

# MULTIPLE-FAMILY GROUP INTERVENTION FOR INCARCERATED MALE ADOLESCENTS WHO SEXUALLY OFFEND AND THEIR FAMILIES: CHANGE IN MALADAPTIVE EMOTION REGULATION PREDICTS ADAPTIVE CHANGE IN ADOLESCENT BEHAVIORS

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*The multiple-family group intervention is an effective, yet affordable, 8-week treatment that is conducted in a juvenile correctional institution in Alabama with adolescents who sexually offend and their families. Data from 115 incarcerated male adolescents and their male and female caregivers collected at pre-, post-, and 1-year follow-up were used to determine that problem behaviors (internalizing, externalizing) decreased over pre- and posttest and the significant decreases in maladaptive emotion regulation predicted those changes. Adolescent-reported anxiety over abandonment and attachment dependence on parents increased significantly; these changes were predicted by decreases in maladaptive emotion regulation. Linear growth models were also fit over the 3 time points and indicate decreases in adolescent problem behavior and maladaptive emotion regulation.*

The Office of Juvenile Justice and Delinquency Prevention (OJJDP Statistical Briefing Book, 2011) cites that on any day in 2010 nearly 80,000 youth were in custody as juvenile offenders. In that same year, over 15,000 male adolescents under the age of 17 years old were arrested for forcible rape. Adolescent delinquent behaviors (especially sexual offenses) and the resulting incarceration present a significant problem and cost to the public. According to a 2009 report from the OJJDP, adolescents constitute 36% of police-known sexual offenses against minors (Finkelhor, Ormrod, & Chaffin, 2009). This estimate is likely conservative because many sexual abuse incidents go unreported and only a small percentage of reports result in an arrest (Zaremba & Keiley, 2011).

Currently, most adolescent offenders are separated from their adult counterparts with the belief that rehabilitation is possible because their development is incomplete and their behavior still changeable (Myers & Farrell, 2008). Unfortunately, incarceration or detention alone (without rehabilitation efforts) has demonstrated a minimal ability to contribute to long-term behavioral changes for confined adolescents (Sprenkle, 2012; Todis, Bullis, Waintrup, Schultz, & D'Ambrosio, 2001; Wolfe & Wittenborn, 2012). Without effective therapeutic intervention, the coercive interactional patterns of these adolescents and family members do not improve and their conflictual cycles continue with high levels of negative emotion that disrupt family members' attachment bonds (McKillop, Smallbone, Wortley, & Andjic, 2012), impair cognitive functioning (Baker, Beech, & Tyson, 2006), and foster chronic parasympathetic nervous system arousal (Porges, 2003). The result is that adolescents leave institutions disconnected from their families, unable to cope well with conflict or regulate high arousal, whether emotional or sexual, and therefore are less likely to integrate new information and develop alternative solutions to problems. Instead, they are more likely to revert to old, overlearned, and often maladaptive habitual behaviors, leaving them at risk for reoffending and relapse (Evans-Chase & Zhou, 2012). Incarcerated adolescents

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typically have high recidivism rates, poor academic outcomes, and limited chances for success in adulthood (Myers & Farrell, 2008). Evidence-based and effective family treatments do exist for delinquency and conduct disorder (Keiley, 2002a; Pullman & Seto, 2012), but many are somewhat expensive, requiring extensive resources and additional personnel that state-funded juvenile correctional systems seldom can afford. Also, several effective treatments for adolescents who sexually offend exist, but all of them are focused on adolescents who are not incarcerated and their families (Letourneau et al., 2013). The multiple-family group intervention (MFGI) was developed and is conducted to address the need for effective, yet affordable, treatment for delinquent and/or sexually offending incarcerated adolescents. Furthermore, the MFGI provides this treatment in the context of these adolescents' families to facilitate lasting change not just for the individual adolescent, but within the larger family system.

For the past 12 years, we have been treating adolescent offenders (sexual, delinquent, males, and females) and their families successfully using the multiple-family group intervention (MFGI; Keiley, 2002a, 2002b, 2011). Previously, we reported on the clinical effectiveness of this intervention with male and female adolescent delinquent offenders and their families (Keiley, 2007). Most available research has been conducted with delinquent adolescents with less focus on sexually offending adolescents. However, this is a unique and quite underserved population. Males account for an estimated 93% of juveniles who commit sexual offenses and have different treatment needs than female sexual offenders (Finkelhor et al., 2009). The current study, presented here, is about the effectiveness of this treatment for male juveniles incarcerated for sexual offending and their families.

## ATTACHMENT, AFFECT REGULATION, AND THE DEVELOPMENT OF SEXUAL OFFENDING AND DELINQUENT BEHAVIORS IN ADOLESCENTS

Affect regulation and the attachment relationship in which it is constructed are hypothesized to be the major mechanisms through which parent psychopathology and ineffective parenting influence children in the development of problem behaviors such as externalizing (Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010), internalizing (Brumariu & Kerns, 2010) behaviors, psychopathology in general (Kim & Cicchetti, 2010), and sexual offending (Baker et al., 2006; Cassidy, 2008). In addition, other psychopathology within the family such as early sexual abuse and exposure to aggression also result in insecure or disorganized attachment with the often concomitant development of ineffective interactional patterns for managing arousal (emotional and/or sexual) (Porges, 2003).

Attachment greatly influences how individuals behave and interact with others from infancy onward. Early attachment experiences affect the behavioral and affective strategies that children develop as well as how they view themselves and the world (Bowlby, 1989; Seedall & Wampler, 2013). The attachment behavior system established in infancy is activated by stress across the lifetime, with the goal of reducing parasympathetic arousal and reinstating a sense of security.

Caregiver–infant relationships characterized by warmth, consistency, and reciprocity result in infants developing secure attachment. These children are able to regulate distress with strategies that involve seeking comfort and support from others, which allows them to continue their exploration of the world. They display more prosocial behaviors when interacting with their peers, even during stressful situations, and continue toward their explorative goals (Cassidy, 2008). On the other hand, insecure (avoidant, anxious) attachment interferes with children's abilities to regulate affect, manage stressful situations, and maintain exploration and self-confidence in new situations. Emotionally unavailable or rejecting caregivers' infants and children often develop avoidant attachment; that is, they tend to restrict the communication of anger and distress. Avoidantly attached children often have difficulty in interpersonal interactions with peers, displaying withdrawal or flight behavior during times of distress, ultimately putting them at risk for developing anxiety disorders, depression, substance abuse, or sexual offending (Kim & Cicchetti, 2010; Zarembo & Keiley, 2011). Infants and children of inconsistent caregivers develop anxious attachment. Anxious children become hypervigilant to attachment experiences and heighten distress by showing increased fear or anger. They, too, have difficulty both in interpersonal interactions with peers, often displaying aggressive, fighting, or sexual offending behavior during times of distress (Baker

et al., 2006; Cassidy, 2008; Kim & Cicchetti, 2010) and with school and court systems if they develop delinquent behaviors (Kim & Cicchetti, 2010). Infants and children who have been abused or subject to intrusive or fearful caregivers develop no organized attachment strategies; therefore, under stress and high emotional or sexual arousal, they tend to engage sequentially in both fight and flight, often ending up in a frozen stance (Baker et al., 2006; Burk & Burkhart, 2003; Cassidy & Mohr, 2001).

These patterns of response related to attachment quality (secure-flexibility, avoidant-flight, anxious-fight, disorganized-flight, fight, freeze) often become habitual when interacting with adults and peers, tend to escalate over time when they prove to be ineffective in resolving difficulties (Baker et al., 2006), and are often difficult to alter (Weinfield, Sroufe, Egeland, & Carlson, 2008). The result is that insecurely attached children and adolescents revert to their habitual defensive positions (fight, flight, or freeze) in highly arousing sexual or emotional situations where access to cognitive processing is interrupted.

The effects of the development of attachment on the emotional responses of the child that result in flight, fight, freeze, or flexibility as an habitual response are dependent on how caregivers help their infants regulate and manage the arousal of their parasympathetic nervous system. Vagal tone (ability to maintain homeostasis at rest) and vagal suppression (adaptive behavioral regulation when under stress) are indices of this physiological functioning. Although baseline vagal tone stabilizes early in life, evidence exists that vagal suppression is amenable to intervention (Porges, 2003). But, for an intervention to be effective in permanently changing behaviors, we also know that individuals must experience high enough levels of parasympathetic arousal within the intervention that their habitual response is triggered. Once triggered, these habitual responses (fight, flight, or freeze) can be inhibited with the help of the interventionists, allowing participants to regain access to their cognitive processes and engage in less habitual, reactive, and destructive behaviors. One interruption of a habitual response is rarely sufficient, however, to ensure permanent change in these patterns. Instead, repeated practice is required to change individuals' habitual ways of responding to physiological arousal and thereby improve their attachment behaviors in close relationships (Porges, 2003).

## MFGI TREATMENT FOR ADOLESCENTS AND THEIR FAMILIES

The MFGI was developed over 12 years ago to help individuals and family members tolerate and manage high arousal (emotion or sexual), change their habitual responses, and regain access to their cognitive functioning to make decisions that do not include maladaptive or criminal behaviors (e.g., sex offending, delinquency, addiction), freeing them to develop supportive and caring relationships with others. We focus first on several facets of the escalation of physiological arousal and the ensuing interactional cycles that emerge when all family members engage in their own habitual responses—some fighting, some fleeing, some doing both, or freezing. Secondly, we focus on the interruption of these cycles to allow participants to retrieve cognitive processes and institute less damaging responses. Our aim is to reduce the participants' maladaptive emotion regulation to reduce their problematic behaviors.

In the multiple-family group (adolescents, family members, facilitators all meeting in one room), our curriculum begins with a focus on managing physiological and/or sexual arousal using microskills (e.g., noting physiological changes, stopping and doing nothing, accessing fear, having empathy, and risking vulnerability) to interrupt and eventually decrease the cycles of escalating negative affect or sexual arousal. We ask participants about specific physiological experiences that occur when they are feeling aroused emotionally and help them to find a way to stop and endure intense feelings, rather than either shutting them down or acting them out. We then help them find a way to calm themselves long enough to begin thinking again, particularly about the fear that is fueling this powerfully negative reaction. The calming procedures they use may be deep breathing, closing their eyes, standing totally still, sitting down, or closing their mouths. The major focus here is how to stop and do nothing for a second. Participants (and interventionists) often find this process the hardest to implement, given how quickly the sympathetic nervous system (fight, flight) is activated by arousal (Porges, 2003) when the vagal brake of the parasympathetic nervous system is overwhelmed. Once calm, the participants explore more vulnerable feelings that are related to their

highly emotional experience. In effect, anger or rage protects individuals from being vulnerable; anger pushes others away. Feelings of anger and rage help to create disconnection, while the feelings of sadness and fear invite reconnection. Once participants are feeling less aroused and calmer, they can engage their cognitive skills and try to take the other person's perspective, allowing them to experience more empathy and respect for the other individuals and their viewpoints. With this new information, they are able to risk expressing their own more vulnerable feelings, such as sadness, fear, or shame. The expression of these vulnerable feelings invites others to respond similarly, diminishing the escalation of physiological arousal of all involved and opening a space for reconciliation. Once participants are communicating at the level of their more vulnerable feelings, are more connected, and are thus able to communicate, they may be able to discuss the difficulties that have arisen between them, either current or historical, and come to some mutual resolution. In these family groups, we also use these microskills to help everyone involved manage their sexual arousal—to be able to stop, re-engage their brains, and make more appropriate decisions than they have in the past.

The process that we use for this MFGI is threefold: (a) presentation of the microskills (noting physiological changes, stopping and doing nothing, accessing fear, having empathy, and risking vulnerability); (b) interactive group therapy as we discuss a recent event in which participants became aroused and engaged in their habitual patterns; (c) and role-playing these events as they had occurred and how they could have occurred differently after using the microskills.

Further information about the development (Keiley, 2002a), curriculum (Keiley, 2002b), and implementation of the MFGI can be found in previous publications (Keiley, 2007). In summary, for eight sessions, male adolescents who are incarcerated for sexual offending and their family members (usually one or more caregivers) meet with the facilitators who are marriage and family therapy trainees or therapists for an hour and a half twice a month for 4 months. During these sessions, the adolescents and family members learn and experience actual altering of their interactional patterns from this affect regulation and attachment perspective. The current study reports on all of the 14 MFGI groups that we have conducted in the juvenile correctional facility for adolescents who sexually offend in Alabama over the past 7 years. Because we propose that the mechanism of change in our intervention is change in the ability to manage maladaptive emotional arousal, we hypothesized that decreases in problem behaviors and increases in attachment would be predicted by decreases in maladaptive emotion regulation, both at the end of the intervention (posttest) and at later follow-up.

## METHODS

### *Participants*

The sample for this MFGI clinical intervention and research study was drawn from the juvenile department of youth services (DYS) correctional facility in Alabama for male adolescents who sexually offend and attending family members. Male juveniles from across the state who have committed criminal offenses (sexual offenses, delinquency, drug trafficking, alcohol offenses, theft, assault, murder, among other things) are remanded to this facility by the juvenile courts for periods of a few months to several years, but we are only treating those who sexually offend. All of the adolescents in this study were incarcerated at DYS for committing a sexual offense(s); therefore, they were all involved in the Accountability Based Sex Offender Program (ABSOP; Burkhart, Peaton, & Sumrall, 2009) as part of their treatment. These adolescents have committed various sexual offenses, including (but not limited to) fondling and molestation, receiving and/or giving anal or oral sex, digital penetration, and forced vaginal intercourse. Some have perpetrated for a short period of time and others for years. These offenses had occurred with younger siblings, other family members, or others in the community. As part of their ABSOP treatment, they are required to attend the MFGI. All parents are invited to attend the MFGI, but some are unable or unwilling to attend; in the case of nonattendant parents, the adolescents are still required to attend.

The adolescents in ABSOP are housed in dorms, each serving 12–16 boys, and they are constantly supervised unless alone in their bedroom. During the day, they are involved in treatment (individual and/or group therapy), school, and free time for reading, TV, socializing, and/or sports. Despite their structured lifestyle, these adolescents still experience numerous problems with

their behaviors, attachment, and affect regulation while incarcerated. Many opportunities exist in which the adolescents interact with other inmates, dorm staff, therapists, and educators. Inability to regulate physiological arousal levels often contributes to physical fights and verbal altercations with others. These and other externalizing behavior problems displayed while incarcerated cause penalties and consequences for the adolescents. Being incarcerated and separated from family and friends, these adolescents also experience intense internalizing difficulties such as anxiety, depression, and somatic disorders. In addition, attachment is especially relevant as the adolescents are only allowed visitation with family members once a month (twice a month if they are part of the MFGI program). Therapists and case managers, however, often keep primary caregivers informed of their adolescent's observable behaviors and difficulties by phone. The majority of adolescents are incarcerated for approximately 1 year. Because most of the adolescents are scheduled to return to their caregivers' homes after incarceration, the family focus of the MFGI becomes extremely important in their rehabilitation. The few who will not return to their families of origin or who have not reached the age of 18 (approximately 2%) will be placed in half-way houses or foster families.

*Sample.* One hundred and fifteen families (115) consisting of male adolescents who sexually offend and their female and male caregivers were included in this study from the multiple-family groups that were conducted from 2006 to 2012. The adolescents ranged from 12 to 19 years old ( $M = 15.7$ ;  $SD = 1.7$ ); the mothers from 29 to 54 years old ( $M = 40.9$ ;  $SD = 8.4$ ); and the fathers from 27 to 56 years old ( $M = 42.6$ ;  $SD = 7.2$ ). The majority of participants identified as European-American (60%; 33% African American; 7% Hispanic). Adolescents ranged from currently being enrolled in the 6th grade to having completed their GED. Forty percent (40%) of mothers and 25% of fathers went beyond high school graduation or GED achievement. The majority of mothers (58%) and fathers (69%) were employed and married (mothers, 50%; fathers, 62%) at the beginning of the intervention. Twenty three percent of the mothers and fathers were married to each other. On average, annual income for mothers was \$21,100 ( $SD = \$26,300$ ) and for fathers was \$37,800 ( $SD = \$25,970$ ).

### *Procedures*

Caregivers are asked to attend the MFGI by the DYS therapist at the facility who is in charge of recruitment. The incentive for caregivers attending is that participation allows them to see their adolescent twice a month rather than the one visit that is normally allowed. The adolescents must attend MFGI as part of the facility's treatment program. Because families travel to the facility from all over the state of Alabama or other states, they are given a small monetary reimbursement to help pay for travel to the sessions that they attend. Adolescents receive no compensation. If the adolescents or caregivers agree to participate in the research segment of the MFGI, they submit their signed informed research consents. For the purposes of this study, caregivers are considered the adolescents' mothers or fathers and only their responses are utilized. All MFGI sessions are 1½ hr long and facilitated by master's-level marriage and family therapists or therapists-in-training who are supervised by the first author. Each of the full 8-week MFGI sessions is conducted with eight to eleven adolescents and their available family members (including mothers, fathers, grandparent(s), aunts, uncles, older siblings) all together in one room with the facilitators. The full 8-week MFGI program has been conducted twice a year for the past 7 years in this institution. The research study uses preintervention, postintervention (4 months after pretest), and 1-year follow-up quantitative assessments. Self-report and other-report questionnaires are administered to all participants (adolescents and caregivers) on the first day of the intervention and on the last day of the intervention (4 months later). All participants independently fill out the surveys without the input of their other family members.

### *Measures*

*Demographics.* The adolescents and their caregivers complete a brief survey of demographic information. We collect information about age, sex, and race from all participants. Adolescents also report their grade in school, with whom they lived prior to incarceration, and the number of siblings in the family. We collect information about education, income, home ownership, employment, marital status, and number of children from each caregiver.



*Adolescent problem behaviors.* Internalizing and externalizing behaviors (adolescent, mother, and father reports) are collected at three time points (preintervention, postintervention, and 1-year follow-up) to denote adolescent problem behaviors. The adolescents complete the youth self-report (YSR; Achenbach, 1991), and both mother and father figures complete the Child Behavior Checklist (CBCL; Achenbach, 1991); these measures are designed and have been validated (Schaeffer et al., 2014) for use with and about adolescents including offenders between the ages of 11 and 18. Adolescents and caregivers rate 112 problem behavior items listed on the YSR or CBCL as currently 0 (*not true*), 1 (*somewhat true*), or 2 (*very true or often true*) for the adolescents. In this study, the average internal reliability alphas across the 3 time periods were .91 for adolescents, .90 for mothers, and .88 for fathers for internalizing and .91 for adolescents, .92 for mothers, and .93 for fathers for externalizing behaviors. Averages scale scores were created at each time point for each of these measures, keeping the metric of the total score the same as the metric of the items. We did this for every score that we created below (Singer & Willett, 2003).

*Adolescent affect regulation.* Both adolescents and caregivers complete the Emotion Regulation Checklist about the adolescent's regulatory ability (ERC; Shields & Cicchetti, 1997). This 24-item measure is completed using a four-point Likert scale ranging from 1 (*almost always*) to 4 (*never*), according to the extent each item fits for the adolescents. The ERC was developed to distinguish between emotionally well-regulated and emotionally dysregulated children and adolescents. This scale has been validated on juvenile offenders (Zaremba & Keiley, 2011; Weems & Pina, 2010). We used the lability-negativity subscale, a measure of maladaptive emotion regulation that includes mood lability, lack of flexibility, and dysregulated negative affect. Over the three time periods in this study, the average internal reliability alphas were .77 for adolescents, .83 for mothers, and .84 for fathers for this measure of maladaptive emotion regulation.

*Adolescent attachment.* Only adolescents complete the attachment scale (AS; Collins & Read, 1990), an 18-item scale measuring three attachment dimensions (dependence, anxiety, closeness) using a five-point Likert scale from 1 (*not at all like me*) to 5 (*very much like me*) at all 3 time points. The average alpha for the two assessments (preintervention and postintervention) of each subscale that was used was "feelings of being able to depend on others" ( $\alpha = .72$ ), "anxiety or fearfulness about being abandoned" ( $\alpha = .61$ ), and "feelings of closeness with others" ( $\alpha = .55$ ). This measure has been validated on deviant offenders (Miller, 2013).

*Recidivism.* All juveniles who sexually offend must register with their local police departments when they are released into the general population. Yearly, the Alabama Probation Officers of the Alabama Department of Youth Services collects data on recidivism by accessing the National Crime Information Center (NCIC) and the Automated Fingerprint Identification System (AFIS) to determine whether any of the juveniles from the facility in which we conduct the MFGI have been arrested for any offense, including sexual offenses.

### *Analysis Plan*

We conducted a univariate and bivariate analysis for each study variable using the statistical program of SAS (version 9.2; SAS Institute Inc., 2009). All variables met the requirements for use in linear analysis. Because our data are not independent, we used the actor-partner model in all analyses (Wittenborn, Dolbin-MacNab, & Keiley, 2013). In each model fit, we included adolescent, mother, and father report simultaneously and independently to examine the differences in the reports of change in adolescent behavior across the three reporters. We examined change in four behavioral domains: (a) our predictor domain, maladaptive emotion regulation, reported by all three family members (adolescent: A, mother: M, and father: F) over pre- and posttest about the adolescent's regulation, and our outcome behavioral domains: (b) externalizing reported by all three family members about the adolescent; (c) internalizing reported by all three family members about the adolescent; and (d) attachment comfort with dependence on others, attachment anxiety about abandonment, and closeness to others reported by adolescent.

To examine change in each of these domains, in Mplus (Version 6; Muthén & Muthén, 1998–2010), we created change scores using the difference between the pre- and posttest scores for each of the three reporters. We then estimated the means of all adolescent, mother, and father change scores simultaneously using MPlus to determine whether change existed in any domain. We then used these change scores as predictor (maladaptive emotion regulation) and outcomes

(externalizing, internalizing, and attachment) for all three reporters simultaneously in one model. In other words, we fit a series of three simultaneous equations of change in one path model to account for the nonindependence of the data. See Figure 1 for an example of one of these models for change in maladaptive emotion regulation predicting change in externalizing behaviors. Mplus allows for the inclusion of participants with missing data by using full information maximum likelihood (FIML) estimation (Enders, 2010; Muthén & Muthén, 1998–2010), drawing on the theory by Little and Rubin (1987). When using FIML estimation with missing data, observations are sorted into missing data patterns and each parameter is estimated using all available data for that particular parameter. Muthén and Muthén (1998–2010) recommended that the amount of missing data not exceed 90%; in other words, they recommended that there be at least 10% available data in the observed information matrix. In our study, respondents' reports on the measures ranged from 29% available for fathers at posttest to 75% for adolescents at posttest, which well exceeds the recommendation of 10%. Because we hypothesized that the possible mechanism of change in our intervention is change in maladaptive emotion regulation, we used change in that domain as our predictor of change in the other behavioral domains. Therefore, if significant change existed in any behavioral domain for the three reporters (adolescent, mother, father) over the two time points, we entered change in maladaptive emotion regulation reported by adolescents, mothers, and fathers as the predictor of that change.

To examine linear change in adolescents' reports of maladaptive emotion regulation, externalizing, internalizing, attachment dependence and anxiety over the three time points, pre-, post-, and 1-year follow-up, we fit individual growth models, but just with adolescent reports of these behaviors. Data collection at 1-year follow-up is difficult in this population; we have fewer respondents who can be found at that time point; 14% of the adolescents returned their questionnaires at that time. But, we did have an adequate number of adolescents for this analysis. All analyses are controlled for age and race. In all MPlus analyses, the criteria that we used for model fit was a nonsignificant chi-square and a nonsignificant RMSEA (Kline, 2011).

## RESULTS

Table 1 includes means and standard deviations for all the study variables. In fitting the simultaneous change score analyses for adolescent (A), mother (M), and father (F) and the growth analyses for adolescents, age and race were controlled; however, they were not significant in any of the models.

### *Change Scores*

We tested whether significant change and variance existed in each of four behavioral domains across all three reporters (A, M, F). For maladaptive emotion regulation, our predictor of change for the other three behavioral domains, only adolescents and mothers reports showed significant decrease and variance over pre- to posttest (A:  $-.10, p < .05$ ; M:  $-.15, p < .01$ ); father reports did not show any change (F:  $-.07, p > .05$ ), but significant variance did exist; therefore, it could be

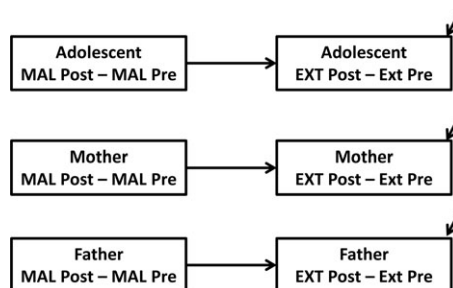


Figure 1. Example of the hypothesized model fit for all three reporters simultaneously for each outcome domain. Change in maladaptive motion regulation (MAL) from pretest to posttest predicts change in externalizing (EXT) from pretest to posttest.

Table 1  
*Estimated Means and Standard Deviations for All Study Variables*

Variable	Pretest		Posttest		1 Year Later	
	Mean	SD	Mean	SD	Mean	SD
Adolescent internalizing						
Adolescent report	0.46	0.33	0.42	0.27	0.38	0.22
Mother report	0.39	0.30	0.26	0.20		
Father report	0.35	0.26	0.27	0.19		
Adolescent externalizing						
Adolescent report	0.65	0.35	0.63	0.35	0.55	0.27
Mother report	0.51	0.36	0.32	0.30		
Father report	0.51	0.36	0.37	0.27		
Adolescent maladaptive emotion regulation						
Adolescent report	2.20	0.45	2.13	0.42	2.03	0.44
Mother report	2.01	0.51	1.84	0.42		
Father report	2.06	0.51	2.04	0.49		
Adolescent report of attachment						
Dependence	3.20	0.83	3.19	0.72		
Closeness	3.27	0.63	3.22	0.68		
Anxiety	3.74	0.72	3.55	0.66		

used as a predictor (Table 2, Model 1). In the remaining three behavioral domains, significant change and variance existed: mean decrease in externalizing behavior reports over pre- to posttest (A:  $-.03, p < .05$ ; M:  $-.12, p < .001$ ; F:  $-.12, p < .001$ ); mean decrease in internalizing behavior reports (A:  $-.08, p < .01$ ; M:  $-.14, p < .001$ ; F:  $-.11, p < .001$ ); mean increase in adolescent reports of attachment dependence on others ( $.17, p < .05$ ) and mean decrease in attachment anxiety about abandonment ( $-.17, p < .05$ ). No mean change existed for adolescents in their closeness to others ( $.00, p > .05$ ), but significant variance did exist; therefore, we could predict change in closeness by maladaptive emotion regulation.

#### *Maladaptive Emotion Regulation as Predictor of Change*

Table 2 also includes the results for the multiple domain change models that we fit in the other three behavioral domains (internalizing, externalizing, attachment) in which we used change in maladaptive emotion regulation as the predictor of change in these other domains. Although for father's reports no change exists in maladaptive emotion regulation, significant variance exists in the change scores; therefore, it could be used as a predictor of change. The first multiple domain model we fit ( $X^2 = 12, df = 6, p = .06$ ; RMSEA =  $.09, p = .15$ ) was for change in adolescent, mother, and father reports of externalizing behavior at pre- and posttest 4 months later (Table 2, Model 2) predicted by change in maladaptive emotion regulation. Mother ( $-.09, p < .001$ ) and father ( $-.10, p < .001$ ) reports of adolescent's behavior show significant decreases in externalizing over the intervention ( $\beta$ s for intercept); adolescents' own reports show no change ( $-.02, p > .05$ ) ( $\beta$  for intercept), but variance did exist that could be predicted. These change scores in externalizing are significantly predicted by change in maladaptive emotion regulation as reported by mother ( $.22, p < .001$ ) and father ( $.09, p < .05$ ) ( $\beta$ s for effect of  $\Delta$ Mal ER). For the adolescent, no significant change existed, but the change scores could still be predicted by change in maladaptive emotion regulation because variance did exist. The result was that decrease in maladaptive emotion regulation had an effect on those change scores for adolescents ( $.10, p < .01$ ) ( $\beta$  for effect of  $\Delta$ Mal ER). Almost 26% of the variance in the change in externalizing reported by mother was predicted by change in maladaptive emotion regulation; almost 9% for both adolescents and fathers. Figure 2 illustrates these changes. For all three reporters, a decrease in maladaptive emotion



Table 2

*Change in Adolescent Behavior Reported by Adolescent, Mother, and Father as Predicted by Change in Maladaptive Emotion Regulation Reported by Adolescent, Mother, and Father*

Model no.	Model	Adolescent Estimate (SE)	Mother Estimate (SE)	Father Estimate (SE)
1 <sup>a</sup>	Maladaptive emotion Regulation change ( $\Delta$ Mal ER)	-.10* (.04)	-.16** (.05)	-.08 (.08)
2 <sup>b</sup>	Externalizing Intercept <sup>b</sup>	-.02 (.02)	-.09*** (.02)	-.10*** (.02)
	Effect of $\Delta$ Mal ER	.10** (.01)	.22*** (.05)	.09* (.04)
	R <sup>2</sup>	8.5%	25.5%	8.8%
3	Internalizing Intercept <sup>a</sup>	-.06** (.02)	-.12*** (.03)	-.11*** (.03)
	Effect of $\Delta$ Mal ER	.20*** (.06)	.23*** (.06)	.10** (.03)
	R <sup>2</sup>	10.5%	10.3%	5.1%
4	Attachment Dependence Intercept <sup>a</sup>	.14~ (.08)		
	Effect of $\Delta$ Mal ER	-.32~ (.20)		
	R <sup>2</sup>	2.8%		
	Anxiety Intercept <sup>a</sup>	-.19** (.07)		
	Effect of $\Delta$ Mal ER	-.32* (.17)		
	R <sup>2</sup>	3.9%		
	Closeness Intercept	-.03 (.07)		
	Effect of $\Delta$ Mal ER	-.29* (.16)		
	R <sup>2</sup>	3.1%		

*Notes.*

<sup>a</sup>These are the actual change scores and their direction and significance levels for maladaptive ER. For example, adolescents report a significant decrease in Mal ER over time.

<sup>b</sup>In this model and all the following models, the intercept is the mean change in the behavioral domain after prediction by change in Mal ER. For example, mothers report a significant decrease in externalizing ( $-.09, p < .001$ ) over pre- and posttest. The effect of change in Mal ER predicting the change in externalizing is positive (.22,  $p < .001$ ). That is, if maladaptive ER decreases, then externalizing does as well. And, change in Mal ER predicts 25.5% of the variance in change in externalizing.

regulation is related to a decrease in externalizing behaviors, while an increase in maladaptive emotion regulation is related to an increase in externalizing from pre- to posttest. This figure and those in Figures 3 and 4 show the effects of change in maladaptive emotion regulation predicting the change in each of our outcome domains moderated by time. To calculate the values for each figure, we use the estimates of the fitted equations from Table 1 and substitute in high and low values (mean  $\pm$  1 SD) of the predictor (Mal ER) to calculate the values of the outcome at these two different values of Mal ER.

The second multiple domain model we fit ( $X^2 = 2, df = 6, p = .88; RMSEA = .09, p = .93$ ) was for adolescent, mother, and father reports of change in internalizing behavior at pre- and

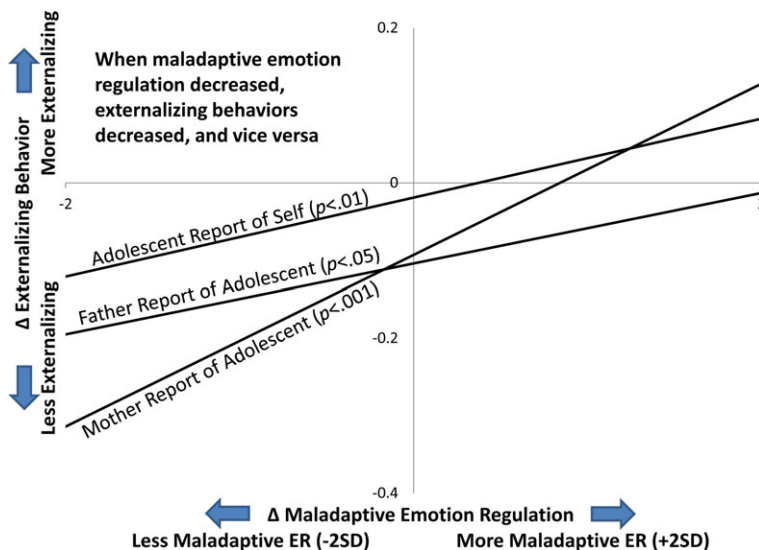


Figure 2. Change in externalizing behavior over the intervention as predicted by change in maladaptive emotion regulation.

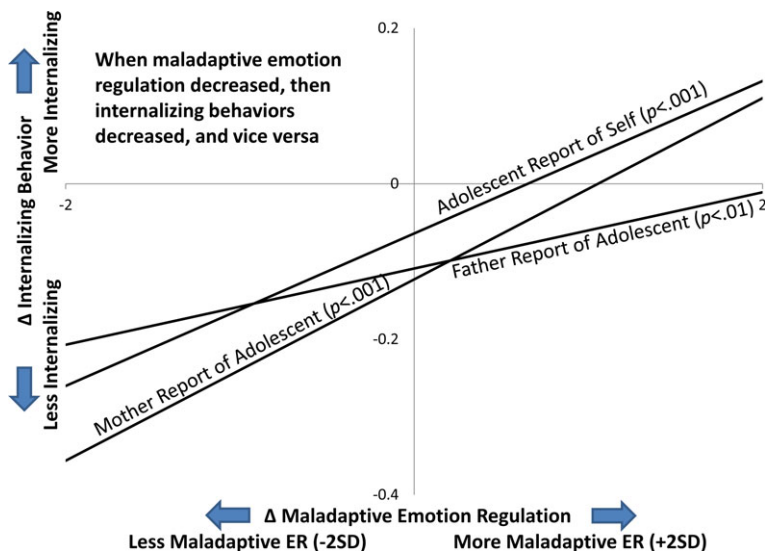


Figure 3. Change in internalizing behavior over the intervention as predicted by change in maladaptive emotion regulation.

posttest 4 months later (Table 2, Model 3) predicted by change in maladaptive emotion regulation. Adolescent ( $-.06, p < .01$ ), mother ( $-.12, p < .001$ ), and father ( $-.11, p < .001$ ) reports show significant decreases in internalizing over the intervention ( $\beta$ s for intercept), and all three reporters have variance in these changes that can be predicted by change in maladaptive emotion regulation. Change in internalizing is significantly predicted by change in maladaptive emotion regulation for adolescent ( $.20, p < .001$ ), mother ( $.23, p < .001$ ), and father ( $.19, p < .01$ ) ( $\beta$ s for effect of  $\Delta$ Mal ER). Ten percent (10%) of the variance in mother-reported and almost 11% in adolescent-reported changes in internalizing behavior is predicted by changes in maladaptive emotion regulation. Only 5% of variance is predicted for father reports. Figure 3 illustrates these changes. For all three reporters, a decrease in maladaptive emotion regulation over the intervention is related to a

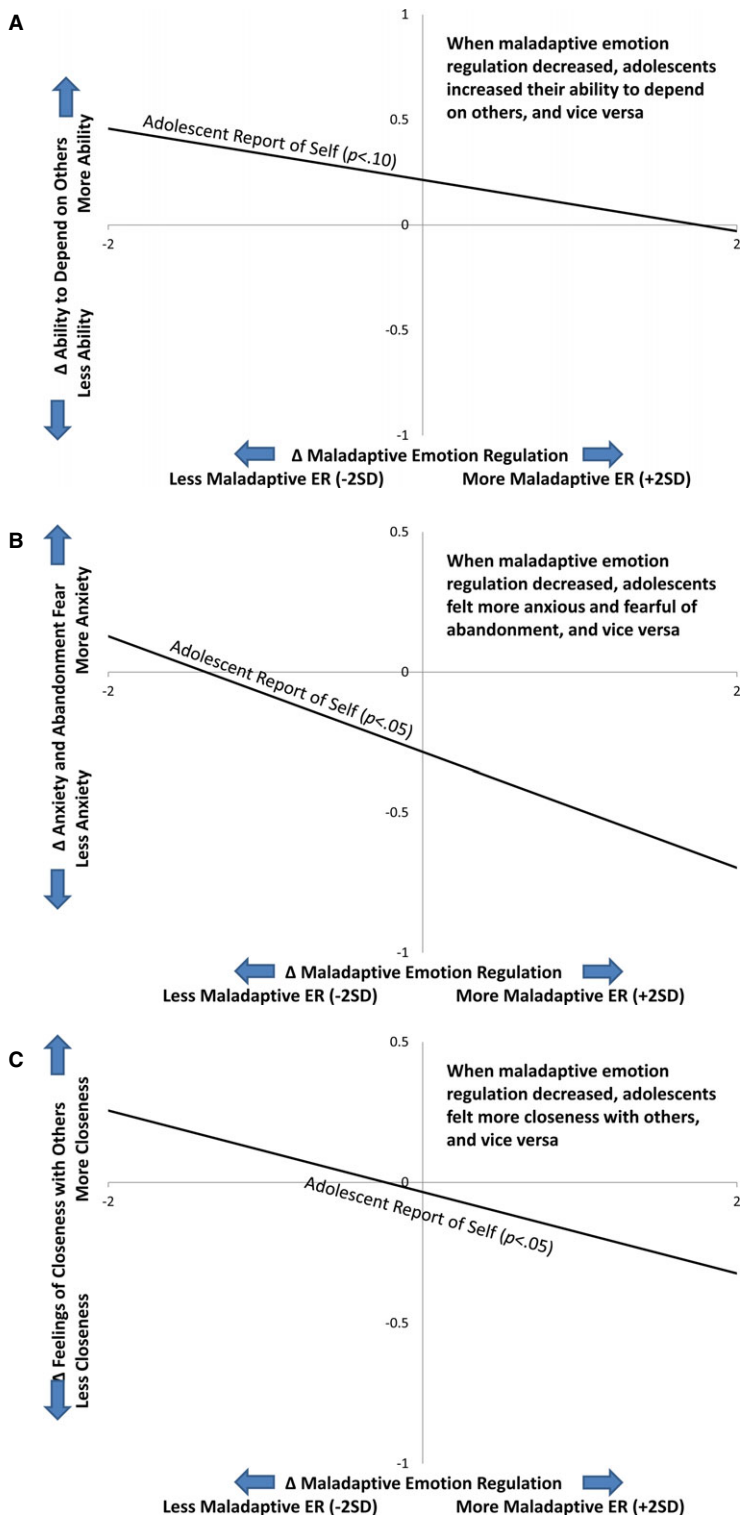


Figure 4. (A) Change in ability to depend on others over the intervention as predicted by change in maladaptive emotion regulation. (B) Change in anxiety and fear of abandonment over the intervention as predicted by change in maladaptive emotion regulation. (C) Change in feeling of closeness with others over the intervention as predicted by change in maladaptive emotion regulation.

decrease in internalizing behaviors, while an increase in maladaptive emotion regulation results in an increase in those internalizing.

The third multiple domain model we fit ( $X^2 = 0$ ,  $df = 0$ ,  $p = 1.00$ ; RMSEA = .00,  $p = 1.00$ ) was for adolescent reports of ability to depend on others, anxiety/fear of abandonment, and felt closeness with others, all subscales of the attachment scale (Table 2, Model 4). Predicting change in adolescent reports of dependence (.14,  $p < .10$ ) and anxiety (−.19,  $p < .01$ ) ( $\beta$ s for intercept) by adolescent reports of change in maladaptive emotion regulation show significant change with dependence increasing and anxiety increasing. On average, no change exists in adolescent reports of closeness (−.03,  $p > .05$ ), but significant variance existed so it too could be predicted by change in adolescent reports of maladaptive emotion regulation. Change in adolescent's dependence is significantly predicted by adolescent reports of change in maladaptive emotion regulation (−.32,  $p < .10$ ), as is their anxiety/fear of abandonment (−.32,  $p < .05$ ) and even their ability to be close to others (−.29,  $p < .05$ ) ( $\beta$ s for effect of  $\Delta$ Mal ER). The amounts of variance predicted in these attachment domains by changes in maladaptive emotion regulation are much lower than for the previous domains of externalizing and internalizing (3–4%). We also tested whether adolescent reports of changes in all three domains of attachment were predicted by mother and father reports of the adolescent's change in maladaptive behavior, and no significant results existed. Figure 4A illustrates the changes in these attachment behaviors. For adolescents, a decrease in maladaptive emotion regulation over the intervention is related to an increase in their ability to depend on others, while an increase in maladaptive emotion regulation is related to less ability to depend. Figure 4B illustrates that a decrease in maladaptive emotion regulation over the intervention is related to an increase in their fear of abandonment, while an increase in maladaptive emotion regulation is related to much less fear of being abandoned. This result in the context of the previous result that if the adolescent is experiencing less maladaptive emotion regulation he begins to depend on his caregivers might coexist because it is possible that the new found dependence increases his fear of abandonment. Figure 4C illustrates that a decrease in maladaptive emotion regulation is related to a greater feeling of closeness with others and an increase in poor emotion regulation reduces the feeling of closeness.

### *Recidivism*

Only 4% of the adolescents who leave this institution recidivate to sexual offending and only about 19% are rearrested for other nonsexual offenses (Burkhart, 2013).

### *Growth Models for Adolescent Behaviors over 1 Year*

Because we had so little data at 1-year follow-up, we only examine change over 1 year for externalizing and internalizing behaviors and maladaptive emotion regulation. We collected data at pretest (time = 0), posttest (time = .25, a quarter of a year after pretest), and follow-up (time = 1, a year after pretest). Externalizing behaviors (model fit:  $X^2 = 0$ ,  $df = 1$ ,  $p = .89$ ; RMSEA = .12,  $p = .13$ ) decrease for adolescents over 1 year from the beginning of the intervention ( $\beta_{\text{Intercept}} = .48$ ,  $p < .001$ ;  $\beta_{\text{slope}} = -.09$ ,  $p < .001$ ); internalizing problems (model fit:  $X^2 = 3.3$ ,  $df = 1$ ,  $p = .07$ ; RMSEA = .12,  $p = .13$ ) also decrease ( $\beta_{\text{INT}} = .45$ ,  $p < .001$ ;  $\beta_{\text{slope}} = -.10$ ,  $p < .01$ ). In addition, maladaptive emotion regulation (model fit:  $X^2 = 1.0$ ,  $df = 1$ ,  $p = .30$ ; RMSEA = .02,  $p = .40$ ) decreases as well ( $\beta_{\text{Intercept}} = 2.19$ ,  $p < .001$ ;  $\beta_{\text{slope}} = -.20$ ,  $p < .01$ ).

## DISCUSSION

The most noteworthy finding from this study is that the MFGI is effective in helping to decrease problem behaviors (externalizing, internalizing, maladaptive emotion regulation) as reported by adolescent, mother, and father over pre- and posttest. Even more importantly, the decreases in these behaviors are possibly due to significant decreases in maladaptive emotion regulation (poor responses to high physiological arousal) over the same time period. In other words, our hypothesis that decreases in maladaptive emotion regulation may be the possible mechanism through which this intervention creates change in problem behaviors is supported. In addition, for adolescents, these decreases in externalizing, internalizing, and maladaptive emotion regulation continue for up to a year after the intervention. In our intervention, we focus

primarily on helping the participants learn how to manage and tolerate high levels of arousal to remain able to think and make sensible decisions about what to do to handle the situation that they are confronting. In fact, interventions for individuals, couples, and families now often focus on altering this very important parasympathetic response that, if left unchecked, leave people at risk for habitual responses (fight, flight, freeze) that escalate the situation in which they find themselves (Ben-Naim, Hirschberger, Ein-Dor, & Mikulincer, 2013; Sutton, Wilson, Van Kessel, & Vanderpyl, 2013).

The adolescent's increase in ability to depend on and be close to others is also related to decreases in poor emotion regulation. It is true that these adolescents have had other treatments during their time in prison (educational groups and individual therapy) that could also have lessened their problem behaviors; additionally, we did not have a control group, which also limits our ability to state absolutely that improvement was due solely to our intervention. But, the fact that congruence existed across adolescent, mother, and father reports in these changes adds a bit more validity to our claim that the MFGI appears to be successful in reducing problem behavior and increasing functional arousal regulation.

Another striking result is that after release, only 4% of these adolescents return to sexual offending, an extremely low recidivism rate (Burkhart & Cook, 2010). In a critical review of the juvenile sex offender literature, Keelan and Fremouw (2013) estimated that, on average, between 8–10% of juvenile sex offenders reoffend sexually after release from incarceration. The juveniles in our treatment are sexually reoffending at <50% of the national rate.

We were pleased that race did not have an effect on the outcomes that we report here. That similar improvement in problem behaviors in the context of the MFGI as reported in a previous study (Keiley, 2007) is possible across race, combined with the fact that implementing the MFGI is very cost effective, suggests that this intervention should be considered in institutions in which costs for treatment have to be kept at very minimal levels.

That these juveniles decrease in internalizing and externalizing behaviors over pre-, post-, and 1-year follow-up was not totally surprising, as previous research of the MFGI in a similar population of adolescents, those incarcerated for delinquency but not sexual offending, also show decreases in externalizing and internalizing over a 6-month follow-up (Keiley, 2007). But in this previous study, how this change occurred was not investigated. Indeed, adaptive affect regulation was improved over the time of this previous study, but we did not test whether that change was the predictor of the change in problem behaviors. The current study's finding that when adolescents are able to reduce the use of maladaptive emotion regulation strategies the result is a possible decrease in externalizing and internalizing and increase in attachment behaviors to caregivers is an important one. Our findings support previous theoretical assumptions that interventions that focus on helping individuals inhibit habitual responses and change behaviors should take place in situations in which high enough parasympathetic arousal exists to interfere with the current pattern of response, allowing a new response to be shaped (Porges, 2003). This knowledge that altering adolescents' maladaptive affect regulation strategies may decrease their internalizing/externalizing behavior and improve their attachment to parents will further guide our focus during the implementation of our intervention.

Somewhat surprising was the finding that over the period of intervention, the adolescents who decreased the most in their maladaptive emotion regulation were more fearful of abandonment than were those who continued the use of these maladaptive emotion regulation strategies. As expected, the adolescents who used less maladaptive emotion regulation over time did feel they could depend more on their caregivers and feel closer to them, but those who improved the most in maladaptive emotion regulation appeared to fear their caregivers might leave them. If they are feeling closer and allowing themselves to feel dependent, it would not be surprising that they might fear losing this new connection with their caregivers.

One of the major limitations of this study is that no control group existed. This made it impossible for us to assess whether the changes in problem behavior and arousal regulation were totally due to the MFGI because, of course, the adolescents receive other treatments while in the facility. Another difficulty, however, to mounting a more controlled study is obtaining access to the caregivers of adolescents who are incarcerated for sexually offending, but not in the treatment group. The institution in which we conducted this study is the only one in the entire state



of Alabama; hence, all caregivers have to travel, some great distances, to take part in the MFGI. This was the reason we gave the caregivers in the MFGI a small travel stipend. But with our limited resources, paying the caregivers of a control group of adolescents who sexually offend to come in only to fill in questionnaires was not feasible. Well-funded clinical trials of the MFGI with both experimental and control groups will be our next step. This difficulty with obtaining access to participants also results in a lower response rate at the time 3 data collection than we would have wished.

A major strength of this study is its longitudinal nature. Many intervention studies are merely pre- and posttest design with no longer term follow-up. Even though this population is often difficult to follow over time, we have been able to stay in touch with them approximately 8 months after posttest for the 1-year follow-up assessment. An additional strength is having multiple participants (adolescent, mother, father) report on the adolescents' behaviors over time. Being able to examine the three sets of reports in one statistical model allows us to control for bias in any one report as each report is controlled for the other two reports, thus making more valid inferences to the population.

One of the advantages of the MFGI is that it is fairly inexpensive to implement. The major expenses are for clinical personnel to conduct MFGI and research teams to collect and analyze data. Our clinical group comprised of the PI and 3 clinical/research assistants is funded by the Alabama Department of Youth Services, but we also rely on volunteers from the marriage and family therapy clinic at our university for assistance in the clinical work and use of the data for research purposes. Within the environment of a training program, being able to provide students with experiences in clinical intervention and research with evidence-based treatment for a severely underserved population is another great advantage.

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