

It Takes Time: Dosage and Duration of Outreach, Case Management, and Service Engagement on Reducing Violent Recidivism

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Abstract

Violence intervention strategies and programs are typically time-limited to occur over days or months at a time, even though desistance from violence, individually and when disengaging from group affiliation is a time-dependent process that can take years to accomplish. As a result, interventions that show positive results in the near term may not hold up over subsequent years. The Safe and Successful Youth Initiative (SSYI) in Massachusetts is an exception to this norm. SSYI is a community-based, public health intervention, open to individuals ages 17 to 24 with a proven risk for violence as demonstrated through police data on violent offending. Once enrolled, there is no restriction on how long someone may receive services through SSYI, if they still meet the age criteria. Since its inception in 2012, SSYI has generated consistent results reducing violent crime *at the community level* in Massachusetts. Using lifetime offending history and case management records for 212 SSYI clients, the current study examines violent recidivism in relation to the dosage and duration of client outreach, case management, and service engagement. The results indicate that lengthy duration and high dosage of frequent client involvement with outreach workers and case managers is associated with greater service engagement, program retention, and decreased recidivism. The total number of contacts and meetings between clients and staff were inversely related to recidivism after program exit and relationships were statistically significant. The most typical SSYI client did not have any recidivism events while enrolled and recidivism events declined as clients remained engaged in the program. Only 20% of clients who left the program recidivated within 18 months,

which is substantially lower than reported rates of recidivism for violent offending. Implications for research and the practice of using time-limited interventions to sustainably reduce violence are discussed.

Background

The Scope and Impact of Violent Crime

Across the United States, homicide remains the third leading cause of death for all youth 15–24 years of age, and it is the leading cause of death for Black youth. Firearms are used in more than 90% of these homicides (Centers for Disease Control, 2024). The current study examines gun violence intervention outcomes in Massachusetts, where despite being a leader in effective violence prevention, there were 94,881 violent crimes reported in the commonwealth from 2019 to 2023. These offenses included homicide, aggravated assault, and sexual assault. More than 26,000 youth and young adults, 10–24 years of age, were arrested for 24% of these violent crimes (Commonwealth of Massachusetts, 2024). Notwithstanding some preliminary good news that gun violence is on the decline at the start of 2024, nearly every major American city has experienced alarming increases in gun violence in years following the Covid-19 pandemic (Kim, 2022; Mac Donald, Mohler, & Brantingham, 2002; Ssentongo, et al., 2022). Despite the enormous economic costs and grave loss of life that disproportionately harm communities of color due to gun violence, the research and intervention development to reduce violence has lagged considerably behind the problem, due to political and special interest headwinds that impacted access to funding independent studies on the issue (Keel, 2021).

Desistance from Violence

A person's road to committing violence is likely measured in years, rather than days or months. Research in developmental psychology shows that human adolescence persists well

beyond the teenage years into early adulthood. Development of the adolescent brain continues until around age 25 and can be delayed or harmed by adverse childhood experiences, such as exposure to violence (Scott & Steinberg, 2008). When children experience adverse events, the fear response hormone, cortisol, is released as a survival mechanism to enable a rapid response in the face of danger (e.g., the fight or flight response) (de Kloet, & Joëls, 2024). However, a build-up of cortisol, from repeated exposure to adverse events, can delay or even damage healthy brain development that affects executive functioning, or the ability to judge the consequences of behaviors rather than responding on impulse, as so frequently typifies acts of violence (James, Stromin, Steenkamp, & Combrinck, 2023). As a result, the more adverse events one is exposed to, and the longer these exposures last over childhood and adolescence, the less able one is to use cognitive assets to avoid future risk in adulthood unless those cognitive pathways are built or reset (Wojciechowski, 2021).

Identity Development

The literature suggests that the concepts of desistance and identity development are intimately intertwined. For an individual engaged in violence to move from the present self (i.e., engaged in criminogenic behavior) toward the future self (i.e., ideally a “positive possible self”), the individual might believe that the costs or consequences of the current path outweigh the potential benefits. This process may be set in motion when an individual recognizes that they may, in fact, be headed down a path toward their “feared self”. This recognition may shift individual’s preferences and motivations toward non-violent behaviors and actions, and ultimately desistance (O’Connell, Visher, & Liu, 2020; Harris, 2020; Forney & Ward, 2019; Paternoster & Bushway, 2009). This recognition can be realized in isolation or through targeted and individualized support from interventions and others.

However, individuals do not exist in a vacuum, and the enabling environment or context in which they live, work, or commit violence affects each person's unique path to desistance. We often think of responsiveness to interventions, or the ability to respond to what an intervention has to offer, as something the intervention can control (Ward, Melser, & Yates, 2007). When, in reality, many of the barriers and facilitators affecting intervention successes lie outside the intervention, in the person's relationships and opportunities in the community, especially when individuals are known for committing community-based violence. For example, when a person is gang-involved and wants to desist from violence, their ability to do so can be constrained by the rules of the gang, their proximity to where the gang operates, and even their gender, age, or position in the gang, with some gang members facing an easier exit than others (Cruz, Coombes, Mizrahi, Vorobyeva, Tanyu, & Campie, 2020).

Whether group-affiliated or not, a person wanting to desist from violence will generally be at risk for future violence, underemployment due to a criminal record, unstable housing due to low income and criminal record restrictions, and undereducated due to early push out from school, often to the point of being illiterate (Grossi, 2017). While an intervention can identify these risks and work to mitigate them, unless the intervention is itself a self-contained community, it will not be able to control the labor market, the supply of adequate safe and affordable housing, or the policies that limit those with a criminal (felony) record from obtaining the resources they need to pursue a meaningful life outside of crime. The perceptions of a community can also hinder a person's desistance goals if the community refuses to accept the person for who they aspire to be (i.e., future self), rather than who they used to be when they were victimizing the community. If the person must leave their community to avoid this barrier, they could also be leaving important cultural and familial supports that bolster their internal

willingness and ability to change (Mowen, Stansfield, & Boman IV, 2019). In other words, desisting from violence in the long-term takes time, for both the internal and external worlds to develop and align in support of the non-violent identity's future success.

What Works to Prevent and Reduce Violent Crime

Acknowledging adolescent development and desistance, a growing body of research in the violence prevention space increasingly supports the notion that violence prevention programming for youth and young adults, 16–24 years of age, should be comprehensive to include multiple types of support (Campie, et al., 2013). During the past 15 years, policies and practices have changed from a focus on police suppression to efforts that promote prevention and intervention through multisector partnerships with and without law enforcement involvement. Researchers in public health and criminology generally categorize violence prevention strategies in either a police framework or a health framework. Law enforcement agencies typically lead police-based frameworks that (a) focus on individuals or groups of people (as well as places) who are most susceptible to violence and (b) seeks to deter people through general (e.g., incarceration) or specific deterrence strategies, most notably using focused deterrence approaches (Braga & Weisburd, 2015; Chalfin & McCrary, 2017; Braga, Weisburd, & Turchan, 2018). In both cases, policing-oriented violence interventions are typically short-lived, lasting days or weeks, despite the foundational research on the extensive time it takes for someone to desist from violence for good.

Community-based institutions, including health departments or hospitals generally apply a health-based framework that views violence as a health problem for those who commit, are injured by, or even exposed to it because of the direct physical, emotional, and mental health consequences. Community-based, multisector strategies utilize a cross-system approach to

address violence through a public health lens with the support of law enforcement data to identify those at highest need of intervention. This strategy comes in two flavors, one that focuses on community norms and attitudes and attempts to interrupt violence by influencing those at greatest risk through credible messengers ¹(Butts, Roman, Bostwick, & Porter, 2015), and a second approach that focuses on providing participants with individualized support and access to educational, employment, and therapeutic opportunities that reduce their risk for violence (Campie, Petrosino, Fronius, and Read, 2017). In the latter, strategies often include trauma-informed recovery support services that focus on substance use disorder and mental health needs of participants. Programming efforts typically provide participants with opportunities to connect with family members, healthy peer groups, and other natural supports in communities, and parenting support is often available for both male and female participants. Unfortunately, many of these interventions are short-lived in nature, due to lack of resources or a theory of change that limits intervention to short-term outputs, such as “getting a job”, a common element to many violence interventions working with individuals who need to replace their ill-gotten gains through crime, and attended by violence, with “legitimate” means of income (Bhatt, Heller, Kapustin, Bertrand, & Blattman, 2024). As a result, violence reductions can be fleeting or inconsistent (Braga & Weisburd, 2015; Webster, 2015). “Identity transformation . . . is a slow, gradual process (Harris, 2020; Paternoster & Bushway, 2009)” so to have the greatest impact, sustained over time, interventions need to evolve and be funded to support desistance over years, not months – until the process is complete.

¹ While definitions vary, credible messengers are typically individuals often with lived experienced who are deemed credible within the community network.

The Current Study

The Safe and Successful Youth Initiative (SSYI) in Massachusetts is an exception to the norm of short duration interventions. SSYI is a community-based, public health intervention, open to individuals ages 17 to 24 with a proven risk for violence as demonstrated through police data on violent offending. Once enrolled, there is no restriction on how long someone may receive services through SSYI, if they still meet the age criteria. Begun in July 2012 working with ten cities demonstrating the highest rates of gun violence in Massachusetts, SSYI sites now serve nearly 2,000 young people at any given time in fourteen cities north to south and east to west across the commonwealth: Boston, Brockton, Chelsea, Fall River, Haverhill, Holyoke, Lawrence, Lowell, Lynn, New Bedford, North Adams, Pittsfield, Springfield, and Worcester. SSYI youth workers, sometimes called outreach workers or transition coaches, and SSYI case managers support their clients with relentless support, advocacy, and access to services to aid their transformation. The staff act as supportive peers and community members, serving as “important sources of social capital who provide support for clients’ new identities,” and who identify supports and services that prior research has shown to be effective to varying degrees for bolstering well-being through employment, education, housing, and mental health support (O'Connell, Visher, & Liu, 2020; Harris, 2020; Paternoster & Bushway, 2009). This theoretical framing underlies assumptions of how SSYI intercedes with crime trajectories and recharts clients toward prosocial and positive individual outcomes.

Prior Research on SSYI.

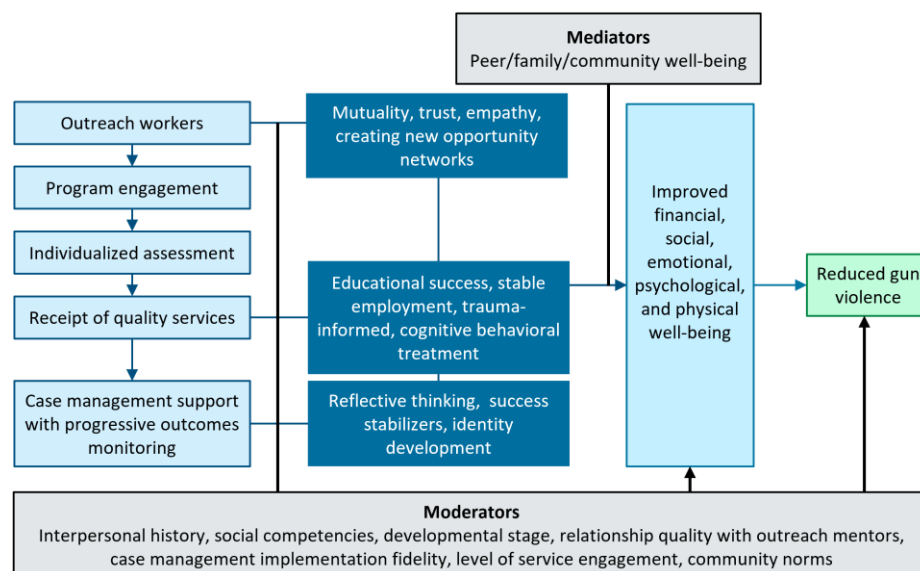
Since its inception in 2012, SSYI has generated consistent results reducing violent crime *at the community level* in Massachusetts. Using lifetime offending history and case management records for 212 SSYI clients, the current study examines violent recidivism *at the individual*

client level by analyzing the dosage and duration of engagement through client outreach, case management, and service provision over the course of a client's involvement in the intervention.

The study seeks to answer the question: *How does the dosage and duration of program involvement through outreach and case management contact influence service engagement and eventual desistance from crime?*

The SSYI theory of change (Figure 1) guides the current study. The research team developed this theory from our previous research on SSYI, described below. Although each funded site has developed unique means to implement SSYI within the context of its communities and clients, each site deploys client outreach, case management, and services targeted to meet the priority needs of each client. Outreach and case management roles are designed to work in complementary fashion during a client's stay in the program to maintain contact with and strengthen support for clients.

Figure 1. SSYI theory of change



Since its inception, SSYI has shown promise for reducing violent crime at the community level in Massachusetts. Researchers from our team evaluated the intervention's impact on community-level violent crime victimization from 2010 to 2013 in 33 cities. We examined 11 cities that received SSYI funding and 22 comparison cities with comparable rates of violent crime. The evaluation found 5.5 fewer violent crime victimizations per month in cities that received SSYI funding (Petrosino, et al., 2019). Using propensity score matching in 2014, our research team also found that SSYI clients were 40% less likely to be incarcerated than their comparison peers who were not involved with SSYI but had similar propensities for violence (Campie, Vrinotis, Read, Fronius & Petrosino, 2014). In a cost-benefit analysis that same year, we estimated that SSYI prevented violence in the two largest SSYI sites resulting in justice and healthcare benefits of just under \$14 million (Bradham & Campie, 2014). This same analysis was extended in 2017, and we found that, from 2010 to 2016, cities with SSYI funding, compared with 32 similar cities not operating SSYI, experienced 2.1 fewer violent crimes each month per 100,000 residents after the program started (Campie, Petrosino, Fronius, & Read, 2017). In 2020, our research team replicated this analysis to examine (a) trends in violent crime in SSYI and non-SSYI cities in Massachusetts from 2007 to 2017 and (b) the cost-effectiveness of SSYI in the context of these trends. Using program costs from 2018, results showed that each dollar invested in SSYI led to societal savings of approximately \$5.10 in cities with SSYI (Figure 2) (Campie, et al., 2019).

Figure 2. Results of a cost-benefit analysis of SSYI on violent crime in SSYI cities



In a related analysis within this same study, more than 800 individuals who were eligible for and engaged in SSYI were compared with individuals who were eligible *but not enrolled* in SSYI during the program implementation period from 2012 to 2019, finding that the unenrolled group experienced an 8% higher number of arraignments, on average, than SSYI clients. This difference was statistically significant. Based on the cumulative results of these evaluations, SSYI was designated as a “promising program” in 2021 by the U.S. Department of Justice CrimeSolutions evidence review repository and the Office of Juvenile Justice and Delinquency Prevention Model Programs Guide.²

² SSYI evidence rating and review are available at <https://crimesolutions.ojp.gov/ratedprograms/717>.

Sample

Eleven of the 14 current SSYI sites, all in Massachusetts, participated in the study. Two of the nonparticipating sites were expansion sites that were still in the program start-up phase at the time of the study or newly awarded after the study period, and one other site did not have sufficient staff capacity to participate in the study, without taking time away from direct service to clients. SSYI sites provided case management data for clients who were eligible for SSYI and were either (a) currently enrolled at the time of data collection (between May and September 2019) or (b) never enrolled, despite outreach attempts. Lifetime CORI data (including that for juvenile offenses) were obtained from the Massachusetts Department of Criminal Justice Information Services for 827 individuals who were eligible for SSYI through June 30, 2019. This dataset included individuals who were identified and engaged in SSYI services and those who were identified by SSYI sites but never engaged in the program. The CORI cases were matched to case management records provided by SSYI sites for clients who were actively or formerly engaged in program activities through September 2019. Between both data sources, we were able to match 212 unique male clients, across 10 SSYI sites, who comprise the total sample used for analysis (Table 1).

Table 1. Study sample ($n = 212$)

Age	Race	Immigrant	Parent	Substance Use Disorder (SUD)	Mental Health Needs (MH)	Unstable Housing	Gang- Involved	Employed	GED/HS Diploma
	51 %								
μ 19.5	Latinx 41%	8%	25%	58%	26%	79%	62%	21%	25%
R 16-24	Black								

Methods

Overall Approach

The current study seeks to understand the relationship between program dosage and duration and program engagement and recidivism. Criminal court and case management data provide the quantitative means to explore these relationships for the purpose of understanding the SSYI theory of change. The case management data also includes data related to client characteristics (e.g., parenting status, immigration status, race, etc.). SSYI sites serve clients with a diverse set of individual needs that may relate to their propensity to enroll and engage in programming as well as desist from criminogenic outcomes. Understanding how programmatic experiences and client outcomes are affected by such characteristics and needs are key to ongoing continuous improvement and to inform similar initiative elsewhere; therefore, these characteristics are operationalized as covariates and included in the analyses to determine whether these characteristics influence the findings. The results discussed but not shown are available upon request.

Recidivism

Recidivism is defined as any technical violation (e.g., failure to appear, possessing a firearm without a permit) or a new criminal offense. Per normal convention, convictions are not included in our definition of recidivism. Each offense was analyzed separately to understand the nature of the client's contact with the criminal justice system after enrolling in SSYI. Recidivism data were available through CORI for SSYI clients known to programs between July 2016 and June 2019. CORI records included lifetime offending histories through June 30, 2019. Recidivism was calculated at three points: between program identification and program enrollment, while enrolled in SSYI, and 18 months after exiting SSYI.

Program Dosage and Duration

SSYI sites provided case management records through an online data entry system developed by the research team, and from data extracts of site case management systems. Programs reported on client demographics and characteristics, as well as the frequency and amount of both outreach and case management contacts for each client. Programs also reported on level of engagement in education, employment, and mental health services, and on barriers that impeded engagement and facilitators that supported engagement.

Results

Client Offending History

Because SSYI is meant to serve individuals at “proven risk” for violence, CORI data were analyzed to determine lifetime and age-of-onset offending patterns of the subsample of 212 SSYI clients for whom CORI data and case management data were available (Table 2).

Table 2. Historical and age-of-onset offending patterns ($n = 212$)

Mean number of arraignments for violent and non-violent offenses through May 2019	Mean age (years) of first offense Minimum age/mode
Violent offenses: 6.24	15.65
Non-violent offenses: 19.42	11/15

Violent offenses included armed robbery, armed burglary, and any type of assault (e.g., sexual, simple, aggravated). Weapons-related offenses that did not involve an act of violence (e.g., illegal possession, probation/parole violation) were included in nonviolent offenses.

Program Dosage: Outreach

Overall, most clients (54%) enrolled in SSYI after more than one month of outreach attempts by the program; slightly more than one quarter of clients (28%) enrolled between a week and a month of being contacted by outreach staff. Clients who engaged after one week tended to be younger than 21 years of age, White or Latino, and served by two SSYI sites. The majority of SSYI clients (83%) experienced contact by an outreach worker one or more times per week. Correlation analyses examined how key outreach factors were related to each other and whether that relationship can be explained by chance alone. Outreach frequency (e.g., once a week, once a month) and outreach amount (count of outreach contacts) were directly related to a client's time to enrollment and eventual program participation, regardless of time to enroll (Table 3). Total outreach attempts were also strongly related to client retention in the program, as clients in the top quartile of contact (80–125 contacts) were the most likely group to remain in the program (Table 3). At the time of the study, client retention was an average of 18 months, and some clients stayed in the program as long as 44 months. Lower levels of outreach were related to longer time to enroll, but this relationship was not statistically significant.

Table 3. Client outreach, enrollment, and retention ($n = 212$)

	Time from eligible to enrolled	Client still enrolled
Outreach frequency	.120* (.033)	.114* (.049)
Total outreach amount	-.071 .210	.252** (.000)

* Correlation is significant at the .05 level (2-tailed). ** Correlation is significant at the .01 level (2-tailed).

The total number of outreach contacts that clients experienced correlated positively with the total number of priority risks and needs assessed after enrollment. Greater outreach frequency

was related to a client being gang-involved, the client's race, and the client being identified for the program based on police-generated data. Several client characteristics were statistically associated with program retention, including employment needs, being older than 21 years of age, and being gang-involved. Older clients were more likely to be parents, to have been gang-involved, and to have greater employment needs and trouble with substance use. Needing help with educational services was inversely associated with substance use needs, indicating that clients who have substance use needs did not have priority needs related to education.

Program Dosage: Case Management

Meeting frequency with case managers was inversely related to increased outreach frequency (-.356 correlation), and this relationship was statistically significant (.000 probability of chance at the 99% confidence level) indicating that outreach workers and case managers may perform in a complementary manner when engaging with SSYI clients, or some sites may use outreach workers and case managers interchangeably. When examining the frequency of case management contact based on level of risk or need, results indicate that SSYI clients were more likely to meet more often with case managers when the client was assessed at greater need. However, even clients assessed to have fewer needs still met more frequently with case managers than did clients who were not assessed for risks and needs at all (Table 4).

Table 4. Client characteristics and program retention (*n* = 212)

	Client >21	Client is gang- involved	Client is a parent	Client Race	Client employment needs	Client substance use needs	Client education needs
Client still enrolled	.323** (.000)	.141* (.014)	.024 (.681)	-.061 (.295)	.213** (.000)	.026 (.653)	.105 (.069)

* Correlation is significant at the .05 level (2-tailed). ** Correlation is significant at the .01 level (2-tailed).

Several client characteristics beyond those shown in Table 5 affected the frequency of meetings between clients and their case managers, including consequences around the client's past criminal involvement, immigrant status (inverse relationship), and risk or need priorities that focused on substance use disorders (positive relationship) and education (inverse relationship). These results suggest that some circumstances—such as working through court-related issues, expunging criminal records, or ongoing relapse and recovery from substance use—require case managers to provide more support and spend more time with clients. Most clients (62%) met with case managers, either virtually (e.g., text, phone) or in person, one to four times per month, with more than one quarter (29%) meeting with case managers one or more times per week. The majority (87%) of meetings with case managers lasted one hour or less. On average, clients met with their SSYI case managers 111 times during their time in the program. Some clients who were in the program for several years met with their case manager as many as 800 times.

Table 5. Client characteristics and contact with case managers (*n* = 212)

Characteristic	Case management meeting frequency
Parent	-.003
Race	-.006
Immigrant	.119
Crime-related needs	-.131*(.020)
Education needs	.189**(.001)
Substance use needs	-.192**(.001)
Mental health needs	.209**(.000)
Employment needs	-.044
Peer/family relationships needs	.030
Housing needs	-.018
Age	-.091

* Correlation is significant at the .05 level (2-tailed). ** Correlation is significant at the .01 level (2-tailed).

Program Dosage: Service Engagement

The overall level of clients' engagement in services was directly related to their total amount of contact with outreach workers and case managers. Having a case plan with goals and objectives for clients was statistically related to greater levels of contact with outreach workers and case managers (Table 6). Dosage of services was assessed based on the level with which clients engaged in each SSYI service and overall, across all SSYI services. Using case records, case managers reported on whether the client was not at all engaged, engaged a little, or engaged a lot in each service. Because specific SSYI services may vary by site, this study assessed the services that all SSYI sites are required to offer as core components—employment, education, and mental health supports—as mandated through their funding agreements with the Commonwealth of Massachusetts.

Several client characteristics were correlated with level of engagement in services. Duration in the program and employment needs were most strongly related to greater level of engagement. Clients who reported substance use disorders, gang involvement, or multiple risk or need priorities were more likely than other clients to show greater levels of engagement in SSYI services (Table 6).

Table 6. Client level of engagement in services and programmatic characteristics (*n* = 212)

	Outreach frequency	Total outreach contacts	Total number of case manager meetings	Case manager meeting frequency	Case manager meeting duration	Case plan with goals	Risks and needs assessed
Engaged in services	-.114* (.045)	.643** (.000)	.697** (.000)	.239** (.000)	.179** (.001)	.114* (.043)	.003 .963

* Correlation is significant at the .05 level (2-tailed). ** Correlation is significant at the .01 level (2-tailed).

Client Recidivism

Recidivism was analyzed during three time periods for the 212 clients in the study: 1.) Between identification and enrollment in SSYI, 2.) While enrolled in SSYI , and 3.) Up to 18 months after exiting SSYI. As shown in Table 7, the most typical SSYI clients did not have any recidivism events during their enrollment in SSYI, and recidivism events declined as clients remained engaged in the program. Recidivism was correlated across time periods, suggesting a core group of clients was reoffending within each period, as opposed to a completely unique or different group of clients offending during each period. Prior history of nonviolent offending was related to recidivism just before enrollment and once enrolled, while prior history of violent offending was correlated with recidivism after program exit. This result suggests that early recidivism might be tied to technical violations stemming from earlier violent offenses that made clients eligible for SSYI, but recidivism after leaving the program might be tied to new criminal offenses. Individuals with substance use needs and a greater number of needs overall (e.g., mental health, employment, housing, education, substance use) were the most likely groups to recidivate while enrolled in SSYI. Being a parent was inversely related to reoffending (e.g., parents were less likely to reoffend), but the relationship was not statistically significant.

Table 7. Level of engagement in services and client characteristics ($n = 212$)

	Age	Parent	Race	Substance use needs	Mental health needs	Education needs	Employment needs	Gang- involved	Multiple risk/need priorities
Level of engagement in services	-.019	.060	.194**	.166**	.089	.047	.259**	.146**	.156**

* Correlation is significant at the .05 level (2-tailed). ** Correlation is significant at the .01 level (2-tailed).

SSYI Core Components and Recidivism

The total number of contacts between clients and outreach workers and the total number of meetings between clients and case managers were each inversely related to recidivism after program exit, and these relationships were statistically significant (Table 8). These results suggest that clients exposed to greater contacts with outreach workers and greater numbers of meetings with case managers are less likely to recidivate after they leave the program.

Table 8. Client recidivism over time ($n = 212$)

	Clients recidivating between identification and enrollment ($N = 203$) 46%	Clients recidivating while enrolled in SSYI ($N = 140$) 11%	Clients recidivating within 18 months of exiting SSYI ($N = 55$) 20%
Clients recidivating between identification and enrollment	-	.323** (.000)	.258** (.000)
Clients with SUD needs	.010 (.893)	.145* (.043)	-.024 (.744)
Clients with multiple needs	.160* (.030)	.191** (.010)	.017 (.816)

There was an inverse relationship between engagement in multiple SSYI services and recidivism, and this relationship was statistically significant. Except for mental health services, participation in programming was significantly related to a lower recidivism (Table 9).

Table 9. Outreach or case management contact and post-program recidivism ($n = 212$)

	Total number of outreach contacts	Total number of case management contacts
Clients recidivating within 18 mos. of exiting SSYI	-.177* (.012)	-.148* (.035)

* Correlation is significant at the .05 level (2-tailed). ** Correlation is significant at the .01 level (2-tailed).

When examining the overall effect of individual- and program-level factors, regression analyses indicated that history of past offending *and prior* violent offenses were the strongest predictors of client recidivism. This result is consistent with prior research (Katsiyannis, A., Whitford, D. K., Zhang, D., & Gage, 2018). However, recidivism could not be explained by prior history of offending alone. The total number of outreach contacts and case manager contacts with clients, and the client's engagement score added more explanatory strength to the statistical model and were all inversely related to recidivism. These results suggest that more outreach and case manager contact with clients, and greater engagement in services, are related to lower client recidivism (Table 10).

Table 10. Service engagement and recidivism after leaving SSYI (*n* = 212)

	Engagement in >1 service	Engagement in Education	Engagement in job training	Engagement in job placement	Engagement in MH services
Recidivism after exiting SSYI	-.142* (.022)	-.144* (.020)	-.117* (.048)	-.121* (.043)	-.077 (.138)

*Correlation is significant at the 0.05 level (1-tailed)

Discussion

The SSYI approach had previously demonstrated positive impacts on community levels of violent crime in cities using the intervention. The current study indicates that SSYI also impacts client recidivism, which likely influences community levels of crime, given that SSYI clients are targeted specifically for their persistence in offending and their propensity for future involvement in violence. The findings of the current study deepen the understanding of SSYI's impact at an individual level: Recidivism decreased over time as youth moved from pre-enrollment outreach to early engagement to full enrollment in the program, and only 20% of

clients who left the program recidivated within 18 months after leaving the program, which is substantially lower than reported rates of recidivism for violent offending (Hunt, Iaconetti & Maass, 2019 ; Alper, Durose & Markman, 2018).

The total number of outreach contacts that clients experienced correlated positively with the total number of priority risks and needs assessed after enrollment, indicating that SSYI is prioritizing outreach to those individuals at greatest risk for violence and the results from the study reflect this high risk population. Greater outreach frequency was also related to a client being gang-involved, the client's race, and the client being identified for the program based on police-generated data. Most clients (62%) met with case managers, either virtually (e.g., text, phone) or in person, one to four times per month, with more than one quarter (29%) meeting with case managers one or more times per week. On average, clients met with their SSYI case managers 111 times during their time in the program. Some clients who were in the program for several years met with their case manager as many as 800 times. Total outreach attempts were strongly related to client retention in the program, as clients in the top quartile of contact (80–125 contacts) were the most likely group to remain in the program. At the time of the study, client retention was an average of 18 months, and some clients stayed in the program as long as 44 months. Taken together, these results indicate that individuals with the highest need are receiving high doses of the program over an extended duration.

Although overall recidivism was best explained by prior, lifetime history of offending—an expected result based on the broader criminological research—contact with outreach workers and case managers and engagement in multiple SSYI services added predictive value to the estimate of recidivism. The fact that this outreach and contact occurs over an extended period of time, may also support the developmental thesis that underlies identity development explanations

of desistance. Regardless of mechanism, this result confirms that the dosage and duration of SSYI services can counteract the influence of prior involvement with the criminal legal system on future client recidivism.

Limitations

Due to the unique nature of this specialized population and program, and the stakes of withholding service, using a control group has never been an option that sites or the funder would agree to, when studying SSYI. However, given the strong and consistent track record of the program reducing violence with those individuals who comprise the population committing the violence, we can be confident that the results in our study are accurately measuring the reality of the intervention experience for those most at risk for committing violence. Secondly, recidivism is most reliably measured 2 years after an intervention experience. Although this study's results showing low recidivism 18 months after program exit are encouraging, it would be important to follow up on these cases to determine whether desistance was sustained over a longer period. Also, data on recidivism were not available for all clients served by the program because such data were not always complete within sites. Ten of the 11 sites in the study contributed at least partial data on recidivism, providing an opportunity to examine short-term recidivism estimates overall. However, additional data are needed to determine the extent, if so, to which site-specific variations for program dosage, duration, and recidivism outcomes exist over time. Service engagement is one area where case managers may not have had complete access to information, particularly if the services were delivered outside of the SSYI site—which is sometimes the case.

Implications for Policy and Practice

Given the large and lasting impact of violence on individuals, families, and communities, intervention approaches must recognize the need to provide solutions that understand pathways to desistance are unique and may be as complex and lengthy as pathways to violence. The results of this study indicate that while it takes some time for SSYI clients to get their footing in the program, once they engage and sustain long-term contact with SSYI, their recidivism outcomes are remarkably better than those found in the general population of violent offenders. As discussed earlier, this finding is consistent with other research on desistance, particularly gang-offending, where it takes time for individuals to reframe their identities and the future they want away from the gang and criminal lifestyles. It appears evident from our results that allowing clients to stay in the program as long as they need, up to a maximum of 24 years of age and up to 800 interactions or doses of program involvement, increases the odds of completing the unique desistance pathway that each client takes. In fact, the long-duration aspect of the SSYI program model may be the central reason why the intervention has produced such consistent positive results since launching in 2012. More gun violence intervention programs should investigate expanding the dosage and duration of their engagement with individuals at greatest risk for violence.

Although employment supports were the single most used type of SSYI service, engagement in multiple services had stronger statistical relationships with lower recidivism. Engaging in multiple services may keep clients busy and engaged in prosocial activities, so they have fewer opportunities to fall back into past antisocial behavior and peer relationships, or the relationship strength between clients and outreach workers and case managers may drive the client's desire to stick closer to the program and engage in multiple activities. Across the board,

contact with outreach workers and case managers appeared to strongly influence a client's engagement in the program and reduce offending. Although this study could not measure the quality of those relationships, the relationship appears to be essential for bringing clients into SSYI, keeping them engaged as they find their unique paths to desistance, and leading to lower rates of recidivism after clients exit the program. Investing in the client-worker relationship aspect of gun violence intervention programs, not just service referrals, should also be a priority.

Future Research

While the study provides clear and promising evidence that the dosage and duration of program engagement is important for engaging the highest risk clients and limiting their recidivism, more research is needed to unpack the type of dosage and degrees of duration that might differentially impact different clients along their unique pathway to desistance. The study found that clients older than 21 years of age are more difficult to engage initially, but in the long run they have the greatest success in the program and appear to engage most frequently with outreach workers and case managers once they are engaged. Understanding the engagement and desistance pathways for younger age groups will be important for maximizing violence reductions among a population who will have more years ahead of them to reoffend if intervention efforts are unsuccessful. Related to this, a better understanding of the relationship between improved financial, social, and emotional well-being and reduced recidivism among the older SSYI clients might shed light on the desistance pathways for those eligible for SSYI, while perhaps pointing to earlier intervention with younger youth.

This study partially supported the SSYI theory of change, in that relationships between clients and outreach workers and case managers appear to drive the behaviors of clients to enroll in the program, engage in services, and stay in the program. And the unique ability of SSYI to

retain clients over years, not months, continues to differentiate this intervention from the typical approach taken in time limited prevention programs that rarely have sustained funding, policy, and evaluation support – SSYI is currently in its 12th consecutive year of such support, statewide (Campie, et al., 2020). Although this study shows the critical importance of frequent contact between clients and their outreach workers and case managers for engaging clients in the program and services and for impacting recidivism, data are not available from these cases on the quality or evolution of these relationships over time. From related work, survey and anecdotal information suggest that a mentor-like relationship is the glue that connects clients and SSYI staff, but that information comes from a different sample of SSYI clients and could not be credibly tied to the current analysis. Current research is underway to understand in greater detail how program practices influence these relationships and the resulting impact on client outcomes.

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Disclosures

The authors have no conflicts of interest to declare.

Ethical Approval

The AIR Institutional Review Board, IRB00000436 / FWA00003952 reviewed and approved the use of human subjects in this research. The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki.

Informed Consent

Human subjects provided informed consent to participate in this research.

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