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## Abstract

Multisystemic Therapy (MST) and other evidence-based treatments targeting juvenile delinquency have been well substantiated in the literature. While these treatments have been demonstrated to be effective overall at reducing juvenile delinquency, it is well known that they do not benefit all treated youth. Research has yet to examine the potential influence of contextual factors, such as socioeconomic status (SES) and neighborhood characteristics, on treatment outcomes, particularly as they influence parental monitoring, which is often a focus of interventions targeting juvenile delinquency. A primary goal of these treatments is to help parents develop the requisite skills to adequately monitor and discipline their children; however, this goal may be compromised by contextual factors affecting parental effectiveness and, ultimately, treatment efficacy. The objective of this study was to explore the role of SES and neighborhood factors in moderating the effects of parental monitoring across treatment. Using hierarchical linear modeling (HLM), we analyzed these contextual and family predictors of response to MST treatment within a sample of 185 youth (65.4% male) ages 12-18 (*M*=15.35; *SD*=1.28). Neighborhood factors interacted with parental monitoring, such that monitoring predicted decreases in externalizing behavior only for youth residing in better neighborhoods. In contrast, SES was unrelated to changes in externalizing behaviors in response to MST. Taken together, these results demonstrate a need for further understanding the potential role of the youth's larger social context in predicting MST outcomes.

The fifth author is a paid consultant of MST Services and is part owner of Evidence Based Services, Inc., a MST Network Partner Organization.

**Keywords**

Multisystemic Therapy; socioeconomic status; social context; neighborhood; parenting

Multisystemic Therapy (MST; Henggeler, 1999) is a comprehensive family- and evidence-based treatment designed to target empirically determined correlates of juvenile delinquency and drug use, including individual (e.g., positive attitudes towards delinquency and substance use), family (e.g., poor parental monitoring), peer (e.g., association with delinquent, drug-using peers), school (e.g., academic difficulties, truancy), and community (e.g., availability of weapons, drugs) factors. Across four decades and 19 randomized clinical trials (with at least six independent investigators), MST has consistently demonstrated its effectiveness in reducing serious and chronic juvenile delinquency and substance abuse (Henggeler, 2011).

Although treatments like MST have shown positive results in reducing juvenile delinquency, questions remain regarding the conditions and populations for whom these treatments work best. Parenting behavior is an essential ingredient in many effective treatments targeting juvenile delinquents and serves as a promising point of inquiry in starting to understand differences in treatment efficacy (Dishion & McMahon, 1998). Research has shown that interventions targeting parental monitoring skills directly or eliminating ecological barriers to parental monitoring have been effective at improving child behavior (Dishion & McMahon, 1998). In the context of MST treatment, several studies have shown that parental monitoring predicts successful treatment outcomes (e.g., Henggeler et al., 2009). For example, Huey and colleagues (2000) demonstrated that increases in parental monitoring across treatment predicted decreases in delinquent peer affiliation and in delinquent behaviors.

One limitation of the existing treatment literature is that very few studies have explored factors that might moderate the effectiveness of improved parental monitoring. One candidate that would seem important in understanding differences in treatment efficacy is socioeconomic status (SES). There are several studies that cite socioeconomic disadvantage as a predictor of poor parent training outcomes (e.g., Kazdin & Wassell, 2000). Furthermore, a meta-analytic review conducted by Reyno and McGrath (2006) found that, among the predictors often thought to be involved in predicting parent training efficacy in a treatment context, low family income and maternal mental health were the two most salient predictors.

Similarly, neighborhood characteristics, by virtue of their influence on the child's home environment and immediate social context, might have a significant impact on both parenting and children's externalizing behaviors or the relationship between the two. A number of studies have explored the impact of neighborhood disadvantage on child outcomes (Kohen, Leventhal, Dahinten, & McIntosh, 2008), some even showing that neighborhood disadvantage moderates the relationship between parenting and child behavior (Brody, et al., 2003; Cleveland, Gibbons, Gerrard, Pomery, and Brody, 2005). Results, however, have been mixed regarding the nature of moderation with some studies showing stronger associations between parenting and child outcomes in high-risk neighborhoods (Cleveland et al., 2005) and others showing less of an impact of parenting on child behavior

in high-risk neighborhoods (Brody, et al., 2003). Importantly, none of these studies have explored the roles of economic or neighborhood disadvantage in the context of understanding differences in treatment efficacy. This is a crucial unaddressed issue because, as noted earlier, changes in parenting are assumed to be the active ingredient propelling child behavior change in many empirically based treatments (EBTs). Factors that undermine this relationship would clearly be important to address in improving treatment effectiveness. Therefore, the aim of this study was to test whether SES and neighborhood factors moderate the relationship between changes over time in parental monitoring and externalizing behavior at treatment termination in the context of an effectiveness study of MST.

Two hypotheses have been proposed in the literature to explain why parental monitoring might be more or less effective in different social contexts (Simons, Lin, Gordon, Brody, & Conger, 2002), the *parental buffering hypothesis* and *evaporation hypothesis*. These two hypotheses are competing to the extent that environmental pressures and parenting interact. The buffering hypothesis presumes that parental control acts as a "buffer" against environmental pressures and mitigates delinquent behavior in suboptimal contexts; the evaporation hypothesis presumes that the effects of parental control are diminished or "evaporated" in suboptimal contexts, because environmental pressures prevent parental control from having its desired or intended effects on child behavior. Simons and colleagues (2002) found support for the evaporation hypothesis in their study of general parenting influence on conduct behavior; however, they did not examine this relationship within a treatment context. Notably, while family income data was collected in Simon and colleagues' study, the evaporation hypothesis was not tested in regards to family SES. Instead, they found that community deviance (e.g., gang behavior, selling drugs, drinking in public) and safety were moderators of the relationship between parenting influence and conduct problems. The proposed study aims to explore these hypotheses in the MST treatment context, focusing on both neighborhood factors and socioeconomic status.

The current study had three specific hypotheses. First, we aimed to replicate prior studies, in an effectiveness context, that found parental monitoring to be predictive of better treatment outcomes, hypothesizing that an increase in parental monitoring would be associated with better treatment outcomes. Second, we hypothesized that SES and neighborhood factors would directly predict changes in parental monitoring over time. Given the limited amount of literature exploring this issue, we did not predict a direction for these relationships. Finally, we tested the *parental buffering hypothesis* and the *evaporation hypothesis* by examining the role of SES and neighborhood factors as moderators of the relationship between parental monitoring and changes in youth externalizing behaviors over time in the context of MST. Results demonstrating a stronger effect of improvements in parental monitoring on decreases in externalizing behaviors in disadvantaged neighborhoods would provide support for the parental buffering hypothesis, whereas results demonstrating a weaker effect in these neighborhoods would provide support for the evaporation hypothesis.

# 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 four licensed MST programs in the Denver metropolitan area. Youth were referred to these MST programs 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). Over 47% of youth were Caucasian, 27.8% were Latino/a, 19.8% were African American, and 4.3% identified as "other". Inclusion criteria included youth who (a) were between the ages of 12 and 17 years at the onset of data collection; (b) had been referred for MST by social service agencies or juvenile justice courts due to involvement with substance abuse, property offense, crimes against another person, or other antisocial behavior; (c) 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 the youth's caregiver, and youth provided assent prior to the study's initiation.

Participating caregivers were between the ages of 25 and 74 (*M*=43.62; *SD*=9.58), and predominantly female (86%; *n*=159). Caregivers were comprised of mothers (74.3%), fathers (9.1%), grandparents (10.2%), older siblings (1.1%), aunts/uncles (1.1%), foster parents (0.5%), and stepparents (0.5%). At the time of the initial assessment, 41.6% of caregivers reported receiving financial assistance, and 60% reported having a high school education or less.

Multisystemic Therapy was provided by 52 therapists carrying an average caseload of 3.52 families. Each therapist received supervision and consultation in accordance with MST licensure requirements. At the time of recruitment, therapists had accumulated an average of 9.51 (*SD*=17.35) months of experience using MST.

Institutional Review Boards at the University of Colorado School of Medicine, the Medical University of South Carolina, Alliant International University, and Emory University approved this study.

## Study Design and Procedures

Data for this study were taken from a longitudinal investigation of MST as delivered in community-based settings (NIMH R01 MH068813, Cunningham PI). In the present study, assessment data was collected from each participant at four time points: Time 1 was conducted as close to treatment onset as scheduling permitted and was on average of 3.1 weeks (*SD* = 2.04) from intake; Times 2 and 3 were collected twice mid-treatment on average 9.3 (*SD*=2.73) and 15.3 (*SD*=3.30) weeks from treatment start, respectively; and Time 4 was conducted immediately post-treatment on average 19.3 weeks after treatment start (*SD* = 7.48). Because time between observations differed across participants, time was controlled in HLM analyses.

## Measures

A multi-method and multi-informant measurement battery assessed constructs relevant to the current study including youth externalizing behaviors, parental monitoring, neighborhood characteristics, and SES. Table 1 contains means and standard deviations for each of the predictors and outcome variables used in the study.

**Externalizing Behavior—**Externalizing behavior was measured using the Child Behavior Checklist (CBCL; Achenbach, 1991) completed by caregivers at each time point. Internal consistency for the externalizing behavior subscale in this study was 0.94 at T1, 0.94 at T2, 0.95 at T3, and 0.95 at T4. Standardized t-scores on the externalizing scale were used in analyses.

**Parenting—**The Alabama Parenting Questionnaire (APQ; Frick, 1991) is a well-validated measure of parenting practices that have been linked to conduct problems (Shelton, Frick, & Wootton, 1996). The APQ was designed for use with children aged 6 to 17 (Dadds, Maujean, & Fraser, 2003; Shelton et al., 1996) and assesses parenting strategies across five domains: parental involvement, poor monitoring, inconsistent discipline, positive parenting, and corporal punishment. We focused on the parental monitoring scale within this broader measure given that parental monitoring behaviors are such a centrally targeted component of MST. Caregivers and youth at each time point completed the APQ. Youth reports were used in the present study to avoid shared method variance and the potential for socially desirable responding in mothers' reports. Studies suggest that children ages 10 and older provide valid data on APQ subscales (Shelton et al., 1996). Internal consistency for the parental monitoring scale in this study was 0.82 at T1, 0.82 at T2, 0.80 at T3, and 0.85 at T4.

Two measures of parental monitoring were used in the current study. First, we used HLM exported linear slopes of parental monitoring, using methods described by Henggeler and colleagues (2009), to assess change in parental monitoring over the course of treatment; higher numbers reflect more positive change in monitoring between T1 and T4. Linear slope measures were used because quadratic effects did not account for significant variance in statistical models examining changes in parental monitoring over time. Second, an average of parental monitoring levels from T1, T2, T3, and T4 was computed as a predictor variable. While this additional measure was not critical to our hypotheses, we thought it worthwhile to explore whether there were differences in our results for overall parental monitoring levels versus *changes* in parental monitoring over time.

**Socio-economic status—**The Hollingshead (1979) Index of Social Position was used to determine participants' SES. This multidimensional index is based on a model of SES that includes occupation and educational level for each of a youth's caregivers. Parental education is rated on a seven-point scale (1 = education level below 7$^{th}$ grade, 7 = graduate professional training and beyond). Occupation is rated on a nine-point scale (1 = farm laborers and menial service workers, 9 = higher executives, large business owners, and major professionals). 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 designed to emphasize the individual contributions of occupation and income to the construct of SES. In

this study, education and occupation scores were assigned to youth's primary and secondary caregivers. The Hollingshead index has been shown to yield an inter-rater reliability of 0.91 and has been well-validated against other measures of SES (Cirino et al., 2002).

**Neighborhood factors—**The Neighborhood Rating Scale (NRS) assessed participants' neighborhoods on 13 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 adapted for the current project from existing instruments (Rains, 2002; Wei, Hipwell, Pardini, Beyers, & Loeber, 2005). Research assistants (RAs) completed the NRS upon each visit to a family's home based on their observation of the characteristics of interest. For the purpose of this study, NRS scores across all four time points were averaged to reflect the condition of each family's neighborhood across treatment. Higher scores on the NRS indicate more disadvantaged neighborhoods, as evident by the higher prevalence of unfavorable neighborhood characteristics. Scores showed acceptable reliability and validity. Internal consistency of scores was 0.86 at T1, 0.82 at T2, 0.75 at T3, and 0.80 at T4. Correlations across adjacent time points for families who lived in the same home ranged from .62 to .74, *p*s < .001. NRS scores were negatively correlated ($r = -.31$; $p < .001$) with SES (i.e., more neighborhood problems were associated with lower SES) and were also positively correlated with therapist reports of discomfort when treating the family at each time point (i.e., more neighborhoods problems were associated with greater therapist discomfort; Glebova, Foster, Cunningham, Brennan, & Whitmore, 2012).

**Statistical analyses—**Growth curve analyses were used to examine the relationships between predictor variables and the trajectories of externalizing behavior and parental monitoring over the course of treatment. Hierarchical linear modeling (HLM) was chosen for its ability to predict slope (growth rate of dependent variable) and its capacity to accommodate nested data. Nested data are relevant to the current study, as the 185 participants were treated by 52 therapists.

We began analyses with an examination of factors that might violate the assumptions of HLM. Because CBCL externalizing behavior scores were skewed, square root transformations were applied to improve distributions. Missing data are allowed at level 1 in HLM analyses. However, cases in which there were missing data for any of the predictor variables at level 2 were deleted during the analyses per guidelines set by HLM 7 (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011). Nine cases were deleted during analysis due to missing data at level 2. Separate analyses revealed that these cases did not differ significantly from those included in analyses on age, gender, ethnicity SES, neighborhood factors, parental monitoring or externalizing behaviors (*p*s>.09). Therefore, the analytic assumption that data are missing at random appears to be satisfied.

To examine our moderation hypothesis, interaction terms were computed within SPSS by centering each independent variable of interest and computing the product of the two variables predicted to interact (i.e., parental monitoring × SES and parental monitoring × neighborhood factors). We then used multilevel modeling to assess whether parental monitoring interacted with either SES or neighborhood factors in predicting youth

behavioral outcomes. In these analyses, potential confounds (e.g., age, gender, and ethnicity) were entered as controls when related to externalizing behavior at $p < .05$. If interactions were significant, post hoc analyses were used to probe the direction of the effects.

In this study, time point (level 1) is nested within families (level 2), which are nested within therapist clusters (level 3). Before beginning our analyses, we tested therapist effects on level 1 outcomes by computing the ICC for a model that included externalizing behavior and parental monitoring separately as outcome variables at level 1, with time points (level 1) nested within families (level 2), which were nested within therapists (level 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 the particular therapist assigned to a family. Therefore all analyses were tested at two levels (e.g., Level 1: time as a predictor of externalizing behavior from T1 to T4; Level 2: family).

Analyses that examined parenting as the dependent measure included APQ monitoring scores at level 1, and control variables and social context predictors at level 2. Analyses that examined externalizing behavior as the dependent measure included CBCL externalizing scores at level 1 and control variables and parenting and social context predictors at level 2. Each continuous variable was centered around its mean, and each nominal variable was included as an uncentered variable. Covariates in each model were fixed, whereas variables of interest (i.e. parental monitoring, SES, and neighborhood factors) were allowed to vary at random.

## Results

### Preliminary Analyses

Correlations between each of the predictor variables and the outcome variable at each of the four time points are found in Table 2. 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 estimated mean slope (of the nontransformed raw CBCL scores) for externalizing behaviors was −1.63 ($SE$=0.18). 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 was significant variation among slopes of externalizing behavior in our sample ($\chi^2$=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), $p = 0.13$, suggesting that, on average, parental monitoring did not change significantly over time. Despite this, variance components of the slope suggest that there is significant variance to be predicted ($\chi^2$=202.64; $p$=0.04) and that some families changed more than others. Therefore, parental monitoring was entered as an outcome variable in later analyses to explore our stated hypothesis.

## Hypothesis Testing

**Hypothesis 1: Parental monitoring as a predictor of externalizing behavior outcomes—**Among potential covariates (youth age, gender, and ethnicity), only gender showed a negative correlation with changes in externalizing behavior over time ($p$=0.04; girls showed less steep changes over treatment). Therefore, gender was entered as a covariate in subsequent analyses. In a series of separate HLM models, we examined whether the slope of externalizing behavior over treatment was predicted by parental monitoring (both mean and slope of T1-T4).

As can be seen in Table 3, the average of parental monitoring T1-T4 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 (greater improvements in parental monitoring predicted steeper declines in externalizing behaviors across treatment).

**Hypothesis 2: SES and neighborhood factors as predictors of parental monitoring—**In the next series of HLM models, we explored whether SES and neighborhood factors predicted changes in monitoring across time. Parental monitoring (time varying) was entered as the outcome variable in level 1, and SES and neighborhood factors were included as separate predictors at level 2. As can be seen in Table 3, and contrary to our predictions, neither SES nor neighborhood factors predicted slope of parental monitoring across treatment as main effects.

**Hypothesis 3: Interactions between SES/neighborhood factors and parental monitoring in the prediction of externalizing behavior—**The next HLM models examined externalizing behavior (time varying) as the outcome at level 1. Centered variables and interaction terms were added as predictors at level 2 to test whether either SES or neighborhood factors moderated the relationship between parental monitoring and externalizing behavior. Gender was included as a control at level 2. Separate analyses were conducted for SES and neighborhood variables. Interactions were 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 3. Interactions between SES and parental monitoring measures did not predict slope of externalizing behavior over time. The interaction between neighborhood factors and the average of parental monitoring did, however, predict the slope of externalizing behaviors over time. Furthermore, this relationship held when SES was entered as a covariate at level 2 (β=0.005; $p$=0.01; $df$=569; $SE$=0.002). Similarly, the interaction between neighborhood factors and the slope of parental monitoring predicted changes in externalizing behaviors over time, and this relationship also held once SES was entered as a control (β=0.188; $p$=0.03; $df$=569; $SE$=.005).

To determine the nature of the interaction between parental monitoring and neighborhood factors, the file was split to examine the relationship between monitoring and externalizing behaviors separately for those one standard deviation below the mean ($n$ = 35) and those one standard deviation above the mean ($n$ = 31) on the neighborhood scale. Within each

subsample, gender was included as a covariate (at level 2), the average and slope of parental monitoring over treatment were included separately as predictor variables (at level 2), and externalizing behavior was included as the outcome variable (at level 1).

In better neighborhoods, the average of parental monitoring from T1-T4 showed a negative though nonsignificant relationship (β = −0.018; *p*=0.10; *df*=128; *SE*=.082) in predicting changes in externalizing behaviors over treatment. The *slope* of parental monitoring, however, significantly and negatively predicted (β=−1.40; *p*=0.01; *df*=128; *SE*=.512) changes in externalizing behavior in these better neighborhoods. These relationships are in the direction expected from previous studies of MST: steeper increases in parental monitoring predicted sharper decreases in externalizing behavior over time.

Conversely, in worse neighborhoods, the average of parental monitoring from T1 to T4 did not predict slope of externalizing behavior over time (β = −0.010; *p* = 0.41), nor did the slope of parental monitoring predict slope of externalizing behavior over time (β=0.035; *p*=0.96). Therefore, the magnitude of the relationship between parental monitoring and changes in externalizing behavior appears to be much stronger in better neighborhoods, providing support for the evaporation hypothesis.

## Discussion

In our sample, greater increases in parental monitoring over treatment were associated with sharper declines in externalizing behaviors among delinquent youth; this replicates earlier MST study findings and provides support for our first hypothesis (e.g., Henggeler et al., 2009). Importantly, contrary to our second hypothesis, neither SES nor neighborhood quality directly predicted changes in parental monitoring across treatment, suggesting that actual changes in parental monitoring across treatment are not influenced by socioeconomic context. Finally, with regards to our third hypothesis, we found that neighborhood quality, but not SES, moderated the role of parental monitoring in treatment outcomes within the context of MST in an effectiveness context (or “as delivered in a real world practice setting”). Although increases in parental monitoring predicted more successful treatment outcomes in better quality neighborhoods, they did not predict more successful treatment outcomes in poorer quality neighborhoods. This finding suggests that, for children living in less optimal neighborhoods, treatments targeting parental monitoring are less likely to be effective. Post-hoc graphical representation of our interaction findings (see Figure 1) demonstrates that, while parental monitoring does not appear to have a significant impact on treatment outcomes in riskier neighborhoods, there does appear to be some component of treatment within these neighborhoods that *is* achieving positive treatment outcomes. Therefore, future studies should aim to explore and isolate factors that are predictive of better outcomes in these neighborhoods, so that relevant components of treatment can be emphasized for them.

Results of this study are consistent with literature suggesting that parenting strategies may be less effective in some neighborhoods than in others (Simons et al., 2002) and support the evaporation hypothesis, namely that undesirable neighborhood characteristics might weaken the relationship between parental monitoring and externalizing behaviors due to various

environmental pressures. Given the focus within treatments like MST on reducing risk factors in each environmental context of a child's life, the role of neighborhood characteristics in moderating the relationship between parental monitoring and externalizing behavior is critical. The MST model (and others like it) aims to reduce exposure to targeted risk factors by using the parent as an agent of change. Our findings suggest that neighborhoods in which unsupervised youth, drug use, and theft are prevalent may present barriers to treatment that diminish the overall effectiveness of parental monitoring, no matter how successful caregivers are at implementing and improving these parenting behaviors. These neighborhoods may expose youth to greater risk (by virtue of more visible crime and opportunities for involvement in drug use and delinquent activities), and these higher risk levels may call for incorporation of other techniques (for example, promoting sharing of information among neighbors, local support networks, and youth involvement in prosocial activities that take place in less risky contexts) in order to change youth behavior. Post hoc analysis of families that did achieve positive outcomes despite living in disadvantaged neighborhoods suggests that minimizing youth's association with delinquent peers may be useful (data not shown); therefore, this may be a factor worth exploring as a potential supplement to parental monitoring in more risky neighborhoods, at least within the context of MST implementation. Additionally, it may be beneficial for therapists providing treatments in these neighborhoods to focus on strengthening therapeutic alliance or increasing their personal levels of comfort in poorer neighborhoods given demonstrated associations between neighborhood quality and therapist comfort, between therapist comfort and therapeutic alliance, and between therapeutic alliance and treatment outcomes (Glebova et al., 2012). At a policy level, providing vouchers to families in disadvantaged neighborhoods for relocating to better quality neighborhoods may be promising. Future research designed to explore contributors to this neighborhood finding and, in particular, intervention components to counteract it, would have important clinical as well as conceptual implications for understanding the mechanisms by which environmental disadvantage may undermine parental efforts in treatment.

Beyond its implications for treatment efficacy research, these findings may reveal problems with our current conceptualization of socioeconomic status. It may be necessary to "unpack" the construct of SES, exploring the construct beyond its current conceptualization of caregivers' incomes, education levels, and/or occupations. Findings from this study suggest that more proximal and immediate factors within a child's neighborhood may be more relevant in understanding the psychosocial context in which treatment does not result in desired outcomes.

More broadly speaking, this finding speaks to a larger issue, namely the universal application of EBTs across contexts and populations with little consideration of factors that may diminish successful treatment outcomes. A large majority of treatment efficacy studies focus on demonstrating efficacy overall; however, this study aimed to compare responders with non-responders, exploring elements of a child's environment that might impact the success of treatment, specifically by way of diminishing the impact of parental monitoring. This finding suggests that, within the body of treatment efficacy research, it may be useful to tease apart active components of treatment and better understand conditions under which they are more or less effective.

## 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 over the course of treatment could be a result of normative development or other factors unrelated to MST. Nevertheless, several sources of evidence support our interpretation of these findings as likely to be reflective of treatment effects. First, although normative data suggest that externalizing behavior declines over adolescence, youth with higher initial values of externalizing problems (similar to our sample of clinically referred youth) show slower rates of decline, and delinquent behaviors tend to show a normative increase from ages 12 to 17 (Bongers, Koot, van der Ende, & Verhulst, 2003). Here, these behaviors declined significantly. Second, MST has been shown in numerous randomized controlled effectiveness trials as well as efficacy studies to produce better outcomes than treatment as usual, and in this study MST was implemented in accord with structured dissemination procedures implemented by MST Services (which disseminates MST) that devote considerable attention to treatment fidelity.

Notably, we used only youth report (to reduce the influence of shared method variance) on a brief measure of monitoring, which did not permit examination of the multiple component behaviors that make up this construct. The literature suggests that the construct of parental monitoring, although often described in terms of supervision practices, might also be related to parents' value and belief systems, motivation to monitor effectively, and competence in troubleshooting the home environment and boundary setting (e.g., Dishion & McMahon, 1998). Our measure of parental monitoring does not address all of these factors; therefore, our conclusions are somewhat limited to behavioral indicators of parental monitoring. It is also noteworthy that, while we hoped to avoid socially desirable responding from caregivers who may have been motivated to respond in a biased fashion, there may still be some level of socially desirable responding among youth in our sample as well.

In any examination of parent-child relationships, the bidirectionality of such relationships must be considered. The HLM analyses conducted in the current study assume externalizing behaviors are influenced by parental monitoring, but this ignores any bidirectionality that might exist between these two variables. More dynamic models allowing for multi-directional relationships among variables should be incorporated in future research.

Our analyses revealed that there was no statistically significant change in parental monitoring over treatment across the entire sample. Statistically, we believe that this finding may be attributed to differences in linear trajectories that may "cancel out" the overall effects seen on parental monitoring. Given the severity of behavioral problems seen in our sample, it may be the case that families have different rates of change in parental monitoring. Perhaps, children whose behaviors are improving over time lead their parents to temper their parental monitoring as they begin to see positive results, while other parents may continue to improve upon their parental monitoring skills in compliance with treatment protocol. Such differences in trajectories may result in an inability to detect any consistent pattern in parental monitoring within this population. The bidirectional dynamics of the

parent-child relationship makes it especially difficult to detect long-lasting trends in any one behavior.

While attrition did not appear to be related to SES or neighborhood context in our sample of participants, attrition should be examined in future treatment studies to ensure that it is not the mechanism explaining differences in treatment outcome across various socioeconomic contexts. Additionally, the issue of therapeutic alliance within the context of treatments (particularly those administered in the home) should be considered in future work. Glebova and colleagues (2012) presented research from our dataset suggesting that economically disadvantaged families receiving MST within the home may be at greater risk for damage to the therapeutic relationship as well as lower therapist comfort. Given the associations between therapist comfort and therapeutic alliance and between therapeutic alliance and clinical outcomes, these factors are all critical to consider in future research in this area.

### Conclusion

The benefits of maximizing the active components of any treatment model are crucial for producing more effective and shorter-term treatment with 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 EBTs targeting juvenile delinquency and so serves as an ideal candidate for maximizing efficacy of these treatments. By “fine-tuning” parental monitoring strategies within populations in which EBTs are less effective or by giving greater emphasis to other treatment components in these contexts, greater efficacy at more rapid rates might be achieved across all families.

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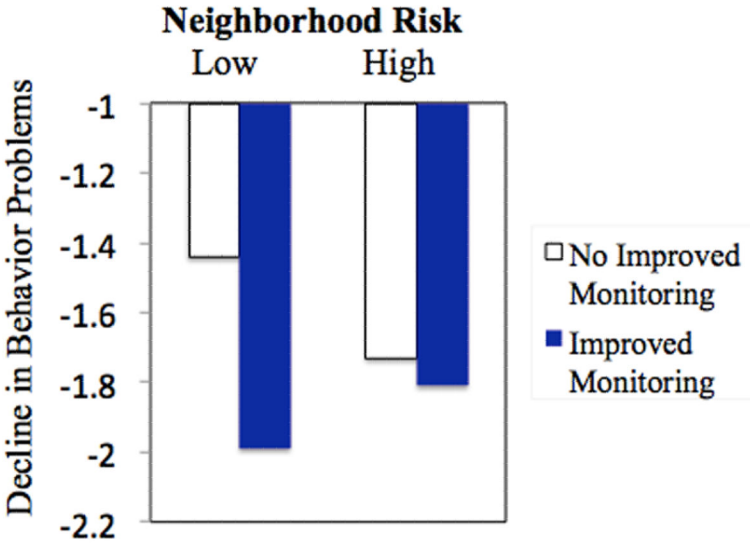


**Figure 1. Interaction between neighborhood risk and parental monitoring**

Note. Changes in behavior problems reflect differences in slope across each condition.

## 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 | 0.181 | 0.122 |
| CBCL (Externalizing), T1 | 185 | 64.61 | 12.19 |
| CBCL (Externalizing), T2 | 151 | 57.99 | 12.67 |
| CBCL (Externalizing), T3 | 107 | 57.89 | 13.59 |
| CBCL (Externalizing), T4 | 169 | 57.02 | 13.85 |

**Table 2**
**Intercorrelations among Study Variables**

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| | | | | Predictor variables | | | | |
| 1. SES | – | −0.31** | −0.02 | −0.03 | 0.18* | 0.23** | 0.08 | 0.12 |
| 2. Neighborhood | | – | 0.03 | 0.05 | −0.02 | −0.08 | −0.13 | −0.02 |
| 3. Parental monitoring, $mean_{T1-T4}$ | | | – | 0.92** | −0.14 | −0.15 | −0.24* | −0.18* |
| 4. Parental monitoring, slope | | | | – | −0.05 | −0.16 | −0.20* | −0.17* |
| | | | | Outcome variables | | | | |
| 5. Externalizing, T1 | | | | | – | 0.73** | 0.64** | 0.65** |
| 6. Externalizing, T2 | | | | | | – | 0.69** | 0.77** |
| 7. Externalizing, T3 | | | | | | | – | 0.72** |
| 8. Externalizing, T4 | | | | | | | | – |

SES = Socioeconomic Status.

T1 = Time 1. T2 = Time 2. T3 = Time 3. T4 = Time 4.

* $p < .05$.

** $p < .01$.

## Table 3

**Predictors of Time 1-4 Externalizing Behavior Scores and Parental Monitoring (analyses run separately)**

| | Coefficient | *SE* | *t* |
|---|---|---|---|
| Hypothesis 1: Main Effects on Slope of Externalizing Problems | | | |
| Parental monitoring, mean $_{T1\text{-}T4}$ | −.007 | .005 | −1.41 |
| Parental monitoring, slope | −.572 | .221 | −2.58** |
| Hypothesis 2: Main Effects on Slope of Parental Monitoring | | | |
| SES | .003 | .007 | .380 |
| Neighborhood factors | −.015 | .033 | −.45 |
| Hypothesis 3: Interaction Effects on Slope of Externalizing Problems | | | |
| SES × Parental Monitoring, mean$_{T1\text{-}T4}$ | −.000 | .000 | −.95 |
| SES × Parental Monitoring, slope | −.004 | .023 | −.19 |
| Neighborhood × Parental Monitoring, mean$_{T1\text{-}T4}$ | .004 | .002 | 2.63* |
| Neighborhood × Parental Monitoring, slope | .187 | .087 | 2.16* |

SES = Socioeconomic status.

* $p < .05$.

** $p < .01$.