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Social Context, Parental Monitoring, and Multisystemic Therapy Outcomes

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Social Context, Parental Monitoring, and Multisystemic Therapy Outcomes

By

Brittany A. Robinson

B.A., Yale University, 2009

Advisor: Patricia A. Brennan, Ph.D.

An abstract of

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Abstract

Social Context, Parental Monitoring, and Multisystemic Therapy Outcomes
By Brittany A. Robinson

Multisystemic Therapy (MST) is an integrative, empirically driven modality of treatment used to decrease externalizing behaviors in adolescents. Although parent training has been identified as a critical component of the therapy, it has scarcely been measured to determine its role in the relationship between treatment and outcomes. There is even less literature investigating the potential influences of socioeconomic status (SES) and neighborhood context on both parenting and treatment outcomes. Thus, the proposed study aims to explore these relationships in an effort to comprehend under which socioeconomic conditions and in what populations MST might be most efficacious. Using hierarchical linear modeling (HLM), we analyzed the role of parental monitoring, SES, and neighborhood factors in predicting changes in externalizing behaviors over the course of treatment. Parental monitoring was found to predict rate of change in externalizing behaviors over time. Neighborhood factors interacted with parental monitoring, such that monitoring predicted rates of change in externalizing behavior only for families in better neighborhoods. In contrast, SES was unrelated to externalizing behaviors in the MST context. Taken together, these results support the importance of parental monitoring in this therapeutic model and demonstrate a need for further understanding the potential role of the youth's larger social context in predicting outcomes.

Keywords: *Multisystemic Therapy, socioeconomic status, social context, neighborhood, parenting*

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Multisystemic Therapy (MST) is an integrative treatment aimed at changing the home, school, and community environments of troubled youth. The therapy has seen much success in recent years in reducing externalizing behaviors and criminality among delinquent adolescents (Henggeler & Schaeffer, 2010). Not only has MST proven useful for producing positive changes in the lives of the adolescents who receive it, but it has also been shown by cost-benefit analyses to be associated with substantial reductions in expenses to taxpayers, alleviation of loss and suffering to crime victims, and a host of other benefits, both tangible and non-tangible, to society as a whole. In fact, the cumulative benefits of MST to taxpayers, crime victims, and society have been estimated to range from approximately $75,110 to $199,374 per participant (Klietz, Borduin, & Schaeffer, 2010). A lifetime of crime committed by just one individual can have an economic impact of up to $1.5 million, but with empirically driven practices designed to limit and prevent crime in adolescence, the period where it most often begins, we are capable of producing substantial changes to both our youth and our economy (Foster, Jones, & the Conduct Problems Prevention Research Group, 2006; Klietz, Borduin, and Schaeffer, 2010).

A necessary step toward channeling the potential of MST for these preventative purposes is understanding how it works, for whom it works, and the conditions that must be present in order to maximize its efficacy. Surprisingly, despite its primary focus on parent training, a rather limited number of studies have examined the role of parental disciplinary and monitoring practices as mechanisms of change in MST (Henggeler, et al., 1986; Henggeler, et al., 2009; Huey, Henggeler, Brondino, & Pickrel, 2000). Even less attention has been given to the socioeconomic factors that might underlie or

influence associations between parenting and therapy outcomes (Henggeler & Schaeffer, 2010; Huey et al., 2000). SES, in particular, may influence parenting and affect the association between parenting and treatment outcomes, as it pervades so many areas of the parent and adolescent's lives. Additionally, neighborhood characteristics, by virtue of their influence on the child's home environment and immediate social context, might have significant impact on both parenting and children's exhibition of externalizing behaviors or the relationship between the two. Therefore, it seems that both SES and neighborhood factors may impact MST treatment outcomes through their influence on parenting and children's behavior, and that both SES and neighborhood factors may moderate the relationship between parental monitoring and treatment outcomes in MST. The aim of the proposed study is to test these predictions in the context of an MST treatment study.

Built from Bronfenbrenner's (1979) socio-ecological model of human development, MST is an individualized intervention program that endorses the view that adolescents' behaviors are influenced by interactions among multiple actors and systems of the child's life and that each of these components must be addressed in order to prevent future maladaptive behaviors. Thus, it is the adolescent's social ecology, and not just his cognitions or individual behaviors, that needs modification to improve problematic areas (Henggeler & Schaeffer, 2010). The role of the parent in MST is critical to achieving positive outcomes. The active engagement of a parent in treatment is a necessary precursor to MST having any real or lasting influence on the life of the adolescent. Thus, one of the primary goals of this form of therapy is to help parents develop the skills they need to adequately monitor and discipline their adolescent.

Although it is not often a focus of MST research, the significance of the parent's role in MST has been empirically substantiated. A limited number of studies have shown that parental monitoring mediates the relationship between MST and successful treatment outcomes (Henggeler et al., 1986; Henggeler et al., 2009; Huey et al., 2000). More specifically, these studies have shown that evaluating problem behavior in the context of parental strategies and providing comprehensive parent training around problem behavior produces increases in parental monitoring that reduce delinquent behavior over the course of treatment. Another recent study has demonstrated the role of parental factors in MST outcomes within a population of juvenile sex offenders (Borduin & Schaeffer, 2001; Henggeler et al., 2009). In this population, both parent disciplinary strategies and deviant peers were identified as mediators of MST treatment effects.

Treatment outcome research not involving MST has also found parental engagement to be predictive of improvements in behavioral problems. For example, research has shown that, in general, children with parents who are more engaged in treatment show less symptoms post-treatment than children of parents who are less engaged (Trunzo, 2006). Literature in non-treatment samples has also supported parental monitoring as a valuable influence on youth behaviors (Bornstein & Lamb, 1992). For example, studies have found that less well-monitored boys show poorer academic performance than those who are monitored more closely (Crouter, MacDermid, McHale, & Perry-Jenkins, 1990). Additionally, research has found that children with disengaged parents are more irresponsible, immature, and likely to have poorer relationships with family and friends than children with involved parents (Baumrind, 1991; Patterson, Reid, & Dishion, 1992; Rubin, Coplan, Chen, Bowker, & McDonald, 2011). Thus, it seems

that the role of parental monitoring in shaping youth's outcomes has been found not only in MST research, but also in other treatment and community samples, and it appears to highly associated with positive outcomes for children and adolescents.

In addition to altering the adolescent's family systems, another stated emphasis of MST is to remove barriers to treatment (Henggeler, 1999; Henggeler & Schaeffer, 2010). Stress, lack of financial resources, long work hours, and poor work conditions are just a few potential hindrances to adequate engagement in therapy. These factors can all be tied to a family's SES, since populations of low SES have been found to experience higher levels of stress, poorer work circumstances, and longer work hours (Franzini, Caughy, Spears, & Esquer, 2005). In fact, low SES has been identified as a vulnerability factor for poorer outcomes in children due to the higher rates of instability and risk these youth may face. The main mechanisms thought to link SES to child well-being are limited material and social resources, as well as high stress-inducing conditions experienced by both the children and their parents (Bradley & Corwyn, 2002). These conditions prevent parental involvement in children's school activities, academic performance, and social environments due to the economic strains these parents often experience on a daily basis (Evans, 2004).

Because most child and adolescent therapies, including MST, depend so highly on parental involvement, SES becomes particularly critical. Parents who are presented with SES-related stressors on a daily basis may be less likely to adhere to treatment regimens, attend sessions, and remain actively engaged in achieving therapeutic goals. Particularly in MST where parental monitoring may be the key mechanism to change, the ability of parents to effectively carry out their role in therapy is paramount. If a parent is mentally

and physically taxed from financial hardship, long work hours, and poor work conditions, sufficient parental monitoring and discipline may not be possible, and treatment objectives may not be reached. No study to date has examined whether SES influences changes in parenting practices in the context of MST; this is a unique contribution that the proposed study will make to the MST treatment literature.

In addition to SES, neighborhood factors have been found to have substantial influence on both parenting and youth behavior. Neighborhood factors may affect youth behavior via their overall impact on the child's most proximal community context. Additionally, these factors could impact parental well-being, parental stress, and a parent's capacity to effectively monitor and discipline their child. Of particular relevance to the current study is the relationship among neighborhood factors, parental monitoring, and youth externalizing behavior. Neighborhood poverty has been shown to be associated with decreased parental monitoring, as well as harsher and less nurturing parenting (Klebanov, Brooks-Gunn, & Duncan, 1994; Rankin & Quane, 2002; Taylor, 2000). In addition to its effect on parenting, poorer neighborhood conditions have also been found to predict problem behavior in youth (Furstenberg, Cook, Eccles, Elder, & Sameroff, 1998; Rankin & Quane, 2002) and that relationship has been found to be fully mediated by parenting (Guion, Mrug, & Windle, 2009). The current study will test whether neighborhood factors have similar influences on parent and child outcomes in the context of MST.

It is also important to explore the role of SES and neighborhood factors as potential moderators between parental monitoring and externalizing behaviors. Two theories have been proposed in an effort to explain why parenting strategies might be

more or less effective in different social contexts (Simons, Lin, Gordon, Brody, & Conger, 2002). The *parental buffering hypothesis* suggests that parental control becomes more critical in lower SES context and poorer neighborhoods, because the parent is needed to reduce the rates of youth exposure to adverse environmental factors (Simons, Lin, Gordon, Brody, & Conger, 2002). If this theory holds true, the relationship between parental monitoring and externalizing behavior in lower SES context and poorer neighborhoods should be stronger than that same relationship in higher SES neighborhoods.

The alternative hypothesis assumes that parental control works more effectively in more optimal social contexts where environmental pressures to engage in antisocial influences are modest. Parenting strategies might be less effective in contexts where crime, externalizing problems, and deviant behavior are widely prevalent. In such contexts, these negative influences might overpower a parent's capacity to monitor and control their child. This theory is termed the *evaporation hypothesis*, since it suggests that the effect of parental control decreases (or evaporates) as environmental pressures to engage in negative behaviors increase within a community (Simons, Lin, Gordon, Brody, & Conger, 2002). In an effort to explore these hypotheses, the current study will test the role of SES and neighborhood factors as moderators between parental monitoring and externalizing behaviors and the direction of the interaction should it exist.

As a final note, many studies exploring the role of neighborhood context in predicting youth behavior have measured neighborhood factors by assessing child and parent perceptions of neighborhood conditions or, alternatively, using census data of concentrated neighborhood poverty and ethnic heterogeneity. The current study aims to

add to that literature by using observational reports of various neighborhood factors. This method of measuring neighborhood condition is thought to provide a more qualitative picture of the neighborhoods in which these families live by assessing the presence and pervasiveness of various adverse neighborhood characteristics, such as the presence of groups of unsupervised youth, bars on windows, and graffiti, among other characteristics.

Although MST emphasizes the adolescent's family and peer systems, the theoretical underpinning of the therapy acknowledges that there is a bigger picture. Even the systems in which an adolescent is embedded are, themselves, rooted in a larger framework of social circumstances, policies, and other environmental factors. Thus, this broader ecology must also be addressed in terms of how it might influence behavior. The circumstances affecting a parent's ability to monitor the adolescent are a part of this broader context. Although such factors are often acknowledged, they are seldom a central focus in MST research. Thus, this paper aims to explore whether SES and neighborhood context affect treatment outcomes by influencing the amount of effort a parent can exert toward improving monitoring. It is hypothesized that such a relationship does exist and that SES and neighborhood factors influence treatment outcomes through direct effects on parenting changes during treatment. It is also possible that the association between parenting changes and MST treatment outcomes is moderated by socioeconomic status and neighborhood factors. Changes in parenting may be more or less influential depending on SES and neighborhood context. They may be more influential if they are the isolated and necessary mechanisms for change, because other risk factors are lower in a high SES context. Alternatively, changes in parenting may be less influential for therapeutic change if their effects on outcome depend upon a cascade of changes in other

risk areas (such as associations with delinquent peers) that are less apparent in high SES families.

In this study, we hypothesize that changes in parental discipline and monitoring will predict MST treatment outcomes, similar to what has been seen in previous findings. Next, we hypothesize that SES and neighborhood factors will influence changes in parental monitoring over the course of treatment. Finally, we will explore whether SES and neighborhood factors moderate the relationship between parental monitoring and treatment outcomes, however, we make no a priori predictions as to the direction of this moderating effect.

Methods

Participants

The sample used for this study included 185 youth (65.4% male) ages 12 to 18 years (M=15.35; SD=1.28) who were recruited from one of four licensed MST programs in the Denver metropolitan area. Youth were referred for MST services due to commission of a criminal offense, diagnosis of conduct disorder, or significant behavioral problems at home or in school (e.g. truancy, suspension, expulsion, aggression). 47.1% of youth were Caucasian (n=88), 27.8% were Latino/a (n=52), 19.8% were African American (n=37), and 4.3% identified as "other" (n=8). Inclusion criteria required that youth (1) were between the ages of 12 and 17 years at the onset of data collection; (2) had been referred for MST by social service agencies or juvenile justice courts due to involvement with substance abuse, property offense, or crimes against another person; (3) had lived in their caregiver's home for at least one month prior to treatment and had no immediate plans for placement elsewhere; and (4) were available to participate in current

MST treatment. Informed consent was obtained from caregiver and youth participants prior to the study's initiation.

Participating caregivers were primarily female (85.9%) between the ages of 25 and 74 (*M*=43.62; *SD*=9.58). Of the caregivers who participated, 41.6% (*n*=77) reported receiving financial assistance at the time of assessment, and 60% (*n*=111) reported having a high school education or less.

MST services were provided by 52 participating therapists (71% female) with an average age of 31 years. Of these therapists, 80% were Caucasian, 9% were Latino/a, 2% were African American, and 9% identified as "other." Before providing services, therapists had to meet their agency's requirements for hiring and have completed their agency's training requirements prior to participation. At the time of recruitment, therapists had accumulated an average of 9.51 (*SD*=17.35) months of experience using MST and 2.62 (*SD*=2.96) years of postgraduate training. A large majority of participating therapists (85%, *n*=44) reported having attained a Masters degree in fields including Social Work (50%, *n*=25), Counseling (19%, *n*=9), Psychology (15%, *n*=7), and Marital and Family Therapy (12%, *n*=6).

This study was approved by the Institutional Review Boards at the University of Colorado, the Medical University of South Carolina, and Emory University.

Study Design and Procedures

The data for the present study are drawn from a longitudinal study investigating a range of factors influencing differential treatment responses to MST in a community-based setting. The overarching goal of the larger longitudinal study is to explore the

influences of biological, family, therapist, and environmental factors on adolescents' response or non-response to treatment.

Shortly after the initiation of treatment, an initial intake assessment was scheduled at the home of each eligible participant. At this initial assessment, participants and their caregivers completed questionnaires measuring the youth's current level of delinquency, externalizing behaviors, deviant peer affiliation, health status, and pubertal status. Additionally, parenting practices were rated by caregivers, youths, and therapists. Demographic variables, including race, gender, and SES were collected as well.

Participant data were collected at five time points over a period of several months. The first of these assessments (time 1) was conducted as close to treatment onset as scheduling allowed at an average of 3.1 weeks from intake. Data were subsequently collected twice mid-treatment (times 2 and 3) at an average of 9.3 (*SD*=2.73) and 15.3 (*SD*=3.30) weeks from treatment start, respectively. At the conclusion of treatment, youth, caregivers, and therapists reported the youth's post-treatment (time 4) levels on the variables of interest, as well as the caregivers' post-treatment parenting strategies.

Notably, time between observations differed across participants in this study. Due to these differences, the variability in time between assessments over the course of treatment was controlled for in our HLM analyses.

Measures

The measures relevant to the current study include the Child Behavior Checklist (CBCL), the Alabama Parenting Questionnaire (APQ), the Hollingshead Index, and the Neighborhood Rating Scale (NRS). Table 1 contains means and standard deviations of each of the predictors and outcome variables used in the study.

The Child Behavior Checklist (CBCL) is an empirically validated measure of child behavior developed by Thomas Achenbach in 1991 and revised in 2000 for youth ages 1½ to 18. Given the age range of the current sample, the CBCL designed for use among ages 6 to 18 was used to assess youth behaviors. The CBCL is one of the most widely used measures of child behavior and has been found to show sensitivity to MST treatment effects (Schoenwald, Halliday-Boykins, & Henggeler, 2003). In this study, the questionnaire was completed by caregivers at each time point to assess youth's behaviors at the time of assessment and within the past thirty days. Although the measure assesses a range of behavioral variables, this study will focus primarily on the externalizing behavior scale within the full CBCL measure. The 33-item externalizing behavior scale includes items that assess the frequency of youth's lying, swearing, threatening, stealing, and vandalizing, among other behaviors. Response options range from zero to two (0-"Not true", 1-"Sometimes True", and 2-"Very True or Often True"), and these totals are summed to create a total externalizing score between 0 and 66. Internal consistency for the externalizing behavior scale in this study was 0.942 at time 1, 0.941 at time 2, 0.947 at time 3, and 0.950 at time 4.

The Alabama Parenting Questionnaire (APQ) is a 42-item measure designed to assess those dimensions of parenting practice that have been found to be linked to conduct problems (Shelton, Frick, & Wootton, 1996). The measure was designed for use with children from ages 6 to 17 and is well-validated as a measure of parenting style (Dadds, Maujean, & Fraser, 2003; Shelton, Frick, & Wootton, 1996). The APQ assesses parenting strategies across five domains: parental involvement, poor monitoring, inconsistent discipline, positive parenting, and corporal punishment. Youth reports on

the 10-item parental monitoring scale was of interest in the present study and included items such as "you stay out in the evening past the time when you are supposed to be home," "your parents do not know the friends you are with," and "you are at home without an adult being with you." Item responses range from 1 to 5 (1-"Never", 2-"Almost Never", 3-"Sometimes", 4-"Often", 5-"Always") and are summed to create total scores ranging from 10 to 50. Items were reverse coded, so that higher scores on the scale reflect better parental monitoring. Internal consistency for the parental monitoring scale in this study is 0.824 at time 1, 0.821 at time 2, 0.797 at time 3, and 0.847 at time 4. Two measures of parental monitoring were used in the current studies. First, we calculated an average of youth reports of parental monitoring at Time 1, Time 2, Time 3, and Time 4. Second, we used HLM exported slopes of parental monitoring using methods described by Henggeler et al. (2009).

A third measure of importance to this study is the Hollingshead (1979) Index of Social Position, which was used to determine participants' SES. This index is useful in that it considers social status a multidimensional rather than a unidimensional concept. This multidimensional index is based on a four-factor model that includes occupation and educational level for each of a youth's caregivers. These factors were chosen to represent SES, as they were thought to be salient characteristics that are reliably indicative of one's social status. Education, in this model, is rated on a seven-point scale in which a score of 1 represents an education level below 7^{th} grade, and a score of 7 represents graduate professional training and beyond. Conversely, occupation is rated on a nine-point scale, whereby a score of 1 is assigned to farm laborers and menial service workers, and a score of 9 is assigned to higher executives, large business owners, and major professionals.

Each occupation classification lists several titles receiving the score held by that particular category in order to facilitate reliability of ratings. The Hollingshead composite score is calculated by weighting the occupation score by a factor of five and the education score by a factor of three. The weights assigned to each factor are designed to emphasize the individual contributions of occupation and income to SES. In this study, education and occupation scores were assigned to youth's primary and secondary caregivers. These scores were weighted, summed, and then averaged between the two caregivers to produce an estimation of the youth's SES. The highest possible score on this measure is a 66, and the lowest is 0, reflecting an absent caregiver. The Hollingshead index has been shown to yield an inter-rater reliability of 0.906 and has been well-validated against other measures of SES (Cirino et al., 2002).

Finally, the Neighborhood Rating Scale assessed participants' neighborhoods by rating each of 13 neighborhood characteristics (e.g., presence of bars on windows, graffiti, groups of unsupervised youth) on a 3-point scale (1 = none, 2 = some, 3 = a lot) with possible scores ranging from 13 to 39. This instrument was constructed for the current project by adopting items from existing instruments when researchers were unable to find a satisfactory measure of neighborhood characteristics. Research assistants (RAs) completed the NRS upon each visit to a family's home based on their observation of the characteristics of interest. An option of "not observed" was available for characteristics that could not be seen, for example, when visits were conducted at night. The NRS is calculated by averaging all the items that were rated during a given observation. Additionally, NRS scores across all four time points were averaged for use in this study to reflect the average condition of each family's neighborhood across

treatment. Notably, higher scores on the measure indicate more disadvantaged neighborhoods, as evident by the higher prevalence of unfavorable neighborhood characteristics. Internal consistency for this measure was 0.858 at time 1, 0.819 at time 2, 0.749 at time 3, and 0.798 at time 4.

Statistical Analyses

Growth curve analyses were conducted to examine the relationship between predictor variables and the trajectory of externalizing behavior over the course of treatment. Hierarchical linear modeling (HLM) is one of several multilevel modeling approaches used for this purpose. HLM is particularly useful, not only for its ability to predict slope (growth rate of dependent variable), but also for its capacity to accommodate nested data. Nested data is particularly relevant to the current study due to the potential cluster effects of 185 participants being treated by only 52 therapists, as well as the lack of independence between data at each time point. HLM handles this issue by specifying both within-participants and between-participants equations at different levels of the model. In this design, time point (level 1) is nested within individuals (level 2), which are nested within therapist clusters (level 3). When a higher level of the model is found not to cause interdependence of data at a lower level, it can be excluded from the model (Raudenbush, Bryk, Cheong, Congdon, & Toit, 2004).

Statistical analyses, for the purposes of this study, began with an examination of factors that might have violated the assumptions necessary to test a hierarchical linear model. Thus, we ensured that there were no errors or outliers that might affect our results, as well as corrected for violations of linearity, independence of errors, homoscedasticity, and normality of distribution of errors. Missing data is allowed at

level 1 in HLM analyses and is assumed to be missing at random. However, cases in which there was missing data for any of the predictor variables at level 2 were deleted during the analyses.

In testing moderation, it must be demonstrated that the magnitude of the relationship between parental monitoring and youth behavioral outcomes differs at varying levels of SES or neighborhood characteristics. We will first ensure that parental monitoring, SES, and neighborhood characteristics are not so highly correlated that our analysis will be compromised. We will then use multilevel modeling to assess whether there is an interaction between parental monitoring and either SES or neighborhood factors in predicting youth behavioral outcomes. In these analyses, potential confounds (e.g., age, gender, and ethnicity) will be entered as controls, the main effects of SES, neighborhood factors, and parental monitoring will be controlled, and interactions between SES and parental monitoring, as well as neighborhood factors and parental monitoring, will be tested in their predictions of externalizing behavior. If any significant interactions are noted, post hoc analyses will be used to probe the direction of the interaction, as outlined by Aiken and West (1991).

Results

Descriptive Analyses

Correlations between each of the predictor variables and the outcome variable at each of the four time points are found in Table 2. SES was significantly correlated with neighborhood factors, as well as externalizing behavior at times 1 and 2, but not at times 3 and 4. Parental monitoring was significantly related to measures of externalizing

behavior at times 3 and 4. Finally, all four time points of externalizing behavior were significantly correlated with one another.

Data Analysis

Before beginning our analyses, we tested therapist effects on level 1 outcomes by computing the ICC for an empty model that included externalizing behavior and parental monitoring separately as outcome variables at level 1 and dummy variables at levels 2 and 3. The ICCs for level 3 ($\tau_\beta/(\tau_\beta+\tau_\pi+\sigma^2)$ in these models were minimal ($ICC_{externalizing}$=0.02; $ICC_{monitoring}$=0.01), suggesting that there are no differential effects on externalizing behavior or parental monitoring based upon therapist group. Therefore all analyses were tested at 2 levels (e.g., Level 1: slope of change in externalizing behavior from T1 to T4; Level 2: parenting and social context predictors). Variance components for both externalizing behavior and parental monitoring were analyzed before adding predictors and both were found to be significant at $p < 0.001$, suggesting that there is a significant amount of variance to be predicted within each outcome variable.

Unconditional Model: Externalizing behavior and parental monitoring as outcomes. Mean levels of externalizing behaviors at each time point can be found in Table 1. To determine whether externalizing behaviors changed significantly over the course of treatment, an unconditional model was run with externalizing behavior as the outcome variable and time as the predictor at level 1. The trajectory is represented in the following Level 1 (within-individual) equation

$$externalizing_{ti} = \pi_{0i} + \pi_{1i}(time_{centered})_{ti} + e_{ti}$$

The Level 1 intercept (π_{oi}) and slope (π_{1i}) were modeled by the following level 2 equations:

$$\pi_{0i} = \beta_{00} + r_{0i}$$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

The estimated mean slope (of the nontransformed raw CBCL scores) for externalizing behaviors was -1.63 (*SE*=0.180). Based on this mean trajectory, youth's externalizing behaviors decreased at an average rate of 1.63 points per observation point from the onset of treatment to termination. The slope in this model was significant at $p < 0.001$, suggesting significant change across treatment. Additionally, the variance component of the slope in this model suggests that there is significant variation among slopes of externalizing behavior in our sample (χ^2=229.57; p=0.002).

An identical model was used to examine the trajectory of parental monitoring across treatment, and this model produced a mean slope of 0.17 (*SE*=0.179) at $p = 0.13$, suggesting that, on average, parental monitoring did not change significantly over time. Despite the nonsignificance of the slope of parental monitoring, variance components of the slope suggest that there is significant variance to be predicted (χ^2=202.64; p=0.04). Therefore, parental monitoring was still entered as an outcome variable in later analyses to explore our stated hypothesis.

Model 1: Parental monitoring, SES, and neighborhood factors predicting externalizing behavior. Before testing this model, potential covariates (youth age, gender, and ethnicity) were entered as level 2 predictors in separate models to determine their significance. Only gender was significant in predicting changes in externalizing

behavior over time (p=0.041), so this was entered as a covariate in subsequent analyses. In model 1, we examined whether the slope of externalizing behavior over treatment was predicted by parental monitoring (both mean of T1-T4 and slope across the four assessments), SES, or neighborhood factors using the following models:

Level-1 model

$$\text{externalizing}_{ti} = \pi_{oi} + \pi_{1i}(\text{time}_{\text{centered}})_{ti} + e_{ti}$$

Level-2 models (each tested individually)

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{parental monitoring}_{\text{MEAN,T1-T4}}) + r_{1i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{parental monitoring}_{\text{SLOPE}}) + r_{1i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{SES}) + r_{1i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{neighborhood ratings}) + r_{1i}$$

As can be seen in Table 3, the average of T1-T4 measures of parental monitoring did not significantly predict the slope of externalizing behaviors over time. However, the slope of parental monitoring did significantly predict the slope of externalizing behaviors in the expected direction. Neither SES, as measured by the Hollingshead scale, nor neighborhood factors predicted the slope of externalizing behaviors over time.

Model 2: SES and neighborhood factors predicting parental monitoring. Parental monitoring was entered as the outcome variable in level 1 of this model, and both SES and neighborhood factors were included as separate predictors at level 2. As can be seen in Table 4, and contrary to our predictions, neither SES nor neighborhood factors significantly predicted slope of parental monitoring across treatment.

Model 3: SES x parental monitoring and neighborhood factors x parental monitoring predicting externalizing behavior. Centered variables and interaction terms were added to the model in order to test whether either SES or neighborhood factors moderated the relationship between parental monitoring and externalizing behavior. In this model, externalizing behavior was the outcome variable at level 1, while the centered main effect variables and interaction terms were included as predictors at level 2. This interaction was tested using both the mean of parental monitoring across all four time points and the slope of monitoring over treatment.

Results for the moderator tests are presented in Table 5. The interaction between SES and the parental monitoring average did not predict slope of externalizing behavior over time. Similarly, the interaction between SES and the slope of parental monitoring over treatment did not predict changes in externalizing behavior across treatment. The interaction between neighborhood factors and the average of parental monitoring did, however, predict the slope of externalizing behaviors over the course of treatment. Furthermore, this relationship held when SES was entered as a covariate at level 2 (β=0.005; p=0.010). Similarly, the interaction between neighborhood factors and the slope of parental monitoring predicted changes in externalizing behaviors over the course of treatment, and this relationship also held once SES was entered as a control (β=0.188; p=0.034).

To determine the nature of the interaction between parental monitoring and neighborhood factors in predicting externalizing behaviors, the file was split to examine this relationship separately for those below 1 SD from the mean and levels above 1SD from the mean on the neighborhood scale. Individuals with low scores are assumed to

live in more optimal neighborhood environments, as indicated by the lower prevalence of unfavorable neighborhood characteristics. Conversely, individuals with higher scores are assumed to live in worse neighborhoods, as their neighborhoods are characterized by substantially more of these features. Therefore, differences in relationships across these two sub-samples were expected to reflect differences in the role of monitoring in better or worse neighborhood conditions, respectively.

In better neighborhoods, the average of parental monitoring from T1-T4 produces a trend toward significance ($\beta = -0.018$; $p=0.096$) in predicting changes in externalizing behaviors over treatment. The *slope* of parental monitoring, however, produces a stronger relationship and significantly predicts ($\beta=-1.40$; $p=0.010$) changes in externalizing behavior in these better neighborhoods. These relationships are in the direction expected, such that higher levels of parental monitoring and steeper increases in parental monitoring predict sharper decreases in externalizing behavior over the course of treatment.

Conversely, in worse neighborhoods, the average of parental monitoring from T1 to T4 did not predict slope of externalizing behavior over time ($\beta = -0.010$; $p = 0.412$), nor did the slope of parental monitoring predict slope of externalizing behavior over time ($\beta=0.035$; $p=0.958$). Therefore, the magnitude of the relationship between parental monitoring and changes in externalizing behavior appears to be much stronger in better neighborhoods.

Discussion

Our findings showed that parental monitoring predicted the rate of change in adolescent externalizing behaviors over time, such that greater levels of and increases in

monitoring predicted sharper decreases of externalizing behavior over time. This finding adds to a large body of literature demonstrating a link between "neglectful" parenting and negative child outcomes (Loeber & Stouthamer-Loeber, 1986). Within the context of MST, these findings are consistent with research demonstrating the significance of parental monitoring in this particular treatment model (Henggeler et al., 1986; Henggeler et al., 2009; Huey et al., 2000). The importance of parental monitoring in achieving positive MST outcomes has implications for therapists and researchers in this area, as it sheds light on the components of MST that are most active. By maximizing the effects of the active components of MST, better outcomes may be attained and at more rapid rates. When considering the cost of providing treatment to delinquent youth, efficacy and rate of improvement become paramount. Identifying and fine-tuning treatment components that play a vital role in treatment success can aid in the reduction of costs and time associated with receiving treatment. This is essential to the dissemination of MST services across wide-ranging populations of youth.

It is notable that, although parental monitoring was found to predict decreases in externalizing behaviors in our sample, we did not notice a significant change in parental monitoring over the course of treatment. The non-significant slope of parental monitoring coupled with significant variation in our unconditional HLM model suggest that trajectories of parental monitoring may vary in a way that "cancels out" any slope we would potentially see across participants. For example, if a third of our sample increased and then decreased in their levels of parental monitoring across treatment, another third decreased and then increased, and a final third stayed the same, we might notice significant variation in parental monitoring, but a slope of zero. Overall, this finding

suggests the importance of exploring factors that might impede the progress of some families in learning or improving their parental monitoring skills. Attempting to pinpoint specific factors that are predictive in this regard would prove useful in future MST research.

In addition to the role of parental monitoring in predicting externalizing behavior, the role of neighborhood factors was explored as well. Neighborhood factors did not directly predict either externalizing behavior or parental monitoring; however, these factors did interact with parental monitoring in predicting changes in externalizing behaviors in the context of MST. More specifically, parental monitoring predicts the slope of externalizing behaviors in families living in better neighborhood conditions, but not in families living in worse neighborhoods.

These findings are consistent with literature suggesting that parenting strategies may be more effective in some neighborhoods than in others (Simons, Lin, Gordon, Brody, & Conger, 2002). The results of this study seem to support the evaporation hypothesis, namely that undesirable neighborhood characteristics might weaken the relationship between parental monitoring and externalizing behaviors due to various environmental pressures. In other words, due to the environmental stressors characteristic of unfavorable neighborhoods, parental monitoring might be compromised in its influence on externalizing behaviors. Conversely, parental monitoring in more optimal neighborhood contexts might have stronger effects, due to the absence of these stressors. This might explain the stronger relationship between parental monitoring and decreases in externalizing behaviors within more favorable neighborhood environments.

Given MST's focus on reducing risk factors in each environmental context of a child's life, the role of neighborhood in moderating the relationship between parental monitoring and externalizing behavior is critical. The MST model aims to reduce exposure to targeted risk factors by using the parent as an agent of change. However, if parental influence (more specifically, parental monitoring) is less effective in certain neighborhoods, treatment protocol within these contexts may need to be modified to achieve desired outcomes. Our findings suggest that neighborhoods in which unsupervised youth, drug use, and theft are prevalent may present barriers to treatment that diminish the effectiveness of parental monitoring. Therefore, specific therapeutic strategies may be required within these contexts to circumvent these barriers, whereas such strategies may not be needed elsewhere.

The greater prevalence of externalizing behaviors in low-SES populations has been well-documented in the literature (Campbell, 1995; Deater-Deckard, Dodge, Bates, & Pettit, 1998; Hinshaw, 1994; Kazdin, 1995), but the role of SES in treatment efficacy is somewhat less understood, especially within the MST literature. Our findings suggests that SES as measured by factors of income and occupation does not significantly predict how well or how quickly this treatment will work, suggesting that other factors (such as neighborhood characteristics) may be more important to understanding differential effects within this treatment.

Despite a long and rich research tradition of exploring associations between SES and child development, some researchers question whether other contextual factors might be more important to understanding child outcomes (DeGarmo, Forgatch, & Martinez, 1999). Still others have sought to understand the mechanisms, both micro and macro,

that link SES to negative outcomes (Anderson & Armstead, 1995; Lerner, 2003; Taylor & Seeman, 2006). While traditional theories in this area of research explored SES as separate from other potential biological, psychological, and sociological influences, more contemporary models have embraced the dynamic relationships among these variables. These newer models have begun to "unpack" SES in a way that its individual components are better understood in relation to each other and in relation to child outcomes. These models emphasize the integrative processes throughout child development that are influenced by SES, family characteristics, and other levels of social organization across human development (Lerner, 2003).

SES has not necessarily become better defined over time, but what has come to be accepted is that SES is a socially constructed concept and is, therefore, not without flaw. In this sample, SES was measured using the Hollingshead scale, which combines an individual's income and occupation to determine their social position. Since creating this two-factor model, Hollingshead (1979) has himself acknowledged its shortcomings, suggesting that the social and cultural changes that have occurred since its creation necessitate its revision. In addition, the sample size in the current study precludes our ability to test for potentially important three way interactions such as SES X ethnicity X parenting in the prediction of treatment outcomes. Exploring the combined impact of these SES-related variables on the relationship between parental monitoring and externalizing behavior within larger samples is a critical next step in understanding MST efficacy.

Limitations

The findings of this study must be interpreted with consideration of several limitations. Notably, this study lacks a control group to which the effects of MST can be compared. Therefore, any decreases in externalizing behavior observed across treatment could be a result of any number of factors unrelated to treatment effects. Especially due to the intensive nature of MST, treatment outcomes might be a result of placebo effect or demand characteristics felt by participants.

In any examination of parent-child relationships, the bidirectionality of such relationships must be considered (Loulis & Kuczynski, 1997). The HLM analyses conducted in the current study assume externalizing behaviors to be influenced by parental monitoring, but this ignores any bidirectionality that might exist between these two variables. One might argue that as externalizing behaviors decrease, parents experience less child-related stress and have more energy to expend monitoring their youth. Moreover, any number of intermediary processes between treatment and outcomes might explain decreases in externalizing behavior more fully than the construct of parental monitoring alone. Therefore, more dynamic models allowing for multi-directional relationships among variables should be incorporated in future research.

As noted, the small sample size of this study did not permit sufficient exploration of other SES-related factors that might have some bearing on outcomes. Especially given the complex nature of SES, individual components of SES and family structure should be given as much if not more attention than the simpler notion of SES in future MST research. The Hollingshead scale used in the present study is thought to provide a fuller picture of SES than income alone, but there is still much room for progress in the understanding and assessment of socioeconomic factors.

Future Research

Differences in parenting and child behavior across developmental periods should be considered when using a sample across an age range this broad. For example, parental monitoring might be expected to be less prevalent and, perhaps, have less impact among 18 year-olds in comparison to the 12-year olds in our sample. Moreover, trajectories in externalizing behaviors may differ among younger age groups in this range. Our HLM analyses controlled for age, but conducting larger longitudinal studies that allow closer examination of the differences in these relationships within more restricted age groups would prove useful.

Conclusion

The benefits of maximizing the active components of any treatment model are vast. A more effective and shorter-term treatment allows for broader application of the treatment across diverse populations, decreased costs to consumers of the treatment, and various costs benefits to society as a whole. Parental monitoring has been consistently identified as an active component of MST and so serves as an ideal candidate for maximizing MST efficacy. By fine-tuning the design of treatment protocol surrounding parental monitoring within populations in which it is less effective, greater efficacy at more rapid rates might be achieved across all samples.

Although parental monitoring provides a good start for treatment revision purposes, it is not the only factor that might be targeted. Bronfenbrenner's model of multiple systems emphasizes that no one system plays a solitary role in predicting outcome. Therefore, this study is inherently oversimplified in its focus on parental monitoring as a predictor variable and SES-related constructs that might moderate its

relationship to adolescents' externalizing behaviors. Future studies should expand upon this one in analyzing the contributions of multiple layers of the treatment model to treatment outcomes. This study is but one step toward better understanding the nature of MST, why it works, and for whom it works best.

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Table 1

Descriptive Statistics for Predictor and Outcome Variables

Variable	N	Mean	Standard Deviation
Hollingshead (SES)	185	30.28	11.27
NRS (Neighborhood ratings)	179	15.68	2.53
APQ (Parental monitoring, mean T1-T4)	185	36.66	6.09
APQ (Parental monitoring, slope)	185	.181	.122
CBCL (Externalizing), T1	185	22.29	13.62
CBCL (Externalizing), T2	151	15.42	12.10
CBCL (Externalizing), T3	107	15.66	12.94
CBCL (Externalizing), T4	169	15.27	13.17

Table 2

Intercorrelations for Study Variables

Variable	1	2	3	4	5	6	7	8
				Predictor variables				
1. SES	–	-.31**	-.02	-.03	.18*	.23**	.08	.12
2. Neighborhood		–	.03	.05	-.02	-.08	-.13	-.02
3. PMT, mean$_{T1-T4}$			–	.92**	-.14	-.15	-.24*	-.18*
4. PMT, slope				–	-.05	-.16	-.20*	-.17*
				Outcome variables				
5. Externalizing, T1					–	.73**	.64**	.65**
6. Externalizing, T2						–	.69**	.77**
7. Externalizing, T3							–	.72**
8. Externalizing, T4								–

SES = Socioeconomic Status.

PMT = Parental Monitoring. T1 = Time 1. T2 = Time 2. T3 = Time 3. T4 = Time 4.

* $p < .05$. ** $p < .01$.

Table 3

Model 1: Externalizing Trajectories

Fixed Effects	Coefficient	*SE*	*t*
Intercept (Time 1)			
Parental monitoring, $mean_{T1\text{-}T4}$	-.044	.020	-2.27*
Parental monitoring, slope	-1.03	.955	-1.08
SES	.025	.010	2.63**
Neighborhood factors	-.033	.048	-.682
Slope			
Parental monitoring, $mean_{T1\text{-}T4}$	-.007	.005	-1.41
Parental monitoring, slope	-.572	.221	-2.58**
SES	.000	.002	.056
Neighborhood factors	-.010	.011	-.901

SES = Socioeconomic status.

* $p < .05$. ** $p < .01$.

Table 4

Model 2: Monitoring Trajectories

Fixed Effects	Coefficient	*SE*	*t*
Intercept (Time 1)			
SES	-.032	.049	-.658
Neighborhood factors	-.188	.224	-.839
Slope			
SES	.003	.007	.382
Neighborhood factors	-.015	.033	-.445

SES = Socioeconomic status.

* $p < .05$. ** $p < .01$.

Table 5

Model 3: Externalizing Trajectories

Fixed Effects	Coefficient	*SE*	*t*
Intercept (Time 1)			
SES x Parental Monitoring, mean$_{T1\text{-}T4}$	-.001	.002	-.742
SES x Parental Monitoring, slope	-.096	.089	-1.08
Neighborhood x Parental Monitoring, mean$_{T1\text{-}T4}$	-.010	.008	-1.18
Neighborhood x Parental Monitoring, slope	-.216	.370	-.586
Slope			
SES x Parental Monitoring, mean$_{T1\text{-}T4}$	-.000	.000	-.951
SES x Parental Monitoring, slope	-.004	.023	-.190
Neighborhood x Parental Monitoring, mean$_{T1\text{-}T4}$	.004	.002	2.63*
Neighborhood x Parental Monitoring, slope	.187	.087	2.16*

SES = Socioeconomic status.

* $p < .05$. ** $p < .01$.