Appendix A: Voices of Local Stakeholders

We interviewed several local stakeholders to better understand the current context of juvenile crime reduction efforts in Baltimore City. Stakeholder organizations, position of staff contacted, method of interview, and date of interview are listed below.

1. **Frederick Douglass High School, 10th grade English teacher, phone interview, April 2017.**
   Established in 1883, Frederick Douglass High School is a Baltimore City Public School that includes grades nine to 12 and enrolls about 880 students. It is one of the lowest-performing schools in the state of Maryland.

2. **Frederick Douglass High School, three high school students (10th and 11th grade), in-person interview, May 2017.**

3. **Youth for Christ, Metro/Maryland Director of Juvenile Justice Ministry, phone interview, April 2017.**
   The Youth for Christ Juvenile Justice Ministry engages young people at detention centers, group homes, correctional facilities, residential treatment centers, and emergency shelters. The Metro/Maryland Division of the Justice Juvenile Ministry serves BCJJC and the Charles H. Hickey Jr. School, a detention center for male youth in East Baltimore County.

4. **Baltimore City Juvenile Justice Center (BCJJC), Community Services Coordinator, phone interview, May 2017.**
   The BCJJC is a large detention facility operated by the DJS and located in downtown Baltimore City. Opened in 2003, it can house up to 144 male youth and contains three circuit courtrooms, hearing rooms, and offices.

5. **THREAD, Managing Director of Programs, phone interview, May 2017.**
   Founded in 2004 by a Johns Hopkins graduate student, THREAD is a unique relationship-based mentoring program that currently reaches 48 high school students per year (including 16 at Frederick Douglass High School). Up to 86 percent of THREAD student alumni have completed a two- or four-year degree or certificate program.

6. **Youth Guidance, Operations Associate, phone interview, May 2017.**
   Founded in 1924, Youth Guidance is a Chicago-based organization that specializes in social-emotional learning. It administers the school-based program, Becoming a Man, and more recently, Working on Womanhood, to disadvantaged youth. Youth Guidance has received over $3 million in grants from the MacArthur Foundation and was chosen as a partner organization in the Heller et al. study.

Appendix B: Existing Youth Violence Prevention Programs in Baltimore

Program Name	Description
PATHS TO PAX	An initiative by the Johns Hopkins Center for Prevention and Early Intervention to administer the PATHS (Promoting Alternative Thinking Strategies) curriculum, which is similar to BAM in spirit, but focuses on a younger target population, typically elementary school students.
CBITS (Cognitive Behavioral Intervention for Trauma in Schools	A school-based group and individual intervention, designed to reduce symptoms of PTSD, depression, and other behavioral problems. A secondary goal is to improve functioning, grades, attendance, peer/parent support, and coping skills. The intervention targets students from grades five to 12 who have undergone traumatic life events such as violence, accidents/injuries, abuse, and disasters.
Mentoring Male Teens in the Hood	A group mentoring program for youth between the ages of 8 and 18. Meetings occur twice a month, and youth undergo mentoring sessions and are exposed to a wide variety of speakers and coaches.
Operation Safe Kids	A collaboration between the Health Department and DJS that provides intensive community-based case management and monitoring of high-risk juvenile offenders to prevent them from becoming victims or perpetrators of violent crimes, while also ensuring that they have the necessary tools to become productive adults.
Emergency Violence Interruption Program	A partnership between the Baltimore City Health Department and local hospitals to encourage emergency room doctors to stop treating traumatic injuries as only medical problems. To ensure continuity of care, treatment begins in the hospital and results in physicians referring victims of violence to appropriate services in the community. As a preventive measure, this program will provide resource cards and other tools to youth. (youth.gov)
Dating Matters	A collaborative youth-focused communications campaign led by the Baltimore City Health Department to reduce teen dating violence. The campaign is intended to reinforce messages learned in school, while using targeted technology and language that is appealing and relevant for youth. (youth.gov)
BUILD Health Challenge (Upton/Druid Heights)	An initiative to develop a comprehensive youth violence plan. It is led by the Druid Heights Community Development Center, the University of Maryland School of Social Work, the Adams Cowley Shock Trauma Center at the University of Maryland Medical Center, the Baltimore City Health Department, and community-based organizations. (youth.gov)
Mindful Moment Program	An active program at Patterson High School and Robert W. Coleman Elementary School led by Holistic Life Foundation. Both schools have Mindful Moment Rooms, where students can "cool down" when upset or disruptive, as well as 15-minute daily morning meditations. (http://hlfinc.org/programs-services/mindful-moment-program/)
Safe Streets	A model designed to relay a personal message to high-risk neighborhoods that violence is no longer acceptable. There is a strong street outreach component to the intervention that relies on local community members and organizations. (http://health.baltimorecity.gov/safestreets)
Seeds of Promise	A male mentoring program designed to target recent high school alumni and provide social and emotional support, life skills modeling and development, and social work services. Currently, it is active at Renaissance Academy High School and serves about 20 male alumni.

Appendix C: Sample of Nationwide CBT Interventions, via National Institute of Justice

Program Name	Rating	Program Status	Location	Audience	Setting
Aggression Replacement Training® (ART®)	Effective	Active	Nationwide	Youth with Violent Tendencies, Ages 11-17	Detention Center, In-School
AMIkids Community-Based Day Treatment Services	Promising	Active	Florida	Youth Offenders, Ages 14-17	Community-Based Programming
CASASTART	No Effects	Active	Various	Truants/Dropouts, Ages 11-13	Home, Community-Based Programming
Connections	Promising	Active	Washington	Youth Offenders, Ages 14-17	Community-Based Programming
Coping Power Program	Promising	Active	Alabama, North Carolina	Families of Agressive Children, Ages 8-13	In-School
Equipping Youth to Help One Another (EQUIP)	Promising	Active	"A Midwestern State"	Youth in Corrections, Ages 15-18	Juvenile Detention
HOMEBUILDERS	Effective	Active	Utah	Youth Offenders, Ages <18	Comprehensive Case Management
Methodist Home for Children's Value-Based Therapeutic Environment (VBTE) Model	Promising	Active	North Carolina	Youth Offenders, Ages 10-18	Juvenile Justice System Youth
Multisystemic Therapy (MST)	Effective	Active	South Carolina, Missouri, "A Midwestern State"	Youth Offenders, Ages 12-17	Incarcerated Youth
Operation New Hope	Promising	Active	California	Youth Offenders, Ages 16-22	Aftercare Treatment
Serious and Violent Offender Reentry Initiative (SVORI)	No Effects	Inactive	14 States	Offenders, Ages 14-35	Aftercare Treatment

Appendix D: Illustrative BAM and JTDC Activities

Activity Category	Illustrative BAM Activities
Immersive/Experimental	**The Fist:** Students are told to get an object from a partner, and many try to use force. The counselor asks questions to highlight how their partners were willing to give up the object if the students calmly requested it.
	Plates: Students reflect on what it takes to successfully complete group missions and write those attributes on a plate. The plates are placed on the floor, and students must cross the floor by using the plates. However, if no one is standing on a plate, then it is removed (making the task more difficult).
	Trust Walk: Students follow group leaders around the school silently and without disrupting the school. They are told that with freedom comes responsibility.
	Focus Mitt Drill: Students punch focus mitts for an extended period.
	Human Knot: Students stand in a circle and grab the hands of someone standing across from them. They must then untangle themselves without letting go.
Reflective/Introspective	**Check-ins:** Students talk to each other about what they are doing well and areas where they still need to improve. Students must listen patiently while someone else discusses his/her attributes.
Role-playing	**Our Story of What Happened:** Students imagine a conflict and discuss why the conflict came about. They examine thinking distortions that might have made the conflict worse.
	High School Day: Students role-play a confrontation between a student and administrator. They act out the conflict with "out of control" and "in control" anger expressions.
	$10 Role-play: Students role-play a student borrowing money and then never paying it back.
Skill-building	**Cognitive Thought Replacement:** Students learn how to recognize negative thoughts that arise and how to replace them. It is not necessary to replace negative thoughts with positive thoughts, but rather to instead focus on what can be done to control the situation that is leading to the negative thought.
	Manhood Questions and Rites of Passage: Students discuss the key moments when boys become men and various rites of passage that exist.
	Positive Anger Expression: Students are taught about how to express anger in a controlled way.

Appendix D: Illustrative BAM and JTDC Activities (continued)

Activity Category	Illustrative BAM Activities
Stories & Discussion	**"Rudy":** Students watch and discuss the movie "Rudy." Before beginning the movie, the counselor holds up two dollars and asks who wants the money. Even as students raise their hands, he keeps asking who wants them until someone simply takes the money from him. The counselor explains that we often overlook opportunities; however, the student who grabbed the money saw it as an opportunity and took a chance.
	"The Boy Who Cried Wolf": Students listen to and discuss the story where one day a boy pretends that he is being attacked by a wolf. He is amused by how his town responds to this prank. So when he feels bored on another day, he does it again. And again. He promises to stop playing around, but when he feels bored, he can't help but do it again. In the end, when he is actually attacked by a wolf, no one responds to his pleas for help.
	"Miracle": Students watch and discuss the film "Miracle" about the U.S. men's hockey team.

Source: Heller et al., Table I.

Activity Category	Illustrative JTDC Activities
Reflective/Introspective	**Self-talk:** Students are taught about how the mind always tries to make sense of what is going on and how these thoughts drive our behavior. For example, the counselor might hold out his hand and see how people respond. He then explains how the students' minds have an automatic interpretation of and reaction to his outstretched hand.
	Hot Button Situations: Students talk about situations that make them upset, and describe the situation and their thoughts regarding that situation. They identify elements of "hot" self-talk that lead to negative consequences and hot button situations that trigger these thoughts.
	Camera Check: Students imagine a hot button situation and then describe how they would navigate it. They then imagine the situation again from a neutral outsider perspective. Rational Self Analysis (RSA): After anti-social behavior, students complete an RSA, writing down the facts of the incident, identifying what self-talk/feelings led to the behavior, reporting what a camera would have seen, and brainstorming alternative/more adaptive self-talk. Youth then process their RSA with staff and discuss the new self-talk options they have developed.

Appendix D: Illustrative BAM and JTDC Activities (continued)

Activity Category	Illustrative JTDC Activities
Skill-building	**Goal Setting:** Students are encouraged to make one concrete statement about something they want to do better or differently. **Goals and Choices:** Students discuss what they want versus what they need. They discuss how goals, wants, and needs are always set internally—no one else can set them for you. Students talk about "big wins" that they want to achieve and think about how they can break down long-term goals into shorter, more manageable pieces to help achieve them. **Keeping Cool When You Get Angry:** Students discuss how situations can drive angry self-talk, which leads to negative outcomes. They are taught about various cognitive distortions. They then learn techniques to physically calm down and to replace negative or angry thoughts.
	Me Mode and We Mode: Students discuss elements of self-talk that are focused only on one's own needs instead of other people's needs. **Problem Solving:** Students are given a six-step problem-solving approach that involves identifying the problem, thinking about several solutions, and picking the best solution.
Stories & Discussion	**Thinking Patterns:** Students are shown several optical illusions that can be seen in two ways. A lesson follows about how the mind sometimes only sees one interpretation or how it only sees what it expects to see. Students fill out a sheet on expectations and basic rules for their lives.
	Moral Development Groups: Students are presented with morally ambiguous situations, and are asked to identify various potential outcomes for themselves and others based on different responses.
Other	**Drugs and Alcohol:** Students use the framework they have developed to specifically focus on situations involving drugs and alcohol.

Source: Heller et al., Table II.

Appendix E: Key Tables from Heller et al.

Table IV. Becoming a Man Studies 1 and 2 – Effects on Youth Outcomes

	Control Mean	Intention to Treat	Effect of Participation (IV)	Control Complier Mean
BAM Study 1 (Program Year 2009-10, n = 2,740)				
Year 1 (program offered)				
School Engagement Index	0	0.0569***	0.1367***	0.222
		(0.0215)	(0.0511)	
Total arrests per youth per year	0.699	-0.0778*	-0.1869*	0.672
		(0.0456)	(0.1087)	
Violent	0.167	-0.0345**	-0.0829**	0.186
		(0.0165)	(0.0394)	
Property	0.077	0.0048	0.0116	0.066
		(0.0127)	(0.0303)	
Drug	0.151	0.0013	0.0032	0.097
		(0.0177)	(0.0422)	
Other	0.305	-0.0495*	-0.1188*	0.323
		(0.0272)	(0.0648)	
Year 2 (program not offered)				
School Engagement Index	0	0.0782***	0.1878***	0.040
		(0.0215)	(0.0514)	
Total arrests per youth per year	0.595	-0.0643	-0.1543	0.606
		(0.0420)	(0.1000)	
Violent	0.11	0.0006	0.0013	0.092
		(0.0143)	(0.0340)	
Property	0.057	-0.0034	-0.0082	0.052
		(0.0103)	(0.0245)	
Drug	0.164	-0.0196	-0.0471	0.173
		(0.0194)	(0.0461)	
Other	0.264	-0.0418	-0.1004	0.288
		(0.0259)	(0.0617)	
BAM Study 2 (Program Years 2013-14 & 2014-15, n = 2,064)				
Year 1 (program offered)				
School Engagement Index	0	0.0058	0.0117	0.221
		(0.0248)	(0.0488)	
Total arrests per youth per year	0.591	-0.0806	-0.1614	0.630
		(0.0506)	(0.0999)	
Violent	0.119	-0.0180	-0.0361	0.121
		(0.0161)	(0.0318)	
Property	0.073	-0.0078	-0.0157	0.075
		(0.0129)	(0.0253)	
Drug	0.126	-0.0153	-0.0307	0.168
		(0.0233)	(0.0459)	
Other	0.273	-0.0394	-0.0789	0.266
		(0.0293)	(0.0579)	
Year 2 (program offered)				
School Engagement Index	0	0.0501**	0.0993**	0.081
		(0.0252)	(0.0490)	
Total arrests per youth per year	0.383	-0.0841**	-0.1670**	0.471
		(0.0392)	(0.0771)	
Violent	0.079	-0.0276*	-0.0549*	0.110
		(0.0155)	(0.0303)	
Property	0.046	-0.0018	-0.0036	0.062
		(0.0101)	(0.0197)	
Drug	0.094	-0.0147	-0.0292	0.115
		(0.0171)	(0.0335)	
Other	0.163	-0.0400*	-0.0793*	0.183
		(0.0221)	(0.0434)	

Notes: Baseline covariates and randomization block fixed effects included in all model specifications (see text). Heteroskedasticity-robust standard errors in parentheses. School engagement index is equal to an unweighted average of days present, GPA, and enrollment status at end of school year, all normalized to Z-score form using control group's distribution. Year 1 arrest data from start of program school year until start of following school year for both studies. For study 1, the year 2 arrest data runs through July 18 (capturing a ~10 month window) while for study 2, year 2 arrest data run through March 31st (~8 months). * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Appendix E: Key Tables from Heller et al. (continued)

Table A.26 Becoming a Man Study 1 – Estimated Benefits Per Participant

	Low-end Estimate	High-end Estimate
	From Year 1 Crime Reduction	
Savings to Potential Victims	4,615	32,918
	(3,161)	(21,381)
Savings to Government	720*	1,268*
	(407)	(718)
Subtotal	5,335*	34,186
	(3,238)	(21,473)
	From Increased High School Graduation	
Earnings Increase to Participant	1,011	5,617**
	(633)	(2,644)
Cost of Additional Schooling	-294	-678**
	(202)	(323)
Subtotal	716	4,939**
	(455)	(2,338)
	Total	
	6,051*	39,125*
	(3,282)	(21,701)
Costs per participant	$1,100	$1,100
Benefits/Costs	6/1	36/1

Notes: Table assigns a social cost to each crime (top panel) and a social benefit to each high school graduate (bottom panel), then estimates an individual level program benefit with an IV regression using social cost as the dependent variable. All estimates reported in 2010 dollars. The low estimate column uses lower-bound participation rates, the cost of the cost of crimes to victims from Miller, Cohen and Wiersema (1996) with the cost of homicide trimmed by half, the measure of graduating from CPS only, and the lower range of estimated earnings and health benefits from an additional year of education in the literature. The high estimate column uses participation as reported, the costs of crime from the contingent valuation surveys in Cohen, et al. (2004), the measure of graduation that assumes all verified out-of-district transfers graduate, and the higher end of estimated earnings and health benefits from a year of education. Both columns assign each graduate the cost of one extra year of instruction in CPS and each offender the cost of each arrest to the criminal justice system. See Appendix C Section V for details. Baseline covariates and randomization block fixed effects included. Heteroskedasticity-robust standard errors in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Appendix F: Discussion of Heller et al. Results

The Heller et al. paper is not without limitations, although the researchers have painstakingly attempted to mitigate them via sensitivity tests where possible. Limitations include:

- **Random Assignment**: An ideal randomized controlled trial should have perfect randomization of treatment and control groups. In practice, this is rarely achievable, and the interventions in Heller et al. are no different in this respect. In the JTDC intervention, random assignments were not always binding due to potential safety concerns with placing certain youth in certain detention units. In the BAM intervention, students with learning disabilities and students who rarely attended school were excluded from randomization, although this should not be an issue if these students do not receive the intervention in practice. Moreover, as in many social experiments, not all youth assigned to the treatment actually took the treatment (or participated in every session), and there was also a small amount of attrition as well. Consequently, the researchers adjusted their estimates to account for these sampling irregularities (for a more in-depth discussion, see literature on "Intent-to-Treat" estimates versus "Treatment-on-Treated" estimates).

- **Measurement Error:** Certain aspects of the design introduced measurement error into the results. For example, participation rate is needed to calculate intent-to-treat estimates, and this was inherently difficult to measure accurately due to the nonbinary nature of program participation (e.g., students who do not attend all sessions, attrition, etc.) Another example of measurement error is that individuals who come through the Cook County Detention Center may have more than one detention across the observed timeframe. The researchers acknowledge these possible shortcomings and provide sensitivities to show that the final results remain robust to more conservative assumptions.

- **Cost-Benefit Estimates**: As with any typical cost-benefit analysis, the methodology for determining program benefits is somewhat subjective and imprecise. In fact, the Heller et al. paper caveats: "Any sort of benefit-cost analysis for a social program like this is necessarily speculative and subject to a number of caveats." In particular, specific assumptions were made to calculate: 1) direct savings to the criminal justice system, 2) benefits to society from reduced crime, and 3) future benefits from increased graduation rates. Despite the possible subjectivity of these assumptions, the researchers have provided upper and lower bounds for their estimates; even the lower-bound estimates are compelling enough to warrant serious discussion about replicating the program in other cities.

- **External Validity**: Finally, as is the case with any randomized control trial, a key question is how the experiment would generalize to other settings and youth populations. Answering this question was one of the main endeavors of our paper.

Appendix G: Description of Data Sources

BPD Arrest Data: We used publicly available arrest-level data supplied by the Baltimore Police Department (henceforth "BPD") via Open Data Baltimore, a public repository of downloadable city-level data. The arrest-level data include one record for every arrest that was processed by BPD between the calendar years 2013 and 2016, inclusive. Because arrests are often associated with multiple charges, each record in the data is linked to only the most severe charge. The arrest data can also be linked to the age of the arrestee, allowing for segmentation of arrests by age group. However, the data appear to be relatively unreliable with respect to the description of the arrest charge. There does not appear to be a systematic and/or categorical method for classifying arrest types, and the large number of typos, idiosyncratic abbreviations, and lack of standardization (there are nearly 12,000 unique values of charge descriptions) imply that there is a manual input process that is not cleansed prior to release to the public. All calculations using these fields are completed after text standardization. Although done to the best of our abilities, these calculation almost certainly contain periodic misclassifications.

BPD Part 1 Victim Data: Victim-level data is also published by the BPD and is accessible via Open Baltimore. In contrast to the arrest data, the victim-level data include one observation per incident that was reported to BPD. In this paper, we interpret these data as representing reported crimes. Clearly, a key limitation of the victim-level data is that no information is provided with respect to the offender. To illustrate, consider that a drive-by shooting may result in a report that is recorded in the victim-level data, but may not result in an arrest that is recorded in the arrest data. Conversely, an arrest of a fugitive may not result in a victim-level record being published in the data. Generally speaking, the victim data provide a much more accurate picture of true crime levels than arrest data, which can experience fluctuations due to changes in policing.

Uniform Crime Reporting (UCR) Data: The most recent iteration of the UCR data is the 2014 extract. We obtained the data via the Inter-University Consortium for Political and Social Research at the University of Michigan.

Department of Juvenile Services Data: Finally, it is important to note that many crimes committed by juveniles are not processed by the Baltimore Police Department. For example, schools are a major source of youth referrals to the Maryland Department of Juvenile Services ("DJS"), where juveniles are subjected to a booking process orthogonal to the BPD. Although the microdata for each individual admitted to BPD were not available for public use, the DJS publishes an annual Data Resource Guide with detailed aggregate and trend data for each county in Maryland, including Baltimore City.