HHS Public Access

Author manuscript

J Am Acad Child Adolesc Psychiatry. Author manuscript; available in PMC 2018 December 01.

Published in final edited form as:

J Am Acad Child Adolesc Psychiatry. 2017 December ; 56(12): 1053–1061. doi:10.1016/j.jaac.2017.09.424.

A Two-Week Psychosocial Intervention Reduces Future Aggression and Incarceration in Clinically Aggressive Juvenile Offenders

Dr. Ashley D. Kendall, PhD,

University of Illinois at Chicago and Northwestern University, Evanston, IL

Ms. Erin M. Emerson, MA,

University of Illinois at Chicago

Dr. William E. Hartmann, PhD,

University of Illinois at Chicago and University of Michigan at Ann Arbor

Dr. Richard E. Zinbarg, PhD, and

Northwestern University and The Family Institute at Northwestern University

Dr. Geri R. Donenberg, PhD

University of Illinois at Chicago

Abstract

Objective—There is a largely unmet need for evidence-based interventions that reduce future aggression and incarceration in clinically aggressive juvenile offenders serving probation. We addressed this gap using a group randomized controlled trial. Offenders both with and without clinical aggression were included, enabling comparison of intervention effects.

Method—Juveniles 13–17 years old ($N = 310$, mean = 16 years, 90% African-American, 66% male) on probation were assigned to a 2-week intervention targeting psychosocial factors implicated in risky behavior (e.g., learning strategies to manage “hot” emotions that prompt risk taking) or to an equally intensive health promotion control. Participants completed aggression measures at baseline, 6-, and 12-month follow-up and reported on incarceration at 12 months. Spline regression tested symptom change.

Results—Among clinically aggressive offenders ($n = 71$), the intervention arm showed significantly greater reductions in aggression over the first 6 months compared with controls. Juveniles from the intervention no longer met clinical criteria, on average, but clinically significant

Correspondence to Ashley D. Kendall, PhD, 1603 West Taylor Street, Chicago, IL 60612; akendall@uic.edu. Drs. Kendall and Zinbarg served as the statistical experts for this research.

Disclosure: Drs. Kendall, Hartmann, Zinbarg, and Donenberg, and Ms. Emerson report no biomedical financial interests or potential conflicts of interest.

The funding source had no involvement in the study design; the collection, analysis, or interpretation of the data; writing of the report; or the decision to submit the present paper for publication.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

symptoms persisted in the control group. By 12 months, participants from the intervention appeared to maintain treatment gains, but their symptom levels no longer differed significantly from those in the control. However, the intervention group was nearly 4 times less likely than controls to report incarceration. Intervention effects were significantly stronger for offenders with clinical than nonclinical ($n = 239$) baseline aggression.

Conclusion—A 2-week intervention expedited improvements in aggression and reduced incarceration in clinically aggressive juvenile offenders. The findings underscore the importance of directing intervention resources to the most aggressive youth.

Clinical trial registration information—PHAT Life: Preventing HIV/AIDS Among Teens in Juvenile Justice (PHAT Life); <http://clinicaltrials.gov/>; NCT02647710.

Keywords

juvenile offenders; aggression; incarceration; intervention; prospective

INTRODUCTION

Acts of aggression by juvenile offenders, including violent activity, are a major source of psychiatric and economic burden among victims and witnesses, the perpetrators themselves, and society more broadly.^{1–3} Although arrest rates for violent crimes by juveniles in the United States have fallen from an all-time high in the 1990s,⁴ the absolute numbers remain troubling: approximately 1.3 million youth were arrested in 2012, including 61,070 for violent crime.⁴ Youth exposure to violence as either a victim or witness has been shown to disrupt typical developmental trajectories through various biopsychosocial pathways, with adverse outcomes including increased depression and anxiety, greater displays of aggression and other externalizing problems, and poorer academic functioning.¹ To address violence, incarceration continues to be used at relatively high rates in the United States, particularly when the charges are against young African-American males.⁵ There is mounting evidence, however, that this approach fails to meet either the developmental or criminogenic needs of youth.² Instead, incarceration frequently exacerbates psychiatric conditions among offenders, perpetuating engagement in criminal activity and contact with the justice system.² The economic costs, in turn, are tremendous. It has been estimated that saving a single high-risk juvenile from lifelong criminal activity would save society up to \$5.3 million.³

From the perspective of intervening in juvenile aggression and offsetting its cascade of negative effects, youth currently on probation—particularly those high in aggression—are at a critical juncture. Up to 80% of juvenile offenders in the United States are released into the community following arrest,⁶ including a large portion charged with crimes against a person.⁷ These youth, then, are returned to the daily environments in which the behaviors that led to arrest occurred (if arrest was warranted), often without new resources for navigating triggers of high-risk behavior. As a result, youth high in aggression are at risk for continuing to act on their impulses, potentially amplifying the likelihood they will recidivate and ultimately face incarceration.

It should be acknowledged here that acts of aggression clustering in low-income urban communities, where arrest rates are disproportionately high relative to the rest of the country,⁵ represent to a substantial extent reactions to environmental stressors stemming from structural inequalities.⁸ Insofar as this is the case, structural reform will be necessary to ultimately address juvenile aggression. As long as widespread inequalities persist, interventions that teach youth to recognize personal triggers of aggression embedded in their daily lives, and use tools to manage their responses, may represent the most promising means available for reducing aggressive acts by juveniles.

Encouragingly, meta-analyses have shown psychosocial interventions can reduce aggression among youth with clinical symptoms^{9–11} as well as rates of recidivism.^{12, 13} The studies documenting reduced aggression have primarily been conducted with samples from in- or outpatient clinics and schools.^{9–11} A promising method to emerge from this work has been teaching young people to recognize and respond effectively to triggers of aggression and related symptoms.¹⁴ Drawing from samples within the juvenile justice system, meanwhile, meta-analyses have documented that a variety of psychosocial interventions result in lower recidivism (e.g., ^{12, 13}). Recent meta-analytic work suggested three major correlates of program effectiveness: a “therapeutic” intervention philosophy that attempts to engage youth in supportive processes of change, for instance skills building; high quality of implementation, including protocol fidelity; and serving high-risk offenders, except for those high in aggression.¹² Indeed, aggressive/violent histories showed a small but significant inverse relation with reductions in recidivism. There is thus an important need for evidence-based interventions that reduce aggression and incarceration in clinically aggressive juvenile offenders on probation. Given that resources for disseminating interventions within the juvenile justice system are limited, successfully treating those youth highest in aggression could help maximize public health benefit while minimizing cost.

We aimed to test the prospective effects of PHAT Life (Preventing HIV/AIDS among Teens)—a two-week psychosocial intervention for juvenile offenders serving probation—on future aggression and incarceration. Our group randomized controlled trial, described in more detail below, was set in Cook County, Chicago, the second largest juvenile justice system in the United States and a national focal point of youth violence. The control group focused on health promotion and was matched for number of sessions, session length, and facilitator training. We examined offenders with and without baseline clinical aggression, enabling comparison of intervention effects between these groups. Of note, changes in aggression and incarceration were secondary outcomes of PHAT Life; its primary aim was to reduce HIV risk behavior.¹⁵ The intervention was rooted in a Social-Personal Framework,¹⁶ however, and simultaneously targeted psychosocial factors implicated in a broad range of risk behaviors.

Three key aspects of PHAT Life distinguished it from existing interventions for juvenile offenders and positioned it to reduce aggression and incarceration among the most aggressive youth. First, PHAT Life was highly personalized and applied, with participants translating intervention concepts into concrete plans for their daily lives. Activities relevant to aggression included evaluating the impact of “hot” feelings on behavior, and learning to regulate “hot” emotions. Second, PHAT Life addressed a broad range of sexual risk

behaviors and mental health problems, rather than targeting a narrow set of isolated issues. This approach was consistent with Jessor's Problem Behavior Theory, according to which behavioral and mental health problems not only co-occur, but are interrelated, such that greater gains will be seen in any given area when problems are addressed simultaneously rather than individually.¹⁷ As it applies to the present study, Jessor's theory suggests offenders who learn to recognize and plan for triggers of multiple risk behaviors (e.g., unprotected sex and aggressive acts) will experience greater improvements in each domain than those who focus exclusively on one area. This could be in part because such training encourages greater cognitive flexibility in applying intervention techniques. Finally, in contrast to lab-based interventions, PHAT Life was implemented within the juvenile justice system, enhancing generalizability.

We hypothesized that by the first (i.e., 6-month) follow-up, clinically aggressive juvenile offenders who received PHAT Life would show significantly greater reductions in aggression than those assigned to the control. From 6 to 12 months, we expected no significant changes in either arm, suggesting the intervention maintained treatment gains while symptoms among controls persisted. By 12 months, we expected youth from the intervention would be significantly less likely than controls to report having been incarcerated. We further predicted that changes in aggression from baseline to 6 months would partially mediate the relation between treatment and incarceration.

We next sought to determine if PHAT Life differentially impacted clinically aggressive offenders versus those without clinical aggression, as this could inform decision-making around resource allocation in the juvenile justice system. We hypothesized that reductions in aggression over the first 6 months of the study would be significantly stronger in clinical than non-clinical offenders, given that youth with elevated symptoms have more room for treatment gains. Competing models of intervention effects on incarceration were compared. One hypothesis, based on meta-analytic findings that aggression was inversely related to treatment efficacy in reducing recidivism in juveniles,¹² was that incarceration by 12 months would be significantly lower among non-clinical than clinical offenders. The competing hypothesis made the opposite prediction. This was because PHAT Life is differentiated from prior interventions in part by the inclusion of activities specifically relevant to decreasing aggression—a potential mediator of future violent crime. To the extent that clinically aggressive youth were more likely than their non-aggressive peers to have been arrested for crimes against a person at baseline, the clinical group could be expected to benefit significantly more from the effects of PHAT Life on incarceration.

Finally, we examined if the intervention differentially impacted two empirically and conceptually meaningful facets of aggression. In prior work,¹⁸ we examined the factor structure of the Aggressive Behaviors scale from the Youth Self-Report (YSR-AB),¹⁹ used to measure aggression in the present study. The analyses revealed a hierarchical solution, with two lower-order factors distinguishing aggression targeting others (e.g., physical attack) from non-targeted aggression (e.g., mood swings). Compared to the non-targeted aggression items, those tapping targeted aggression were significantly stronger markers of the underlying aggression construct.¹⁸ We thus expected the targeted aggression items would be significantly more sensitive to intervention effects than would the non-targeted aggression

items. This distinction is important because it is acting out against others—not being “moody” or “stubborn” per se—that could result in direct physical harm to others and arrest.

METHOD

Participants

Two strategies were employed to recruit offenders 13–17 years old and on probation (for full details, see ¹⁵). First, youth were recruited from Evening Reporting Centers (ERCs) throughout Cook County. The ERCs were designed as community-based alternatives to detention following arrest and offered single-sex, on-site, after-school supervision. Minors were sentenced to ERCs for 5–28 days in lieu of detention. Research staff presented the study to all youth at the ERC as a group.

The second strategy focused on females because they constituted only 14% of youth arrested annually in Cook County and were less likely than males to be remanded to ERCs. Probation officers distributed study fliers to girls in their caseload, taking care not to promote the study. The officers collected responses, indicating yes/no interest in learning more, in a sealed envelope.

The eligibility criteria for juvenile offenders were: (1) English speaking, due to norming of assessments; (2) understood assent/consent; (3) provided assent; (4) had legal guardian consent; (5) were remanded to an ERC or on probation and attended 1 of the first 4 intervention sessions, and (6) completed baseline assessments.

These procedures yielded an analytic sample of 310 participants,¹⁵ 71 of whom reported clinically significant levels of aggression at baseline (T-scores ≥ 67 on the Youth Self-Report [YSR] ¹⁹). There were no inclusion or exclusion criteria specific to the clinical subsample.

Intervention

Participants were randomized in groups to PHAT Life or an equally intensive health promotion control; there was no stratification of the clinical versus non-clinical subsamples. Both arms were run at each ERC. Youth were assigned to arms in groups (not individually) due to insufficient space to run both arms simultaneously and to minimize contamination effects (see ¹⁵ for full details).

The interactive, group-based intervention targeted psychosocial factors implicated in a range of high-risk behaviors, including sexual risk taking, substance use, emotion regulation, and negative peer influence.²⁰ Two activities were specifically relevant to this report. First, youth identified and anticipated personal risk-related triggers of high-risk behavior and developed plans to address the people, places, situations, and moods that prompted risk taking. Second, they used a “feelings thermometer” to evaluate the impact of their “hot” (i.e., very strong) and “cool” (i.e., less intense) feelings on their decisions and risk behaviors, and learned strategies to manage their “hot” emotions and bring them into the “cool” zone. Although sexual risk-taking was emphasized, participants were invited to consider a range of risky behaviors relevant to their lives, including violence and other aggressive acts. Criminal

behavior and incarceration were not specifically addressed because these outcomes were not primary aims of the larger study.

The control group took the same interactive approach and was matched for time and facilitator training, but primarily provided information about nutrition, substance use, violence, and HIV/AIDS. Incarceration was not specifically addressed. Regarding violence, controls reviewed tips for preventing interpersonal conflicts from becoming violent and were taught definitions and statistics related to violence. A main distinction between arms was that the control curriculum was informative in nature, emphasizing generalized knowledge, whereas the intervention was more personalized, encouraging youth to identify personal triggers of risk and generate individualized plans for responding to triggers.

Both groups spanned 8 sessions lasting 90–120 minutes each, with each session designed to stand alone so prior attendance was not required to understand or benefit from session content. Sessions were delivered at ERCs by co-facilitators with backgrounds in HIV prevention, group therapy, and adolescents. Each facilitator received over 20 hours of study training. All sessions were observed for fidelity by a third trained facilitator using an observer rating scale. There were no significant differences between arms in fidelity (mean = 95% across sessions). The University of Illinois at Chicago (UIC) Institutional Review Board approved study procedures, with special attention to vulnerable populations. A certificate of confidentiality was obtained for additional protection of participant privacy.

Measures

Participants completed assessments at baseline, 6-, and 12-month follow-up. Respective retention rates were 85% and 86%. There were no significant differences between arms in retention.

Aggression—The full YSR,¹⁹ including the Aggressive Behaviors scale (YSR-AB), was administered at each time point along with other questionnaires not used in the present study. The YSR, normed for children 11–18 years old, has been widely used to measure adolescent behavioral and emotional problems. Its reliability and validity have been documented.²¹ The YSR-AB consists of 17 items describing symptoms of aggression, each rated out of 3 points. YSR-AB T-scores ≥ 67 were considered clinically significant in the present study. In our baseline sample, coefficient alpha (α) for the YSR-AB total score was .86 and omega_{hierarchical} (ω_h) was .66. Factor analyses of these YSR-AB data conducted previously by our group¹⁸ revealed a hierarchical solution with lower-order factors distinguishing aggressive behaviors targeting others (e.g., physical attack), from symptoms of aggression not necessarily targeting others (e.g., sudden mood change). We labeled these factors “targeted aggression” ($\alpha = .83$) and “non-targeted aggression” ($\alpha = .72$), respectively. To maintain contact with existing literature, we considered total score as an outcome in the present study. However, based on our findings that the YSR-AB is meaningfully divided into targeted and non-targeted aggression subscales, we also tested each subscale.

Incarceration—At baseline, participants reported how many times they had ever been incarcerated. At each follow-up, they indicated if they had been incarcerated in the past 6

months. Given the potential lag between arrest and incarceration, incarceration occurring by 6 months could have reflected crimes committed pre-intervention. Thus, when testing the effects of our intervention on incarceration, we only considered 12-month data.

Data Analyses

Data analyses were conducted in SPSS version 23.²² Because data were missing at random, imputation methods for missing data were irrelevant. Spline regression with 2 pieces, also known as piece-wise regression,²³ compared changes in aggression between the intervention and control arms from baseline to 6 months and then from 6 to 12 months. In each part, time and arm were entered as the within- and between-subjects factors, respectively. Spline regression was selected over simple tests of differences in group means at each separate time point because the latter provides only static snapshots of average symptom levels, whereas the former offers dynamic insights into symptom trajectories, comparing group differences in slopes. Partial eta-squared (η^2) values derived from these models indicated the ratio of variance in the change score accounted for by the intervention (plus associated error variance). Partial η^2 values $< .06$, $.06-.14$, and $> .14$ may be considered small, medium, and large effects, respectively.²⁴ In order to help validate the clinical relevance of symptom change, chi-square (χ^2) difference tests compared the percentages of participants meeting clinical criteria for aggression at each time point by arm. These tests also compared group differences in incarceration at 12 months.

We began by testing the higher-order interactions in which each simple interaction was embedded, detailed below. In addition to establishing if we were justified in examining differential effects of the intervention as a function of clinical group (i.e., clinical versus non-clinical baseline aggression) and/or subscale (i.e., targeted vs. non-targeted aggression), these omnibus tests protected against inflated experiment-wise Type I error.²⁵ If a higher-order interaction was not significant, we did not proceed with the corresponding tests of simple effects. Simulation studies have shown this provides adequate protection against Type I errors while offering better power than other approaches used to correct for multiple comparisons.²⁶

RESULTS

Table 1 presents baseline descriptive statistics, and Table 2, mean levels of aggression at each time point. Both the clinical and non-clinical samples were primarily African-American (89–90%), male (65–67%), and qualified for free lunch at school (85–88%). Most recent offences as reported by the clinical group were primarily person-related (e.g., assault) (51%), followed by property-related (23%), drug-related (6%), public-order (e.g., gun possession) (13%), and other (7%). In the non-clinical group, offenses were person-related (38%), public order (25%), property-related (19%), drug-related (10%), and other (8%). The average number of sessions completed was 5 ($SD = 2$) (see ¹⁵ for full details); there were no significant differences between subsamples or arms. Number of sessions completed did not significantly predict the aggression or incarceration outcomes in either subsample (all p -values $> .05$).

Baseline randomization was successful for all variables reported in Table 1 (p -values $> .05$), with the exception of significantly older age in the intervention versus control group of the non-clinical subsample. Accordingly, we co-varied for age in analyses of the non-clinical group. Because the main effect of age and its interaction with arm were non-significant in every model, it was ultimately removed. In order to rule out the possibility that the cluster in which participants received the intervention or control program impacted intervention effects, we co-varied for cluster in all analyses. Such inclusion did not significantly impact any of the models, so cluster was similarly removed. Findings reported below are thus from models without covariates.

Differential Effects of the Intervention on Clinically and Non-Clinically Aggressive Juvenile Offenders

We first tested if the intervention differentially impacted offenders with clinical versus non-clinical baseline aggression. For models predicting changes in total aggression, we tested the 3-way interaction of time by arm by clinical group (i.e., clinical versus non-clinical baseline aggression). The 3-way interaction was significant when predicting change in total aggression from baseline to 6 months, $F(1, 258) = 6.36$, $p = .012$, partial $\eta^2 = .02$, and 6 to 12 months $F(1, 237) = 6.41$, $p = .012$, partial $\eta^2 = .03$. We then examined if the targeted and non-targeted aggression subscales were differentially responsive to the intervention. The 4-way interaction of time by arm by clinical group by subscale was significant in predicting subscale change from baseline to 6 months, $F(1, 257) = 4.60$, $p = .033$, partial $\eta^2 = .02$, but not 6 to 12 months, $F(1, 235) = 0.56$, $p = .455$, partial $\eta^2 = .00$. In logistic regression predicting incarceration, the interaction of arm by clinical group was significant, odds ratio (OR) = 6.87, standard error (SE) = 0.77, $p = .012$.

Together, these findings showed that clinical group moderated the effects of the intervention on changes in total aggression and each subscale from baseline to 6 months, on changes in total and targeted aggression from 6 to 12 months, and on incarceration by 12 months. We thus established that we could proceed with testing these outcomes separately in participants with clinical and non-clinical baseline aggression. We did not test the effects of the intervention on either subscale over the second half of the study, given that the higher-order 4-way interaction in which this simple 2-way interaction was embedded was not significant.

Changes in Aggression From Baseline to Six Months

We followed up the significant 3-way interaction predicting changes in total aggression over the first half of the study by testing simple 2-way interactions of time by arm in the clinical and non-clinical groups separately. We found that although there were improvements in total aggression among all clinically aggressive youth from baseline to 6 months, on average, the reduction was significantly greater for the intervention group (see Table 3; see Figure 1). Average YSR-AB T-scores in the intervention were no longer at clinical levels at 6 months (mean = 63.11, $SD = 10.56$), but remained clinically significant for controls (mean = 68.42, $SD = 10.22$). The difference in percentage of youth meeting clinical criteria in the intervention (36%) versus control (61%) was significant, $\chi^2(1, n = 61) = 3.76$, $p = .046$. Non-clinical offenders did not show significant changes in aggression over this same period (see Table 3). Among these youth, average YSR-AB T-scores remained at non-clinical levels

in both arms at baseline (intervention mean = 54.61, $SD = 4.99$; control mean = 54.56, $SD = 4.94$) and 6 months (intervention mean = 54.07, $SD = 5.48$; control mean = 54.40, $SD = 6.85$).

Next, we followed up the significant 4-way interaction predicting change in each of the subscales over the first half of the study to determine which subscale was more sensitive to the intervention. A model with time and the two subscales included as within-subjects variables and arm as the between-subjects factor was run in only the subsample with baseline clinical aggression. This produced a significant 3-way interaction, $F(1, 58) = 5.66$, $p = .021$, partial $\eta^2 = .09$, indicating that the treatment effect was significantly stronger for the targeted versus non-targeted aggression subscale in the clinical group. The simple 3-way interaction was not significant in the non-clinical group, $F(1, 199) = 1.49$, $p = .224$, partial $\eta^2 = .01$.

Changes in Aggression From Six to Twelve Months

We followed up the significant higher-order interactions predicting changes in total and targeted aggression over the second half of the study with separate tests of the simple 2-way interactions of time by arm in the clinical and non-clinical groups. From 6 to 12 months, there was a significant reduction in aggression among all clinically aggressive offenders, on average, as captured by total and targeted aggression (see Table 3). The effects were significantly stronger among offenders in the control than intervention.

To help determine if participants from the intervention had maintained treatment gains, a regression was run on only youth from the intervention. The results were non-significant for total score, $F(1, 26) = 0.04$, $p = .840$, partial $\eta^2 = .00$ and targeted aggression, $F(1, 26) = 0.00$, $p = .963$, partial $\eta^2 = .00$. Independent samples t -tests did not show significant differences between treatment groups at 12 months on either total score, $t(60) = -0.06$, $p = .949$, or targeted aggression, $t(60) = .03$, $p = .978$. T-scores for both the intervention (mean = 62.93, $SD = 8.64$) and control (mean = 63.89, $SD = 11.01$) groups were at non-clinical levels; there was no significant difference between the intervention (37%) and control (37%) arms in the percentage of youth meeting clinical criteria, $\chi^2(1, n = 62) = 0.00$, $p = .999$.

Incarceration by Twelve Months

Clinically aggressive offenders who received the intervention were significantly less likely to report incarceration by 12 months than were controls, $OR = 5.11$, $SE = 0.70$, $p = .026$ (see Figure 2). The odds of incarceration were nearly 4 times lower in the intervention (11%) than control (40%) group. To test if aggression partially mediated this effect, changes in aggression from baseline to 6 months and arm were entered simultaneously into a logistic regression predicting incarceration. There was no evidence for mediation with aggression measured by total score, $OR = 1.08$, $SE = 0.06$, $p = .196$, arm $OR = 7.24$, $SE = 0.81$, $p = .015$, or the targeted subscale, $OR = 1.07$, $SE = 0.08$, $p = .380$, arm $OR = 6.38$, $SE = 0.80$, $p = .021$.

DISCUSSION

The present report examined the effects of PHAT Life, a two-week psychosocial intervention for juvenile offenders serving probation, on future aggression and incarceration. We found that among juveniles with baseline clinical aggression, those assigned to the intervention showed significantly greater symptom reductions by 6 months, and significantly lower rates of incarceration by 12 months, compared with those assigned to an equally intensive control. Two aspects of these findings merit highlighting. First, reductions in aggression were clinically meaningful. By 6 months, the intervention group was significantly less likely than controls to meet clinical thresholds for aggressive symptoms. Second, the effect sizes for the incarceration outcome were very large, with youth from the intervention reporting nearly 4 times lower likelihood of incarceration. Both effects were significantly stronger in offenders with clinical versus nonclinical baseline aggression, underscoring the importance of directing resources within the juvenile justice system to the most aggressive offenders.

From 6 to 12 months, there was no indication that treatment gains deteriorated for clinically aggressive offenders who received PHAT Life. Controls unexpectedly “caught up” over this period, reporting levels of aggression that did not differ significantly from those in the intervention group. Also unexpectedly, the expedited improvement in aggression over the first half of the study among youth who received the intervention did not appear to mediate its impact on future incarceration.

The lessening of aggression among offenders in both arms by 12 months might be explained by the fact that, to the extent aggression contributed to activity resulting in arrest, these symptoms were likely elevated at baseline and would subsequently regress to the mean. Given the societal costs of juvenile aggression,^{1–3} the savings to victims, witnesses, and perpetrators of even six months of reduced aggressive behavior may justify PHAT Life’s implementation. Large intervention effects on reduced recidivism strengthen this point, although formal cost-benefit analyses are needed.

This is the first prospective study of which we are aware to document a psychosocial intervention significantly reducing future aggression and incarceration in clinically aggressive juvenile offenders on probation. The gap addressed by our work is meaningful given staggering costs associated with juvenile aggression and incarceration,^{1–3} and that the large majority of juveniles are released on probation following arrest rather than sent to detention, introducing increased opportunity for risk behavior and recidivism.⁶ Our findings are also noteworthy in the context of results from a meta-analysis of psychosocial interventions showing aggression was inversely associated with intervention effects on reduced recidivism.¹² We posited that PHAT Life could succeed in reducing future incarceration among the most aggressive offenders because it included activities specifically relevant to decreasing aggression, a mediator of violent crime. Given that we did not find evidence for this pathway, future work is needed to explain our results. We return to this point below.

It is interesting the targeted aggression subscale from the YSR-AB, which captured aggressive behaviors targeting others such as physical attack, was significantly more

responsive to the intervention than was the non-targeted aggression subscale, which tapped more internal states like mood change. As we have discussed elsewhere,¹⁸ the symptoms assessed by the first set of items are relatively specific to aggression, whereas those captured by the second are common to several psychiatric conditions. That the intervention showed the largest effects on targeted aggression is encouraging from a public health perspective, given that internal states like mood swings will not cause direct physical harm to others or result in arrest.

Three main limitations to the present study warrant consideration. First, our sample of primarily African-American and male offenders on probation limits generalizability. Our sample demographics also represent an important strength, however, as these characteristics are consistent with national trends, including for juveniles most likely to be charged with crimes against a person.⁵ For this reason, we did not oversample other groups.

Second, our main outcomes of aggression and incarceration relied on self-report. However, whereas neither aggression in general nor violence in particular was explicitly emphasized in the intervention, violent behavior was a focus of the control group. Incarceration was not addressed in either arm. It thus seems unlikely that the intervention group was more prone than controls to demand biases when reporting on the outcomes examined in this study. If anything, control youth might have been less likely to report violent behavior at follow-up, attenuating effects.

Why then might the intervention have been more effective than the control? We speculate that the personalized and applied nature of PHAT Life, with its emphasis on identifying and planning for personal triggers of high-risk behavior (which could but did not have to relate to aggression), was important.²⁷ By contrast, the health promotion control presented youth with general information but did not encourage translation of abstract concepts into personally relevant, concrete examples. The intervention approach is consistent with work showing aggression can be reduced by teaching youth to recognize and respond to triggers of aggression and related symptoms.¹⁴

A final limitation is that the present design may have impeded our ability to identify mechanistic pathways underlying the intervention. The intervention took a “multi-modal” design, addressing several behavioral and mental health problems simultaneously. Although this approach is situated in a strong conceptual framework¹⁷ and is efficient from an implementation perspective, it obfuscates the effects of particular intervention elements on specific outcomes. We were thus unable to determine empirically, for example, if the personalized and applied nature of PHAT Life contributed to its success in reducing incarceration. Moreover, the pathway tested—if reductions in aggression partially mediated the effects of the intervention on incarceration—was not supported. It is possible that such reductions did mediate the prospective pathway to incarceration, but only for violent crimes. However, the sample size was too small to run the mediation analyses for specific crime outcomes. Even with more power, such analyses would encounter substantial methodological challenges, as there may be little consistency across what youth were told they had been charged with, their memories of those charges, their reports, the charges filed,

and the judicial outcomes. For these reasons, we consider it prudent to focus on a single, salient event: if a young person was incarcerated (for any charge) after the intervention.

Importantly, there was no evidence of power limitations to our main findings of decreased aggression by 6 months or lower incarceration by 12 months among clinically aggressive offenders who received PHAT Life versus the control. Assuming equal effect sizes, power should have been weaker in the clinical ($n = 71$) than non-clinical ($n = 239$) subsample. That the intervention effects were significantly stronger among youth with clinical aggression cannot be explained by differential power and in fact makes the findings more persuasive.

Several methodological strengths further bolster confidence in our findings. As noted above, our sample of clinically aggressive offenders on probation represents a key demographic with regard to reducing juvenile aggression and offsetting its chain of adverse outcomes. Our prospective design included long-term follow-up, with assessments out to 12 months. Whereas many prior psychosocial interventions conducted in the juvenile justice system have suffered poor retention, our respective 6- and 12-month retention rates were excellent at 85% and 86%. Finally, the inclusion of an equally intensive health promotion control allowed us to rule out the possibility that intervention effects merely represented regression to the mean.

Beyond addressing limitations, future work is needed to uncover the mechanisms underlying PHAT Life's effects and test how it can be widely disseminated. Collection of court records on re-arrest could help clarify if reductions in aggression mediate intervention effects on future incarceration for specific crimes. It would also be useful to examine changes in emotion regulation and substance use as potential mediators. Regarding dissemination, few evidence-based interventions are sustained within the juvenile justice system due to limited resources and competing demands. It is imperative to translate interventions with known efficacy into sustainable programming. To this end, next steps for PHAT Life should include testing if probation staff or juvenile offenders can serve as group leaders, and streamlining methods of directing intervention resources to the most aggressive youth in the juvenile justice system.

Acknowledgments

This research was supported in part by a National Institute of Minority Health and Health Disparities grant (R01MD005861) to Geri R. Donenberg and Erin M. Emerson.

The authors thank all collaborating institutions in the conduct of this study: Cook County Department of Probation and Court Services, Evening Reporting Centers, Circuit Court of Cook County, Cook County Juvenile Temporary Detention Center, Illinois Department of Juvenile Justice, Cook County Sheriff's Office, and Illinois Department of Corrections. The authors thank the youth and their families for their participation.

References

1. Margolin G, Gordis EB. The effects of family and community violence on children. *Annu Rev Psychol.* 2000; 51:445–79. [PubMed: 10751978]
2. Lambie I, Randell I. The impact of incarceration on juvenile offenders. *Clin Psychol Rev.* 2013; 33:448–59. [PubMed: 23454219]
3. Cohen MA, Piquero AR. New evidence on the monetary value of saving a high risk youth. *J Quant Crim.* 2009; 15:25–49.

4. Puzzanchera, C. Juvenile Justice Bulletin. Washington, DC: Office of Juvenile Justice and Delinquency Prevention; 2014. Juvenile arrests 2012.
5. US Department of Justice, Federal Bureau of Investigation. [Accessed June 20, 2017] Crime in the United States, 2009. 2010. Available at: http://www2.fbi.gov/ucr/cius2009/data/table_43.html
6. Snyder, HN., Sickmund, M. Juvenile offenders and victims: 2006 national report. Washington, DC: Department of Justice, Office of Juvenile Justice Programs, Office of Juvenile Justice and Delinquency Prevention; 2006.
7. Office of Juvenile Justice and Delinquency Prevention. [Accessed June 20, 2017] OJJDP Statistical Briefing Book. 2015. <http://www.ojjdp.gov/ojstatbb/probation/ga07103asp?qaDate=2013>
8. Attar BK, Guerra NG, Tolan PH. Neighborhood disadvantage, stressful life events and adjustments in urban elementary-school children. *J Clin Child Psychol.* 1994; 23:391–400.
9. McCart MR, Priester PE, Davies WH, et al. Differential effectiveness of behavioural parent-training and cognitive-behavioral therapy for antisocial youth: A meta-analysis. *J Abnorm Child Psychol.* 2006; 34:527–43. [PubMed: 16838122]
10. Wilson SJ, Lipsey MW, Derzon JH. The effects of school-based intervention programs on aggressive behaviour: A meta-analysis. *J Consult Clin Psychol.* 2003; 71:136–49. [PubMed: 12602434]
11. McGuire J. A review of effective interventions for reducing aggression and violence. *Philos Trans R Soc B.* 2008; 363:2577–97.
12. Lipsey MW. The primary factors that characterize effective interventions with juvenile offenders: A meta-analytic overview. *Vict Offenders.* 2009; 4:124–47.
13. Garrido V, Morales LA. Serious (violent or chronic) juvenile offenders: A systematic review of treatment effectiveness in secure corrections. *Campbell Syst Rev.* 2007; 3:7.
14. Kazdin AE. Implementation and evaluation of treatments for children and adolescents with conduct problems: Findings, challenges, and future directions. *Psychother Res.* 2016:1–15.
15. Donenberg GR, Emerson E, Kendall AD. HIV-risk reduction intervention for juvenile offenders on probation: The PHAT Life group randomized controlled trial. *Health Psychol.* in press.
16. Donenberg GR, Pao M. Youths and HIV/AIDS: Psychiatry's role in a changing epidemic. *J Am Acad Child Adolesc Psychiatry.* 2005; 44:728–747. [PubMed: 16034275]
17. Jessor R. Problem behavior theory, psychosocial development, and adolescent problem drinking. *Brit J Addict.* 1987; 82:331–42. [PubMed: 3472582]
18. Kendall AD, Emerson E, Zinbarg RE, Donenberg GR. Psychometric properties of the Aggressive Behaviors Scale from the Youth Self-Report in juvenile offenders. under review.
19. Achenbach, T., Rescorla, LA. Manual for the ASEBA school-age forms and profiles. Burlington, VT: Department of Psychiatry; 2001.
20. Donenberg GR, Emerson E, Mackesy-Amity ME, Udell W. HIV-risk reduction with juvenile offenders on probation. *J Child Fam Stud.* 2015; 24:1672–1684. [PubMed: 26097376]
21. Achenbach T, McConaughy SH, Howell CT. Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychol Bull.* 1987; 101:213–32. [PubMed: 3562706]
22. IBM Corp. IBM SPSS Statistics for Macintosh. Armonk, NY: IBM Corp; 2015.
23. Singer, JD., Willett, JB. Applied longitudinal data analysis: Modeling change and event occurrence. New York, NY: Oxford University Press; 2003.
24. Gray, CD., Kinnear, PR. IBM SPSS statistics 19 made simple. New York: Psychology Press; 2012.
25. Cohen, J., Cohen, P., West, SG., Aiken, LS. Applied multiple regression/correlation analysis for the behavioral sciences. 3. Mahwah, NJ: Lawrence Erlbaum Associates; 2003. p. 188
26. Carmer SG, Swanson MR. An evaluation of ten pairwise multiple comparison procedures by Monte Carlo methods. *J Am Stat Assoc.* 1973; 68:66–74.
27. Humayun, S., Scott, S. Evidence-based interventions for violent behavior in children and adolescents. In: Lindert, J., Levav, I., editors. Violence and mental health. New York: Springer; 2015. p. 391-419.

Clinical Guidance

- PHAT Life is a 2-week psychosocial intervention for juvenile offenders on probation.
- Among clinically aggressive juvenile offenders, those randomized to PHAT Life showed significantly expedited improvements in aggression and nearly four times lower rates of future incarceration compared with those randomized to an equally intensive health promotion control.
- The intervention effects were significantly stronger among juvenile offenders with clinical than non-clinical baseline aggression, pointing to the importance of directing intervention resources to the most aggressive youth in the juvenile justice system.

Figure 1.

Mean levels of total aggression, as measured by total score from the Aggressive Behaviors scale of the Youth Self-Report (YSR-AB) at baseline ($n = 71$), 6 months ($n = 61$), and 12 months ($n = 62$) among juvenile offenders with clinically significant baseline aggression.

Figure 2.

Percentages of juvenile offenders with clinically significant aggression at baseline who reported having been incarcerated at 12-month follow-up in the intervention ($n = 3/26$) and control ($n = 14/35$). Note: Error bars indicate the standard error of the probability within the given group.

Descriptive Statistics at Baseline

Table 1

Variable	Clinically Aggressive Juvenile Offenders				Between-Group Difference
	Total (<i>n</i> = 71) Mean (<i>SD</i>) or % (<i>n</i>)	Intervention (<i>n</i> = 28) Mean (<i>SD</i>) or % (<i>n</i>)	Control (<i>n</i> = 43) Mean (<i>SD</i>) or % (<i>n</i>)		
Aggression T-score	73.18 (6.33)	73.75 (5.82) ^a	72.81 (6.68) ^a		<i>t</i> (69) = 0.61
Ever incarcerated	53% (37)	46% (13) ^b	57% (24) ^b		χ^2 (1, 70) = 0.77
Number of times incarcerated	1.92 (2.03)	2.00 (3.03) ^c	1.87 (1.25) ^c		<i>t</i> (34) = 0.18
Age	15.80 (1.23)	15.53 (1.25) ^d	15.97 (1.19) ^d		<i>t</i> (69) = -1.49
Black or African American race	89% (63)	93% (26) ^e	86% (37) ^e		χ^2 (1, 71) = 0.79
Hispanic ethnicity	10% (7)	11% (3) ^f	9% (4) ^f		χ^2 (1, 71) = 0.04
Male	65% (46)	64% (18) ^g	65% (28) ^g		χ^2 (1, 71) = 0.01
Qualified for free lunch at school	88% (64)	89% (25) ^h	93% (39) ^h		χ^2 (1, 70) = 0.27

Variable	Non-Clinically Aggressive Juvenile Offenders				Between-Group Differences
	Total (<i>n</i> = 239) Mean (<i>SD</i>) or % (<i>n</i>)	Intervention (<i>n</i> = 135) Mean (<i>SD</i>) or % (<i>n</i>)	Control (<i>n</i> = 104) Mean (<i>SD</i>) or % (<i>n</i>)		
Aggression T-score	54.59 (4.96)	54.61 (4.99) ⁱ	54.56 (4.94) ⁱ		<i>t</i> (237) = 0.09
Ever incarcerated	57% (135)	60% (79) ^j	43% (56) ^j		χ^2 (1, 235) = 0.71
Number of times incarcerated	2.07 (2.12)	1.91 (1.59) ^k	2.30 (2.70) ^k		<i>t</i> (133) = -1.06
Age	16.16 (1.03)	16.33 (1.00)^l	15.94 (1.03)^m		<i>t</i> (237) = 2.97
Black or African American race	90% (216)	90% (121) ⁿ	91% (95) ⁿ		χ^2 (1, 239) = 0.20
Hispanic ethnicity	9% (21)	9% (12) ^o	9% (9) ^o		χ^2 (1, 239) = 0.00
Male	67% (159)	63% (85) ^p	71% (74) ^p		χ^2 (1, 239) = 1.77
Qualified for free lunch at school	85% (200)	84% (113) ^q	85% (87) ^q		χ^2 (1, 236) = 1.04

Note. Matching superscripts indicate no significant difference between arms on the given variable; differing superscripts indicate a significant difference. Aggression was measured with the Aggressive Behaviors Scale of the Youth Self-Report (YSR-AB) (range = 50–100; scores 67 indicate clinical significance). Data on number of times incarcerated were collected only from the subset of youth who reported ever having been incarcerated. All descriptive statistics were based on available data.

Table 2

Mean Levels of Aggression at Baseline, Six- and Twelve-Month Follow-Up

Variable	Clinically Aggressive Juvenile Offenders				Non-Clinically Aggressive Juvenile Offenders			
	Total (n = 71) Mean (SD)	Intervention (n = 28) Mean (SD)	Control (n = 43) Mean (SD)	Between-Group Difference	Total (n = 239) Mean (SD)	Intervention (n = 135) Mean (SD)	Control (n = 104) Mean (SD)	Between-Group Difference
Baseline								
Total aggression	18.37 (3.78)	18.75 (3.50) ^a	18.12 (4.00) ^a	$t(69) = 0.68$	6.59 (3.73)	6.52 (3.81) ^j	6.67 (3.65) ^j	$t(237) = -0.32$
Targeted aggression	10.69 (3.16)	11.21 (3.14) ^b	10.35 (3.16) ^b	$t(69) = 1.13$	3.14 (2.27)	3.16 (2.43) ^k	3.11 (2.05) ^k	$t(237) = 0.19$
Non-targeted aggression	8.58 (2.35)	8.29 (2.45) ^c	8.77 (2.29) ^c	$t(69) = -0.84$	3.75 (2.45)	3.73 (2.40) ^l	3.79 (2.51) ^l	$t(237) = -0.20$
Six-month follow-up								
Total aggression	13.97 (6.67)	12.25 (6.80) ^d	15.42 (6.30) ^d	$t(59) = -1.89$	6.25 (4.39)	6.25 (4.01) ^m	6.26 (4.86) ^m	$t(199) = -0.03$
Targeted aggression	7.49 (4.32)	6.36 (4.38) ^e	8.45 (4.09) ^e	$t(59) = -1.93$	2.81 (2.79)	2.79 (2.49) ⁿ	2.84 (3.16) ⁿ	$t(199) = -0.13$
Non-targeted aggression	7.32 (3.49)	6.67 (3.57) ^f	7.85 (3.38) ^f	$t(59) = -1.31$	3.75 (2.57)	3.77 (2.36) ^o	3.72 (2.84) ^o	$t(199) = 0.13$
Twelve-month follow-up								
Total aggression	12.35 (6.25)	12.30 (5.38) ^g	12.40 (6.93) ^g	$t(60) = -0.06$	6.10 (4.81)	6.40 (4.94) ^p	5.68 (4.61) ^p	$t(204) = 0.30$
Targeted aggression	6.24 (4.36)	6.26 (3.76) ^h	6.23 (4.82) ^h	$t(60) = 0.03$	2.65 (2.88)	2.90 (3.11) ^q	2.29 (2.49) ^q	$t(204) = 1.49$
Non-targeted aggression	6.73 (2.97)	6.56 (2.68) ⁱ	6.86 (3.21) ⁱ	$t(60) = -0.39$	3.75 (2.81)	3.83 (2.71) ^r	3.64 (2.96) ^r	$t(204) = 0.48$

Note. Matching superscripts indicate no significant differences between arms on the given variable. Aggression was measured with total and subscale scores from the Aggressive Behaviors scale of the Youth Self-Report (YSR-AB). Descriptive statistics were calculated based on available data.

Table 3

Prospective Effects of the Intervention on Changes in Aggression Over Time

Clinically Aggressive Juvenile Offenders					
Outcome	Effect of Time		Effect of Time by Arm		
	F (df)	p-value	Partial η^2	F (df)	p-value
Baseline to six-month follow-up					
Total aggression	34.57 (1, 59)	.000 ^a	.37	4.69 (1, 59)	.034 ^b
Targeted aggression	33.70 (1, 59)	.000 ^a	.36	6.40 (1, 59)	.014 ^b
Non-targeted aggression	13.12 (1, 58)	.001 ^a	.18	0.43 (1, 58)	.515
Six- to twelve-month follow-up					
Total aggression	4.06 (1, 56)	.049 ^a	.07	5.14 (1, 56)	.027 ^c
Non-Clinically Aggressive Juvenile Offenders					
Outcome	Effect of Time		Effect of Time by Arm		
	F (df)	p-value	Partial η^2	F (df)	p-value
Baseline to six-month follow-up					
Total aggression	2.33 (1, 199)	.128	.01	0.02 (1, 199)	.901
Targeted aggression	2.78 (1, 199)	.097	.01	0.48 (1, 199)	.489
Non-targeted aggression	0.43 (1, 199)	.511	.00	0.31 (1, 199)	.576
Six- to twelve-month follow-up					
Total aggression	0.18 (1, 181)	.670	.00	0.18 (1, 181)	.670

Note. The effects of the intervention on targeted and non-targeted aggression from 6- to 12-month follow-up were not tested because the higher-order interaction in which these simple interactions were embedded was not significant.

^aSignificant reduction in aggression over time.

^bSignificantly greater reduction in intervention than control group.

^cSignificantly greater reduction in control than intervention group.