0.09 – 0.91</td>
</tr>
<tr>
<td>3</td>
<td>0.997</td>
<td>9028.29</td>
<td>6091.53</td>
<td>0.11</td>
<td>0.039 – 0.89</td>
</tr>
<tr>
<td>4</td>
<td>0.992</td>
<td>8830.51</td>
<td>8838.00</td>
<td>0.12</td>
<td>0.02 – 0.89</td>
</tr>
<tr>
<td>5</td>
<td>0.999</td>
<td>5862.79</td>
<td>6025.38</td>
<td>0.24</td>
<td>0.01 – 0.82</td>
</tr>
</tbody>
</table>
Table 9
*Fit Indices for Conditional Latent Growth Mixture Model for Restraints/Seclusions with Three Trajectories*

<table>
<thead>
<tr>
<th>Entropy</th>
<th>BIC</th>
<th>LMR-LRT</th>
<th>Posterior probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.995</td>
<td>6166.76</td>
<td>0.49</td>
<td>0.06</td>
</tr>
</tbody>
</table>
Table 10
Fit Indices for Conditional Latent Growth Mixture Model for Restraints/Seclusions with Two Trajectories

<table>
<thead>
<tr>
<th>Entropy</th>
<th>AIC</th>
<th>Sample Size Adjusted BIC</th>
<th>LMR-LRT</th>
<th>Posterior probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.995</td>
<td>6212.85</td>
<td>6216.15</td>
<td>0.066</td>
<td>0.01 – 0.91</td>
</tr>
</tbody>
</table>
Table 11
Latent Growth Mixture Models: Two-Trajectory Solution for Restraints/Seclusions

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
<th>Intercept</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Restraint/Seclusions</td>
<td>21</td>
<td>9.9</td>
<td>3.64**</td>
<td>0.029</td>
</tr>
<tr>
<td>Low Restraints/Seclusions</td>
<td>188</td>
<td>90.1</td>
<td>0.278**</td>
<td>0.041</td>
</tr>
</tbody>
</table>

*p<0.05  
**p<0.01
Table 12
Latent Growth Mixture Models for Restraints/Seclusion: Odds Ratios for the Conditional Two-Trajectory Solution

<table>
<thead>
<tr>
<th>Client Characteristics</th>
<th>Low Restraint/Seclusion (95% CI)</th>
<th>High Restraint/Seclusion (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.32 (0.13 – 0.51)**</td>
<td>1.38 (1.133 – 1.67)**</td>
</tr>
<tr>
<td>Female</td>
<td>0.13 (-0.796 – 1.05)</td>
<td>1.14 (0.451 – 2.86)</td>
</tr>
<tr>
<td>Presence of Internalizing Symptoms/Diagnoses</td>
<td>-0.38 (-1.462 – 0.71)</td>
<td>0.69 (0.232 – 2.03)</td>
</tr>
<tr>
<td>Trauma History</td>
<td>-0.47 (-0.786 – 0.16)**</td>
<td>0.62 (0.46 – 0.86)**</td>
</tr>
<tr>
<td>Previous Treatment History</td>
<td>-0.26 (-0.445 – 0.07)*</td>
<td>0.77 (0.64 – 0.93)*</td>
</tr>
</tbody>
</table>

* *p<0.10  
** *p<0.05
Table 13
Correlations Between Pretreatment Factors and Length of Treatment

<table>
<thead>
<tr>
<th></th>
<th>STTEP Length of treatment</th>
<th>IRT Length of treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.36</td>
<td>.93</td>
</tr>
<tr>
<td>Sex</td>
<td>.31</td>
<td>.74</td>
</tr>
<tr>
<td>Pretreatment Internalizing Disorder Diagnosis</td>
<td>.39</td>
<td>.57</td>
</tr>
<tr>
<td>Pretreatment Internalizing Disorder Symptoms</td>
<td>.13</td>
<td>.59</td>
</tr>
<tr>
<td>Pretreatment Internalizing Disorder Total</td>
<td>.59</td>
<td>.32</td>
</tr>
<tr>
<td>Trauma Prevalence</td>
<td>.93</td>
<td>.59</td>
</tr>
<tr>
<td>Previous Treatment</td>
<td>.69</td>
<td>.84</td>
</tr>
</tbody>
</table>

* $p<0.05$
** $p<0.01$
Figure 1. Trajectory hypotheses for points data
Figure 2. Trajectory hypotheses for restraint/seclusion data
**REFERRAL/CLINICAL INFORMATION:**

Check reason for referral to Brewer-Porch Children's Center:

- ) poor self-control
- ) cruelty to animals
- ) inappropriate aggressive behavior/hostile tantrums
- ) hyperactivity
- ) running away
- ) destructiveness
- ) poor school performance
- ) truancy
- ) defence of authority
- ) manipulative behavior
- ) sexual maladjustment
- ) assaultive behavior
- ) child abuse victim
- ) other: ______________________

- ) sexual abuse
- ) dysfunctional family
- ) enuretic
- ) anorectic
- ) withdrawn/regression/confusion
- ) moderate to severe depression
- ) moderate to severe anxiety
- ) homicidal ideation
- ) inadequate social skills/
- ) poor interpersonal skills
- ) drug experimentation
- ) irrational fears

- ) low frustration tolerance
- ) inappropriate attention seeking behavior
- ) inadequate problem solving skills
- ) in need of 24 hour protective oversight and supervision in daily living
- ) impaired reality contact e.g., hallucinations, delusions, ideas of reference
- ) disabling somatic symptoms
- ) medication compliance
- ) poor socialization skills
- ) inpatient care is not warranted

---

*( ) Explain checked items and include any recent precipitating events: _________________________________*
Figure 4. Three-trajectory solution for weekly points earning
Figure 5. Two-trajectory solution for weekly point earnings
Figure 6. Two-trajectory solution for weekly restraints/seclusions
May 2, 2016

Hannah Price
Dept of Psychology
College of Arts and Sciences
Box 870348

Re: IRB # 16-OR-184, “Examining the relationship between age, gender, and internalizing symptoms and treatment outcome in a residential treatment facility”

Dear Ms. Price:

The University of Alabama Institutional Review Board has granted approval for your proposed research.

Your application has been given expedited approval according to 45 CFR part 46. You have also been granted the requested partial waiver of patient authorization and waiver of written documentation of informed consent. Approval has been given under expedited review category 7 as outlined below:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your application will expire on May 1, 2017. If your research will continue beyond this date, please complete the relevant portions of the IRB Renewal Application. If you wish to modify the application, please complete the Modification of an Approved Protocol form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, please complete the Request for Study Closure form.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Sincerely,

[Signature]

Stuart Usdan, Ph.D.
Chair, Non-Medical IRB
The University of Alabama
UNIVERSITY OF ALABAMA
INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS
REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

I. Identifying information

Principal Investigator: Hannah Price, M.A.
Second Investigator: Matthew Jarrett, Ph.D.
Third Investigator: 
Department: Psychology
College: Arts & Sciences
University: Box 870348
Address: 
Telephone: (205) 348-6705
FAX: 
E-mail: hfracport@crimson.ua.edu

Title of Research Project: Examining the relationship between age, gender, and internalizing symptoms and treatment outcome in a residential treatment facility

Date Submitted: 4/14/2016
Funding Source:

Type of Proposal: ☑ New □ Revision □ Renewal □ Completed □ Exempt

Please attach a continuing review of studies form

Please enter the original IRB # at the top of the page

UA faculty or staff member signature: 

II. NOTIFICATION OF IRB ACTION (to be completed by IRB):
Type of Review: ☐ Full board ☑ Expedited

IRB Action:
☑ Approved—this proposal complies with University and federal regulations for the protection of human subjects.

Approval is effective until the following date: 5/1/17
Items approved: ☑ Research protocol (dated 5/2/17)
☐ Informed consent (dated)
☐ Recruitment materials (dated)
☐ Other (dated)

Approval signature ____________________________ Date ____________________________