CHILD SEXUAL ABUSE AND USE OF RESTRAINT AND SECLUSION:
THE INTERACTIVE CONTRIBUTIONS OF EARLY ENVIRONMENTAL FACTORS
AND CHILD CHARACTERISTICS

A Thesis

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This master’s thesis further examined the relation between child sexual abuse history and subsequent restraint and seclusion incidents, and additionally evaluated the influence of three potential moderators on this primary relationship (namely, prenatal exposure to alcohol, tobacco, and/or illicit drugs, child temperament, and executive functioning). Results revealed that child temperament, specifically effortful control, and prenatal exposure to alcohol, tobacco, and/or illicit drugs were both significant moderating influences on the relation of child sexual abuse history to restraint and seclusion. In contrast, child executive functioning was not found to be a significant moderator in predicting restraint and seclusion. Ultimately, this research, focused on a high-risk clinical population, is essential for increasing our understanding of child psychopathology and enhancing treatments for youth affected by sexual abuse. Specifically, these findings have critical clinical implications that may inform specialized inpatient treatment in the prevention of the use restraint and seclusion.
This master’s thesis is dedicated to my loving and supportive parents,
Lazaro and Ileana Comas, who have sacrificed and bestowed
all they have achieved for their three children.
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INTRODUCTION

Restraint and seclusion are commonly recurring forms of intervention used in psychiatric inpatient settings. Meta-analytic research indicates that, on average, 29% and 26% of patients experience at least one episode of restraint and seclusion, respectively (De Hert, Dirix, Demunter, & Correll, 2011), with individual units reporting prevalence rates ranging from 7.6% to 61%. Moreover, compared to rates in adult psychiatric settings, rates of restraint and seclusion are six times greater in child and adolescent units (LeBel et al., 2004). These practices typically are used for one of the following most frequently cited rationales: dangerous behaviors towards oneself or others, agitation, or aggression (Angold & Pickles, 1993; Busch & Shore, 2000; Day, Franklin, & Marshall, 1998; Fassler & Cotton, 1992; Millstein & Cotton, 1990; Oberleitner, 2000; Salias & Fenton, 2000).

The use of restraint and seclusion, however, remains controversial and greatly debated in the literature, with some researchers and clinical professionals in support of using restraint and seclusion in the abovementioned circumstances, and others strongly disputing the need for such practices in any situation. Opponents of restraint and seclusion question the therapeutic value and effectiveness of these interventions, in part because patients frequently view them as predominantly coercive and aversive (Day, 2002; Grigg, 2006; Masters et al., 2002; Mohr, Mahon, & Noone, 1998; Oberleitner, 2000). Additionally, restraint and seclusion can have severe consequences. Specifically,
these practices can be traumatic for the individual and may result in critical physical side effects, including asphyxia, aspiration, blunt trauma to the chest, thrombosis, and even mortality (De Hert, Einfinger, Scherpenberg, Wampers, & Peuskens, 2010; Masters et al., 2002; Oberleitner, 2000; Prinsen & van Delden, 2009).

In general, both restraint and seclusion are intervention practices aimed at managing dangerous behaviors to ensure safety in mental health settings. Restraints, in particular, are physical interventions most commonly characterized by holding, which can be performed either by a caregiver or staff member or by using mechanical restraining tools. In contrast, seclusions refer to placing patients alone in a room (De Hert et al., 2011). Overall, the literature on restraint and seclusion focuses only narrowly on documenting prevalence rates, identifying specific predictors for prompting their use, and proposing alternative interventions. Moreover, the research identifying predictors for the use of restraint and seclusion remains limited to investigation of individual child and organizational characteristics that may contribute to elevated aggressive behaviors or decisions to use these practices, respectively. Key child characteristic predictors include being male; having been previously hospitalized or having longer hospitalizations; having greater documented previous aggression, higher fearfulness, and lower effortful control; and having a child abuse history (Bridgett, Valentino, & Hayden, 2012; Delaney & Fogg, 2005; Fryer, Beech, & Byrne, 2004); whereas frequently reported organizational predictors include lack of staff leadership and organization as well as lack of staff training in de-escalating aggressive behaviors (Delaney, 2006).

This study, therefore, aimed to address the abovementioned limitations of the existing literature on restraint and seclusion. This project not only further examined the
relation between child abuse history and subsequent restraint and seclusion incidents, but additionally evaluated the potential interactive effects of child sexual abuse with other early adverse environmental factors on the use of restraint and seclusion. Moreover, this study investigated the potential moderating effects of specific child characteristics on the relation of child sexual abuse to restraint and seclusion, in order to identify factors that may have influenced or modified this relation.

I. Child Sexual Abuse and Restraint and Seclusion

The literature consistently identifies child sexual abuse as creating a severe environment resulting in significantly elevated risk for children’s maladaptation and abnormal development across biological and psychological domains (Briere & Elliott, 1994; Cicchetti & Toth, 2005). Among the myriad negative childhood outcomes related to child abuse, child abuse has been found to predict low intellectual and academic functioning (Jones, Trudinger, & Crawford, 2004; Kaufman, Jones, Steiglitz, Vitulano, & Mannarino, 1994), internalizing and externalizing behaviors (Briere & Elliott, 1994; Kaufman & Cicchetti, 1989; Toth, Cicchetti, & Kim, 2002), and psychological problems, including, but not limited to, substance use (Harrison, Fulkerson, & Beebe, 1997), risky sexual behaviors (Fergusson, Horwood, & Lynsky, 1997), and suicidal tendencies (Brown, Cohen, Johnson, & Smailes, 1999; Maniglio, 2010). Research on the sequelae of child sexual abuse, however, is implemented predominantly through community samples or through involvement with associated service agencies. Consequently, little research has examined the effects of child sexual abuse within psychiatric inpatient settings despite the fact that problems resulting from child sexual abuse, particularly aggressive
and suicidal behaviors, are often those requiring psychiatric hospitalization (Boxer & Terranova, 2008; Briere & Elliott, 1994). In fact, child sexual abuse rates among psychiatrically hospitalized youth are high, broadly ranging from approximately 10% to 70% (Cohen, Spirito, Sterling, & Donaldson, 1996; Fehon, Grilo & Lipschitz, 2001; Kohan, Pothier, & Norbeck, 1987; Lipschitz, Bernstein, Winegar, & Southwick, 1999). Thus, research focused on this high-risk population is essential for increasing our understanding of child psychopathology and enhancing treatments for youth affected by this abuse (Boxer & Terranova, 2008).

Little research has examined the association between child sexual abuse and risk for restraint and seclusion among psychiatric inpatient children. Child abuse histories, broadly defined as any sexual, physical, or emotional abuse, have been identified as a predictor for use of restraint and seclusion (Fryer et al., 2004). Further, in addition to the potential risk of injury or death associated with restraint and seclusion, research suggests that restraints experienced by children with sexual abuse histories may be especially detrimental. For instance, the experience of restraint may intensify emotional distress already existing from past trauma or abuse, where victims, through restraint use, often relive the helplessness and powerlessness first experienced during abuse (Gallop, McCay, Guha, & Khan, 1999; Mohr, Petti, & Mohr, 2003). This ultimately results in the antithesis of these practices’ original intended goal, and thus may increase rather than decrease the risk for violence and aggression in the psychiatric unit (Gallop et al., 1999; Mohr et al., 2003). Additionally, a relationship between child sexual abuse history and restraint and seclusion in part may exist, and thus be attributed to the fact that children with sexual abuse histories may develop negative attribution biases, where they may thus interpret
ambiguous occurrences in psychiatric units as negative and even threatening to them (Valle & Silovsky, 2002). Thus, in response to these circumstances, children with sexual abuse histories may engage in more aggressive behaviors that would then warrant use of restraints and seclusion.

II. Prenatal Exposure to Alcohol, Tobacco, and/or Illicit Drugs and Restraint and Seclusion

Another severe early environmental circumstance heavily documented as posing increased risk for the development of adverse child and adolescent outcomes is having prenatal exposure to alcohol, tobacco, and/or illicit drugs. The literature is scant, however, with respect to the effects of this early environmental risk factor on the use of restraint and seclusion.

Prenatal exposure to alcohol, tobacco, and/or illicit drugs also has been found to increase risk for postnatal inadequate and unfavorable caregiving quality (Hans, 2002). Mothers’ prenatal use of alcohol, tobacco, and/or illicit substances is related to reduced stimulation and sensitivity in mother-child interactions, and to poor parental monitoring (Hans, 2002). More specifically, children whose mothers had a documented history of prenatal drug exposure showed elevated rates of reported child maltreatment, ranging from 3 to 12 times more than children whose mothers had no such history of prenatal drug exposure (Jaudes, Ekwo, & Van Voorhis, 1995; Kelley, 1998; Wasserman, & Leventhal, 1993). Additionally, research documents elevated levels of aggression among children prenatally exposed to alcohol, tobacco, and/or illicit drugs (Ashford, van Lier, Timmermans, Cuijpers, & Koot, 2008; Bendersky, Bennett, & Lewis, 2006; Brown et al.,
1991). Although it is reasonable to hypothesize that, like other early adverse environmental factors, prenatal exposure to alcohol, tobacco, and/or illicit drugs may too lead to increased behavioral problems that, in turn, result in greater use of restraint and seclusion, to our knowledge no research to date has investigated this relation.

III. Relations of Child Characteristics with Restraint and Seclusion

In addition to examining the interactive effects of early adverse environmental factors on later restraint and seclusion use, this study also acknowledges the importance in considering child and adolescent characteristics, namely temperament and executive functioning (EF), that not only may predict restraint and seclusion, but also may moderate the relation between child sexual abuse history and later use of restraint and seclusion. These variables were selected primarily because both have been shown to play critical roles in both cognitive and socioemotional regulation, and thus may influence a child’s behavioral patterns in a manner that may either buffer or exacerbate the aggressive tendencies that often lead to the use of restraint and seclusion.

Temperament, defined as inherent differences in self-regulation or in attentional, emotional, and even motor activity (Rothbart & Bates, 2006), is commonly considered a potential buffering or exacerbating agent to child developmental outcomes given unfavorable contexts. In particular, research suggests that children with easy temperamental qualities, such as positivity, adaptability, and predictability in response and behavior, may lead to resilience when facing poor environmental circumstances, such as child abuse or prenatal exposure to pathogens. In contrast, children with difficult temperament, or those who are unpredictable, nonadaptive, and have heightened negative
responses and behaviors, show increased vulnerability in similar environments (Belsky 1997a, 1997b, 2005). Moreover, compared to children with no abuse history, children who have been abused more frequently have negative temperaments (Cicchetti & Valentino, 2006). These negative temperamental dispositions may thus lead to behaviors that, in turn, lead to increased use of restraint and seclusion. In particular, increased temperamental fearfulness in inpatient children has been identified as a risk factor for the use of restraint and seclusion (Bridgett et al., 2012). Additionally, negative temperament or negative emotionality in children has been associated with elevated depressive and mental health symptomatology, that may often lead to use of threatening behaviors increasingly necessitating hospitalization, namely suicidal behaviors (Tamás et al., 2007). However, these links have not yet been investigated directly. Furthermore, this study will focus specifically on the temperamental construct of effortful control (EC), a regulatory-type temperament construct, signifying a child’s capacity to strategically select and implement appropriate and efficient steps in completing a conflicting task or future endeavor, to ignore or refrain from engaging in alternative attractive distractions or behaviors, and to detect potential errors and effectively minimize them (Rothbart & Bates, 2006). Inhibitory control and attentional control, two critical elements comprising EC, are theorized to play a role in or influence children’s behaviors that may lead to increased or decreased use of restraint and seclusion. In fact, inpatient children possessing lower effortful control are found to experience greater rates of restraint and seclusion (Bridgett et al., 2012).

Additionally, EF may have a critical influence on the relation between child sexual abuse history and restraint and seclusion. EF encompasses a number of related yet
distinct components, which together classify higher-order cognitive functioning abilities that facilitate purposeful, goal-directed behaviors (Anderson, 1998). Inhibition, working memory, shifting, planning, and cognitive flexibility are noted most frequently as fundamental components comprising EF (Anderson, 2002; Miyake, Friedman, Emerson, Witzki, & Howerter, 2000). EF is a major neurocognitive functioning system associated with brain development, specifically with the function of the prefrontal cortex (PFC) and its associated subcortical regions and connections (Stuss & Alexander, 2008).

Early adverse life experiences, such as the experience of child abuse, affect neurobiological processes (Cicchetti, 2002; Cicchetti & Valentino, 2006; De Bellis, 2001). Moreover, early environments are critical in shaping children’s brain development (Bernier, Carlson, & Whipple, 2010; De Bellis, 2001). These early environments impact the neural pruning process, thus affecting the brain’s neural connections formulated in the brain and the consequent connections made with other brain structures. Accordingly, environments fostering unfavorable or inadequate experiences are linked to problematic brain development both structurally and functionally (De Bellis, 2001; Rutter & O’Connor, 2004).

The PFC is the final area of the cortex to mature and thus is the most vulnerable to post-natal negative experiences and environmental influences. Unmistakably, the staple figures dictating children’s early environments are the primary caregivers, who consequently have significant influence on their children’s neurocognitive development, including EF. Additionally, recent research has linked EF to temperament, particularly EC, as both are constructs reflecting application of both attentional and behavioral control and regulation (Rothbart & Bates, 2006). Given this connection, EF may
independently influence children’s behavior and thus, subsequently, their experience of restraint and seclusion.

One of the components of EF believed to be particularly relevant for the prevention of restraint and seclusion is that of inhibition. The ability for children to negotiate or mediate their behavior using goal-directed thought or EF in general is important; however, inhibition is particularly critical because restraint and seclusion typically occur when children are provoked or act impulsively to presented stimuli or circumstances in their environments. Thus, possessing high levels of inhibition may aid children in controlling their reactivity and consequent behaviors in a manner that may avoid the need for restraint and seclusion.

IV. The Present Study

Overall, the present study aimed to expand on the limited scope of the existing literature on restraints and seclusions. In particular, this project had three specific aims: (1) to further examine the relation of child sexual abuse history with subsequent restraint and seclusion, (2) to test for main and interactive effects of child sexual abuse history and other early environmental factors (specifically, prenatal exposure to alcohol, tobacco, and/or illicit drugs) that may contribute to the use of restraint and seclusion, and (3) to examine child characteristics that may influence the relation of child sexual abuse histories with restraint and seclusion to identify specific factors that may buffer or exacerbate the primary relation. Within the last few years, interest in initiatives aimed at reducing the use of restraint and seclusion has increased both nationally and internationally. These initiatives, however, have concentrated only narrowly on
organizational changes or monitoring the use of these practices, presumably with the hope that these actions would be sufficient to reduce the prevalence of restraint and seclusion in psychiatric settings (Steinert et al., 2009). Thus, results of the proposed moderation analyses of early adverse environmental factors and child characteristics may inform prevention and intervention efforts with respect to restraint and seclusion. Such research also can aid in the development of better, more elaborated targeted treatments for youth already receiving mental health services (Boxer & Terranova, 2008).

V. Hypotheses

Foremost, a significant relation was expected to exist between child sexual abuse history and the use of restraint and seclusion. Moreover, a significant relation was anticipated between prenatal exposure to alcohol, tobacco, and/or illicit drugs and the use of restraint and seclusion. Similarly, significant relations were expected independently between the child characteristics of EC and EF with restraint and seclusion use.

Furthermore, this study anticipated that prenatal exposure to alcohol, tobacco, and/or illicit drugs would significantly moderate and interactively contribute to the relation of child sexual abuse to the use of restraint and seclusion. Prenatal exposure to alcohol, tobacco, and/or illicit drugs was expected to exacerbate the relation of child sexual abuse to restraint and seclusion, where children with histories of both child sexual abuse and prenatal exposure would show elevated rates of restraint and seclusion. Likewise, but independently, this study expected that the child characteristics of EC and EF also would moderate the relation of abuse history to restraint and seclusion use significantly. Specifically, greater EC and greater EF capacity were hypothesized to play
a buffering role and would aid children with sexual abuse histories to more successfully avoid the use of restraint and seclusion.
METHOD

I. Participants

Forty-six resident youths from an inpatient psychiatric hospital were recruited for participation. Youths ranged in age from 7 to 17 ($M = 14.0$, $SD = 2.3$). Over half (approximately 67%) of the youths were male. The majority of the sample was Caucasian (approximately 44%), whereas approximately 31% and 15% were Hispanic and Black, respectively. Prior to participation, parents or guardians provided informed consent and granted access to children’s medical and child protective services records. Youth provided informed assent. The facility’s medical director and executive board, and The State of Connecticut Department of Children and Families Institutional Review Board, approved the study.

II. Design

Data was collected during children’s hospitalization at Riverview Hospital in Middletown, Connecticut. Eligible youth participants were admitted into the study upon gaining approval from treatment teams and parents or guardians as well as meeting inclusion criteria. Inclusion criteria ensured children were not acutely psychotic and required child and adolescent participants to have an IQ of greater than 70. Parents and/or guardians were asked to complete a brief interview regarding basic demographic information. Following obtained assent, children and adolescents were assessed
individually for approximately 60 minutes by a trained clinical psychologist. In addition, members of inpatients’ treatment team (primary clinicians, coaches, and teachers) at Riverview Hospital completed approximately 30 minutes of assessment instruments regarding the child’s or adolescent’s behavior and psychosocial history.

III. Measures

i. Child Sexual Abuse History

The Maltreatment Classification System (MCS, Barnett, Manly, & Cicchetti, 1993) was first used to code multi-informant reports of children’s sexual abuse histories as documented in youth’s medical records and child protective service records. Coding using the MCS was performed by a trained, reliable gold-standard coder. The MCS is a well-validated measure that contains specific operational definitions of maltreatment subtype experiences (see Barnett et al., 1993). For the purposes of the current investigation, children’s records were then coded dichotomously for the presence or absence of each maltreatment subtype, including sexual abuse, depending on whether or not there was a documented substantiated case of child abuse listed in the child’s protective services and/or medical records.

ii. Prenatal Exposure to Alcohol, Tobacco, and/or Illicit Drugs

Presence or absence of prenatal exposure to alcohol, tobacco, and/or illicit drugs was retrieved from each child’s medical records. Medical information was then coded dichotomously for presence or absence of prenatal exposure, depending on whether or
not there was confirmed documentation of any prenatal exposure to either alcohol, tobacco, and/or illicit drugs, or a combination of prenatal exposure, listed in the child’s medical records.

iii. Temperament

Temperament was measured using the Early Adolescent Temperament Questionnaire – Revised (EATQ-R; Ellis & Rothbart, 2001). This measure, a revision of the Early Adolescent Temperament Questionnaire (Capaldi & Rothbart, 1992), has been extensively used in research applications and is comprised of 62 items that assess the following aspects of emotion and emotional regulation (i.e., temperament): activation control, affiliation, attention, fear, frustration, inhibitory control, and shyness. Participants’ temperament was rated by each youth’s respective clinician. Alphas for these scales range from .65 to .82 (Ellis & Rothbart, 2001). An aggregate of the attention and inhibitory control subscales formed the higher order factor of EC (Capaldi & Rothbart, 1992), which has an independent alpha of .70.

iv. Executive Functioning

Executive functioning was assessed with the Color-Word Interference Test of the Delis-Kaplan Executive Function System (D-KEFS; Delis, Kaplan, & Kramer, 2001). This test was selected because it taps into executive skills such as initiating and sustaining a response, mental flexibility, and the ability to inhibit (i.e., stop) an over-learned response/behavior. In particular, this selected subtest has been shown in the literature to be a solid measure of inhibition, which again is the component of executive
functioning believed to be predominantly relevant to restraint and seclusion (Latzman & Markon, 2010). Measures from the D-KEFS have demonstrated good reliability and validity (Homack, Lee, & Riccio, 2005) and are used extensively in clinical applications as well as in research settings.

v. Restraint and Seclusion

The rates of physical restraint and seclusion for each of the participating youth were obtained from medical records documenting these incidents during each patient’s entire length of hospitalization. Total number of restraints and seclusions were calculated in two forms to account for the varying length of hospitalization among the children, and thus allowing us to establish children equally with respect to length of hospitalization and thus time of potential exposure to these practices: (1) Because length of hospitalization varied across children with an absolute minimum in the sample of two weeks, the first form of total incidents of restraints and seclusions was summed based solely on children’s first evaluative two weeks of hospitalization, and (2) An overall proportion score of restraints and seclusions was constructed as the second form for each youth participant by dividing the total incidents of restraints and seclusions experienced by the total number of days of hospitalization.

IV. Analytic Strategy

Because there was considerable data missing from a number of youth participants, multiple imputation missing data analyses were conducted to replace missing data and consequently enhance power for later preliminary and moderation analyses (Acock,
2005). Using SPSS Missing Values, 40 data sets were imputed and analyzed. The following analyses were conducted utilizing the imputed data sets.

Preliminary correlations were first performed to test for potential significance in relations between the predictor variables and covariates with restraint and seclusion. Covariates included child age, gender, and admission global assessment of functioning (GAF) scores as these have been consistently found in the literature to predict restraint and seclusion (Busch & Shore, 2000).

Three multiple regression analyses were then conducted to examine the proposed moderator effects models. The first examined the moderator effect of prenatal exposure to alcohol, tobacco, and/or illicit drugs on the relation of child sexual abuse history with restraint and seclusion. The remaining two multiple regressions examined the moderator effects of the child characteristics EC and EF, respectively, in the relation of child sexual abuse to restraint and seclusion use.
RESULTS

I. Descriptives

Means, standard deviations, and correlations for all relevant study variables are reported in Table 1. Youth age had a mean of 14.03 ($SD = 2.32$), and admission GAF ratings averaged at 32.30, demonstrating some to major impairment in significant functioning areas, including school, family and peer relations, cognition, and mood. Approximately 65% of the youth inpatient sample was male ($n = 30$), and approximately 37% and 21% of the youth had reported histories of child sexual abuse and prenatal exposure to alcohol, tobacco, and/or drugs, respectively. Mean of youth EC ($M = 2.72$, $SD = 0.57$), where higher scores denoted greater EC, was approximately one standard deviation below the mean score of the standardization sample tested for the EATQ. Additionally, mean EF performance on the Color-Word Interference Test ($M = 5.67$, $SD = 2.78$) neared almost one and one half standard deviations below the mean D-KEFS scale score ($M = 10$, $SD = 3$). Incidents of restraint and seclusion during the first two evaluative weeks and proportion of restraint and seclusion during inpatient length of stay averaged at 2.24 and 0.06, respectively. Logarithmic transformations were performed to both measures of restraint and seclusion to improve normality of the data.
II. Preliminary Correlational Analyses

Correlation analyses confirmed that child age and child GAF score upon admission were significantly related to both restraint and seclusion documented within the first two weeks of admission as well as the overall proportion of restraint and seclusion during inpatients’ full stay. Specifically, younger children were more likely to have incidents of restraint and seclusion (restraint and seclusion weeks 0-2: $r = -.303, p < .05$; overall proportion of restraint and seclusion: $r = -.572, p < .001$). Children with lower GAF ratings were also more likely to have incidents of restraint and seclusion (restraint and seclusion weeks 0-2: $r = -.313, p < .05$; overall proportion of restraint and seclusion: $r = -.256, p < .10$). Child gender, however, was not significantly related to either measure of restraint and seclusion. More importantly, inpatients’ child sexual abuse history was significantly related to restraint and seclusion, particularly the overall proportion of restraint and seclusion, $r = .427, p < .001$, but not the incidents of restraint and seclusion within the first two weeks of admission, $r = .227, p > .05$.

Additionally, correlation analyses indicated that youth’s EC was significantly related to restraint and seclusion, and not their performance in EF nor their exposure to prenatal alcohol, tobacco, or illicit drugs. Specifically, clinicians’ ratings of children’s EC was significantly related to both measures of restraint and seclusion (restraint and seclusion weeks 0-2: $r = -.319, p < .05$; overall proportion of restraint and seclusion: $r = -.485, p < .001$), where higher reported EC was negatively associated with restraint and seclusion. In contrast, children’s performance in the Color-Word Interference EF Task was not significantly related to both forms of restraint and seclusion (restraint and seclusion weeks 0-2: $r = -.186, p = .249$; overall proportion of restraint and seclusion: $r =$
Similarly, children’s prenatal exposure to alcohol, tobacco, or illicit drugs was also not significantly related to both forms of restraint and seclusion (restraint and seclusion weeks 0-2: $r = .085, p = .559$; overall proportion of restraint and seclusion: $r = .045, p = .776$).

III. Moderation Multiple Regressions

Three sets of multiple regression analyses were conducted to examine moderator effects models in the relation of child sexual abuse history to restraint and seclusion by each of the three potential moderators of EC, EF, and prenatal exposure to alcohol, tobacco, or illicit drugs. Each set of multiple regression analyses consisted of two multiple regressions aimed to examine moderation effects on the two forms of restraint and seclusion individually, and differed only in this regard. All covariates and predictor variables were centered prior to the analysis of the interactions (Aiken & West, 1991). In the first step, child age, child gender, and admission GAF were entered as covariates. In Step 2, child sexual abuse history and one of the three proposed moderation variables were entered. In the final step, a product term of child sexual abuse history and the selected moderator was entered predicting restraint and seclusion.

The first set of multiple regression analyses assessed whether the temperament construct of EC moderated the relationship of child sexual abuse history to restraint and seclusion in both forms. A significant child sexual abuse history x EC interaction was found when predicting the overall proportion of restraint and seclusion during an inpatients’ stay [$\Delta F (1, 39) = 1.870, p < .05; \Delta R^2 = .029; \text{total } R^2 = .447$]. Similarly, the interaction between child sexual abuse and EC in predicting incidents of restraint and
seclusion within the first two weeks of hospitalization exhibited a trend that neared significance [\(\Delta F (1, 39) = 1.787, p < .10; \Delta R^2 = .035; \) total \(R^2 = .297\)] (see Table 2).

Plotting the interactions for EC and child sexual abuse history in predicting restraint and seclusion – overall proportion of restraint and seclusion and incidents of restraint and seclusion within the first two weeks of hospitalization (see Figures 1 and 2, respectively) – indicated similar interaction patterns. As anticipated, Figure 1 demonstrates that among children with no sexual abuse history, children with lower EC had comparable rates of restraint and seclusion than did children with higher EC. Among children with a history of sexual abuse, however, children with lower EC had significantly greater rates of restraint and seclusion than children with higher EC. Thus, levels of EC much more greatly affected children’s incidents of restraint and seclusion among children with abuse histories than children without. Simple slopes analysis revealed that among children with sexual abuse histories, there was a significant negative association between EC and the overall proportion of restraint and seclusion, \(\beta = -.023, t(44) = -3.441, p < .01\). In contrast, among children without sexual abuse histories, the association between EC and restraint and seclusion was not significant for overall proportion of restraint and seclusion, \(\beta = .130, t(44) = .646, p = .740\). The same interaction pattern is evident in Figure 2 when predicting restraint and seclusion within the first two weeks of hospitalization. Simple slopes analysis, however, revealed that both among children with sexual abuse histories and among children without sexual abuse histories, there was not a significant association between EC and restraint and seclusion within the first two weeks of admission, \(\beta = -.023, t(44) = -.249, p = .128\) and \(\beta = .003, t(44) = .130, p = .522\), respectively.
The second set of multiple regression analyses assessed whether children’s EF, particularly inhibition, moderated the relationship of child sexual abuse history to restraint and seclusion. The moderation tests proved nonsignificant when predicting both incidents of restraint and seclusion within the first two weeks \([\Delta F(1, 39) = 0.194, p > .05; \Delta R^2 = .005; \text{total } R^2 = .044]\) and also proportion of restraint and seclusion during inpatient stay \([\Delta F(1, 39) = 0.031, p > .05; \Delta R^2 = .001; \text{total } R^2 = .310]\) (see Table 3).

The third and final set of multiple regression analyses assessed whether prenatal exposure to alcohol, tobacco, or illicit drugs moderated the relationship of child sexual abuse history to both forms of restraint and seclusion. A significant prenatal exposure \(\times\) child sexual abuse history interaction was found in predicting incidents of restraint and seclusion within the first two weeks of hospitalization \([\Delta F(1, 39) = 6.996, p < .05; \Delta R^2 = .128; \text{total } R^2 = .239]\). Similarly, the interaction between sexual abuse and EC in predicting the overall proportion of restraint and seclusion during inpatients’ stay exhibited a trend that neared significance \([\Delta F(1, 39) = 4.710, p < .10; \Delta R^2 = .067; \text{total } R^2 = .405]\) (see Table 3).

Plotting the significant interactions for prenatal exposure and child sexual abuse history in predicting incidents of restraint and seclusion within the first two weeks of hospitalization and overall proportion of restraint and seclusion during an inpatients’ stay (see Figures 3 and 4, respectively) indicated similar interaction patterns. Again, as anticipated, Figure 3 demonstrates among children with no sexual abuse history, those also with no prenatal exposure to alcohol, tobacco, or illicit drugs had fewer incidents of restraint and seclusion when compared to those who did experience the adverse circumstance of prenatal exposure to alcohol, tobacco, and/or illicit drugs. Contrary to
expectation, however, among children with a documented history of sexual abuse, prenatal exposure to alcohol, tobacco, or illicit drugs was surprisingly not significantly associated with restraint and seclusion. In contrast, however, it was among children without a history of sexual abuse where the addition of prenatal exposure was significantly associated with restraint and seclusion. Thus, in other words, children exposed to both adverse experiences and thus multiple traumas did not fair worse than children who were exposed to just one adverse circumstance. The same pattern was revealed (Figure 4) when predicting overall proportion rates of restraint and seclusion.
DISCUSSION

Although restraint and seclusion are commonly recurring forms of “intervention” practices utilized in mental health care settings, their use continues to be extremely controversial and immensely debated in the literature. Whereas some support the use of restraint and seclusion as emergency means required to ensure patient and staff safety, opponents of restraint and seclusion question the overall validity and effectiveness of these interventions (Day, 2002; Grigg, 2006; Masters et al., 2002; Mohr et al., 1998; Oberleitner, 2000). Moreover, research links restraint and seclusion to numerous severe physical and psychological consequences. In fact, restraint and seclusion are particularly psychologically detrimental for inpatients with sexual abuse histories, as these interventions often resurface and exacerbate already existing trauma (Gallop et al., 1999; Mohr et al., 2003). Accordingly, the proposed study aimed to expand on a number of limitations in the existing literature on restraint and seclusion. First, the current study further examined the under-researched association between child sexual abuse history and restraint and seclusion among inpatient youth. Additionally, in response to a restraint and seclusion literature that has narrowly fixated on single predictors, the present study also evaluated the potential interactive effects of child sexual abuse with three other factors on restraint and seclusion use. These proposed moderating factors included two individual child characteristics, child EC and EF, as well as a second environmental adversity, children’s prenatal exposure to alcohol, tobacco, and/or illicit drugs.
I. Relations between Restraint and Seclusion, Covariates, and Variables of Interest

i. Selected Covariates and Restraint and Seclusion

Correlation analyses confirmed that child age and child GAF ratings upon admission are significantly related to both compositions of restraint and seclusion – (1) restraint and seclusion incidents documented within the evaluative first two weeks of admission, as well as (2) the overall proportion rates of restraint and seclusion during inpatients’ full length of stay. Specifically, younger child age and lower GAF ratings at admission were positively associated with incidents of restraint and seclusion. These results further affirm extant research that too has identified a significant relationship between child age and functioning with restraint and seclusion (Busch & Shore, 2000; Fisher, 1994). In contrast, child gender was not significantly related to either form of restraint and seclusion. Past literature demonstrates inconsistency in results when investigating the association between child gender and restraint and seclusion. Although some research has found a significant link between child gender and restraint and seclusion (Busch & Shore, 2000), other research too has found no such significance in relation between gender and restraint and seclusion (Donovan, Plant, Peller, Siegel, & Martin, 2003).

ii. Child Sexual Abuse History and Restraint and Seclusion

More importantly, analyses indicated that inpatients’ child sexual abuse history was significantly related to restraint and seclusion, but specifically for the overall proportion rates of inpatient restraint and seclusion and not the total number of incidents
of these practices within the first two weeks of admission. This finding confirms existing literature that has also documented a significant relation between general child abuse and restraint and seclusion among inpatient youth (Fryer et al., 2004). More specifically, the current study suggests that sexual abuse is more strongly related to children and adolescents’ overall proportion of restraint and seclusion, rather than restraint and seclusion incidents occurring within the first two weeks of admission. This disparity may stem from the evident distinction in measurement period existing across the two constructed forms of restraint and seclusion. Whereas restraint and seclusion measured within the first two weeks of hospitalization may reflect children and adolescents’ initial difficulty with a challenging transition period that is experienced by many patients, children with sexual abuse histories may possess persistent difficulties in regulating their behaviors over time. In fact, research indicates that children with sexual abuse histories are often more treatment refractory and thus maintain high risk behavior for longer periods when compared to other children without sexual abuse, who often increasingly improve in condition (Connor, Miller, Cunningham, & Melloni, 1994).

iii. Proposed Three Moderators and Restraint and Seclusion

Among the three proposed moderators, analyses indicated that only EC was significantly correlated with restraint and seclusion. Specifically, children with higher clinician ratings of EC had significantly fewer incidents of restraint and seclusion than children with lower clinician ratings of EC. This association aligns with recently published literature identifying EC as a protective factor against need for restraint and seclusion among inpatient youth (Bridgett et al., 2012). In contrast, both EF, measured by
performance in the Color-Word Interference Task, and prenatal exposure to alcohol, tobacco, and/or illicit drugs were not significantly related to either measure of restraint and seclusion. Although nonsignificant, these findings are critical in the extension of the current literature on predictors of restraint and seclusion, as no prior research, to our knowledge, had investigated the links between restraint and seclusion and children’s EF or prenatal exposure to alcohol, tobacco, and/or illicit drugs.

II. Effortful Control as Moderator in Relation of Child Sexual Abuse to Restraint and Seclusion

EC was hypothesized to assume a buffering moderation role in the relation of child sexual abuse history to restraint and seclusion. In particular, greater EC was expected to serve as a protective factor not only against the early adverse experience of child sexual abuse, but also would consequently protect against the need for restraint and seclusion when compared with children rated by clinicians more poorly on this temperament dimension. In the present study, EC, in fact, was confirmed as a significant moderator of the relation between child sexual abuse history and restraint and seclusion. Fundamentally, discovery of this significant moderator further extends the literature demonstrating EC as a singly predictive protective factor against restraint and seclusion, where children with greater EC were found to experience less incidents of restraint and seclusion when compared to children with lower EC (Bridgett et al., 2012).

More critically, however, this result reveals the substantial knowledge that may be gained from investigating the interactive influence of multiple factors in predicting restraint and seclusion. Specifically, this moderation finding reaffirms the significant
impact of possessing favorable temperamental properties, such as high EC, given
adversity. As demonstrated across other areas of outcome research, positive
temperamental qualities, like high EC, commonly play a protective role against numerous
unfavorable outcomes, as is demonstrated in this study with restraint and seclusion
(Belsky 1997a, 1997b, 2005). Furthermore, although not directly tested within the present
study, this significant moderation continues to lend support in solidifying hypotheses
claiming that given adverse early circumstances, EC specifically plays a critical
moderation role in both cognitive and socioemotional development, consequently either
buffering or exacerbating various child and adolescent outcomes (Lenguá, Bush, Long,
Kovacs, & Trancik, 2008).

Thus, the present study suggests that among inpatient children and adolescents,
children lower in EC may have increased difficulty in modulating psychological distress
from previously experienced trauma, such as child sexual abuse, as well as psychological
distress currently presented upon admission to the psychiatric facility. Consequently,
these low EC children may have more of a challenge in successfully inhibiting behavioral
reactivity to ambiguous and potentially threatening circumstances, and also may struggle
more in disengaging from conflict to seek safer and more adaptive settings (Lenguá et al.,
2008; Rothbart & Bates, 2006). More specifically, the present study demonstrates that
within a psychiatric inpatient setting, children with sexual abuse and low EC may often
fail to successfully modulate their distress in a manner that would avoid need for restraint
and seclusion. Thus, higher EC appears to be associated with more resilience to early
adverse experiences among children with sexual abuse histories, who may otherwise be
at risk for restraint and seclusion
III. Executive Functioning (Inhibition) as Moderator in Relation of Child Sexual Abuse to Restraint and Seclusion

Children’s EF was hypothesized to moderate the relation of sexual abuse history to restraint and seclusion, where children demonstrating greater EF were anticipated to better modulate their exposure to child sexual abuse, thus lessening the necessity for restraint and seclusion. Although the EF construct of inhibition was believed to be particularly relevant for the prevention of restraint and seclusion, EF was not found to be a significant moderator of the relation of child sexual abuse to restraint and seclusion. Thus, although greater inhibition was theorized to allow children to control their reactivity and consequent behaviors given provoked circumstances, this was not the case in the current sample. Ultimately, explanation of these results warrants further investigation. For example, it might be important for future research to consider the influence of commonly prescribed inpatient medications that may have confounded our measurement of children’s EF. In fact, commonly prescribed medications aiming to counteract more behaviorally reactive and aggressive youths in psychiatric inpatient units readily influence children’s cognitive functioning, including EF (Bilder et al., 2002). Specific examples of such medications include certain stimulants such as Ritalin, benzodiazepines such as Valium, and other psychotropic drugs such as Clonidine (Brown, Dingle, & Landau, 1994).
IV. Prenatal Exposure as Moderator in Relation of Child Sexual Abuse to Restraint and Seclusion

Prenatal exposure to alcohol, tobacco, and/or illicit drugs was hypothesized to exacerbate the relation of child sexual abuse history to restraint and seclusion, where children exposed to both adverse experiences (i.e. those inpatients having both a history of sexual abuse as well as documentation of prenatal exposure to alcohol, tobacco, or illicit drugs) would necessitate higher rates of restraint and seclusion when compared to children with the experience of neither or only one of these adverse circumstances. In the present study, prenatal exposure to alcohol, tobacco, or illicit drugs was found to be a significant moderator of the relation between child sexual abuse history and restraint and seclusion, but not entirely in the manner expected. As anticipated, among children without a sexual abuse history, those also without a prenatal exposure history appeared to have fewer incidents of restraint and seclusion than those who with a prenatal exposure history. Contrary to expectation, however, among children with a documented history of sexual abuse, there were not significant differences between children with and without prenatal exposure. In other words, results of the present study, specific to restraint and seclusion occurring in the first two weeks of hospitalization rather than the overall proportion of restraint and seclusion, indicated the following interaction trends: (1) that children exposed to neither early adverse experience, in fact, had the fewest reported incidents of restraint and seclusion, and (2) surprisingly, that among children with sexual abuse histories, anticipated differences between those with and without prenatal exposure to alcohol, tobacco, and/or illicit drugs were not observed in predicting restraint and seclusion.
As expected, the first of these two findings suggests that children exposed to neither of the early adversities (i.e., neither child sexual abuse nor prenatal exposure to alcohol, tobacco, and/or illicit drugs) experience fewer incidents of restraint and seclusion when compared to either children with documentation of only one or both adversities. These results are consistent with extant literature underscoring the negative impact of stress, adversity, and trauma on child and adolescent outcomes, where the experience of one or multiple stressors or adversities is believed to exponentially increase children’s risk for adverse academic, behavioral, socioemotional, and psychopathological outcomes (Anda et al., 2006; Turner & Llyod, 2004). Additionally, to our knowledge, no research has previously linked prenatal exposure to alcohol, tobacco, and/or illicit drugs to restraint and seclusion. Thus, the results of the present study uniquely contribute to the literature by demonstrating that prenatal exposure to alcohol, drugs, and tobacco is a significant predictor of restraint and seclusion, specifically in the absence of child sexual abuse.

The second more unforeseen aformentioned result indicates that there were no anticipated differences among children with sexual abuse histories in predicting restraint and seclusion between those with and without prenatal exposure to alcohol, tobacco, and/or illicit drugs. This finding in part may be due to the fact that the construct of prenatal exposure was not assessed utilizing the most rigorous approach ideal for examining associations among prenatal exposure, sexual abuse, and restraint and seclusion. In fact, measurement was dependent on parental report and documentation in children’s medical or child protective service records. Nonetheless, the observed interaction suggests that sexual abuse history may be a more salient risk factor for
restraint and seclusion when compared to prenatal exposure, as it appears that the effects of prenatal exposure on restraint and seclusion become nonsignificant once placed within the context of sexual abuse.

V. Strengths and Clinical Implications

Foremost, the present study is influential in its overall aim to resolve major limitations in the restraint and seclusion literature. Specifically, this study further examined the under-researched relation between child sexual abuse history and restraint and seclusion among inpatient youth. Moreover, in response to restraint and seclusion literature that has narrowly fixated on single predictors, the present study also evaluated the potential interactive effects of child sexual abuse independently with three other factors on restraint and seclusion use, namely child EC, EF, and prenatal exposure to alcohol, tobacco, and/or illicit drugs.

The results of the current study have significant clinical implications. This study extends extant literature informing clinical staff of critical inpatient environmental and individual predictors posing increased risk for restraint and seclusion. Specifically, this study further confirms the significant relation between child sexual abuse history and restraint and seclusion incidents, where children with a child sexual abuse history are at increased risk for incidents of restraint and seclusion. Along with research demonstrating the unique detrimental psychological and physical consequences resulting from the experience of restraint and seclusion among sexually abused youth, the present study brings knowledge and awareness to clinical personnel that children with sexual abuse histories should be (1) identified early and closely monitored upon admission as
individuals who may be at risk for restraint and seclusion and (2) targeted with specific treatment modalities that will prevent the escalation of dangerous behavior that would lead to the need for restraint and seclusion. Additionally, the present study’s moderation analyses should further inform clinical treatment for inpatient youth. For instance, it may be helpful to provide youth with sexual abuse histories treatments that promote higher EC capabilities. In fact, intervention research continues to advocate for and confirm the substantial gains in children’s adjustment and outcome resulting from interventions aimed at improving cognitive- and self-regulation skills, including EC specifically (Diamond, Barnett, Thomas, & Munro, 2007; Liew, 2012). Furthermore, the current study provides research focused on high risk clinical populations, which is essential not only to broadening our understanding of child psychopathology, but also to enhancing inpatient treatments for youth, and particularly those affected by child sexual abuse, so as to ultimately avoid the negativities of restraint and seclusion.

VI. Limitations and Future Directions

Although the present study possesses a number of significant strengths, it does not exist without limitations. Foremost, this study is limited due to its small sample size of 46 as well as its considerable amount of missing data. The significance in moderation findings, however, given such a small sample size attest to the strength of the tested relationships. Evidently, future research would benefit from capitalizing on larger samples to test and attempt to replicate the associations reported here. Additionally, data was limited in the sense that some critical variables were constructed using dichotomous scales. Future studies should measure constructs such as child sexual abuse history and
prenatal exposure with continuous scales in attempts to avoid the sacrifice of vital information that can be lost when dichotomizing data. Furthermore, the present findings are limited in their generalizability, as data was extracted from a single psychiatric facility. Future research should thus aim to test and replicate these relationships ideally in more diverse psychiatric populations to increase the generalizability of results. Finally, future investigation of the tested relationships would benefit from the examination of the effect of psychiatric medication administered to youth on the tested relationships, specifically in regard to child EF performance.
APPENDIX A:

FIGURES

Figure A.1: Interaction between child sexual abuse history and effortful control predicting overall proportion of restraint and seclusion.
Figure A.2: Interaction between child sexual abuse history and effortful control predicting restraint and seclusion in weeks 0-2.
Figure A.3: Interaction between child sexual abuse history and prenatal exposure to alcohol, tobacco, and/or illicit drugs predicting restraint and seclusion in weeks 0-2.
Figure A.4: Interaction between child sexual abuse history and prenatal exposure to alcohol, tobacco, and/or illicit drugs predicting overall proportion of restraint and seclusion.
APPENDIX B:

TABLES
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<td>-.319*</td>
<td>-.186</td>
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<td>9. Proportion R/S During Inpatient LOS</td>
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<td>-.572***</td>
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<td>.427**</td>
<td>-.485**</td>
<td>-.179</td>
<td>.045</td>
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*Note.*** p < .001, ** p < .01, * p < .05, † p < .10*
TABLE B.2
HIERARCHICAL REGRESSION ANALYSIS FOR CHILD SEXUAL ABUSE HISTORY, EFFORTFUL CONTROL,
AND THE INTERACTION BETWEEN CHILD SEXUAL ABUSE HISTORY AND EFFORTFUL CONTROL
PREDICTING RESTRAINT AND SECLUSION

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Note. *** p < .001, ** p < .01, * p < .05, † p < .10
TABLE B.3
HIERARCHICAL REGRESSION ANALYSIS FOR CHILD SEXUAL ABUSE HISTORY, EXECUTIVE FUNCTIONING, AND THE INTERACTION BETWEEN CHILD SEXUAL ABUSE HISTORY AND EXECUTIVE FUNCTIONING

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*Note.* *** p < .001, ** p < .01, * p < .05, † p < .10
TABLE B.4

HIERARCHICAL REGRESSION ANALYSIS FOR CHILD SEXUAL ABUSE HISTORY, PREGNATAL EXPOSURE, AND THE INTERACTION BETWEEN CHILD SEXUAL ABUSE HISTORY AND PREGNATAL EXPOSURE

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Note. *** p < .001, ** p < .01, * p < .05, † p < .10
REFERENCES


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