

Dropout and Incarceration: Extending the School-to-Prison Pipeline (STPP) Construct



Mike Tapia, Deborah Blalock, Joanne Choi, and Erika Ochoa¹

Justice Policy Journal • Volume 17, Number 2 (Fall 2020)

© Center on Juvenile and Criminal Justice 2020, www.cjcj.org/jpj

Abstract

Prior studies have produced mixed results on the effect of high school dropout on adult incarceration. The current study revisits this issue with a macro-level approach to test the versatility of STPP concepts to various research contexts. We explore the relationship between school dropout rates and prison admission rates for black, white, and Hispanic males in Texas counties with two, time-lagged, cross-sectional models. We use a series of OLS regression analyses to test for relationships, while controlling for a variety of county-level ecological variables. Results were mixed between models, and ultimately do not validate the STPP construct for this particular research context. Study limitations and other implications of the research are discussed.

Introduction

The School-to-Prison Pipeline (STPP) is now a widely familiar concept in the study of race, social class, and juvenile justice due to the significant literature that has amassed on this topic since the late 1990s. Not a formal theory, the concept refers

¹ New Mexico State University

Corresponding Author:

Mike Tapia
miketapia55@yahoo.com

to harsh disciplinary actions in schools leading to referrals into the justice system. While the school dropout event is clearly part of this framework, surprisingly few studies have focused on it. We therefore use it as our independent variable in a study of adult incarceration rates.

Prior research has shown that racially disproportionate school discipline correlates with racially disproportionate rates of referral into the juvenile justice system (Nicholson-Crotty et al., 2009; Skiba et al., 2000; Skiba et al., 2014; Skiba et al., 2006). Yet we do not have a good grasp of how school dropout relates to adult prison admission. This is curious because in the most literal sense, sentencing to adult prison is the logical end of the “pipeline”, inherent in the widely used STPP phrase. In fact, nearly all STPP studies examine juvenile justice system involvement as the end of the pipeline.

As findings on the effect of school dropout on adult imprisonment are rather mixed, our work begins to fill an important gap in this area of research. In this exploratory analysis, we use the adult incarceration rate as the outcome variable, which surprisingly is a unique contribution to the STPP literature. Thus, we measure the STPP quite literally. Furthermore, whereas most of the literature examines only whites and blacks, ours is one of the few to compare Latinos to these groups.

Literature Review

Many studies have examined the effect of dropout on self-reported delinquency and criminal involvement (e.g. Elliott & Voss, 1974; Fagan & Pabon, 1990; Lochner, 1999), but there are not many that examine its effect on adult incarceration. Some of the classical research reviewed below claims that dropping out of school does *not* impact delinquent behavior because the risk factors for both dropout and delinquency are encountered simultaneously by youth. Recent work by Sweeten, Bushway, and Paternoster (2009, p.50) noted that dropouts “tend to come from poor families, have poorly educated parents, are poor readers...chronic truants...more likely to be embedded in a network of delinquent peers, and more likely to have behavioral problems that include a history of antisocial conduct”. Such research argues that dropping out of school may not place youth at a greater risk of problematic, or delinquent behavior beyond what they are already engaged in.

Mukherjee (1971) found that over two thirds of dropouts with juvenile arrest records were no longer committing delinquent acts post dropout. Elliott and Voss (1974) had similar results, showing that school was a critical context or staging area

for committing delinquency and that rates declined after dropping out. Contrary to these studies, Fagan, Piper, and Moore, (1986) found elevated rates of delinquency among dropouts in a larger sample of high poverty inner-city youth.

A weakness of most early investigations into this issue, however, is that the post-dropout follow-up period is too short to examine the delayed, lasting, or future effects of dropout on criminal involvement. When Thornberry, Moore, and Christianson (1985) followed a youth cohort into their mid-20s they modeled the longer-term impact of dropping out on adult criminal involvement that prior studies hadn't. Importantly, however, while specifying a delayed effect of dropout on *criminal involvement* was a key finding, it is not the same as examining the effect of dropout on *incarceration per se*.²

Dropout and Incarceration

Most of those who claim that a causal link between dropout and incarceration exists do not present very convincing evidence. It is common to see the argument in reverse order since a large proportion of inmates in state prisons are school dropouts (Wolf-Harlow, 2003). It is therefore often assumed that dropout *must* be a cause of incarceration (Belfield & Levin, 2007; Maryland Taskforce...,2012), which is clearly a faulty logic. By a conservative estimate, about one fourth of all Americans are high school dropouts, yet we know that only a small proportion of those are headed for prison.

Pettit and Western (2004, p.160) found that the proportion of state inmates who are dropouts declined over time through the 1990s while the proportion of inmates with a diploma increased. Using a national youth survey, by 1997, a larger proportion of state inmates were high school graduates (49 percent) than were dropouts (42 percent), which was not the case historically.³ Wolf-Harlow (2003) published findings from various years of a national survey of inmates. She reported that throughout the 1990s about 33 percent of state inmates had a high school diploma or higher level of education, with an additional 30 percent reporting a GED.

Pettit and Western (2004) found that among white male prisoners, about 11 percent are high school dropouts and for black male prisoners, it was between 31 and 59 percent, depending on the year and data source. Theirs is one of the very

² Most self-reported delinquency goes undetected by the police (Dunford & Elliott, 1984; Huizinga & Elliott, 1987; Thornberry & Krohn, 2002). Therefore, its correlation to incarceration is not expected to be very strong.

³ Among black males, however, 60 percent of prison inmates were high school dropouts and 30 percent were high school graduates (with no college).

few modern studies to show that dropping out of high school increases the odds of prison admission (but only for black males), and this main effect was seemingly driven by the prison boom that occurred in the 1990s. Another modern study was done by Lochner and Moretti (2004), who, using the same data set as Pettit and Western (NLSY), found that high school dropout increases the chance of imprisonment by less than one percentage point.

Given the scant, weak evidence on the impact of school dropout on prison admission, we cannot assume that the link between them is robust or even causal. The relationship depicted in much of the recent literature contains only descriptive evidence. The empirical question of whether dropping out of school is related to imprisonment is therefore largely unanswered, giving impetus to our study. While we do not examine school discipline, we believe our study falls under the general rubric of the School-To-Prison Pipeline (STPP). We thus examine some of this literature and its shortcomings before moving on to our empirical study. We narrow our literature review to the few studies that examine dropout as a predictor variable, with a special focus on Texas.

Zero Tolerance, STPP, and Race

For Skiba, Arredondo, and Williams (2014), STPP describes disciplinary policies and practices in public schools, which decrease the probability of school success for certain groups of disadvantaged youth. These practices in turn increase the probability of negative life outcomes, particularly involvement in the justice system. This construct disproportionately affects race-ethnic minority students, students with disabilities, and students with a history of poverty, abuse, and neglect. Generally, schools with greater proportions of minority students engage in more punitive disciplinary practices (Walsh & Payne, 2010). Lack of school services/resources, strict zero tolerance policies, and the use of disciplinary alternative schools are part of the STPP construct. Cross-cultural differences are also said to contribute to the problem, wherever teachers are white and middle class in areas where the majority of students are poor and non-white (Delpit, 1995; Rocque & Paternoster, 2011).

The stated intent of zero tolerance policies was to create a safe environment conducive learning environment, and to create a fair and equal chance of success for students across schools, using consistency in punishment (Fowler, 2007). These and other safe school initiatives that were enacted during the Clinton administration strayed from their original intent, and eventually came to embody the STPP. Disciplinary policies resulting in both mandatory and discretionary suspension or expulsion for delinquent students sent a message of “zero tolerance” (Skiba, 2008). However, teachers and school officials began using these policies on

a range of infractions including minor acts of misbehavior. To start, mandatory student dismissals only occurred in the high school setting, but soon grew in middle and elementary schools. Many removals extended to first time offenses, where, “most of these students posed little to no threat of harm to other students, their schools, or their community” (Mallett, 2015, p.1). In Texas, zero tolerance was borne of newly created Chapter 37 of the state education code, “Safe Schools” in 1995 (Texas Education Agency, 2017).

Lower academic achievement and alienation from school has been linked to delinquency (Welsh et al., 1999). While it is affected by various factors, dropout is clearly linked to suspension and expulsion, school disengagement, lost educational opportunity, negative school perception, low academic achievement, and being treated unfairly due to race or gender. Suh and Suh (2007) found that suspensions are a stronger predictor of dropout than either grade point average or socioeconomic status.

STPP & Dropout in Texas

In Texas, as in all other places studied in this literature, the relationship between school discipline and dropout is stronger for black versus white students. A study by the Texas Appleseed Foundation showed that black males are more likely to drop out of high school for disciplinary reasons than members of any other demographic group, and over half of all dropouts leave school before the 10th grade (Fowler, 2007). This is important because dropouts and those with disciplinary records are more likely to accrue juvenile records than students who graduate from high school (Sedlak & McPherson, 2010). In turn, juvenile justice system involvement is a strong predictor of adult incarceration down the road (Aizer & Doyle, 2015).

In Texas, 68 percent of black students receive a high-school diploma, compared to the average on-time graduation rate of 74 percent (Fowler, 2007). This is comparable to the national level of overrepresentation of minorities in school dropout, which Sweeten et al. (2009) note is a gross underestimation, due to varying local definitions of “dropout.” Hispanic students in Texas are not as adversely affected by disciplinary practices as are black students. Nonetheless, they are still subject to some level of disproportionality. In general, students of color are overrepresented in lower socioeconomic classes, thus race-ethnicity may proxy for the over-discipline of low-income students (Skiba et al., 2000).

The Shortcomings of STPP Research

Thus far, ‘school-to-prison pipeline’ research excludes the final portion of the pipeline from most, if not, all studies in this topic area. That is, most studies do not

actually use the “prison” outcome per se in the research. The STPP term almost always refers to only school discipline or juvenile justice involvement. While most state-level correctional facilities for youth are similar to adult prisons in their physical structure, they are more rehabilitative in nature and do not quite have the same immediate or future consequences as an adult prison sentence. To our knowledge, no STPP study to date has conducted research on the effect of high school dropout rates on adult prison admission rates.

A second shortcoming of the STPP literature is that many studies skip the dropout aspect completely (See Christle et al., 2005 for an exception in Kentucky). The effects of “expulsion” are prominent in this literature, but not dropout per se. While we may assume dropout is part of the inevitable chain of events effected by zero tolerance policies, at present, it is not so evident whether and how dropout is linked to justice system involvement for juveniles or adults. The lack of much recent work on STPP that examines the effect of school drop out on system involvement is a significant omission since it is a potentially critical event in a young person’s life that officially disconnects them from mainstream activities.

It is well documented that high school dropouts earn less pay over the life-course than high school graduates (Belfield & Levin, 2007; Muennig, 2005; Sweeten et al., 2009), but the link to adult incarceration is far less certain. Furthermore, while they are poorly measured, dropout rates in the U.S. are much higher than incarceration rates, leaving much room for variation on the life outcomes of dropouts, namely with justice system involvement. In 2005, almost one third of public school students in the U.S. did not receive their high school diplomas on time (Sweeten et al., 2009). Importantly, the reason for dropping out is thought to condition its impact on one’s trajectory. For example, dropouts who assume new conventional roles or identities, such as a parent or employee, are less likely to engage in crime compared to those who fail to take on a positive role post dropout (Fagan & Pabon, 1990; Farrington, 2003; Sweeten et al., 2009).

The factors associated with dropping out of school are demographic, performance-based and related to other self-identified psychosocial items (Burrus & Roberts, 2012; Fagan & Pabon, 1990). Students who dropout tend to come from low-income families, are mostly male, are disproportionately members of a racial or ethnic minority group, and tend to be older than the average student in their grade. Performance characteristics include poor attendance and poor grades. Psychosocial items include school disengagement, difficulty with tests, low parental priority for school, and finding classes “boring.” Risk factors can be found as early as first and second grades that reliably differentiated between those who eventually dropped out and those who stayed in school (Alexander et al., 2001;

Alexander et al., 1997). This suggests that school “push out” practices may not be as salient as social selection in drop-out and delinquency outcomes (Sweeten et al., 2009).

Incarceration Trends in Texas

According to the Sentencing Project, Texas’s incarceration rate, like that of the nation, skyrocketed between 1990 and 2000. In 1990, its prison population was about 50,000, but by 2000 it had risen to 158,000 where it remained steady for several years. In 2014, Texas’s black to white imprisonment ratio was 4:1 with the Latino to white ratio at 1.2:1 (State-by-State Data, n.d.). Pfaff (2017) has noted several reversals in the incarceration trend for the nation, specifically for the 18-29 age group. This was evident in Texas, where from 2003-2013 there was a 40 percent decrease in prison admissions for males 18-19 years old, and a 20 percent decrease for males age 20-24 (Tapia et al., 2014).

The Current Study

We analyze the relationship between drop-out rates by race and ethnicity for Texas counties and race-age specific incarceration rates for males by county. We examine whether high school dropout rates at point A are related to adult prison admission rates at point B for two cross-sectional periods. This straightforward approach is surprisingly unique in the STPP literature and therefore helps to evaluate the utility or versatility of the construct at a basic level. Finally, whereas most prior STPP studies exclude Hispanics due to a low number of cases, our Texas data contain enough to include them in the study, filling yet another gap in the literature. In 2010, whites made up 45.3 percent of Texas’ population, while Latinos comprised 37.6 percent, and Blacks comprised 11.8 percent (U.S. Census Bureau 2017).

Data

Independent Variables

The dropout data used in this project came from the Texas Education Agency (TEA). A dropout is defined as “a student who is enrolled in public school in Grades 7-12, does not return to public school the following fall, is not expelled, and does not: graduate, receive a General Educational Development (GED) certificate, continue school outside the public school system, begin college, or die” (TEA, n.d.). We used the dropout rate for grades 9-12 to capture the traditional point of dropout. To compute the race-specific dropout rate, the TEA takes the number of students who departed during a given school year by race/ethnicity and divides it by the number of students enrolled during that school year by race/ethnicity, multiplied by 100.

The first year the TEA had complete information on dropout by race available for all Texas counties was 2010. The data in prior years were incomplete, but still contained enough cases for analysis. The independent variables in this study are race-specific dropout rates for males from each Texas county. We examine the ability of each to predict prison admission rates for two age groups of males from the corresponding race groups in 2014 for Texas counties.

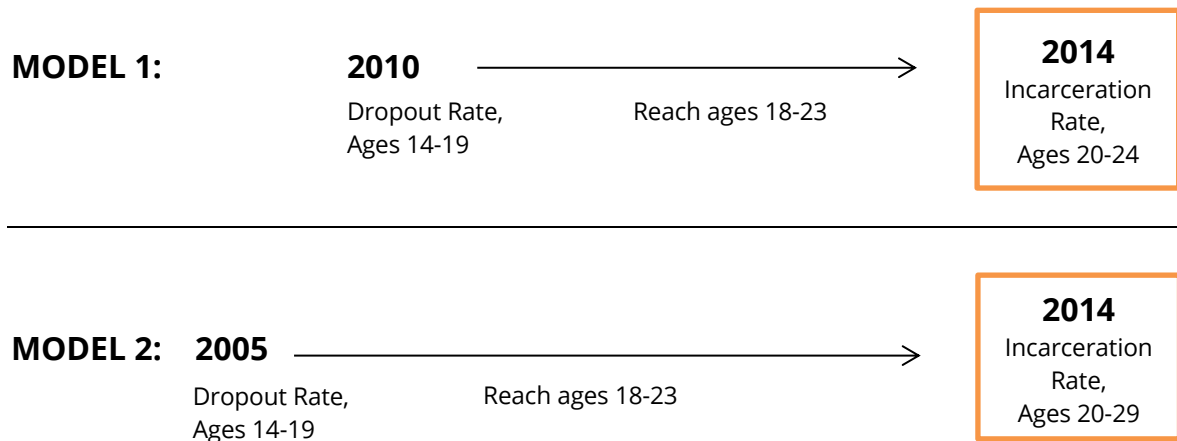
Model 1 contains a short lag period, correlating dropout rates in 2010 to incarceration rates in 2014. This focuses on a young cohort only four years after dropout rates are measured. While this may seem less than ideal, note that the 21-24 age group represents the largest group of males admitted to state prisons in Texas (Tapia et al., 2014), and our measure (shown in Figure 1 below) fully accounts for that age group.

To be sure, Model 2 uses dropout data from an earlier year (2005) for comparison to results from Model 1. This builds in a longer lag period to account for the possibility that the correlation of dropout rates to prison admission rates needs more time to develop. The effect of three race specific dropout rates on male incarceration in 2014 is again examined in Model 2, with age of prison admission (20–29) adjusted for the longer lag period (see Figure 1).

Dependent Variables

Prison admission data were obtained from the Texas Department of Criminal Justice. These were the number of males admitted to prison from each county by race and age in 2014. This customized dataset included the facility type [prison, state jail, or Substance Abuse Felony Punishment Facility (SAFP)], inmate age, county of conviction, and inmate's race. Twenty-two counties (8.6 percent of the state total) were missing incarceration data. We kept all three facility types in the analysis to encompass all incarcerated individuals.

The denominator used to compute incarceration rates came from 2014 census population estimates, which are race, age, and sex specific by counties. The standard five-year census age groups we used were 20-24 for Model 1, and 20-29 for Model 2. Age of prison admission was the numerator in the computation. Figure 1 shows how we attempted to provide the closest possible match between prison admission rate age groups and that of our two dropout cohorts.

Figure 1: Data Timeframes and Age Groups*

* Cross-sectional Incarceration data ages are the closest possible match to cross-sectional dropout data ages due to 5-year intervals for Census data (rate denominator).

When any number of persons from a small county population is sent to prison, it can (artificially) create a very high race-specific incarceration rate. These counties (all rural) thus become outliers for particular race groups (e.g. Collingsworth, Jackson, Leon, and Llano for the black population; Baily, Coleman, Collingsworth, and Sabine for Latinos). The high values for these counties represented big jumps in the frequency intervals for each dependent variable. These outliers were therefore deleted to de-skew the variables. A sensitivity analysis revealed no significant differences on other key variables due to their removal. There are six dependent variables total; one for each of three race groups across two models.

Control Variables

Control variables in the analysis are a series of ecological variables at the county-level for 2010 drawn from the U.S. Census Bureau. They include the percent of families in poverty, an urban county dummy variable, total population size, the percent single female headed households, and the male unemployment rate. The selection of these variables was informed by a similar study on the effect of school discipline on juvenile system involvement in Missouri counties (Nicholson-Crotty et al. 2009).

Analytical Approach

We first examine descriptive statistics for the variables used in our analysis, advancing to means comparisons for dropout and incarceration by race. We then

ran a series of race-specific OLS regressions, comparing significant results, the magnitude of associations, and r-squared fit across two models and three race groups.⁴ We also computed t-tests to gauge the difference of slopes in regression coefficients across race-specific equations, using two-tailed t-tests with a .05 significance level.

Results

Descriptives

Table 1 contains descriptive statistics for county-level aggregates on independent and dependent variables in OLS Model 1. It shows that the mean black and Hispanic male dropout rate is nearly identical in 2010, (1.95 and 1.94) although blacks have a higher dispersion of scores. The white dropout rate, at 1.09 is 44 percent lower than the black and Hispanic rate. Table 1 also shows that after missing data and the removal of incarceration rate outliers, about 80 percent (n = 197) of Texas' 254 counties remain in the analysis in Model 1, with slightly fewer cases for blacks (n = 189). The mean white incarceration rate (481.8) is about 65 percent lower than the mean black rate (1400.2), and about 35 percent lower than the Hispanic rate (728.5).

In Model 2, the (n) of cases for dropout variables is significantly smaller, especially for blacks, where the number of counties with dropout information is about half of the (n) for 2010. Of 254 counties, only 37 percent (n = 96) had valid data on black dropout. The white dropout rate in 2005 is 60 percent lower than the black rate and about 48 percent lower than the Hispanic rate. Mean incarceration rates for blacks are again, nearly two and three times that of Hispanics and whites, respectively.

The bottom of Table 1 contains the descriptive statistics for the control variables used in both models, taken from the most recent year of Census data available, 2010. These show the Mean proportion of families in poverty in Texas was 17.51, and that 36 percent of counties are urban. The Texas counties remaining in the analysis after missing data and outlier removal have a broad range in total population. Hall County has only 3,057 residents, with the largest (Harris County) having over 4 million people, yielding a Mean of about 126,000 residents per

⁴ Given the exploratory nature of this research, we opted to examine the effects of dropout on incarceration with separate regressions for each race group versus entering race groups into a single equation. In the latter, interpretation of regression coefficients are *relative* effects, with the omitted race group as the reference point. Instead, we opted to examine raw coefficients for each race group for cleaner comparisons.

county. The Mean percentage of single female headed households is 9.15 and the Mean male unemployment rate is 5.95.

Table 1: Descriptive Statistics

Model 1					
2010	N	Mean	Std. Dev.	Minimum	Maximum
White Dropout Rate	197	1.09	1.41	.00	15.40
Black Dropout Rate	189	1.95	2.57	.00	14.30
Hispanic Dropout Rate	197	1.94	1.53	.00	8.50
2014					
White Incarceration Rate Ages 20-24	197	481.8	394.73	.00	1780.65
Black Incarceration Rate Ages 20-24	197	1400.2	1785.49	.00	10,000.00
Hispanic Incarceration Rate Ages 20-24	197	728.5	692.96	.00	4000.26
Model 2					
2005					
White Dropout Rate	154	1.56	2.17	.10	20.00
Black Dropout Rate	96	3.98	8.52	.20	66.70
Hispanic Dropout Rate	164	2.51	2.12	.10	14.30
2014					
White Incarceration Rate, Ages 20-29	197	661.8	670.7	.00	4117.6
Black Incarceration Rate Ages 20-29	197	2392.2	3275.5	.00	20,000
Hispanic Incarceration Rate Ages 20-29	197	974.5	957.9	.00	5960.2
Control Variables, Both Models					
2010					
% of Families in Poverty	197	17.51	6.20	5.60	43.40
Urban County Dummy Variable	197	.36	.48	0	1
County Population	197	125,836	395,784	3057	4,092,459
% Single Female Headed Households	197	9.15	3.72	.33	37.7
Male Unemployment Rate	197	5.95	2.56	.00	16.60

* per 100 students ; ^ per 100,000 pop.

In Table 2, t-tests for difference of means show all of the differences among the race groups on independent and dependent variables are significant, except, of course for black and Hispanic dropout, which were virtually equal in 2010. From the STPP literature, we might have expected to see these differences in dropout and incarceration rates by race in Texas. As for whether strong associations between these variables will appear in the multivariate arena within race, it is important to recall a) the lack of literature showing that dropout has a strong effect on incarceration, b) that minorities experience cumulative disadvantage in many areas of youth development, perhaps muting the relationship between dropout

and incarceration rates, and finally c) there are no studies showing the delayed effect of dropout rates on incarceration rates, let alone in Texas.

Table 2: T-tests for Comparison of Means

	Model 1		Model 2	
	Dropout Rate Comparison t-value	Incarceration Rate Comparison t-value	Dropout Rate Comparison t-value	Incarceration Comparison t-value
Whites	-5.03*	-7.54*	-2.86*	-7.45*
Blacks				
Whites	-8.56 *	-3.74*	-4.00**	-4.74*
Hispanics				
Blacks	.20	6.22*	1.57	5.17*
Hispanics				
	*p ≤ .001	*p ≤ .001	* p ≤ .01, **p ≤ .001	*p ≤ .001

Bivariate Correlations

Bivariate correlation matrices for Models 1 and 2 are available upon request from the first author. They showed no significant relationships between the dropout rate and incarceration rate except among Blacks in Model 1 ($r = .15, p < .05$). Dropout was significantly and positively correlated with the percent of families in poverty except among Blacks in Model 1 and Hispanics in Model 2. In most cases dropout and incarceration rates were strongly and significantly correlated with each other across race and timeframe. Outside of this, one of the stronger correlations (not part of the formal analysis) was White dropout in 2005 with the percent of families in poverty in 2010 ($.48, p < .01$)

OLS Regression

Results for Whites

Table 3 contains OLS regression analyses Models 1 and 2 for Whites. Dropout has no significant effect on incarceration in either model. In Model 1, no variables significantly predicted dropout, while in Model 2, the percent of families in poverty was negatively associated with the white incarceration rate ($b = -.21, p \leq .05$), as was urban county ($b = -.20, p \leq .05$). The r-squared in the full Model 1 equation shows it accounts for only about five percent of the variation in incarceration whereas Model 2 accounts for about 10 percent. A longer lag thus appears to fit the data better for whites, but it is still rather low for the type of (ecological) measurements in this study. These findings of no dropout effect and poor model fit among whites

seem consistent with Pettit and Western’s (2004) descriptive finding that only 11 percent of white inmates at state prisons were high school dropouts.

Table 3: OLS Regression of White Incarceration Rates on White Dropout

	Model 1 2010 Dropout (n = 197)				Model 2 2005 Dropout (n = 154)			
	Dropout Only		Full Model		Dropout Only		Full Model	
	b	Beta (SE)	b	Beta (SE)	b	Beta (SE)	b	Beta (SE)
White Dropout Rate	-44.99	-.09 (33.89)	-.06	-28.85 (35.45)	-24.70	-.12 (14.60)	-.03	-5.79 (16.43)
% Families in Poverty 2010	—	—	-.14	-15.17 (9.13)	—	—	-.21*	-14.28 (7.04)
Urban County Dummy Variable	—	—	-.11	-157.88 (111.35)	—	—	-.20*	-158.39 (70.36)
County Population Size 2010	—	—	-.11	.00 (.00)	—	—	-.15	.00 (.00)
% Single Female Headed Households			-.00	-.43 (13.74)			.01	.73 (8.26)
Male Unemployment Rate			.03	6.81 (20.35)			.10	18.76 (15.19)
r-squared	.016		.047		.014		.102	

* p ≤ .05

Results for Blacks

Table 4 contains OLS Regression Models 1 and 2 for blacks. Dropout significantly increases incarceration in Model 1, but interestingly, the effect is reversed with a longer lag in Model 2 (not significant). No other variables in Models 1 or 2 predicted black incarceration. The final r-squared shows that Model 1 only accounts for about 5 percent of the variation in the black incarceration rate and about 8 percent in Model 2. By this measure, the general OLS model does slightly worse at predicting incarceration for blacks than it does for whites.

Table 4: OLS Regression of Black Incarceration Rates on Black Dropout

	Model 1 2010 Dropout (n = 189)				Model 2 2005 Dropout (n = 96)			
	Dropout Only		Full Model		Dropout Only		Full Model	
	b	Beta (SE)	b	Beta (SE)	b	Beta (SE)	b	Beta (SE)
Black Dropout Rate	179.8*	.14 (92.4)	.18*	214.99 (89.71)	-16.06	-.05 (21.51)	-.07	-11.34 (17.83)
% Families in Poverty 2010	—	—	-.11	-56.81 (45.37)	—	—	-.14	-33.04 (29.18)
Urban County Dummy Variable	—	—	-.08	-495.98 (518.08)	—	—	-.15	-415.44 (323.00)
County population size 2010	—	—	-.02	.00 (.00)	—	—	-.04	-9.36 (.00)
% Single Female Headed Households			-.06	-47.75 (63.60)			.11	36.96 (34.29)
Male Unemployment Rate			-.11	-150.35 (103.01)			-.08	-61.22 (91.91)
r-squared	.014		.053		.003		.082	

* $p \leq .05$

Results for Hispanics

Table 5 contains OLS Regression Models 1 and 2 for Hispanics. Similar to that of whites, dropout has no effect on incarceration for Hispanics in Model 1. Another similarity to whites' results was the effect of urban county, which significantly decreased the incarceration rate for Hispanics ($b = -.16$; $p < .05$), although for whites the effect was seen in the longer lag of Model 2. In Hispanics' Model 2, dropout significantly *decreases* the incarceration rate ($b = -.17$; $p < .05$), which is unique across the three race groups examined. Another unique finding is that the county's male unemployment rate also significantly *decreases* Hispanic incarceration in Model 2 ($b = -.28$, $p \leq .001$). Again, no different from that of whites and blacks, Model 1 accounts for five percent of the variance in incarceration rates among Hispanics. Model 2 accounted for 12.2 percent, the highest proportion of any model in the study. Thus, while the effect of dropout was counter to the expectation, the long lag model best fits the Hispanic data the best.

Table 5: OLS Regression of Hispanic Incarceration Rates on Hispanic Dropout

	Model 1 2010 Dropout (n = 197)				Model 2 2005 Dropout (n = 164)			
	Dropout Only		Full Model		Dropout Only		Full Model	
	b	Beta (SE)	b	Beta (SE)	b	Beta (SE)	b	Beta (SE)
Hispanic Dropout Rate	78.59	.12 (44.4)	.14	87.41 (47.14)	-40.0	-.11 (25.4)	-.17*	-47.75 (21.57)
% Families in Poverty 2010	—	—	-.10	-15.73 (13.04)	—	—	.10	9.22 (8.22)
Urban County Dummy Variable	—	—	- .16*	-320.41 (159.53)	—	—	-.16	-197.41 (104.33)
County population size 2010	—	—	-.02	-3.93 (.00)	—	—	.00	1.31 (.00)
% Single Female Headed Households			-.14	-35.36 (19.75)			.01	2.30 (12.78)
Male Unemployment Rate			-.02	-6.11 (28.71)			-.28**	-67.51 (20.16)
r-squared	.009		.051		.012		.122	

* p ≤ .05 **p≤.001

Comparison of Slopes

To execute a critical test of differing effects of variables across race groups, and to better organize the results, we compare the difference of slopes across regressions using a 2-tailed t-test. As might have been expected, none of the race group regression slope contrasts was significantly different.

Table 6: Comparison of Regression Slopes^a

	Model 1 (Short Lag)	Model 2 (Long Lag)
	t-value	t-value
White	.002	.002
Black		
White	.003	.005
Hispanic		
Black	.000	.004
Hispanic		

^a 2-tailed t-test

Alternate Modeling

Since the results of OLS were, on the whole, somewhat erratic and inconclusive with respect to the STPP framework, we sought alternative modeling to test the dropout-incarceration relationship with a series of logistic regression models (not shown).⁵ Using the same time lags seen in OLS, race-specific dependent variables in the logistic regressions were set relative to the national incarceration rate, and then relative to the Texas rate. For Models 1 and 2, incarceration rates were coded as either (1) above or (0) below the national incarceration rate and the Texas rate, yielding four separate models for comparison to OLS results.

Unfortunately, results for logistic models did not clarify much beyond what the OLS models did. Hispanic dropout increased the odds that county-level incarceration for would be higher than the national average in Model 1. However, the relationship reversed in Model 2. Only black dropout was significant in Model 1, relative to the Texas rate. In Model 2, no effects were observed for any of the race groups. Again, the longer lag was better at predicting incarceration, per r-squared, but they were generally within the same range as was obtained with OLS.⁶ Given that the race-sex specific dropout rate does not have any clearly detectable effects on the incarceration rate, more investigation of these issues is warranted.

Summary

We examined the relationship between dropout rates and imprisonment rates among white, black, and Hispanic males in Texas, in a modified test of the STPP construct. With OLS regression white dropout failed to predict white incarceration in either model. Black dropout significantly increased incarceration with a short lag, which is consistent with the literature and bivariate results, however the effect reversed in the longer lag, though not significantly. For Hispanics, the pattern of findings was similar to those of blacks but the negative effect of dropout on incarceration in Model 2 was statistically significant. By extending an analysis of the STPP construct to the logical end of the pipeline (adult prison admission), we had weak, mixed results across race models that mostly failed to extend findings from the STPP literature on juvenile outcomes to those of adults. This was in agreement with an older strand of literature which argued that delinquency declines for

⁵ Results available upon request from the first author.

⁶ Earlier versions of this paper experimented other sets of ecological variables but the r-squared was never much higher than the range in the current analysis.

individuals after the initial dropout point, possibly due to the wide variety of life trajectory outcomes experienced by a large group of American dropouts.

One of the curious findings was the negative effect of the urban dummy variable on the incarceration rate for whites and Hispanics, albeit in different timeframes. Perhaps this reflects resource availability and opportunities for those communities that are not as readily available to black communities, who tend to experience the worst levels of concentrated disadvantage in urban areas (Iceland & Hernandez, 2017). Finally, in terms of model fit across models and race groups, the data fit the long lag for Hispanics best, explaining 12.2 percent of the variation in incarceration. The second highest proportion of variance explained was found among whites in the long lag model. The data failed to explain much variance at all for blacks.

Limitations

Differences in results between the two models examined here, even within race groups, could be due to the different quality levels of the dropout data used. On one hand, the longer lag in Model 2 may be conceptually better because it allows youth enough time to reach the peak age for adult incarceration potential.⁷ However, the dropout data used for this model were missing quite a bit of information for black students, primarily. Given the meager jump in r-squared readings, from 5 percent in Model 1 to 8 percent in Model 2 however, this didn't seem to make much of a difference among blacks.

The four-year lag from dropout to incarceration in Model 1 does not seem ideal because a younger population (age 18-23), may not have had enough time to age into peak incarceration potential. Studies on sentencing outcomes find that criminal history is important to the "in or out of prison" decision (e.g. Bales & Piquero, 2012; Steffensmeir & Demuth, 2000). But what this short lag model may have lacked in conceptual adequacy, it made up for in the quality of the dropout data. Perhaps as a result, dropout only significantly increased incarceration rates in Model 1, and only for blacks.

A final modeling limitation is the high potential for bias in an OLS estimation. The lack of consistency in significance within and across race groups and low r-squared results may signal contamination from unobservable variables important to the relationships of interest. With no apparent correction that we might apply to address endogeneity as a potential source of bias, the results of this exploratory

⁷ For example, Tapia et al. (2014) showed that male prison admission in Texas are highest in the 20-29 age group in the state's largest cities.

research should be interpreted with caution. This is compounded by the fact that our ecological variables are rather blunt measures of complex, multilevel processes.

Discussion

While the School-to-Prison Pipeline seems to be a salient conceptual mechanism for the channeling of youth into the juvenile justice system, the current research context and design showed its implications for adult prison admission are not so clear. These could very well be design flaws, where a four-year lag between dropout and incarceration is not enough time to see an effect for all race groups. We attempted to compensate for this by including state-jail and felony substance abuse facilities within the Texas prison system, as both are known to hold a high proportion of younger offenders. Conceptually, a nine-year time lag is enough time to allow individuals to age into the peak incarceration years. But because the longer lag model had a significant amount of missing dropout data, it potentially masked or weakened the relationship between the independent and dependent variables.

Our study was designed with the work of Nicholson-Crotty et al. (2009) in mind. They examined STPP issues with Missouri counties as the unit of analysis as we have done for Texas. One of the main differences in the two designs was our use of adult incarceration data versus a more immediate outcome of juvenile court involvement used in their study. Also, our independent variable was dropout versus disciplinary action. They used the latter, which is the norm in the STPP literature.

Another possible reason for our findings may be what some scholars have noted about recent decreases in the imprisonment rate for individuals ages 18-29, both in Texas (Tapia et al., 2014) and in the nation (Pfaff, 2017). In Texas, males age 18-19 had the largest decrease in imprisonment rate between 2003 and 2013 at 40 percent. Males, ages 20-24 experienced a 20 percent decrease in their imprisonment rate over this timeframe. We utilized both of these age groups in our models and we examined a similar timeframe as noted above. While it makes for good sentencing policy, this slowing of referrals to prison (i.e. the use of non-prison alternatives) may have impacted our ability to empirically model the effects of dropout on incarceration.

Exclusionary zero-tolerance practices in public schools came into vogue in the 1990s and continued to increase for the better part of two decades thereafter. These practices have been shown to place an individual at risk of dropping out of

school. However, as a precocious transition in a young person's trajectory, assuming our study has some merit, it seems we must consider dropout separately from the school exclusionary practices depicted by a vast STPP literature. While our results are only a starting point in this area of research, we cannot fully characterize the dropout event as a critical or systematic step in the so-called "school-to-prison pipeline." In the multiple marginality framework that is thought to characterize the experiences of many young minority students in the U.S. perhaps dropout per se is not the proverbial "nail in the coffin" towards serious or chronic criminal involvement and imprisonment that many consider it to be. If other social forces like deviant propensity, the lack of parental supervision, the influence of delinquent peers, or exposure to high poverty environments have more of an impact on going to prison than does dropping out of school, our results should not be so surprising.

References

- Aizer, A. & Doyle, J. (2015). Juvenile Incarceration, Human Capital, and Future Crime. *Quarterly Journal of Economics*, 130(2), 759-803.
- Alexander, K.L., Entwisle, D.R., & Horsey, C.S. (1997). From First Grade Forward: Early Foundations of High School Dropout. *Sociology of Education*, 70, 87-107.
- Alexander, K.L., Entwisle, D.R., & Kabbani, N.S. (2001). The Dropout Process in Life Course Perspectives Early Risk Factors at Home and School. *Teachers College Record*, 5, 760-822.
- Bales, W.D. & Piquero, A.R. (2012). Racial/Ethnic Differentials in Sentencing to Incarceration. *Justice Quarterly*, 29(5), 742-773.
- Balfanz, R., & Legters, N. (2004). Locating the Dropout Crisis: Which High Schools Produce the Nation's Dropouts? Where Are They Located? Who Attends Them? (Rep. No. 70). Baltimore, MD: Center for Research on the Education of Students Placed at Risk.
- Belfield, C. & Levin, H. (2007). Economic Losses from High School Dropout in California. CA Dropout Research Project, UC Santa Barbara. Report #1, 1-70.
- Burrus, J. & Roberts, R.D. (2012). Dropping Out of High School: Prevalence, Risk Factors, and Remediation Strategies. Retrieved February 12, 2017 from: https://www.ets.org/Media/Research/pdf/RD_Connections18.pdf.
- Carson, E.A. (2015). Prisoners in 2014 (Rep.). Retrieved February 17, 2017 from: <https://www.bjs.gov/content/pub/pdf/p14.pdf>.
- Christle, C.A., Jolivet, K., & Nelson, C.M. (2005). Breaking the school to prison

pipeline: Identifying school risk and protective factors for youth delinquency. *Exceptionality*, 13(2), 69–88.

Delpit, L. (1995). *Other People's Children: Cultural Conflict in the Classroom*. New York: The New Press.

Dexter, A., Lavigne, A., & de la Garza, T. O. (2009). Communicating Care Across Culture and Language: The Student-Teacher Relationship." *Humanity and Society* 40(2): 155-179.

Dunford F. & Elliott, D. (1984). Identifying Career Offenders using Self Reported Data. *Journal of Research in Crime and Delinquency*, 21, 57 – 86.

Elliott, D.S., & Voss, H.L. (1974). *Delinquency and dropout*. Lexington, MA.

Fagan, J., Piper, E., & Moore, M. (1986). Violent Delinquents and Urban Youth. *Criminology*, 24, 439-466.

Fagan, J. & Pabon, E. (1990). Contributions of Delinquency and Substance Use to School Dropout. *Youth and Society*, 21(3), 306-354.

Farrington, D. (2003). Developmental and Life-Course Criminology: Key Theoretical and Empirical Issues. The 2002 Sutherland Award Address. *Criminology*, 41(2), 221-257.

Fowler, D.F. (2007). Texas' School to Prison Pipeline --Dropout to Incarceration: The Impact of School Discipline and Zero Tolerance. Retrieved October 2, 2015 from: <https://www.texasappleseed.org/sites/default/files/01-STPPReport2007.pdf>.

Garrett, T., Barr, J., & Rothman, T. 2009. "Perspectives on Caring in the Classroom". *Adolescence*, 44(175), 505-522.

Greene, W.H. 2007. *Econometric Analysis*, 6th ed. Englewood Cliffs, NJ: Prentice-Hall.

Greenwood, C.R., Horton, B.T., & Utle, C.A. (2002). Academic engagement: Current perspectives on research and practice. *School Psychology Review*, 31, 328–349.

Harlow, C. (2003). Education and Correctional Populations (Rep.). Washington, D.C.: Bureau of Justice Statistics Special Report.

Huizinga, D. & Elliott, D.S. (1987). Juvenile Offenders: Prevalence, offender incidence, and arrest rates by race. *Crime and Delinquency*, 33, 206-223.

Humphreys, K. (2016). Mass Incarceration is Disappearing Among Young Adults. Retrieved February 15, 2017 from: <http://www.samefacts.com/2016/10/crime-incarceration/mass-incarceration-is-disappearing-among-young-adults/>.

Iceland, J. & Hernandez, E. (2017). Understanding Trends in Concentrated Poverty: 1980–2014. *Social Science Research*, 62, 75-95.

- Krezmien, M.P., Leone, P.E., & Achilles, G.M. (2006). Suspension, race, and disability: Analysis of statewide practices and reporting. *Journal of Emotional and Behavioral Disorders, 14*, 217–226.
- Lochner, L. (1999). Education, Work, and Crime. Working Paper #465, Rochester Center for Economic Research.
- Lochner, L & Moretti, E. (2004). The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports. *American Economic Review, 94*(1), 155-189.
- Mallett, C.A. (2015). *The school-to-prison pipeline: A comprehensive assessment*. New York, NY: Springer Publishing Company.
- Maryland Taskforce on Highschool Dropouts in the Criminal Justice System. (2012). School Dropouts and Their Impact on the Criminal Justice System. Dec. 1-30.
- Muennig, P. (2005). The economic value and health gains associated with educational interventions. Paper presented at the Equity Symposium at Columbia Teacher's College, September. 1-30.
- Mukherjee, S.K. (1971). A typological study of school status and delinquency (Unpublished doctoral dissertation). University of Pennsylvania.
- Nicholson-Crotty, S., Birchmeier, Z., & Valentine, D. (2009). Exploring the impact of school discipline on racial disproportion in the juvenile justice system. *Social Science Quarterly, 90*(4), 1003–1018.
- Pfaff, J. (2017). *Locked In: The True Causes of Mass Incarceration*. New York: Basic Books.
- Pettit, B. & Western, B. (2004). Mass Imprisonment and the Life-Course: Race and Class Inequality in U.S. Incarceration. *American Sociological Review, 69*, 151-169.
- Rocque, M. & Paternoster, R. (2011). Understanding the Antecedents of the School-to-Jail Link: Race and School Discipline. *Journal of Criminal Law and Criminology, 101*(2), 633-655.
- Sedlak, A.J. & McPherson, K. (2010). *Survey of youth in residential placement: Youth's needs and services*. SYRP Report. Rockville, MD: Westat.
- Skiba, R.J., Arredondo, M.I., & Williams, N.T. (2014). More Than a Metaphor: The Contribution of Exclusionary Discipline to a School-to-Prison Pipeline. *Equity & Excellence in Education, 47*(4), 546-564. DOI: 10.1080/10665684.2014.958965.
- Skiba, R.J. (2008). Are zero tolerance policies effective in the schools?: An evidentiary review and recommendations. *American Psychologist, 63*(9), 852-862.

- Skiba, R.J., Michael, R.S., Nardo, A.C., & Peterson, R.L. (2000). The Color of Discipline: Sources of Racial and Gender Disproportionality in School Punishment. *The Urban Review*, 34(4), 317-342. Retrieved April 23, 2016.
- Skiba, R.J., Reynolds, C.R., Graham, S., Sheras, P., Conoley, J.C., & Garcia-Vasquez, E. (2006). Are zero tolerance policies effective in the schools? An evidentiary review and recommendations. Washington, DC: American Psychological Association Zero Tolerance Task Force.
- State-by-State Data. (n.d.). Retrieved February 19, 2017 from: <http://www.sentencingproject.org/the-facts/#map>.
- Stearns, E. & Glennie, E. (2006). When and Why Dropouts Leave High School. *Youth & Society*, 38(1), 29-57.
- Steffensmeier, D. & Demuth, S. (2000). Ethnicity and Sentencing Outcomes in U.S. Federal Courts: Who is Punished More Harshly?" *American Sociological Review*, 65(5), 705-729.
- Suh, S. & Suh, J. (2007). Risk factors and levels of risk for high school dropouts. *Professional School Counseling*, 10(3), 297-306.
- Sweeten, G., Bushway, S.D., & Paternoster, R. (2009). Does Dropping Out of School Mean Dropping Into Delinquency? *Criminology*, 47(1), 47-91.
- Tapia, M., Sparks, C., & J. Miller, M. (2014). Texas Latino Prison Gangs: An Exploration of Generational Shift and Rebellion. *The Prison Journal*, 94(2): 159 - 179.
- Texas Education Agency, Austin, TX. (2015). Secondary School Completion and Dropouts in Texas Public Schools [Abstract]. 1-157. Retrieved February 17, 2017: from http://tea.texas.gov/acctres/DropComp_2013-14.pdf.
- Texas Education Agency. (n.d.). Glossary of Terms, 2014-15: Division of Research and Analysis. Retrieved January 3, 2017 from: <https://rptsvr1.tea.texas.gov/acctres/gloss1415.html#eth>.
- Texas Education Agency (2018). Chapter 37-Safe Schools (Chapter 37-Safe Schools). Retrieved March 1, 2017 from: http://tea.texas.gov/Texas_Schools/Safe_and_Healthy_Schools/Chapter_37_-_Safe_Schools/.
- Texas' School to Prison Pipeline – Dropout to Incarceration: The Impact of School Discipline and Zero Tolerance. (2007). Retrieved October 2, 2015 from: <https://www.texasappleseed.org/sites/default/files/01-STPPReport2007.pdf>.

- Thornberry T.P. & Krohn, M.D. (2002). Comparison of self-report and official data for measuring crime. In: Pepper JV, Petrie CV, eds. *Measurement Problems in Criminal Justice Research: Workshop Summary*. Washington, DC: National Academies Press; 2002: 43-94.
- Thornberry, T.P., Moore, M., & Christenson, R.L. (1985). The Effect of Dropping Out of High School on Subsequent Criminal Behavior*. *Criminology*, 23(1), 3-18.
- Toldson, I.A. (2011). *Breaking barriers 2: Plotting the path away from juvenile detention and toward academic success for school-age African American males*. Washington, DC: Congressional Black Caucus Foundation, Inc., Center for Policy Analysis and Research. Retrieved from:
<http://www.cbcbfinc.org/oUploadedFiles/BreakingBarriers2.pdf>.
- U.S. Census Bureau. (2017). Code Lists, Definitions, and Accuracy: American Community. Survey and Puerto Rico Community Survey 2014 Subject Definitions. Retrieved March 23, 2017 from: <https://www.census.gov/programs-surveys/acs/technical-documentation/code-lists.2014.html>.
- U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), Public School Teacher, BIE School Teacher, and Private School Teacher Data Files, (2007–08).
- Welch, K. & Payne, A. (2010). Racial Threat and Punitive School discipline. *Social Problems*, 57(1), 25-48.
- Welsh, W.N., Greene, J.R., & Jenkins, P.H. (1999). School Disorder: The Influence of Individual, Institutional, and Community Factors. *Criminology*, 37(1), 73-116. doi:10.1111/j.1745-9125.1999.tb00480.x.
- Wolf-Harlow, C. (2003). *Education and Correctional Populations*. Bureau of Justice Statistics Special Report, NCJ #195670. 1-12.

About the Authors

Mike Tapia is an assistant professor of Criminal Justice at Texas A&M University at Commerce. He has published a number of studies in Juvenile Justice & Delinquency, Gangs, and Race-Ethnicity. He has recently authored *Gangs of the El Paso-Juarez Borderland* (2020 University of New Mexico Press) and *The Barrio Gangs of San Antonio* (2017 Texas Christian University Press). E-mail: miketapia55@yahoo.com

Deborah Blalock grew up in California and holds a master's degree in Criminal Justice from New Mexico State University. She is now employed as a field agent with the U.S. Customs and Border Patrol (CBP) agency in New Mexico.

Joanne Choi obtained a Ph.D. in Sociology from the University of Arizona and is a faculty member in the Department of Criminal Justice at New Mexico State University. Her research interests include Women & Crime and testing criminological theories.

Erika Ochoa grew up in Chihuahua, Mexico and holds a master's degree in Criminal Justice from New Mexico State University. She is now employed in the private sector in the oil industry in Midland, Texas.