Prior Record Score, Disparate Impact, & Recidivism in Pennsylvania

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1   Terminology

1. **Recidivism:** Reconviction for any crime committed within three years of a previous criminal conviction. This is the broadest definition of "recidivism" employed throughout this report. For certain analyses, the definition of recidivism may change slightly; see "crime-specific recidivism" below.

2. **Crime-Specific Recidivism:** For the purposes of the report, we define crime-specific recidivism more narrowly than the previously provided definition of recidivism. Two definitions apply here:

   (a) An initial conviction for a **specific** type of offense (violent crime, sex crime, firearms crime, DUI, drug crime, or felony) followed by a subsequent conviction for **any** crime. For example: an initial conviction for a violent crime followed by a subsequent conviction for any crime type.

   (b) An initial conviction for a **specific** type of offense followed by a subsequent conviction for the **same** type of offense. For example: an initial conviction for a violent crime followed by a subsequent conviction for another violent crime.

3. **Recidivistic Case:** A recidivistic case refers to the conviction of an individual who later recidivated within three years. All analyses in this report are conducted at the recidivistic case level. Thus, the recidivism rate can be interpreted as: in what proportion of convictions in a year or a range of years is the individual subsequently re-convicted for a crime committed within three years?

4. **Recidivistic Event:** A recidivistic event refers to the subsequent conviction for a crime committed within three years of a previous criminal conviction. For example, if an offender committed a firearms offense followed by a burglary within three years, the firearms offense would be the recidivistic case, while the burglary would be the recidivistic event.

5. **PRS:** Prior Record Score. This is a score that comprises one of the axes of the sentencing grid and is calculated based on the number and nature of prior criminal convictions and juvenile adjudications. The categories that make up this score differ based on the version of Sentencing Guidelines being referenced:

   (a) **In the 7th Edition:** PRS includes numerical scores from 0 to 5 and two special categories for repeat serious offenders (REVOC and RFEL; definitions below).

   (b) **In the 8th Edition:** PRS categories are denoted by four categories - 0, Low, Medium, and High.

6. **OGS:** Offense Gravity Score. This is a score that comprises one of the axes of the sentencing grid and represents the seriousness of the current crime, with higher numbers representing more serious crimes. The Offense Gravity Score ranges from 1 to 15.

7. **Charge/Offense:** These terms are used interchangeably and refer to a criminal act associated with a particular individual. More formally, a charge refers to a formal assertion by a government authority that an individual has committed a crime.

8. **Incapacitation:** Refers to the state in which an individual is unable to commit a criminal offense against the general public due to their serving an incarceration sentence.

9. **At-Risk Date:** The date at which an individual is considered able to commit another criminal offense. For instance, if an individual is incarcerated following a conviction, they are incapacitated from recidivating until they are released. At-risk date refers to the first date for which they are at risk of recidivism following incarceration, if applicable.

10. **Sentencing Grid:** A matrix of containing the prior record score (PRS) on one axis and the offense gravity score (OGS) on another axis. The intersection of an individual's prior record score and offense gravity score on this matrix determines the sentencing guidance that a presiding judge should use to make a sentencing decision.

11. **REVOC:** Repeat Violent Offender PRS Category. This is a special category for offenders who have at least two previous convictions or adjudications for four-point offenses and whose current conviction corresponds to an OGS of 9 or higher.

12. **RFEL:** Repeat Felony 1 and Felony 2 Offender PRS Category. This is a special category for offenders who have six or more points towards convictions or adjudications for Felony 1 or Felony 2 offenses, and who do not fall within REVOC. In the dataset, RFEL cases account for less than 0.02% of the total cases in the dataset so, for the purposes of this analysis, are combined with REVOC cases into the same category.

13. **Crimes of Violence:** In this analysis, crimes of violence were defined based on definitions outlined in the Pennsylvania Consolidated Statutes Title 42 Section 9714 (g)[1]. This definition includes–but is not limited to–murder of the third degree, voluntary manslaughter, aggravated assault, use of weapons of mass destruction, terrorism, trafficking of persons at the felony level, rape, and kidnapping. Note the data analyzed do not include individuals convicted of 1st and 2nd degree murder who serve mandatory life sentences.

14. **Sex Crimes:** Sex crimes are defined based on the Adam Walsh Child Protection and Safety Act.[2] Sex offenders are organized into three tiers according to the crime committed:

    (a) Tier III: The most serious classification, this tier includes offenses that are comparable or more severe than: aggravated sextual abuse, abusive sxtual act against a minor under 13, or involves kidnapping a minor. Adult offenders must register for life.

    (b) Tier II: This tier includes crimes that are comparable or more severe than: sex trafficking, coercion and enticement, transportation with intent to engage in criminal sexual activity, or abusive sexual contact. Adult offenders must register for 25 years.

    (c) Tier I: Tier 1 includes sex crimes not included in the other tiers. Adult offenders must register for 15 years, or 10 years with a clean record.

15. **Firearms Offenses:** Firearms offenses are defined in the Pennsylvania Uniform Firearms Act, Title 18 Chapter 61. These include–but are not limited to–crimes committed with firearms, unlicensed carrying, and illegal transportation/sale/manufacturing of firearms.[3]

16. **Felonies:** Felonies are crimes of high seriousness punishable by a term of imprisonment of one year or more. In Pennsylvania, a conviction of a felony in the third degree included offenses such as bribery, possession of child pornography, possession with intent to distribute, and certain gun crimes. Second degree felonies include crimes such as sexual assault, involuntary manslaughter of a victim under 12, and aggravated assault. Third degree felonies include crimes such as murder, aggravated assault with a deadly weapon, kidnapping, and rape.[4] This project defines felonies as any crime with an Offense Gravity Score of five or higher.

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[1] *Judiciary And Judicial Procedure - Title 42*. n.d. Vol. 9714. https://www.legis.state.pa.us/WU01/LI/LI/CT/HTM/42/00.097.014.000..HTM.
[2] Adam Walsh Act. n.d. Washington: One Hundred Ninth Congress of the United States of America. https://www.justice.gov/archive/olp/pdf/adam_walsh_act.pdf
[3] *Consolidated Statutes - Title 18*. Pennsylvania General Assembly. https://www.legis.state.pa.us/cfdocs/legis/LI/consCheck.cfm?txtType=HTM&ttl=18&div=0&chpt=61.
[4] "Pennsylvania Crime Classification". 2022. David J. Cohen Law Firm. Accessed May 4. https://www.davidcohenlawfirm.com/pennsylvania-crime-classification.

2   Executive Summary

Equitable, consistent, and fair sentencing practices are crucial to ensuring that the criminal justice system works for all people. With this goal in mind, the Pennsylvania Commission on Sentencing (PCS) designs and maintains the Sentencing Guidelines for criminal convictions in the Commonwealth of Pennsylvania. These Sentencing Guidelines are applied to criminal cases using a sentencing grid, with an offender's prior criminal history on one axis (Prior Record Score (PRS)) and the severity of the current offense (Offense Gravity Score (OGS)) on the other. The various PRS-OGS combinations correspond to different sentence types and, if applicable, incarceration sentence lengths. The Sentencing Guidelines rest on the principle that offenders with longer criminal histories and offenders who have committed more serious offenses are deserving of harsher punishments. Additionally, offenders with longer prior records may be more prone to recidivism, thereby causing further public harm. The sentencing guidelines aim to ensure that sentencing decisions are consistent with these two dimensions (offense gravity and prior criminal history) of each criminal case, while also safeguarding uniform sentencing decisions across all cases.

Pennsylvania is currently operating under the 7th edition Sentencing Guidelines, but PCS is in the process of redesigning the guidelines for the 8th edition. Most notably, the proposed 8th edition guidelines significantly revise the way that an offender's Prior Record Score is calculated. In the 7th edition Sentencing Guidelines, PRS categories range from 0 to 5, with additional special categories for Repeat Violent Offender (REVOC) and Repeat Felony 1 and Felony 2 (RFEL). The 8th edition PRS categories currently under development consolidate PRS categories into four total categories: 0, Low, Medium, and High. Additionally, instead of focusing on the number and severity of an offender's prior convictions, the 8th edition PRS categories shift the focus mainly to the severity of an offender's prior criminal history, with a much-reduced focus on the number of prior convictions. Another key difference is that the 8th edition guidelines' "0" category includes only individuals who have no prior criminal history, while the 7th edition's "0" category includes both individuals with no criminal history as well as individuals with one misdemeanor offense.

As noted, Prior Record Score is included as part of the sentencing grid under the untested presumption that those with more extensive criminal histories are also more likely to commit a criminal offense in the future. Furthermore, despite the sentencing guidelines being developed to promote more uniformity and consistency in sentencing outcomes, it is unclear whether this uniformity of sentencing decisions occurs in practice. Our team at Carnegie Mellon University's Heinz College of Public Policy and Information Systems was commissioned by the Pennsylvania Commission on Sentencing to conduct a systematic review of sentencing outcomes in Pennsylvania, and to answer the following two questions:

1. Are the current PRS score categories indicative of likelihood to recidivate?

2. Accounting for recidivism risk, are Black offenders disproportionately receiving more severe sentences than their White counterparts?

In answer to the above questions, our team used data provided by PCS that includes all criminal offenses charged and convicted between January 1, 2001 and December 31, 2019. The team used these data to create a longitudinal mapping of each offender's criminal history. The final dataset had 1,216,238 observations organized at the individual—date of sentencing level, which corresponded to 785,952 unique individuals. Offenders are predominantly male (77%), White (67%), and over 25 (75%). As shown below in Figure 1, the majority of offenders also had low PRS scores, with 53% and 44% in category 0 in the 7th and 8th editions, respectively.
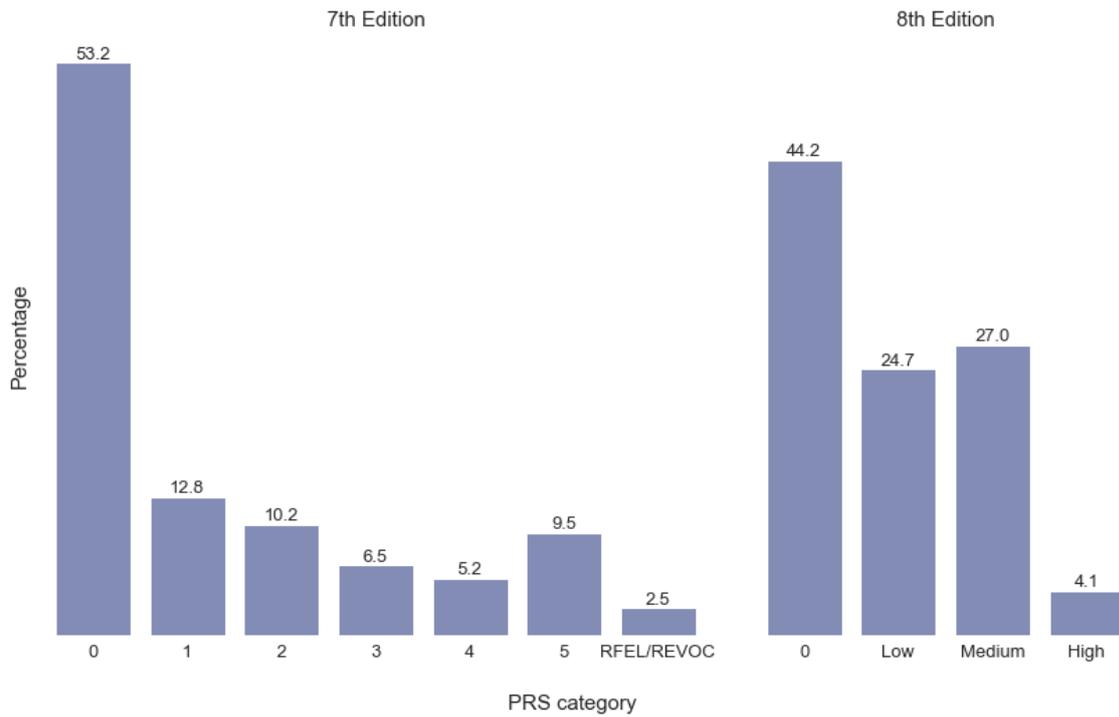
Figure 1: PRS Distribution

Overall, as can be seen in Figure 2, the 8th edition PRS categories are stronger predictors of recidivism risk than the 7th edition PRS categories. Specifically, for the 8th edition, there is a positive correlation between recidivism rates and adjacent PRS categories from 0 to Medium, with a practically meaningful change in recidivism rates between categories. In the 7th edition, there is only a meaningful increase in recidivism rates between categories 0 and 1. From category 2 onward, recidivism rates plateau. Note that in both editions, the highest category (RFEL/REVOC and High) showed a decline in recidivism rates. The average recidivism rate across all categories is 18.8%.
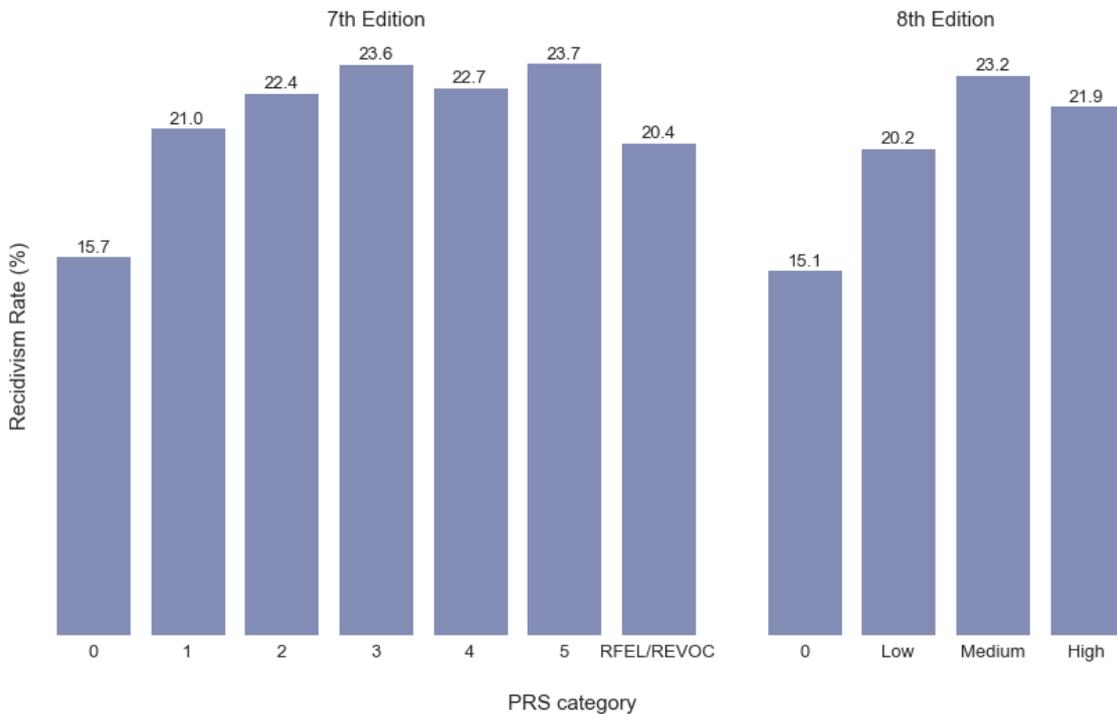
Figure 2: Recidivism Rates by PRS

The 8th edition PRS, for various demographic characteristics including race, sex, and age, are also more predictive of recidivism than the 7th edition, across categories 0 through Medium. This applies to recidivism for males and females, for adults over 25, and for White offenders. However, for Black offenders, recidivism rates across categories Low and Medium do not show a meaningful increase. Note that outcomes for this racial subgroup may be confounded by multiple other factors such as age, or differences in the likelihood of arrest. Lastly, age is found to be a strong predictor of recidivism, with young adult offenders (18-24) being more likely than adults over 25 to recidivate, regardless of their current PRS category. However, neither PRS editions are predictive of recidivism rates for young adult offenders.

Using PRS as a sentencing device for protecting public safety is particularly salient in policy deliberations concerning violent, sex, and firearms crimes. Within the provided dataset, the majority of offenders convicted for each of these three offense types have little or no prior criminal history for any type of crime. 55%, 78%, and 47% of individuals convicted of violent, sex, and firearms convictions, respectively, have a PRS of 0 in the 7th edition. In the 8th edition, 50%, 70%, and 43% of violent, sex, and firearms convictions have a PRS of 0, respectively.

An analysis of recidivism for these three crime types (e.g., a violent convict recidivating to any subsequent crime, or a violent convict recidivating to another violent crime) shows that overall recidivism rates (i.e., recidivating to any crime) are lower than average for all three crime categories–at 11.4% for violent crimes, 10.3% for sex crimes, and 17.5% for firearms offenses. For recidivism to the same crime type (e.g., violent crime recidivating to violent crime), all three categories have a recidivism rate below 3%. This suggests that repeat violent, sex, or firearms offenders are less of a threat to public safety than first-time offenders in each crime category.

As stated, a key goal of sentencing guidelines is to ensure equitable sentencing outcomes for all offenders. However, there may be both structural and non-structural issues underlying the criminal justice system that result in disparate impact across minority groups. A comparison of Black and White offenders, based on the 7th edition PRS categories for which they are sentenced, shows that Black offenders tend to have higher PRS despite being younger on average than White offenders and therefore having less time to accumulate convictions. After controlling for PRS, Black offenders are shown to be more likely to receive an incarceration sentence. The average sentence length given to Black offenders is also longer across each PRS category; it is almost twice as long as the average sentence length given to their White counterparts across categories

0 through 3 in the 7th edition. This issue is particularly acute for young, Black males, whose average sentence lengths are longer than that for both young White males, and for older Black males. After controlling for both PRS and OGS, disparate outcomes still persist, especially across the lower range of PRS and OGS categories where the majority of cases fall. Because the 8th edition Sentencing Guidelines have not yet been implemented, analysis of differences in sentencing lengths for this version of the Sentencing Guidelines is not included in this report.

Based on the findings above, our team makes the following recommendations:

1. Conduct additional research into why Black offenders tend to be in higher PRS categories in order to understand some of the systematic, structural, and societal factors that lead to this difference in distribution.

2. Develop real-time monitoring metrics to ensure that Sentencing Guidelines are being equally applied across different demographic categories and mitigate some non-structural factors causing this disparate impact.

3. Incorporate offender age when determining recidivism risk and reduce the penalty on older offenders via lapsing provisions, which can improve the PRS's predictive power of recidivism.

The results of our team's analysis show that there is some room for improvement in the way that the PRS categories have been developed. By implementing our recommendations above, we hope that the Pennsylvania Commission on Sentencing will be able to continue to ensure that sentencing decisions are more equitable and just for all individuals who interact with the criminal justice system in Pennsylvania.

3 Introduction

The Pennsylvania Commission on Sentencing (PCS) designs and maintains the Sentencing Guidelines for criminal convictions in the Commonwealth of Pennsylvania. The guidelines provide a common framework for judges to follow during the sentencing phase of a criminal conviction in order to promote fair and uniform sentencing outcomes. The guidelines include recommendations for sentence type (e.g., restorative sanctions, county jail, state prison) and, if applicable, sentence duration. Generally, a more serious offense or an offender with a more extensive criminal history will have more severe recommended sentences.

Pennsylvania currently operates under the 7th edition of the Sentencing Guidelines, implemented on December 28, 2012, with some minor updates over time. Two factors determine which guidelines apply to each criminal case: the *Prior Record Score* (PRS) of the offender, and the *Offense Gravity Score* (OGS) of the current offense. Under current guidelines, the Prior Record Score for an offender includes six numeric categories (0-5) and two special eligibility categories: RFEL (Repeat Felony 1 and Felony 2 Offender) and RE-VOC (Repeat Violent Offender). Similarly, offenses are categorized into 15 numeric Offense Gravity Scores (1-15) based on the severity of the crime, with crimes like petty theft corresponding to OGS category 1 and felonies like first-degree murder corresponding to category 15.[5] The sentencing guidelines are arranged in a grid format, with each cell of the matrix corresponding to each OGS-PRS combination.

A key reason for incorporating prior criminal histories into sentencing determinations is to prevent future recidivism, which draws from the utilitarian theory of risk-prevention and public safety in criminal sentencing. However, the current Prior Record Score (PRS) system was not designed through an empirical analysis of recidivism risk; it was determined through professional judgment and policy discussions. Moreover, due to the limited discretion provided to the judiciary within the guidelines, sentencing outcomes in jurisdictions with sentencing guidelines have a much more rigid reliance on the offender's prior criminal history compared to jurisdictions without sentencing guidelines.[6] It is therefore important to test the assumptions underlying this framework by analyzing whether PRS categories predict different levels of recidivism risk. Specifically, is recidivism an increasing function of PRS? Additionally, despite the guidelines' intended objective of standardized sentencing outcomes, PCS is acutely aware of potential disparate impact that PRS may have on criminal sentencing. To better understand these issues and inform future iterations of the Sentencing Guidelines, PCS tasked the capstone team at Carnegie Mellon University, Heinz College of Information Systems and Public Policy with a data-driven evaluation of the Prior Record Score system. This report reflects the conclusion of the project and presents the final analyses, results, and recommendations.

3.1 Project Context

Sentencing guidelines were introduced to the US criminal justice system in the 1970s with the goal of minimizing discretion at all levels of the criminal justice system. Prior to this, all US states had a system of *indeterminate* sentencing, which only established maximum sentences across each judicial system, with the maximums typically set extremely high. This system mainly left the sentence determination to the complete discretion of the judiciary and parole boards, resulting in similar offenses often receiving distinctly different sentencing lengths. Sentencing guidelines were intended to combat this issue through *determinate* sentencing— they introduce the idea of fixed sentence lengths, with very limited discretion allowed during the sentencing process.[7]

Since their introduction into the U.S. judicial system, sentencing guidelines have been established in seventeen states (including the District of Columbia) and in the federal judicial system.[8] Most guidelines incorporate two factors in a grid-like system: determinants of the offender's criminal profile (prior record), and the severity of the offense committed (offense gravity). Although more discretion is allowed when recommending sentences for atypical ("departure") cases, the vast majority of typical cases receive sentencing based

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[5] "204 Pa. Code § 303.15. Offense Listing.". 2022. PA Code And Bulletin. Accessed May 4. https://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/204/chapter303/s303.15.html&d=reduce.

[6] Frase, Richard S., Julian V. Roberts, Rhys Hester, and Kelly Lyn Mitchell. 2015. Criminal History Enhancements Sourcebook. Ebook. 2nd ed. Robina Institute of Criminal Law and Criminal Justice. https://sentencing.umn.edu/sites/sentencing.umn.edu/files/criminal_history_enhancement_web2_0.pdf.

[7] Frase, Richard S., and Kelly Lyn Mitchell. 2018. "What Are Sentencing Guidelines?". Sentencing Guidelines Resource Center. https://sentencing.umn.edu/content/what-are-sentencing-guidelines.

[8] Frase, Richard S., Julian V. Roberts, Rhys Hester, and Kelly Lyn Mitchell. 2015. Criminal History Enhancements Sourcebook. Ebook. 2nd ed. Robina Institute of Criminal Law and Criminal Justice. https://sentencing.umn.edu/sites/sentencing.umn.edu/files/criminal_history_enhancement_web2_0.pdf.

on this matrix, creating a uniform and consistent reliance on prior criminal record information during sentencing. As a result, prior record information has a stronger and more centralized role in criminal sentencing in jurisdictions with guidelines than those without.[9]

The usage of prior criminal records to determine sentence severity has several theoretical underpinnings. First, the retributive theory in criminal justice purports that punishments ought to be proportionate to the offense committed.[10] Some retributive theorists see repeat offenders as being more culpable, and therefore deserving of more severe punishment.[11] In contrast, utilitarian theory values the public good. Utilitarian theorists view the principal objective of legal punishment as promoting public safety and crime prevention through deterrence, incapacitation, and rehabilitation.[12] According to this perspective, previous convictions may indicate higher risk of future reoffense. Repeat offenders therefore deserve more severe punishments–both to incapacitate the current offender, and to deter future offenses by current or other offenders.

These two theories are not mutually exclusive; a repeat offender can be viewed both as more culpable and more dangerous to society. However, there are ongoing questions about the validity of assumptions underlying each. Concerning the retributive perspective, the normative issues underlying a determination of how much additional punishment should be imposed to reflect the higher culpability of an offender are complex.[13] Regarding the presupposed link between punishment and deterrence in utilitarianism, some research shows that the certainty of apprehension actually has a stronger effect on crime deterrence than the severity of punishment.[14] There is also the concern of desensitization to incarceration that might reduce the intended impact of more severe punishment on the offender.[15] Lastly, the majority of existing prior record score systems are monotonically-increasing–offenders accumulate offenses and thus get placed into higher categories as they get older, therefore receiving more severe punishments, despite evidence showing that younger offenders are most likely to recidivate.[16]

Additional concerns regarding using prior records to determine sentence length relate to potential disparate impact. Although the use of prior criminal record is supported by several sentencing philosophies, issues arise when this variable is not used by decision makers in a uniform manner for different types of offenders. Evidence of interactions involving race/ethnicity and prior record on sentencing outcomes, as well as interactions between race and current offense type, exist throughout the sentencing literature. For instance, a study based on Miami sentencing data shows that Black drug offenders with a prior conviction were more likely to be incarcerated than White drug offenders.[17] The downstream effects of sentencing can also impact future outcomes, sometimes referred to as "cumulative disadvantage".[18] A study of three jurisdictions (Chicago, Miami, and Kansas City) found that in Miami, Hispanics were more disadvantaged than Whites by prior incarcerations, although no effects were found between Blacks and Whites in Chicago.[19] Clearly, the interaction between race and prior record scores, and consequently sentencing outcomes, is complex and multidimensional. An in-depth analysis of Pennsylvania's PRS system and potential disparate impact in sentencing outcomes is a high priority.

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[9] Frase, Richard S., Julian V. Roberts, Rhys Hester, and Kelly Lyn Mitchell. 2015. Criminal History Enhancements Sourcebook. Ebook. 2nd ed. Robina Institute of Criminal Law and Criminal Justice. https://sentencing.umn.edu/sites/sentencing.umn.edu/files/criminal_history_enhancement_web2_0.pdf.

[10] Walen, Alec. 2020. "Retributive Justice". Stanford Encyclopedia Of Philosophy. https://plato.stanford.edu/entries/justice-retributive/.

[11] Frase, Richard S., Julian V. Roberts, Rhys Hester, and Kelly Lyn Mitchell. 2015. Criminal History Enhancements Sourcebook. Ebook. 2nd ed. Robina Institute of Criminal Law and Criminal Justice. https://sentencing.umn.edu/sites/sentencing.umn.edu/files/criminal_history_enhancement_web2_0.pdf.

[12] Frase, Richard S., Julian V. Roberts, Rhys Hester, and Kelly Lyn Mitchell. 2015. Criminal History Enhancements Sourcebook. Ebook. 2nd ed. Robina Institute of Criminal Law and Criminal Justice. https://sentencing.umn.edu/sites/sentencing.umn.edu/files/criminal_history_enhancement_web2_0.pdf.

[13] Frase, Richard S., Julian V. Roberts, Rhys Hester, and Kelly Lyn Mitchell. 2015. Criminal History Enhancements Sourcebook. Ebook. 2nd ed. Robina Institute of Criminal Law and Criminal Justice. https://sentencing.umn.edu/sites/sentencing.umn.edu/files/criminal_history_enhancement_web2_0.pdf.

[14] Nagin, Daniel S. 2013. "Deterrence In The Twenty-First Century". Crime And Justice 42 (1): 199-263. doi:10.1086/670398.

[15] Nagin, Daniel S. 2013. "Deterrence In The Twenty-First Century". Crime And Justice 42 (1): 199-263. doi:10.1086/670398.

[16] Frase, Richard S., Julian V. Roberts, Rhys Hester, and Kelly Lyn Mitchell. 2015. Criminal History Enhancements Sourcebook. Ebook. 2nd ed. Robina Institute of Criminal Law and Criminal Justice. https://sentencing.umn.edu/sites/sentencing.umn.edu/files/criminal_history_enhancement_web2_0.pdf.

[17] Brennan, Pauline K., and Cassia Spohn. 2008. "Race/Ethnicity And Sentencing Outcomes Among Drug Offenders In North Carolina". Journal Of Contemporary Criminal Justice 24 (4): 371-398. doi:10.1177/1043986208322712.

[18] Hickert, Audrey, Shawn D. Bushway, David J. Harding, and Jeffrey D. Morenoff. 2021. "Prior Punishments And Cumulative Disadvantage: How Supervision Status Impacts Prison Sentences". Criminology 60 (1): 27-59. doi:10.1111/1745-9125.12290.

[19] Spohn, Cassia, and Miriam DeLone. 2000. "WHEN DOES RACE MATTER?". Sociology Of Crime, Law And Deviance, 3-37. doi:10.1108/s1521-6136(2000)0000002005.

3.2 Project Objectives

PCS's strong emphasis on recidivism risk suggests that the utilitarian concern for public safety is integral to the sentencing guidelines framework. Determining whether PRS categories are actually associated with varying levels of recidivism risk is thus critical to validating this framework. PCS is also aware of concerns surrounding potential disparate impact from using prior records in sentencing and is committed to better understanding these effects. Lastly, PCS is developing the 8th edition Sentencing Guidelines. The current draft proposes large revisions to the Prior Record Score system, and will classify individuals based on the severity, and in some cases the quantity, of their most serious prior conviction(s). The proposed new PRS classification will have four categories: 0 (no prior criminal history), Low, Medium, and High. The High category is further split into two subcategories similar to the RFEL/REVOC categories. This results in five total potential categories that each offender could be placed into, a shift from the eight total categories under the current guidelines. Thus, one key objective of the analysis is to examine whether the new protocol for determining PRS improves upon the prior method in predicting recidivism.

For this purpose, PCS provided the Heinz team with criminal conviction data from 2001 to 2020 to conduct a systematic and empirical analysis of the PRS system. The overarching project objective is to help PCS better understand and evaluate the PRS system in relation to recidivism risk and disparate impact, and to inform the design of the 8th edition Sentencing Guidelines. This project is advised by Daniel Nagin, Professor of Public Policy and Statistics and Associate Dean of Faculty at Heinz College. The project primarily focuses on evaluating the 7th and 8th edition PRS categories with regard to the following:

1. Are the current PRS score categories indicative of likelihood to recidivate?

2. Accounting for recidivism risk, are Black offenders disproportionately receiving more severe sentences than their White counterparts?
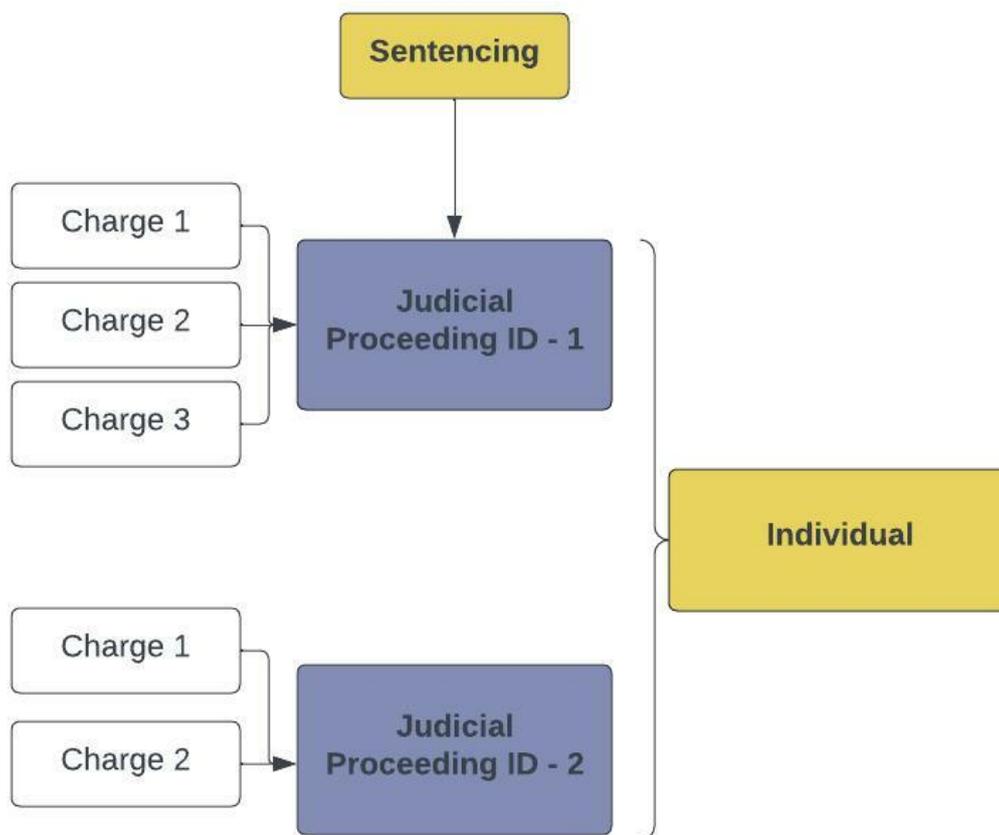
4 Methodology

Recidivism, in the context of this study, is defined as the conviction for a criminal act committed within three years of a prior criminal conviction. There are three key components of this definition:

1. the conviction for the original offense,

2. a three-year window following the initial conviction during which an offender is at risk of recidivism ("risk window"),

3. a conviction for a recidivistic event that was committed during the associated risk window.

This section describes the technical implementation of these three components using the available dataset to determine recidivistic cases[20], which serve as the foundation for all subsequent analyses in this project.

For this project, PCS provided a dataset of all criminal offenses charged and convicted between January 1, 2001 and December 31, 2019. It contains 2,593,636 records (rows) and 547 case features (columns), with each row corresponding to a unique criminal offense. For context, when a criminal act is committed, the offender can be charged with one or multiple charges. These charges are grouped together in a Judicial Proceeding (JP). All charges in a JP are sentenced on the same date by the same judge, regardless of the date(s) that the offenses from which these charges stem were committed (i.e., Date of Offense). In each JP, the offender can receive different sanctions for different offenses, with the most serious sanction often corresponding to the most serious offense being adjudicated in the JP. It is during this judicial process that judges reference the offender's Prior Record Score, as well as the Offense Gravity Score of each offense, to determine the applicable sentencing guidelines. Additionally, there are rare cases where multiple judicial proceedings occur on the same Date of Sentencing (DOS) for the same individual. The following figure illustrates the organization of the dataset:

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[20]As noted in the Terminology section, the term "recidivistic case" used throughout this report refers to the *original* conviction of a criminal event. If that conviction was followed by a subsequent conviction committed within three years, that initial event is flagged as a recidivistic case.

Figure 3: Original Dataset Structure

Using this data, the team defines the first key component of the recidivism definition–the initial conviction–at the Date of Sentencing level. In other words, all charges sentenced on the same date for the same individual are collapsed into a single observation to form the baseline dataset of all "initial" convictions, illustrated by the blue boxes in the previous figure. The reason for this aggregation lies in the overarching objectives of this project. PCS is interested in the relationship between an individual's Prior Record Score and their risk of recidivism. Although an individual can have different PRS's associated with different offenses committed on different dates, it is during each JP that the Prior Record Score is used for sentencing. It is also on this Date of Sentence that the individual becomes liable for fulfilling their adjudicated sanction(s), including serving their incarceration sentence, if applicable. Each judicial proceeding thus effectuates the potential impact of PRS on recidivism through its role in the sentencing guidelines. Moreover, although sentences may differ between charges adjudicated during the same judicial proceeding, the individual is generally only required to serve the most serious sanction adjudicated during that proceeding. It thus follows logically that each Date of Sentence be isolated as a single event for the baseline dataset of initial convictions.[21] Within each JP/Date of Sentence aggregation, the highest PRS and OGS scores are retained for further analysis. Further technical details on this aggregation can be found in Appendix I.

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[21]Note that aggregating initial offenses at the Date of Sentence level, rather than at the Judicial Proceeding level, accounts for several rare cases in which multiple JPs occur on the same date for the same individual.

The second component of this definition of recidivism is the three-year risk window, which is used to evaluate whether an individual's subsequent conviction counts as recidivism based on the latter conviction's Date of Offense. In the base case, the three-year risk window begins on the Date of Sentence for each initial conviction. However, there are cases where the individual must serve an incarceration sanction. While incarcerated, the individual is considered incapacitated (i.e., not at risk of recidivism). Following discussions with PCS, it was determined that the minimum incarceration time at the judicial proceeding level (JP Minimum Incarceration) would be used to account for time incapacitated. Per PCS, most offenders do not serve the full length of the maximum incarceration sentence, but they must serve the minimum sentence before probation/early release. Since the data are aggregated at the Date of Sentence level, in the rare cases where an individual has multiple JPs sentenced on the same date, the maximum JP Minimum Incarceration for each Date of Sentence for a single individual is used as a conservative estimation of time incarcerated. For all cases, the risk window begins on the day after the end of the minimum sentence.[22] The risk window end date is calculated as exactly three years from the "At-Risk Date" (i.e., first date of the risk window). For all analyses, the data are limited to cases where the risk window end date is on or before December 31, 2019—the latest Date of Sentence included in the provided dataset.

The final component of this concept of recidivism is the conviction for a reoffense within the three-year risk window. As noted in the Definitions section, the broadest definition employed in this study considers any type of reoffense resulting in conviction as recidivism, regardless of offense type or severity. Thus, among all charges sentenced on a given Date of Sentence for an individual, the earliest Date of Offense is taken as the offense date for that observation. If the Date of Offense for a subsequent crime falls within the risk window of a previous conviction, the prior criminal conviction is flagged as a recidivistic case. In analyses that employ a more limiting definition of recidivism, such as a violent offender recidivating to another violent offense, the earliest Date of Offense associated with that particular crime type for each Date of Sentence is used to identify recidivism. Note that if an individual commits multiple re-offenses within the three-year risk window that were sentenced on multiple Dates of Sentence, this would count as multiple cases of recidivism in this analysis.[23] It should be noted that if the subsequent crime has a Date of Offense that falls before the risk window start date for the prior offense, it would not be counted as a recidivistic event in this study. Further details regarding the technical implementation of this process, as well as the implementation of the 8th edition PRS categories, can be found in Appendix I.

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[22] Additional considerations for time already served, in cases where the offender is incarcerated between the time of arrest and the date of sentence, is also accounted for. See Appendix I for further details.

[23] As a contrived example, if an individual commits a crime on January 1, 2001 (sentenced on January 5, 2001), then subsequently on March 1, 2001 (sentenced on March 5, 2001) and May 1, 2001 (sentenced on May 5, 2001) with no incarceration sentence for any conviction, two counts of recidivism would be included in our calculations—one count for the offense committed on January 1 with a recidivistic event on March 1, and a second count for the offense committed on March 1 with a recidivistic event on May 1.

5 Analysis and Results

This section describes the analytical process, results, and key findings for this project. The first subsection briefly characterizes the baseline dataset resulting from the data cleaning pipeline. The subsequent sections describe findings related to Prior Record Score and recidivism, recidivism by crime categories, and disparate impact in sentencing.

5.1 Exploratory Data Analysis

Following the data cleaning and preparation steps described in the previous section, the final dataset for analysis includes 1,216,238 total "initial convictions" (i.e., unique individual and Date of Sentencing observations) for 785,952 total unique offenders. Offenders are predominantly male (77.4%), and predominantly white (67.4%).

(a) Overall Sex Breakdown   (b) Overall Race Breakdown
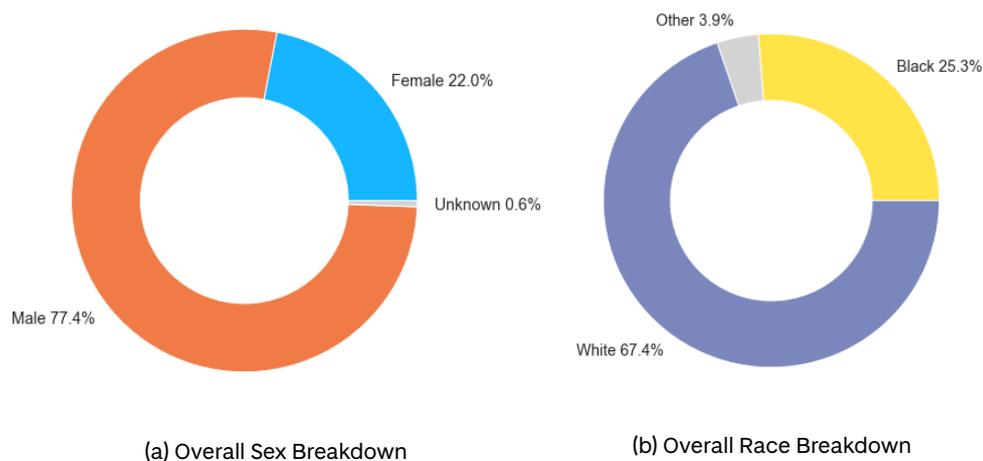
Figure 4: Overall Demographic Breakdowns

Virtually all offenders were 18 or older at the time of offense, as shown in Figure 5 below. However, there is a small number of "transfer cases" committed by offenders who were below the age of 18 at the time. They make up a total of 0.1% of the dataset. This age group is included in subsequent analyses as reference, but due to the relatively small sample size, results specific to this age group should be interpreted with caution. Among adult offenders, the majority of cases are committed by adults 25 and older (75.1%). Cases committed by those within the 21 to 24 age group represent 19.1% of cases, while crimes committed by those between 18 to 20 make up 5.6% of all cases.
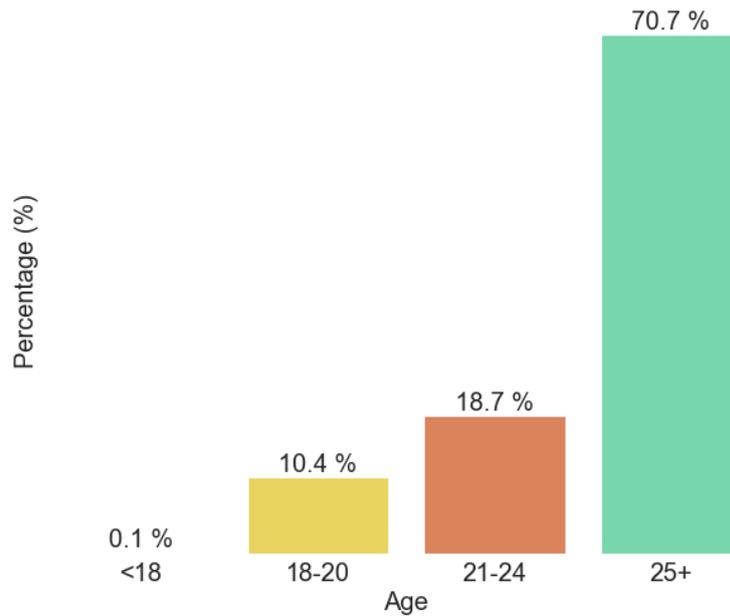
Figure 5: Age Group Distribution by Age at Offense

An analysis of the time between each individual's At-Risk Date and their Next Date of Offense reveals that the majority of recidivistic cases occur within the three-year risk window (60.5% of all recidivistic cases). Note that due to the lag in data between an offender committing a criminal act to their subsequent arrest and judicial proceeding, this analysis is based on the subset of with At-Risk Dates before 2011.

However, as shown in the following Figure 6, there is a significantly long right tail. This suggests that offenders do continue to recidivate after the three-year risk window. Although the three-year window employed throughout this study is based on standard research practice, future analyses incorporating a longer risk window may offer additional insight.
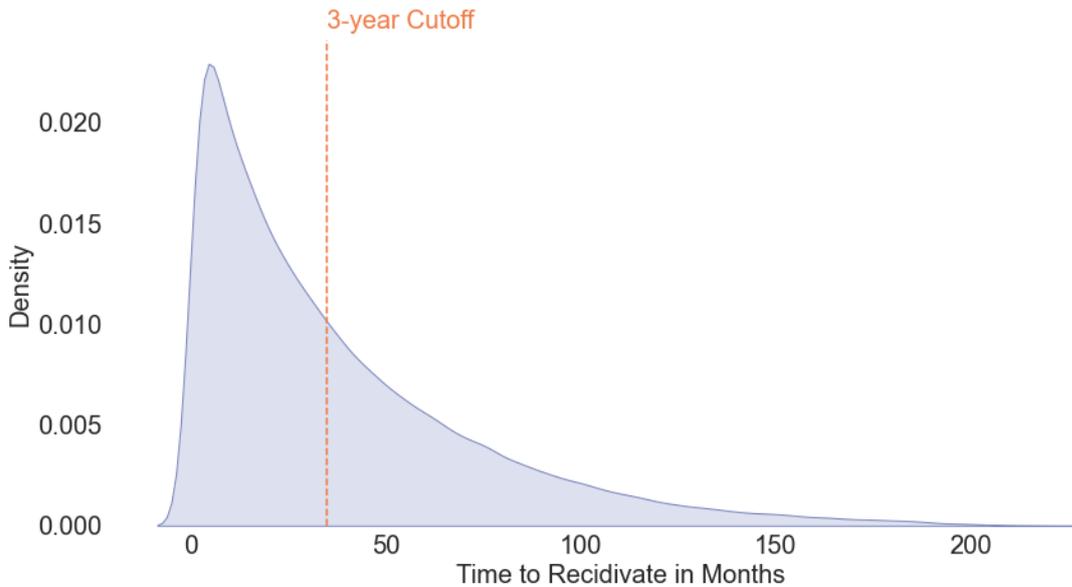
Figure 6: Time To Recidivate For Individuals With At-Risk Date before 2011

5.1.1 PRS Distribution

Using the 7th edition PRS categories, 53.2% of the cases in the dataset have a PRS score of 0. The distribution among remaining categories, in decreasing order, is: category 1 (12.8%), category 2 (10.2%), category 5 (9.5%), category 3 (6.5%), and category 4 (5.2%). The RFEL/REVOC special categories comprised the smallest subset of the data (2.5%).

For the proposed 8th edition categories, the most frequently observed category is also category 0 (44.2%). It makes sense that the overall proportion of cases in the 8th edition PRS category of 0 is smaller than the 0 proportion in the 7th edition category. The redesign of PRS categories in the 8th edition uses stricter criteria for category 0, more closely aligning to the true definition of "no prior history." The next biggest category is Medium (27.0%), followed by Low (24.7%). The High category, which includes most RFEL and REVOC cases, is again the smallest category comprising 4.1% of cases. Table 1 shows the number of cases in each PRS category for both editions.
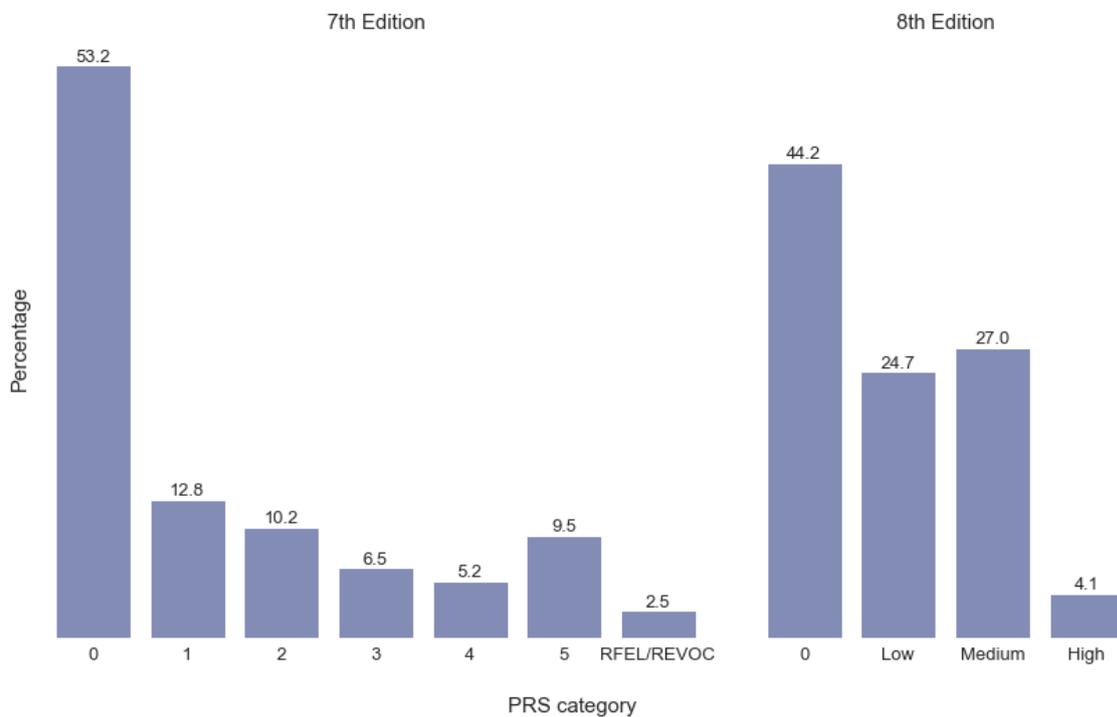
Figure 7: PRS Distribution

PRS Category	Number of Cases
All	1,216,238
7th Edition	
0	647,462
1	156,156
2	124,453
3	78,859
4	63,494
5	115,461
RFEL/REVOC	30,353
8th Edition	
0	537,475
Low	300,771
Medium	327,985
High	50,007

Table 1: PRS Counts

As noted previously, the 8th edition PRS categories significantly reduce the emphasis on the number of prior records, and instead shifts to a severity-based classification. Consequently, an individual's PRS level could also change substantially between guideline versions. Figure 8 below shows how each 7th edition PRS category maps to 8th edition categories. For instance, the first subplot shows that 81.1% of individuals with PRS 0 in the 7th edition remain in PRS 0 in the 8th edition, while 18.6% move up to PRS Low in the 8th edition. This reflects the fact that the 8th edition PRS category 0 is a stricter definition of "true 0" (i.e., individuals with no prior records) compared to the 7th edition. Moreover, it is interesting to note that a small percentage of individuals with lower 7th edition PRS categories (0-3) move to the High category in 8th edition scores, and some individuals previously in the 4, 5, or RFEL/REVOC categories move down to PRS 0 in the new edition.
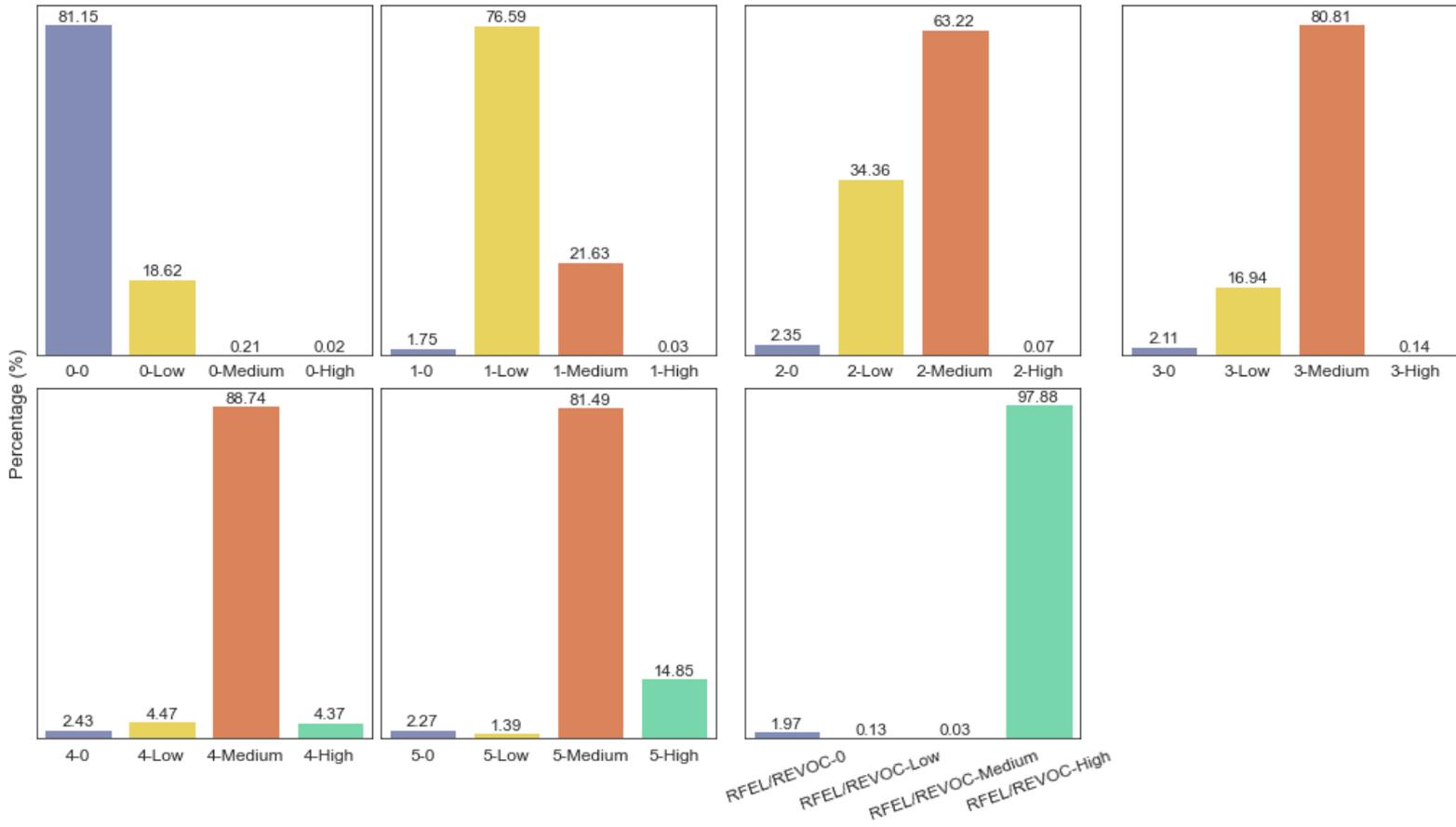
Figure 8: Mapping results between PRS 7th and 8th editions

As shown in Figure 9, the most frequently occurring Offense Gravity Scores in the dataset are: category 3, which typically includes first degree misdemeanor offenses (29.1% of all cases); category 1 (3rd degree or unclassified misdemeanor offenses, 23.9%), and category 5 (3rd degree or unclassified felony offenses, 14.8%). There is a large dip in the proportion of observed cases with an Offense Gravity Score of 4 (3.2%), and a smaller but still significant dip at OGS 2 (13.8%) compared to OGS categories 1, 3, and 5. Note that OGS 15 is not represented in these results as it is most often assigned to first or second degree murder charges, which typically receive life/death sentences.
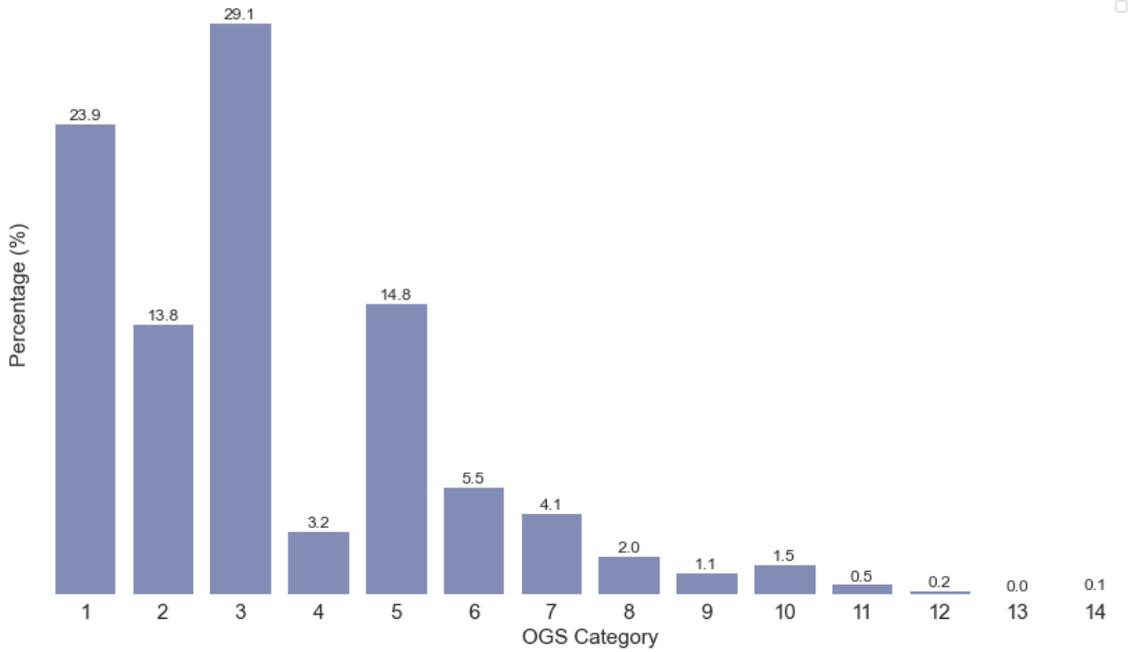
Figure 9: OGS Distribution

5.2 Prior Record Score and Recidivism

5.2.1 Overall Recidivism Rates

Overall, 18.8% of all cases recidivate within the three year window of free time. Figure 10 below shows the measured recidivism rates by PRS category, for both the 7th and 8th editions. Based on the 7th edition PRS categories, there is a significant jump in likelihood-to-recidivate between categories 0 and 1, from 15.7% to 21.0%. For categories 2 through 5, there is very minor variation between recidivism rates, hovering between 22.4% (category 2) and 23.6% (category 3). Recidivism rates for the RFEL/REVOC category is lower than all non-zero numeric categories at 20.4%. Cases with a PRS score of 0 are the only group with a below-average recidivism rate. This initial analysis indicates that current PRS scores can be indicative of recidivism rate between people with little or no prior criminal history (category 0) and people with prior criminal history (categories 1+), but there is no strong correlation between current PRS categories and recidivism rates for categories higher than 1.

The 8th edition PRS categories show an increasing relationship between PRS categories and recidivism risk for the first three categories. The 0 category has a recidivism rate of 15.1%, followed by the Low category at 20.2% and the Medium category at 23.2%. For the final High category, there is a slight drop to 21.9%. Similar to the 7th edition PRS scores, the lowest 0 category is the only category with a below-average recidivism rate. As the 8th edition category of 0 is more restrictive than the 7th edition, there is also a slight drop in recidivism rates for category 0 between the 7th and 8th editions. This suggests that offenders who truly have no prior criminal records (i.e., a "true 0") are slightly less likely to recidivate, but the difference is small in magnitude (0.6%).
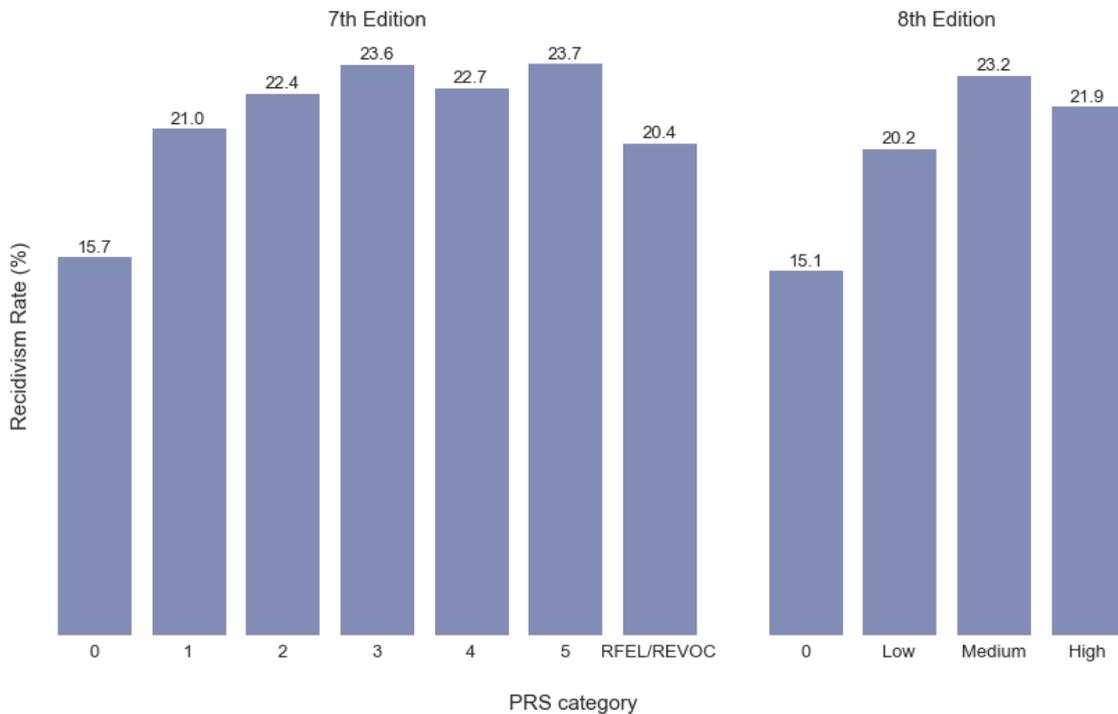
Figure 10: Recidivism Rates by PRS

Table 2 provides results from the one-tailed difference-in-proportions tests conducted on adjacent PRS pairs that have increasing recidivism rates from the lower to higher category. For example, the first row of results shows that the increase of 5.3 percentage points in recidivism rates between categories 0 and 1 is statistically significant (PRS 7th ed.). The results show that all adjacent category pairs that have growing recidivism rates are statistically significant. However, this does not necessarily translate to practical significance. As noted earlier, other than the 5 percentage point increase between categories 0 and the next level up for both PRS editions, the delta for remaining adjacent PRS categories only range between 0.98 and 3.02 percentage points. In practice, this change may be too small to conclude that offenders with higher PRS categories are more likely to recidivate, beyond the lowest two PRS categories. Nevertheless, it is important to note that between the two PRS editions, the 8th edition categories show a larger change in recidivism rates between adjacent categories (from 0 to Medium) compared to the 7th edition. This suggests that the revised PRS categorization is more predictive of recidivism than the current categorization.

Categories	Difference in Proportions	P-Value
PRS 7th Edition		
0 vs. 1	5.32%	0.000***
1 vs. 2	1.43%	0.000***
2 vs. 3	1.32%	0.000***
4 vs. 5	0.98%	0.000***
PRS 8th Edition		
0 vs. Low	5.05%	0.000***
Low vs. Medium	3.02%	0.000***

Table 2: Difference in Proportions Z-Test (one-tailed; α = 0.001)

Recidivism rates by Offense Gravity Scores are displayed in Figure 11 below. The figure shows that there is no consistent relationship between the severity of a crime and likelihood-to-recidivate. Recidivism rates grow slightly between OGS 1 and 3 (from 18.8% to 21.6%), then show a generally downward trend for OGS categories 4 and above, with a slight peak at OGS 9.
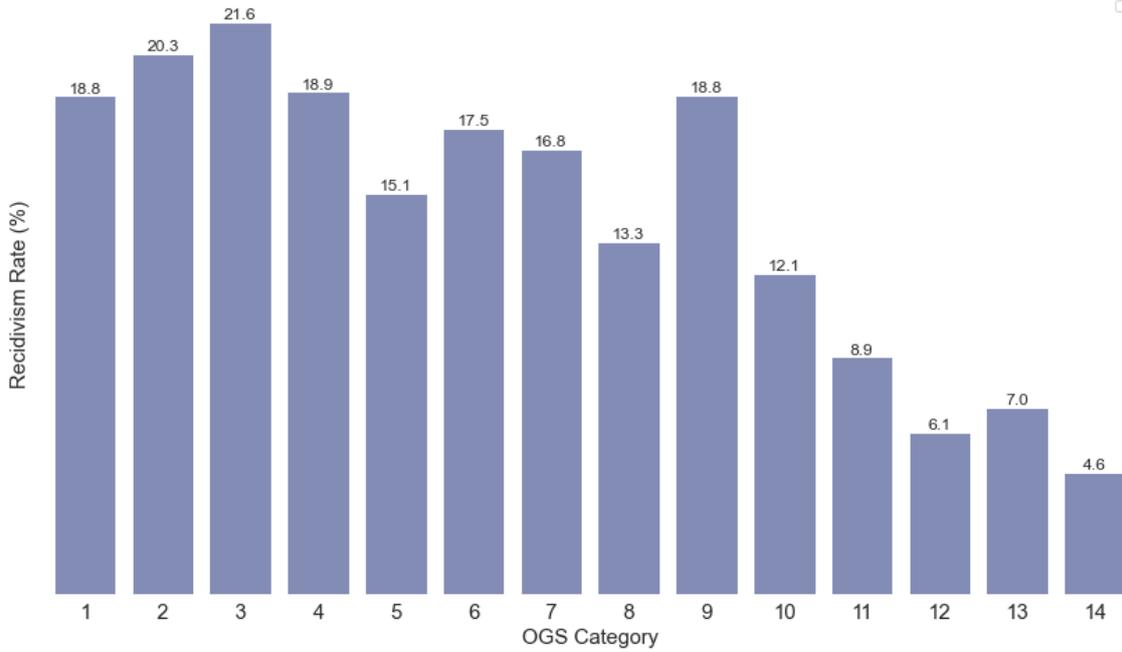
Figure 11: Recidivism Rates by OGS

5.2.2 Recidivism Rates by Sex

On average, males have higher recidivism rates than females. The overall recidivism rate for male offenders is 19.4% and for female offenders is 16.0%. Figure 12 displays recidivism rates by PRS categories for male versus female offenders. 7th edition PRS categories show a stronger correlation between PRS and recidivism for female offenders for numeric categories (0-5), whereas the trend is less consistent for male offenders. 8th edition PRS categories show similar trends for both sexes, with a steadily increasing trend in recidivism rates between the 0 and Medium categories. In both editions, there is an observed drop in recidivism rates for both sexes in the highest PRS category (RFEL/REVOC and High). Overall, males typically show higher recidivism rates across all PRS categories for both editions, with the exception of PRS categories 4 and 5 in the 7th edition.
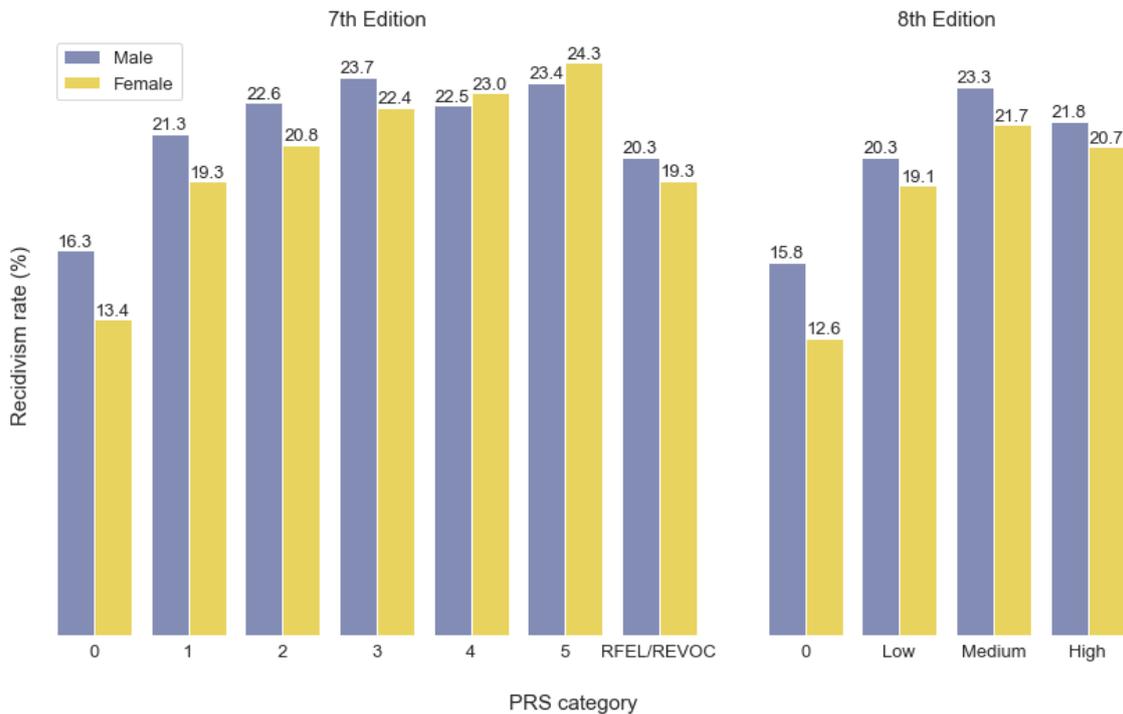
Figure 12: Recidivism Rates by Sex

5.2.3 Recidivism Rates by Age Group

An analysis of recidivism rates by age group, based on the offender's age at offense for the initial conviction, finds that younger offenders are more likely to recidivate. As shown in Table 3, the 18-20 age group has the highest recidivism rate at 28.8% for adult offenders (18+). Recidivism rates decrease to 23.4% for cases committed by adults between 21-24, and declines even further to 16.9% for adults aged 25 and older. For transfer cases, the recidivism rate is much higher than other age groups at 30.8%. The caveat is that this group represents only 0.1% of all cases in the dataset. Moreover, the juvenile cases that are transferred to adult criminal court are typically significantly more serious in nature than the usual juvenile cases, so this statistic may not be representative of all juvenile cases.[24] A parallel analysis on the offender's age at risk (i.e., the age on the first date of the three-year risk window) shows similar results; results are included in Appendix II for reference.

Age Group	Recidivism Rate
< 18	30.8%
18—20	28.8%
21—24	23.4%
25+	16.9%

Table 3: Average Recidivism Rates by Age at Offense

Figures 13 and 14 below break down the recidivism rates by age group (age at offense) and Prior Record Score category. Similar to the patterns for non-PRS adjusted, age-based recidivism rates, cases committed by young adult offenders (18+) typically have higher recidivism rates than cases committed by older adults. This trend is consistent across all PRS categories for both PRS editions, except the RFEL/REVOC category in the 7th edition scores, where the 21-24 age group has a slightly higher recidivism rate than the 18-20 age group. For transfer cases (committed by offenders below 18 at the time of offense), recidivism rates are generally higher than cases committed by adult offenders, except in PRS 1, 5 and Low in the 7th and 8th editions, respectively. Recidivism is highest for PRS 3 (7th ed.) for this age cohort at 43.5%. In the 8th edition PRS categories, recidivism rates are highest for transfer cases in the Medium category (37.5%)

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[24]"Pennsylvania". 2022. National Juvenile Defender Center. https://njdc.info/practice-policy-resources/state-profiles/pennsylvania/.

Note that across PRS categories, recidivism rates for adult offenders under 25 do not follow any clear pattern of increasing recidivism with increasing PRS scores, with the exception of the 0 to 1 and 0 to Low comparisons. In contrast, recidivism rates for adults over 25 show a generally increasing pattern across all numeric PRS 7th edition categories, and across 0 through Medium for the 8th edition categories.
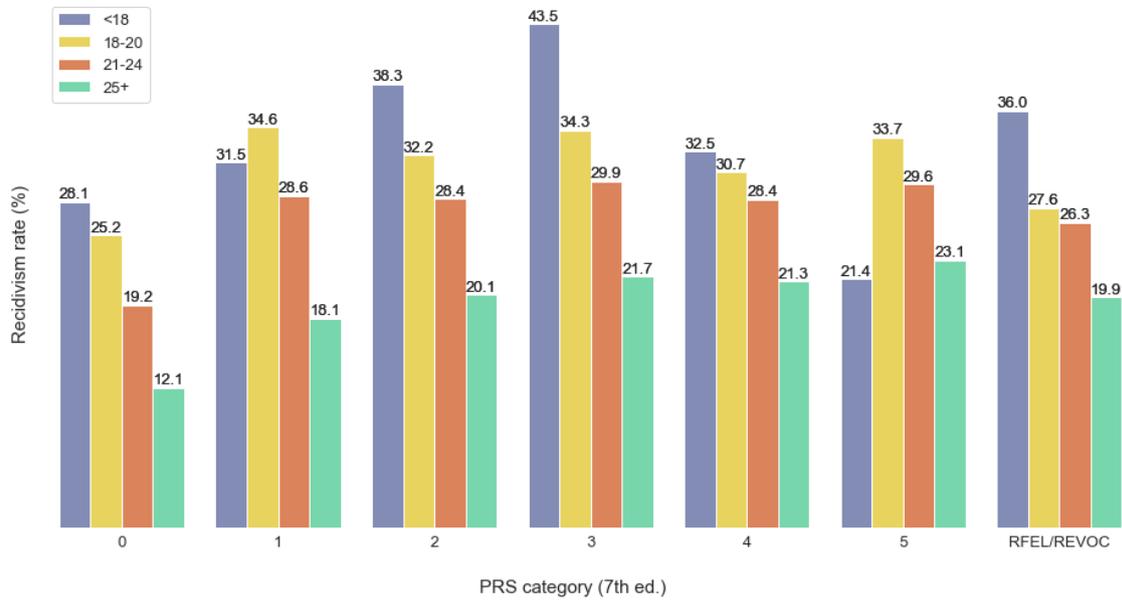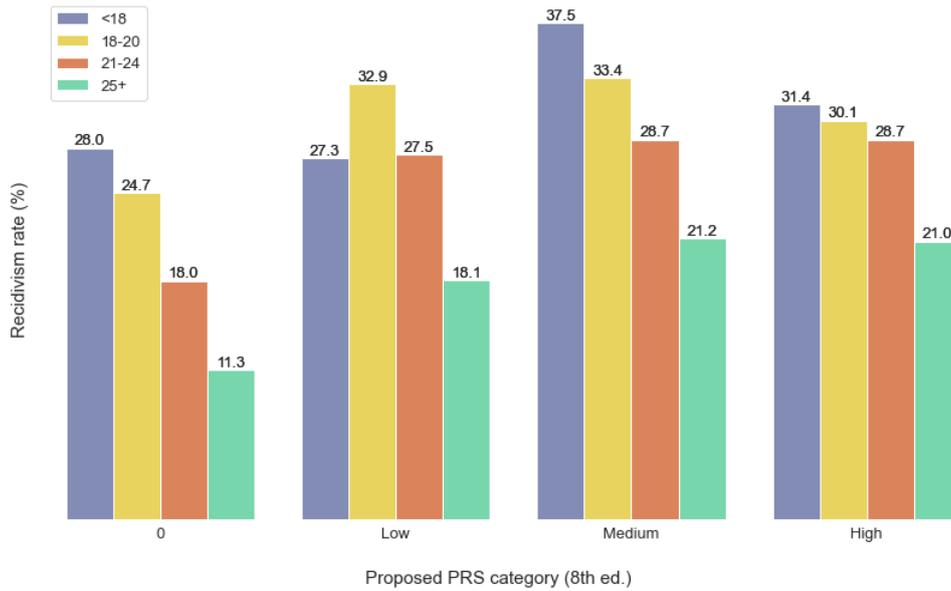

Figure 13: Recidivism by PRS and Age at Offense (7th ed.)

Figure 14: Recidivism by PRS and Age at Offense (8th ed.)

5.2.4 Recidivism Rates by Race

The next section compares recidivism rates by race. Due to the smaller sample size and inconsistent/unreliable reporting of race groups other than White and Black, all race-based analyses are restricted to these two race groups for comparison. Overall recidivism rates between races are very similar: 17.5% for White offenders and 18.5% for Black offenders. Given the large sample sizes, this difference is highly statistically significant (Table 4). However, the absolute difference between recidivism rates is only 1 percentage points. This finding is additionally confounded by the age factor. As discussed previously, young adult offenders have a higher recidivism rate than older adults (25+). Figure 15 shows that a higher proportion of Black offenders are under 25, which may explain the difference in overall recidivism rates by race.

Race	Recidivism Rate
White	17.5%
Black	18.5%
Absolute Difference	1.0%
Z-Test P-Value	0.000***

Table 4: Recidivism Rates by Race and Difference-in-Proportions Z-test (two-tailed, α=0.001)

24
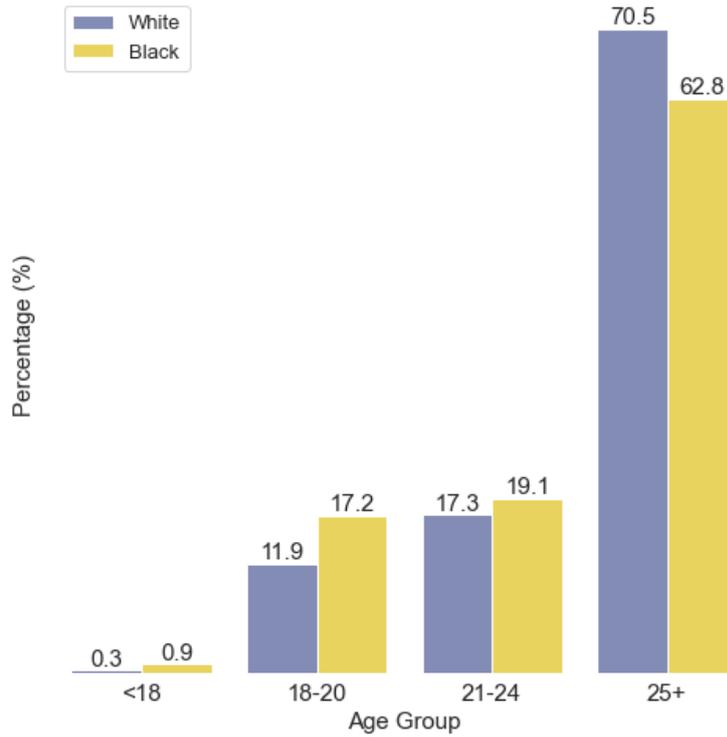
Figure 15: Age Group Distribution by Race

Figure 16 below displays recidivism rates by Prior Record Score and race. At lower PRS categories, Black individuals tend to have slightly higher recidivism rates. This can be observed in PRS categories 0 and 1 in the 7th edition, and categories 0 and Low in the 8th edition. In subsequent PRS categories, White offenders consistently have slightly higher recidivism rates than Black offenders.
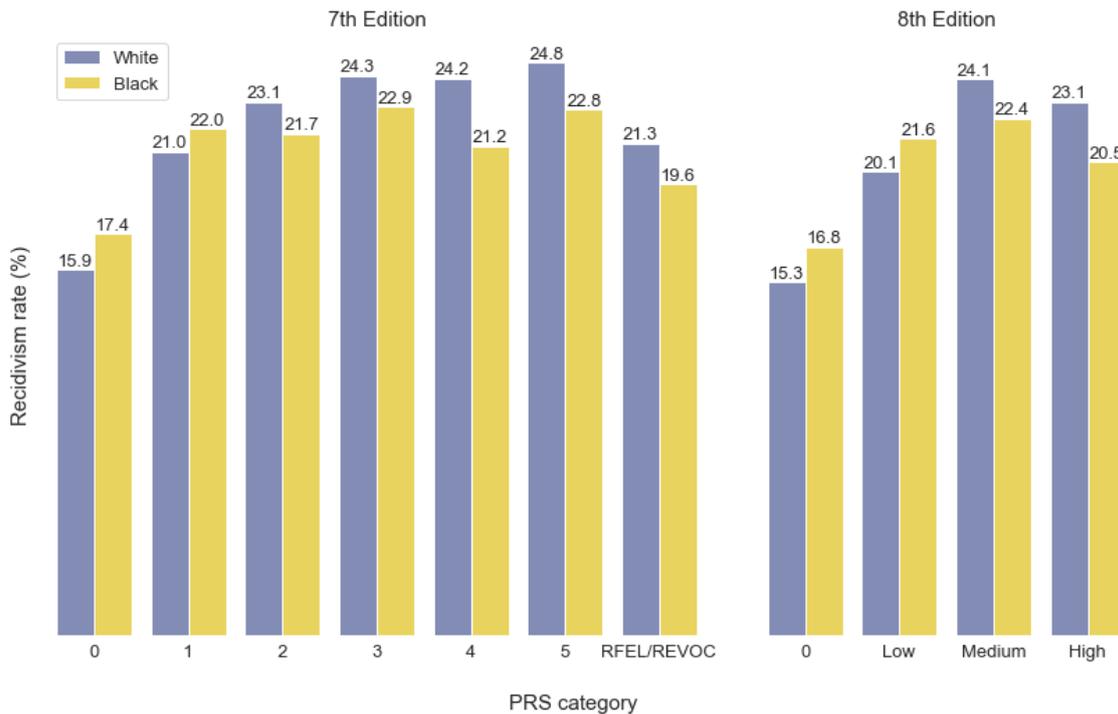
Figure 16: Recidivism by PRS and Race

Among convicts of the same race, it is also apparent that the jump in recidivism rates between no prior criminal history and some prior criminal history is prevalent for both races and in both PRS editions (i.e., the first two PRS categories). Beyond the initial two categories, however, recidivism rates show a generally upward trend for PRS categories 1 through 5 in the 7th edition for White offenders, but is much more varying for Black offenders. For the 8th edition categories, there is a substantial increase in recidivism rates for White offenders between Low and Medium (4.0 percentage points), compared to a change of only 0.8 percentage points for Black offenders. It appears that both PRS systems are generally more predictive of recidivism for White offenders than Black offenders. One caveat to note is that Black offenders are disproportionately placed into higher PRS categories compared to White offenders, either due to differences in policing strategies or due to underlying differences in the types of crimes being committed and/or convicted. Thus, the trend between recidivism and Prior Record Scores may not be fully comparable between two races. Further analysis on this topic can be found in the Disparate Impact section of the report.

5.2.5 Recidivism by Most Serious Sanction Type

During prior discussions with PCS, it was noted that the overall recidivism rate of 18.8% observed in this study is lower than what is typically observed in internal PCS analyses. One potential reason is that not all convictions are reported to PCS, such as certain categories of cases from Philadelphia, or cases that received less serious sanctions (i.e., probation). These may result in the undercount of recidivistic cases in the dataset. To better understand the nature of recidivistic cases in the dataset, this section analyzes recidivism rates by sanction types, using the most serious sanction adjudicated for an offender on a given Date of Sentence.

As shown below in Figure 17, cases with a probation sanction have the highest recidivism rate at 20.8%. In comparison, the two incarceration sanctions—state prison and county jail—have recidivism rates of 14.5% and 18.1% respectively. One potential explanation for this is the monotonically increasing relationship between sentence severity and PRS. It takes time to accumulate prior convictions and thus place older offenders into higher PRS categories, which in turn increases the likelihood of receiving a more serious incarceration sanction compared to probation. On the other hand, age is a strong predictor of recidivism risk—prior analysis shows that young adult offenders consistently have higher recidivism rates than older adults. This difference in age may explain why recidivism rates are lower for the state prison and county jail cases compared to probation cases (Table 5). Given that probation cases have higher recidivism rates and that a substantial

amount of probation cases are missing from the provided dataset, this is a reasonable hypothesis for why the overall recidivism rate observed across this dataset is lower than expected.
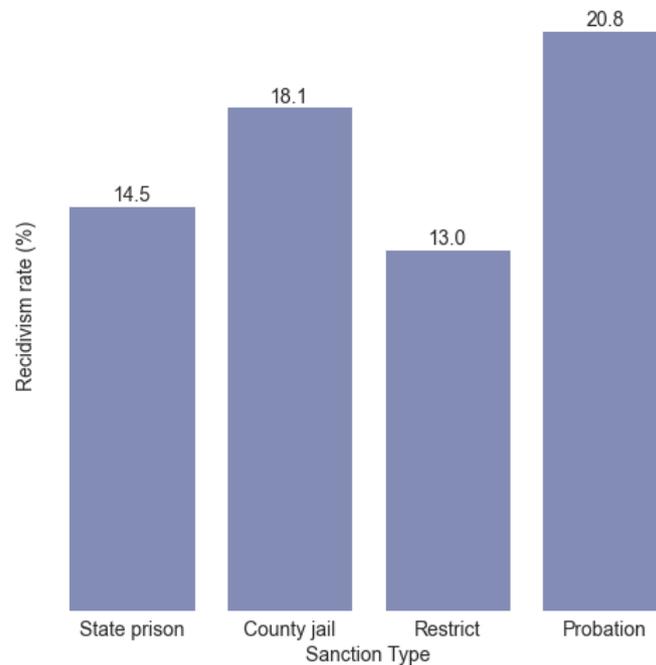

Figure 17: Recidivism by Sanction Type

	Age (Median)
State Prison	31.4
County Jail	32.4
Restrict	34.5
Probation	29.3

Table 5: Age by Sanction Type

Recidivism rates by PRS categories within the state prison and county jail cases follow similar patterns as described above Figures 18 and 19 below). There is a jump in recidivism rates between the 0 and 1 or 0 and Low categories (7th and 8th editions) of between 4 and 6 percentage points, for both sanction types. For 7th edition PRS categories, there is a much more consistent increasing trend in recidivism rates between numeric PRS categories for county jail cases than state prison cases. Similarly, for the county jail cases, recidivism rates increase consistently across all four 8th edition PRS categories (0 through High). For state prison cases, in comparison, there is a dip in recidivism rates for the highest category. The difference in magnitude between recidivism rates for county jail cases across the 8th edition PRS categories is also significantly larger, with around a 5 percentage point difference between the 0 and Low and between the Low and High categories. In contrast, the increase in recidivism rates between the Low and High categories for the state prison population is only around 3 percentage points. This indicates that PRS is more predictive of recidivism rates for cases sentenced to county jail compared to state prison. Between the 7th and 8th edition PRS categories within each sanction type, it is apparent that PRS 8th edition is more predictive of recidivism for both incarceration sanction types than PRS 7th edition.
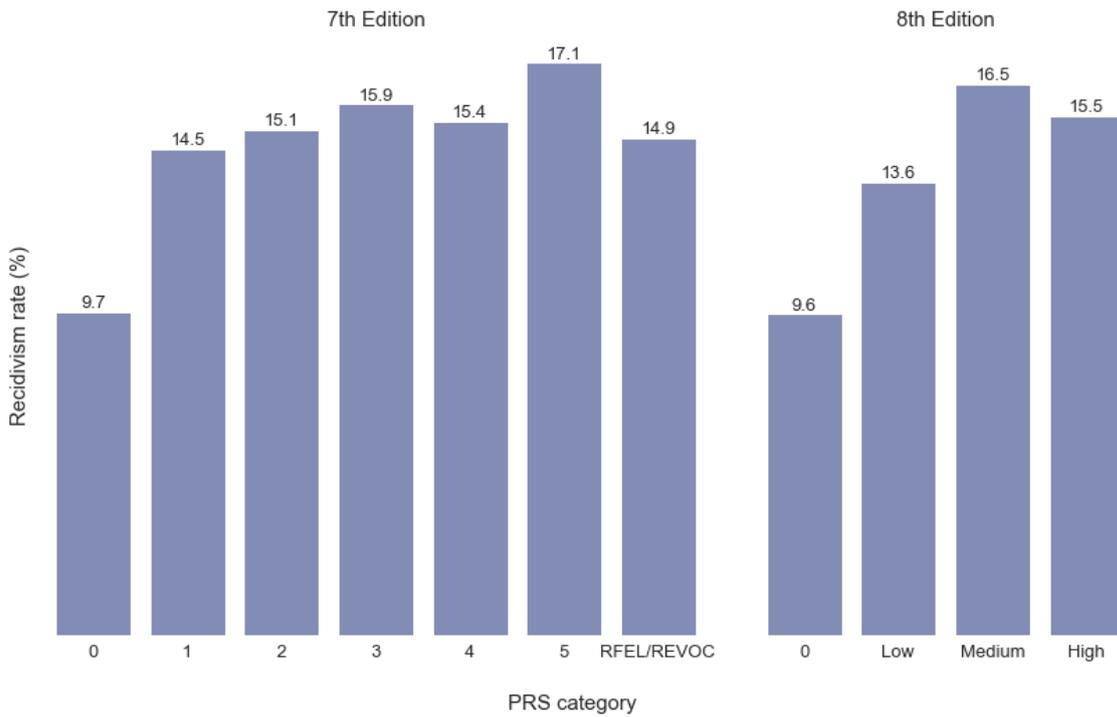
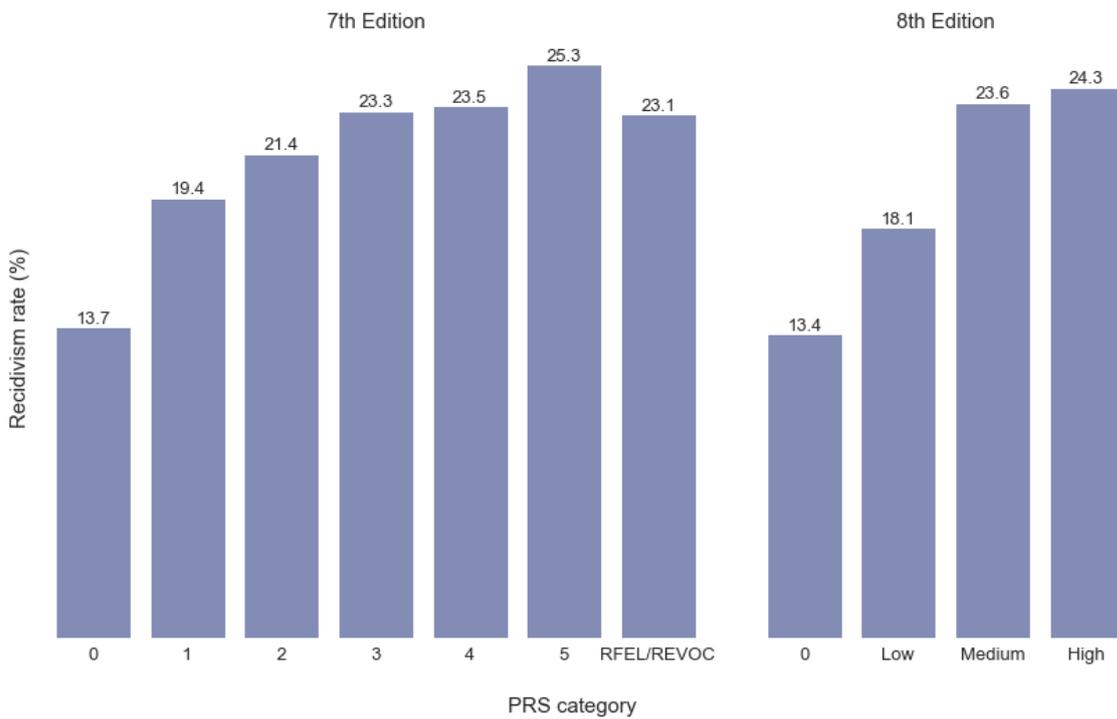Figure 18: Recidivism by PRS in State Prison Cases

Figure 19: Recidivism by PRS in County Jail Cases

5.2.6   Recidivism by Sentencing Cohort

Pennsylvania is currently operating under the 7th edition Sentencing Guidelines, effective December 28, 2012. As the dataset includes cases sentenced from 2001 through 2019, a sizable portion of observations in the dataset were sentenced under prior versions of Sentencing Guidelines. Per conversations with PCS, there were no significant changes to the PRS categorization or other aspects of the Guidelines between the 7th and prior editions, but recidivism rates can still shift over dime due to changing crime rates or prosecutorial

policies. To analyze recidivism over time, the data were grouped into sentencing cohorts roughly determined by different Guideline versions:

- 5th ed., effective 6/13/1997: cases sentenced between 2001 through 2005 (29% of all cases)

- 6th ed., effective 6/3/2005: cases sentenced between 2006 and 2012 (46%)

- 7th ed., effective 12/28/2012: cases sentenced between 2013 and 2015 (19%)

The last cohort has a cutoff date of 2015 to account for the data lag between a crime being committed and its subsequent arrest, processing, and conviction.[25] In discussions with PCS, the team also mentioned that there is typically a slight lag in time between when a guideline version becomes effective versus when it is fully implemented within the sentencing process.

As Figure 20 shows below, there is a growth in recidivism rates from earlier to later sentencing cohorts, with 18.3%, 18.9%, and 19.8% recidivism across the 2001-2005, 2006-2012, and 2013-2015 cohorts, respectively. For a more granular perspective, the right panel of Figure 20 shows recidivism rates by the year of sentencing. There is a plateau in recidivism rates between 2004 and 2010, but overall there is a generally increasing trend in recidivism rates across years. From 2012 to 2015, there is another slightly decreasing trend in recidivism rates. This shows that recidivism rates are slightly increasing over time. Without further analysis, however, it is unclear whether these changes in recidivism rates are driven by differences in Sentencing Guideline editions or changes in criminal trends, policing trends, or other environmental factors.
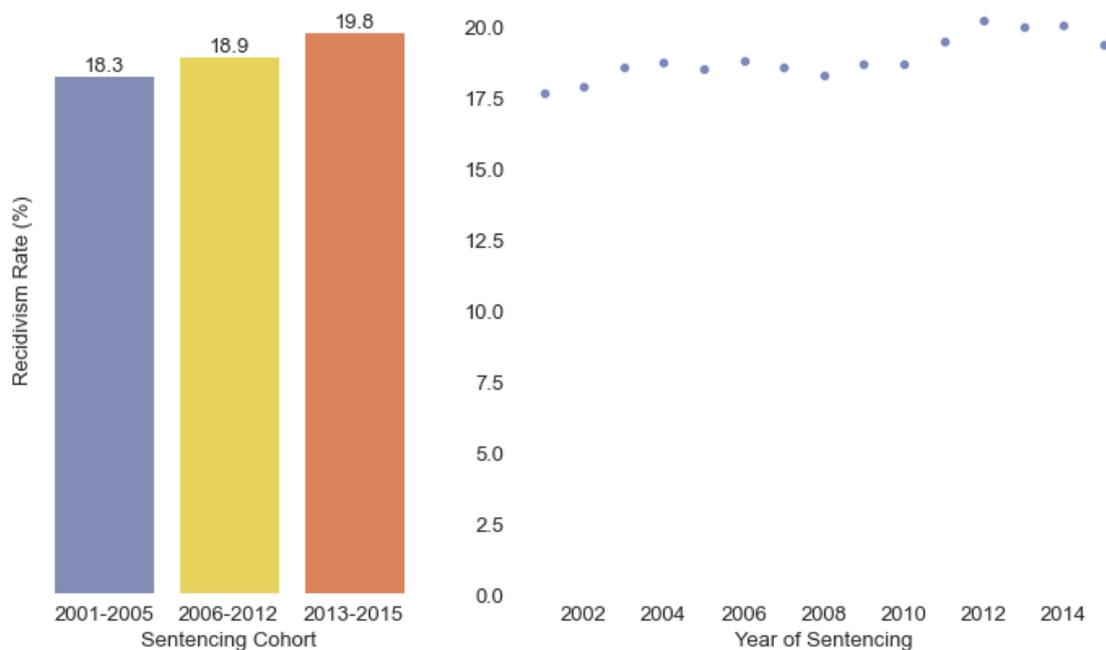
Figure 20: Recidivism by Sentencing Cohort

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[25] Based on the provided dataset, 98% of all offenses were sentenced within 4 years of the Date of Offense.

Figure 21 shows recidivism rates by PRS categories, grouped by sentencing cohorts. Generally, the relationship between recidivism rates and PRS categories within each sentencing cohort are consistent with previously-observed trends. For 7th edition PRS categories, there is a jump in recidivism rates between PRS categories 0 and 1, and remain relatively flat across other numeric categories. The 8th edition categories show a consistent increasing pattern in recidivism rates across categories 0 through Medium for all three sentencing cohorts. Lastly, as noted earlier, overall recidivism rates are lower for the earliest sentencing cohort compared to the two latter ones across all PRS categories in both editions.
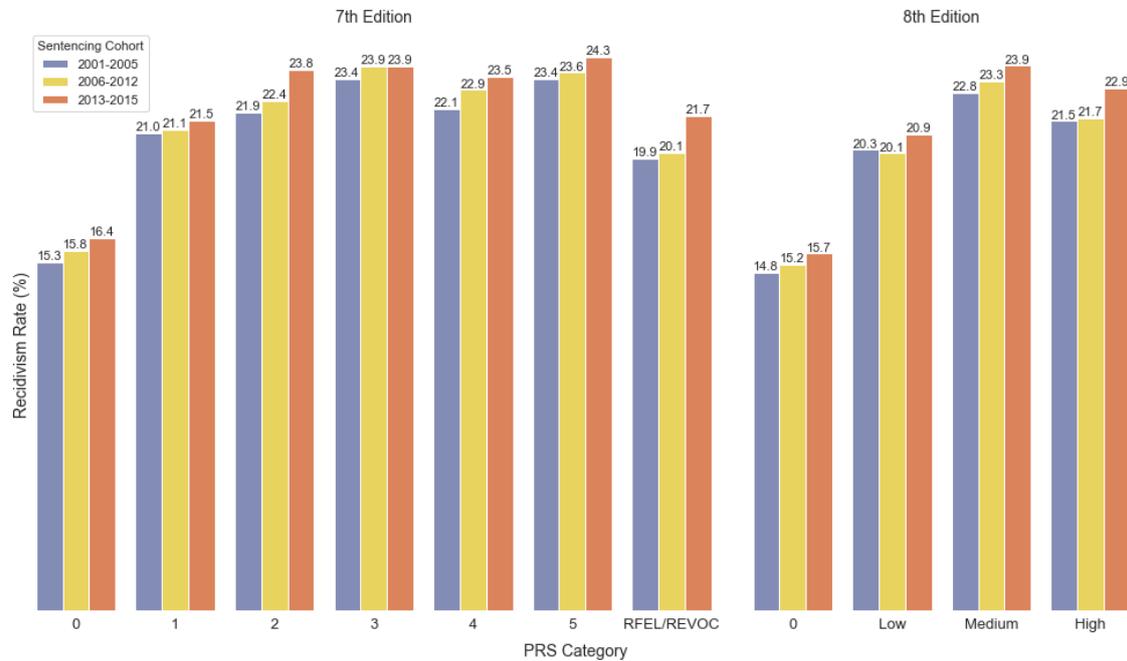
Figure 21: Recidivism by PRS and Sentencing Cohort

5.3 Recidivism by Crime Category

The next set of analyses focus on recidivism rates for six specific crime categories: violent crimes, firearms crimes, sex crimes, felonies, driving under the influence (DUI) crimes, drug crimes. This analysis is of particular interest to PCS due to its implications for public safety, especially with regard to the first three violent crime categories.

5.3.1 Violent Crimes

There are 23,510 cases of violent convictions in the dataset, committed by 23,031 unique individuals. The majority of cases were committed by individuals with little to no prior criminal history: 54.1% and 49.9% in PRS 0 for the 7th and 8th editions, respectively. The overall recidivism rate for violent convicts to any crime is lower than average, at 11.5%. The violent crime to violent crime recidivism rates are even lower at 1.5%. This suggests that violent offenders are not very likely to recidivate to a subsequent violent offense. Instead, a violent offense is much more likely to be committed by a first-time offender than a repeat violent offender. This finding is somewhat expected, as the PRS distribution of violent convictions largely follows the trends in PRS distributions across the entire dataset in that the majority of offenders have a PRS of 0.
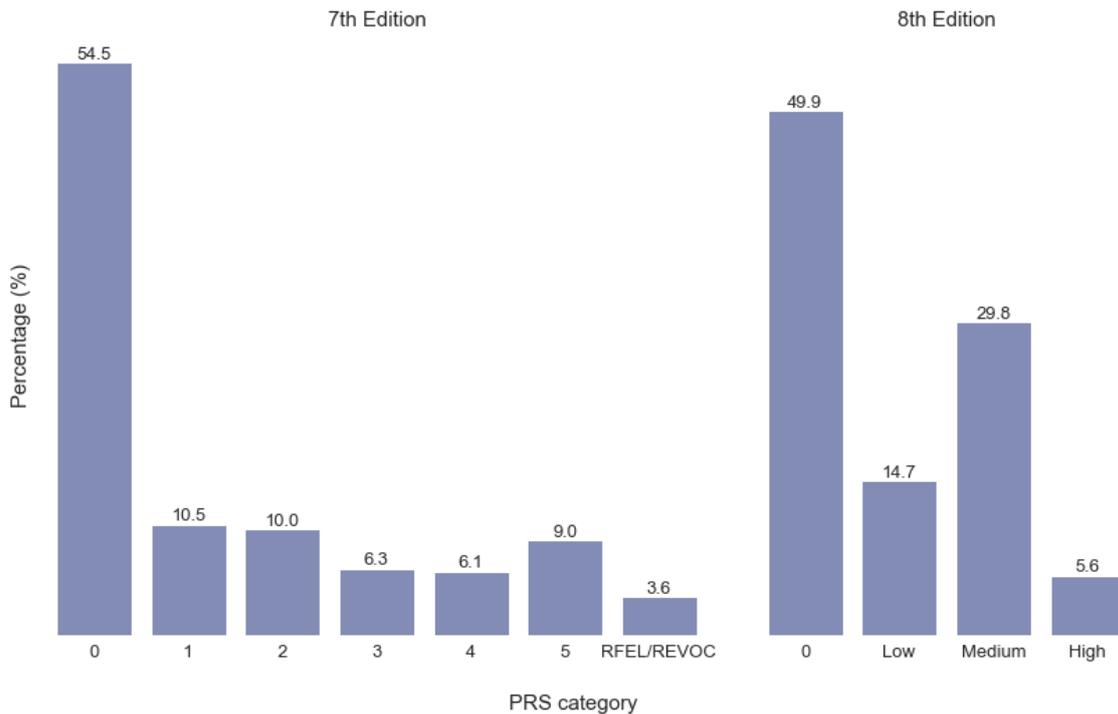
Figure 22: PRS Distribution in Violent Convictions

Figure 23 shows recidivism rates for violent cases by PRS and recidivistic event type. As noted, overall recidivism rates from a violent crime to any crime are much higher than recidivism rates from a violent crime to a subsequent violent crime across all PRS categories. When further categorized by PRS categories, recidivism trends for a violent convict committing a subsequent crime of any offense type does not seem correlated with the 7th edition PRS scores, except for the first two categories (0 and 1). In comparison, violent-to-any recidivism rates do show a positive correlation with the 8th edition score categories 0 through Medium. For violent-to-violent recidivism, there is a small increasing trend in recidivism across categories 0-5 for PRS 7th edition and all four categories in the 8th edition. This suggests that violent offenders who recidivate to a violent crime are more likely to have longer or more serious criminal histories. The difference in recidivism rate is quite small in magnitude here, ranging between 1.3 % to 2.3% in both PRS editions. Overall, the 8th edition PRS performs better in terms of predicting recidivism rates across categories for both overall and violent-to-violent recidivism.

The results for violent-to-violent recidivism is particularly important for three reasons. First, the overall recidivism rate is low. Second, there is only a slight increase in violent-to-violent recidivism rates across PRS categories. Lastly, most violent offenders have a PRS of 0 (both editions). This suggests that repeat violent offenders are perhaps of a lesser concern to public safety compared to first-time violent offenders.
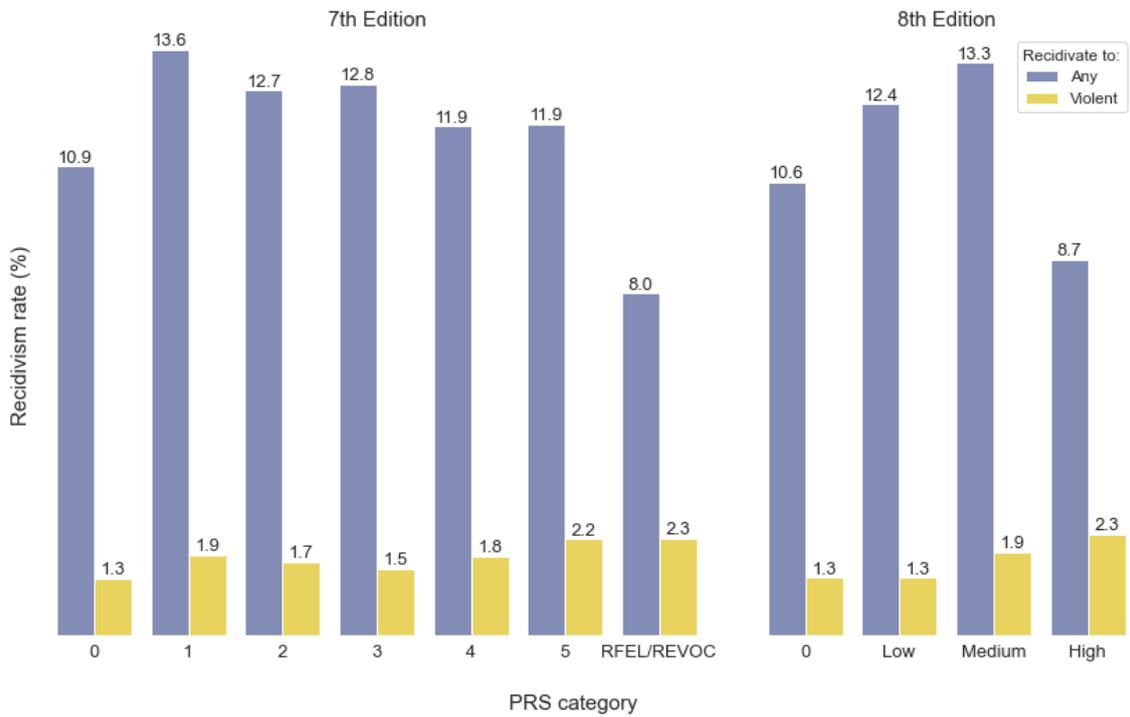
Figure 23: Violence Recidivism by PRS and Recidivistic Event Type

Of all violent convictions in the dataset, 10,429 were committed by White offenders and 10,892 by Black offenders. Both the overall recidivism rate (violent crime to any crime) and the violent-to-violent recidivism rates are comparable across race groups. The overall recidivism rate is 11.7% and 12.6% for White versus Black offenders. The violent-to-violent recidivism rate is 1.6% and 1.5% for White and Black offenders, respectively.

As Figure 24 below shows, for violent crimes recidivating to any crime, Black violent offenders with little or no criminal histories are slightly more likely to recidivate than White offenders with a difference of around 2 percentage points, in PRS category 0 in both editions. However, in the RFEL/REVOC and High categories, White offenders are more likely to recidivate. The difference here is slightly larger at around 3 percentage points for both RFEL/REVOC and High.
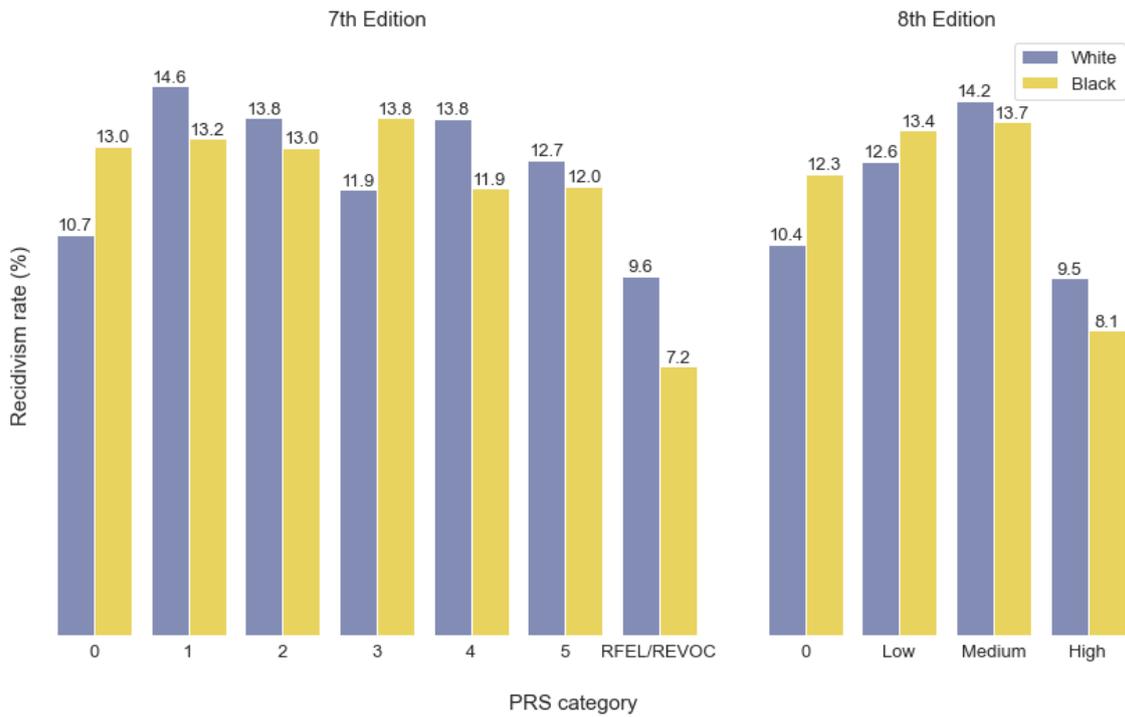
Figure 24: Violent to Any Offense Recidivism by PRS and Race

For violent-to-violent recidivism, Black offenders are slightly more likely to recidivate on both extremes of the 7th edition PRS score spectrum (categories 0 and RFEL/REVOC) compared to White offenders, although the difference here is quite small (below 1 percentage point in absolute difference). This is shown in Figure 25. In the 8th edition scores, Black offenders with PRS categories 0 are slightly more likely to recidivate to another violent crime than White offenders, whereas White offenders have higher recidivism rates in the remaining categories.
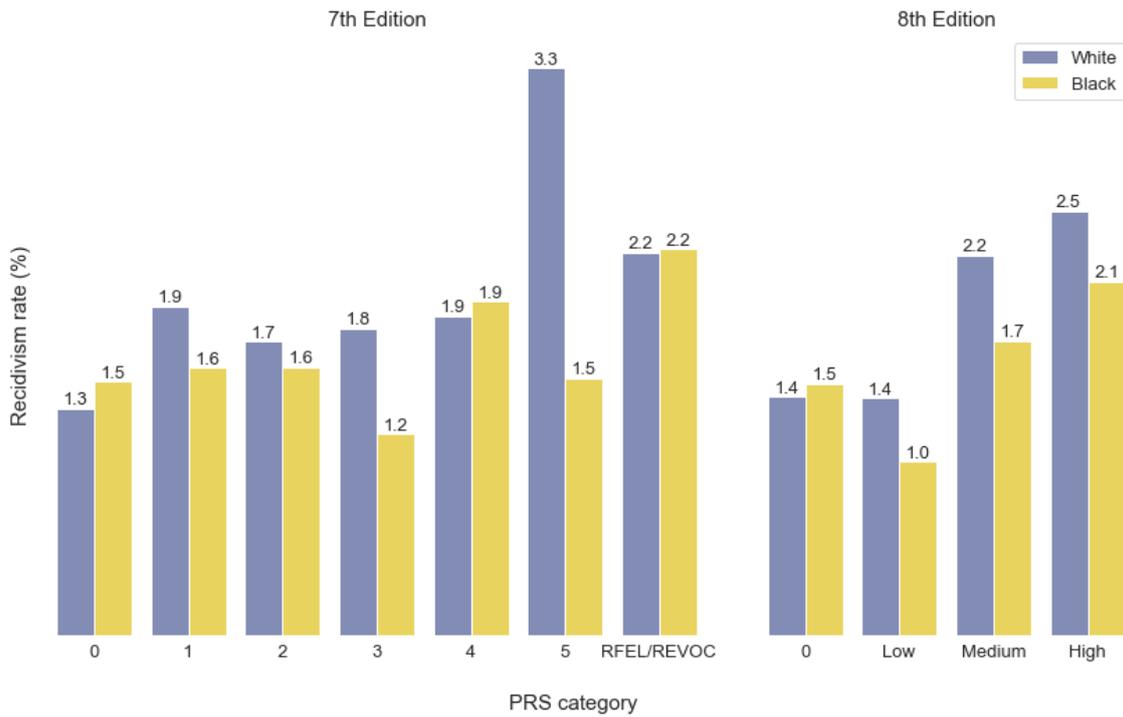
Figure 25: Violent to Violent Recidivism by PRS and Race

5.3.2 Sex Crimes

A total of 1,055 sex crimes are observed in the dataset, committed by 1,053 unique individuals. The majority of cases were committed by individuals with little or no criminal history; 77.6% of cases were committed by individuals in the 7th PRS edition category 0, and 69.6% by individuals in the 8th edition category 0. The overall sample size here is quite small, especially when further subcategorized by PRS. For instance, PRS category RFEL/REVOC only accounts for 1.3% (n=14) of all sex crime cases. Thus, findings should be interpreted with caution.
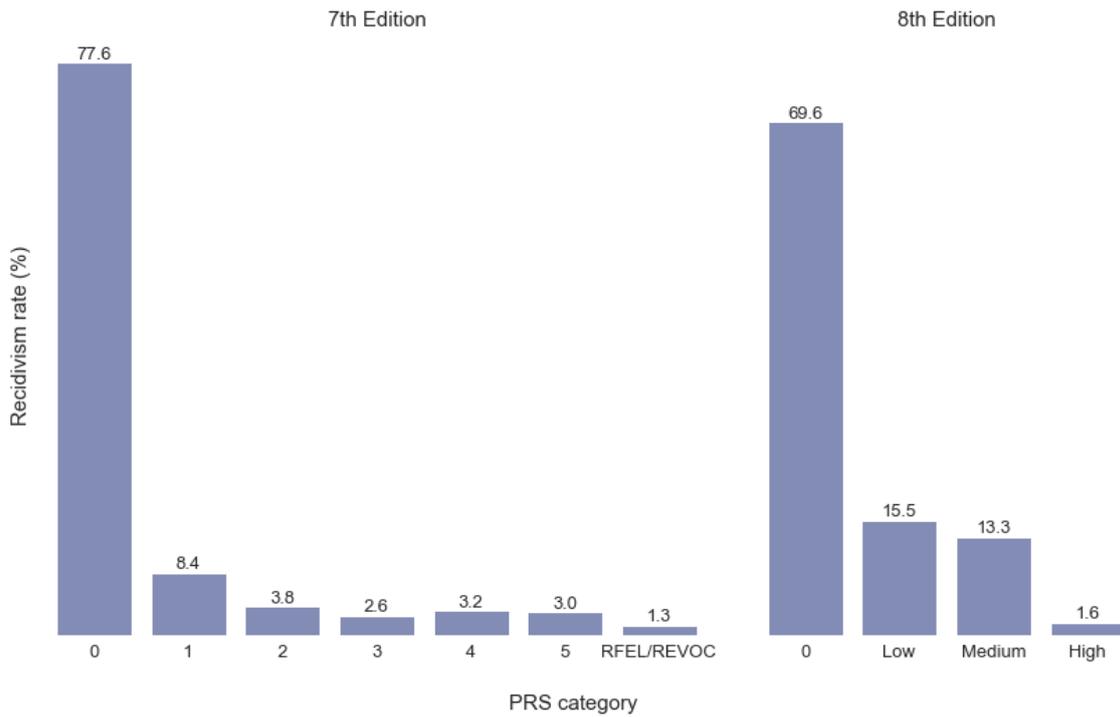
Figure 26: PRS Distribution in Sex Crime Convictions

Among all sex crime cases, only 10.3% recidivated to a subsequent crime of any kind—this is substantially lower than the the overall recidivism rate of 18.8%. Recidivism rates for sex crimes to a subsequent sex crime is even lower at 0.2%. When considering recidivism rates by PRS for sex-to-any crime cases, there is no relationship between recidivism rates and the 7th edition PRS scores. For the 8th edition scores, there is a generally increasing trend between all four categories (Figure 27). The sex crime to sex crime sample size is too small to discern any meaningful trends between recidivism and PRS categories.
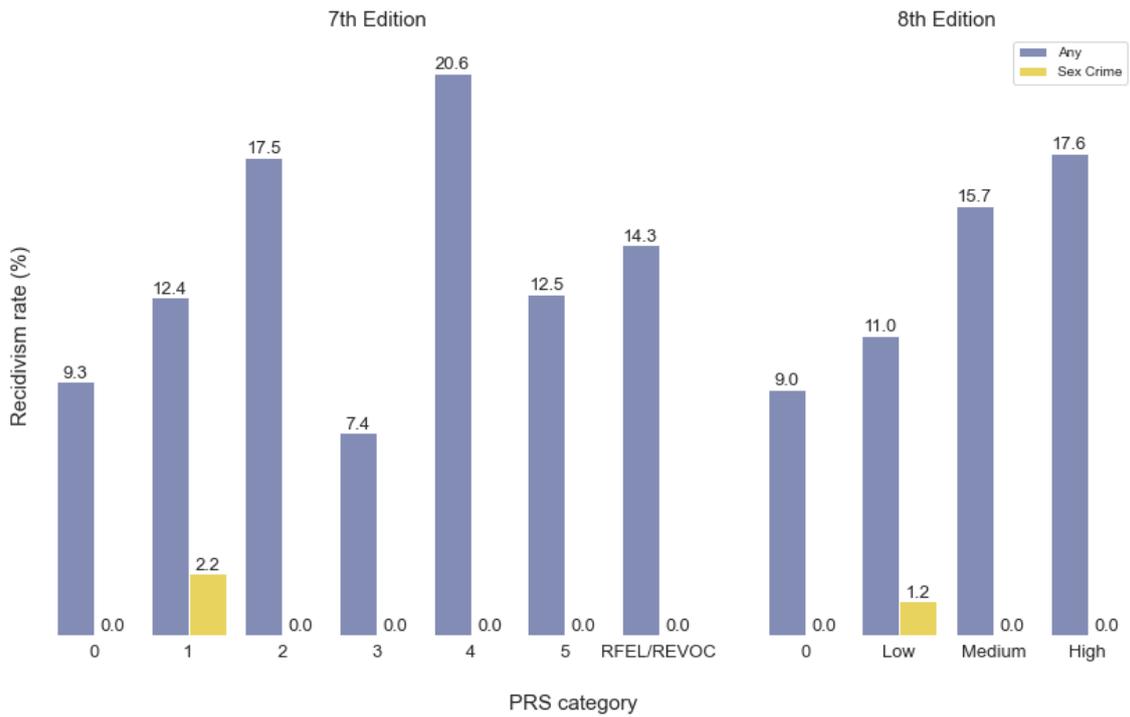
Figure 27: Sex Crimes Recidivism by PRS and Recidivistic Event Type

By race, 847 cases of sex crimes were committed by White offenders, and 151 by Black offenders. Due to the small sample sizes, comparisons in sex crime recidivism rates between races are not included in this report.

In accordance with the Adam Walsh Child Protection and Safety Act of 2006, sex crimes are further organized into three tiers, with tier III being the most serious tier. The tier-based distribution is provided in Figure 28. Within the dataset, Tier I sex offenses constitute the largest share of sex convictions (44.1%), followed by Tier III offenses at a close second at 38.2% and Tier II at 17.1%.
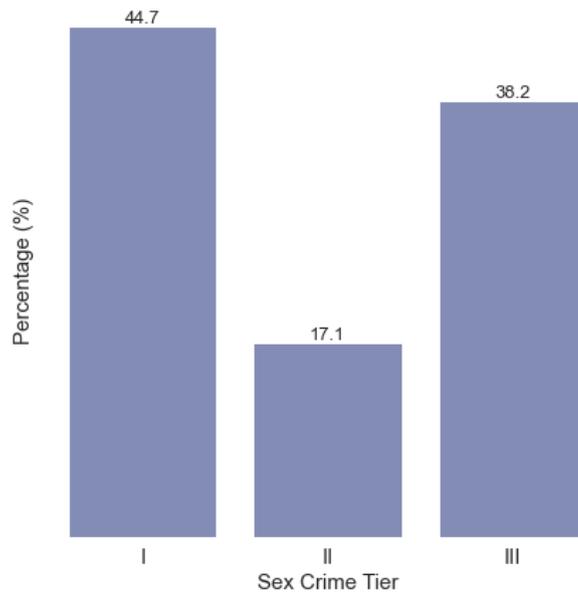
Figure 28: Sex Crimes Tier Distribution

Overall recidivism rates are similar across different Sex Crime Tiers, at 10.4%, 10.0%, and 10.4% for Tiers I, II, and III respectively. Due to the small sample size, sex-crime–to–sex-crime recidivism rates by Tier will not be compared here. Generally, the small proportion of sex-crime–to–sex-crime recidivism indicates that repeat sexual predators are not a huge concern for public safety. Instead, efforts to improve public safety should focus on identifying and deterring first-time sex offenders.

5.3.3 Firearms

There are 28,263 total firearms convictions in the dataset. A large proportion of these cases were committed by individuals with little to no prior criminal histories (47.1% and 43.9% in the PRS 0 categories, 7th and 8th edition). However, in the PRS 8th edition scores, there is a significant portion of cases (38.2%) committed by offenders in category Medium. In contrast, in the PRS 7th edition scores, distribution across categories 1 through 5 are relatively flat, ranging from 7.5% to 13.3%. This may reflect an intentional design in the revised PRS categorization in the 8th edition, which places much heavier emphasis on the type of prior convictions as opposed to the number of priors when determining PRS categories. For both editions, the highest category (RFEL/REVOC and High) represent the smallest proportion of firearms convictions.
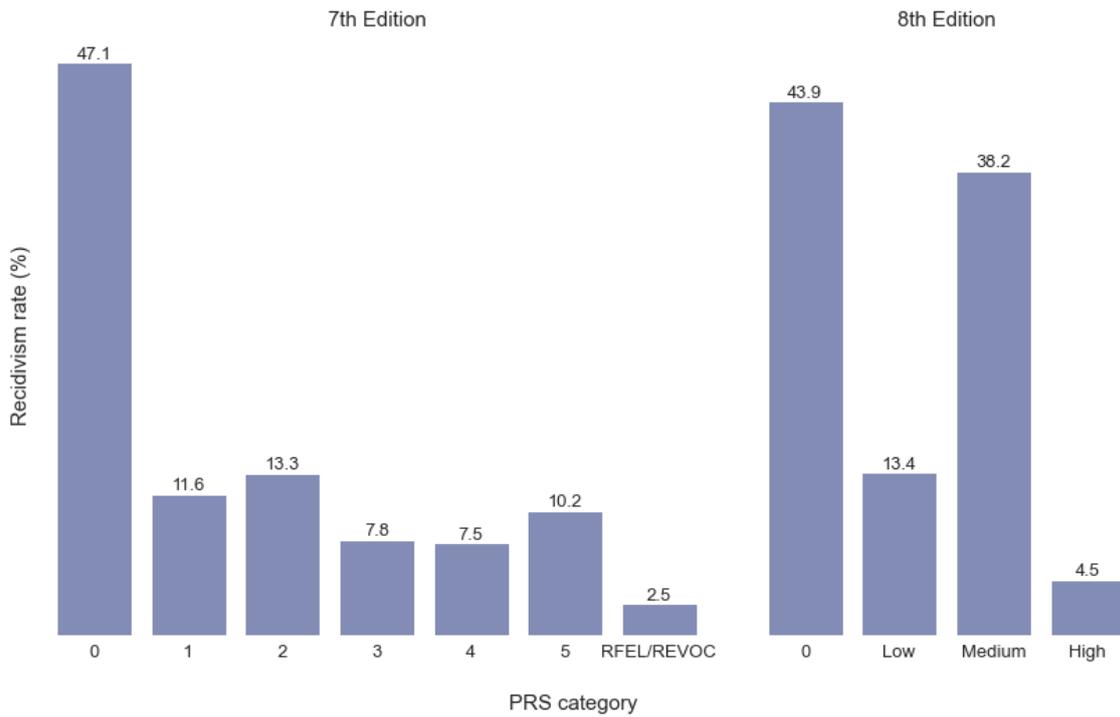
Figure 29: PRS Distribution in Firearms Convictions

Among all firearms offenses, 17.5% recidivated within three years (any subsequent crime), just below the overall average of 18.8%. The firearms-to-firearms recidivism rate is much lower, at 2.6%. For cases recidivating to any offense, there does not appear to be a positive correlation between PRS categories and recidivism rates for both PRS editions, with the exception of the increase between the first two categories. For firearms-to-firearms recidivism, there does not appear to be any trends in relation to increasing PRS categories.
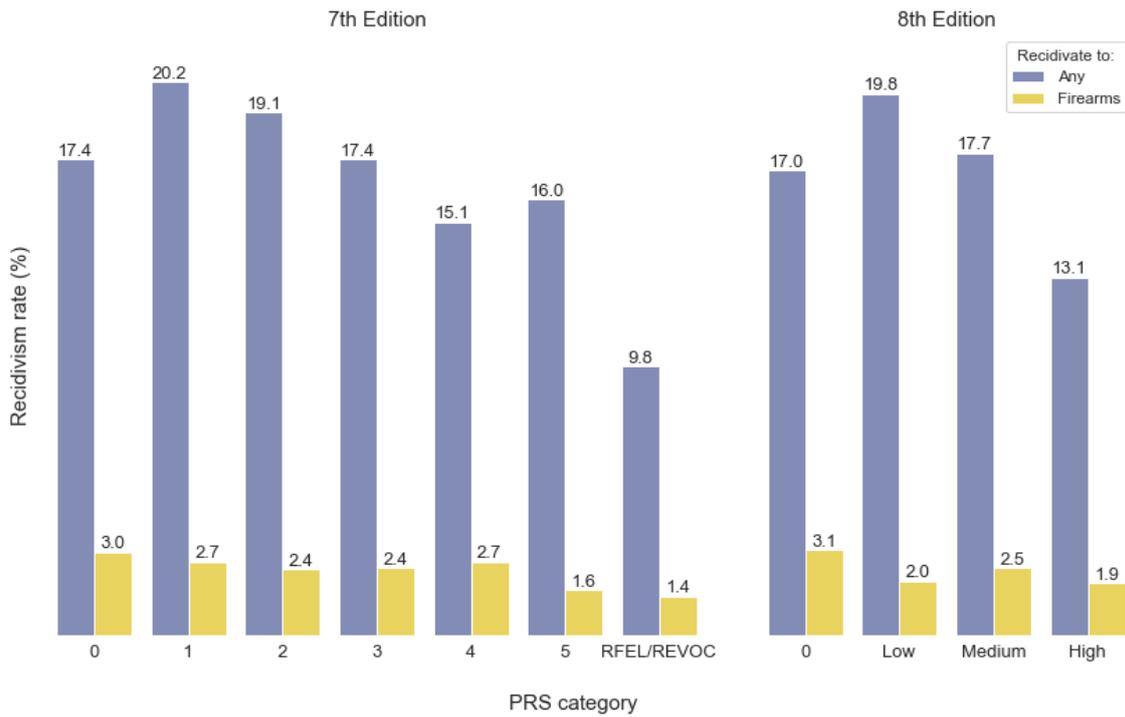
Figure 30: Firearms Recidivism by PRS and Recidivistic Event Type

By race, a larger proportion of cases were committed by Black offenders (18,166) compared to White offenders (7,807). Overall recidivism rates to any subsequent crime are similar between the two groups–17.5% and 18.2% for White versus Black offenders. The firearms-to-firearms recidivism rate, however, is higher for Black offenders at 3.4%, compared to 1.2% for White offenders.

Looking at overall recidivism rates by PRS and race, Figure 31 shows that Black offenders in PRS categories 0, 1, and 3 in the 7th edition as more likely to recidivate than White offenders in the same PRS category, but White offenders recidivate more in categories 2, 4, 5, and RFEL/REVOC. For the 8th edition PRS scores, recidivism rates are higher for Blacks in categories 0, Low, and High.
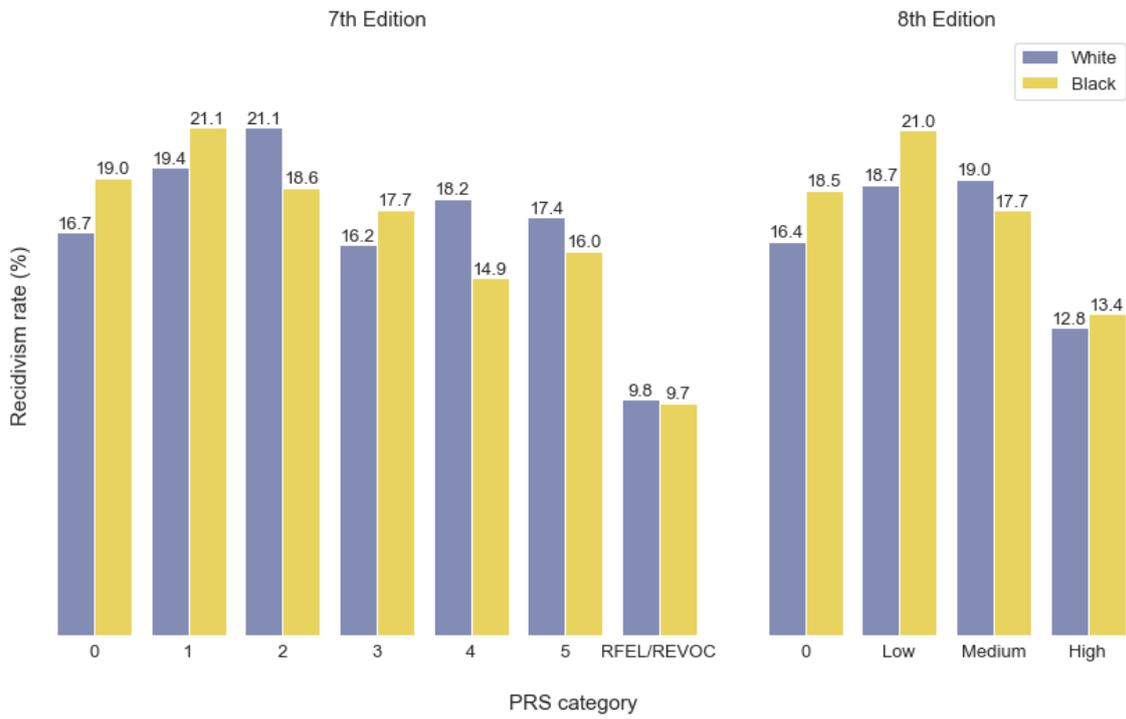
Figure 31: Firearms to Any Offense Recidivism by PRS and Race

Figure 32 below shows the firearms-to-firearms recidivism rates by PRS and race. Recidivism rates for both races do not show any apparent trends with PRS categorization in either edition.
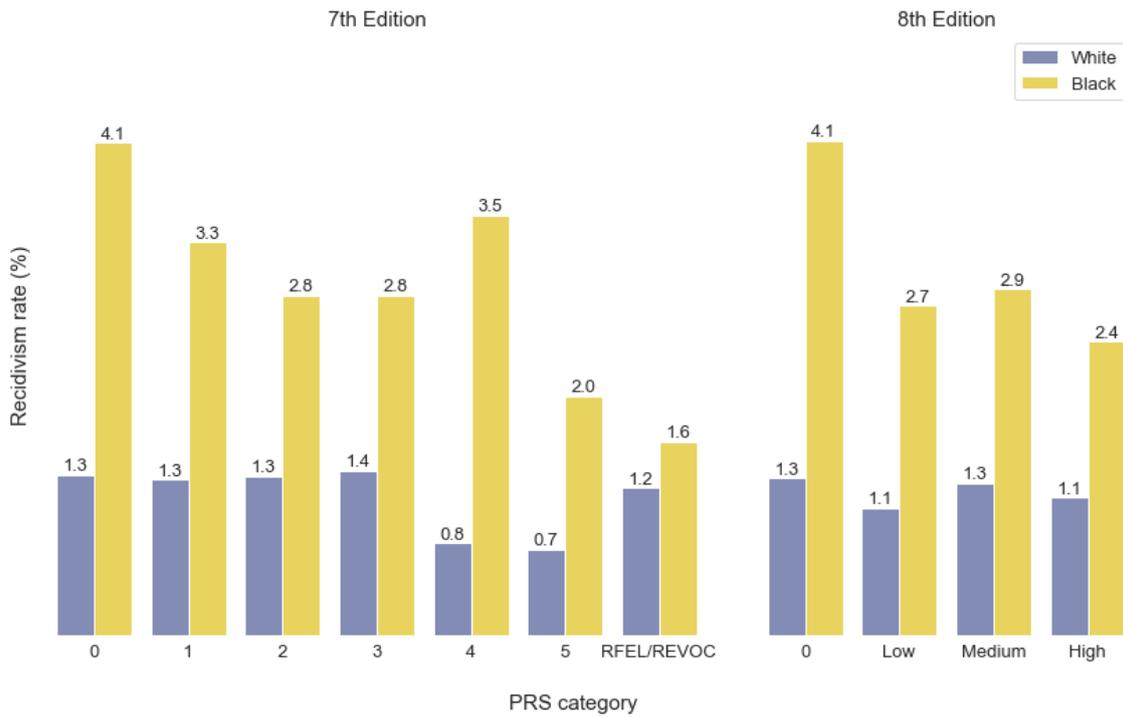
Figure 32: Firearms to Firearms Recidivism by PRS and Race

5.3.4 Felonies

Felonies are identified by cases with an Offense Gravity Score of 5 or higher. Of the 464,101 total felony cases, the biggest subset is cases committed by first time offenders (42.5% in PRS 8th edition category 0), or offenders with little prior criminal history (49.3% in PRS 7th edition category 0), as shown in figure 33 below. The remaining cases are distributed fairly evenly across numeric categories in the 7th edition PRS scores. In PRS 8th edition, 30.7% of cases were committed by individuals in category Medium, followed by 21.9% in category Low. In both editions, the RFEL/REVOC and High categories have the least number of felony convictions.
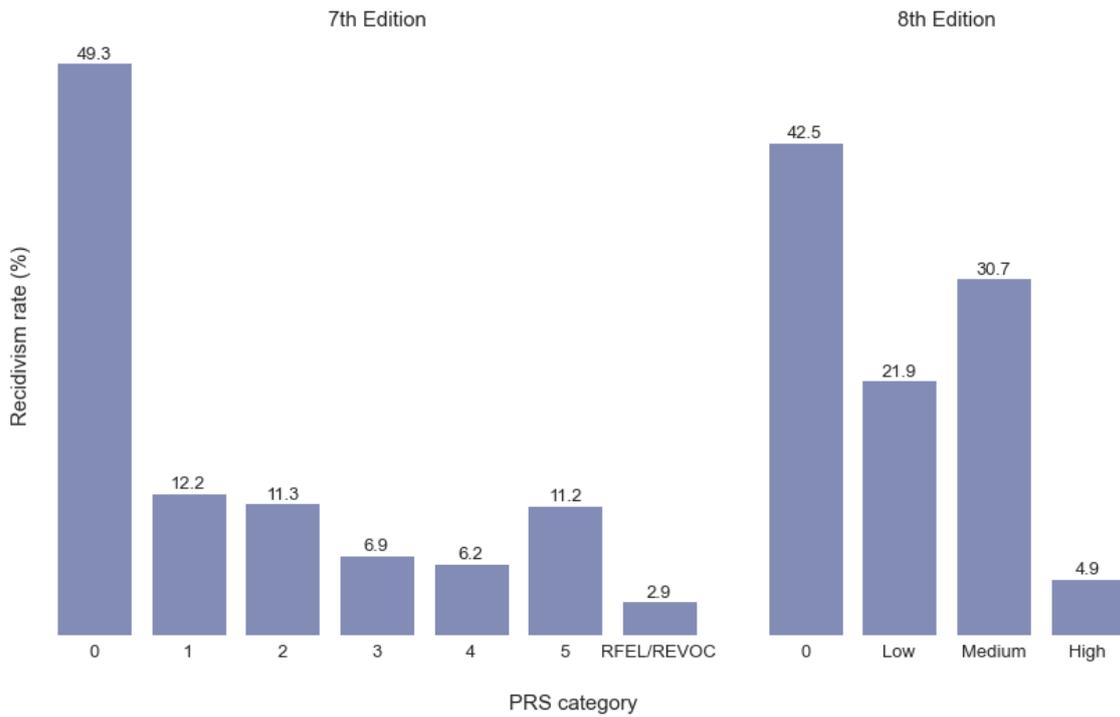
Figure 33: PRS Distribution in Felony Convictions

Among all felony convictions, 15.4% recidivated within three years, and 8.5% recidivated to a subsequent felony. By PRS categories, overall recidivism rates (i.e., recidivating from a felony to any crime) shows an increasing trend between PRS categories 0 and 4 for the 7th edition, and 0 and Medium for the 8th edition. For felony cases that recidivated to a subsequent felony, there is a slightly increasing trend in PRS categories 0 and 2 (7th ed.). The 8th edition PRS categories show an increase from PRS 0 through Medium, with a small decrease in category High. This suggests that PRS 8th edition is better at predicting overall recidivism, as well as felony-to-felony recidivism, among convicted felons.
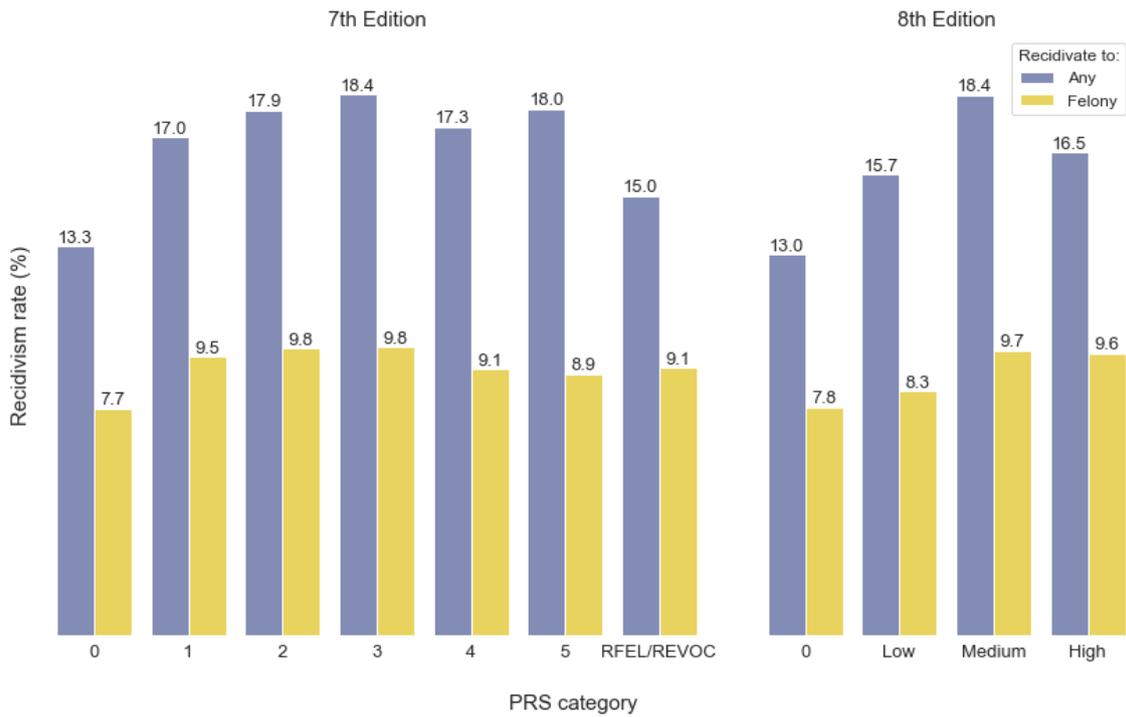
Figure 34: Felony Recidivism by PRS and Recidivistic Event Type

Overall felony recidivism rates are similar for Black offenders (16.9%) and White offenders (15.3%).When grouped by PRS in Figure 35, overall recidivism rates increase between categories 0 to 5 and 0 to Medium for White offenders (7th and 8th editions, respectively). However, no apparent trends exist for Black offenders other than the increase in categories 0 to 1, and 0 to Low, in the 7th and 8th editions respectively. In contrast, recidivisim rates show a generally uptrend across PRS categories for White offenders. This suggests that both PRS editions are more predictive of recidivism for White felons than Black felons.
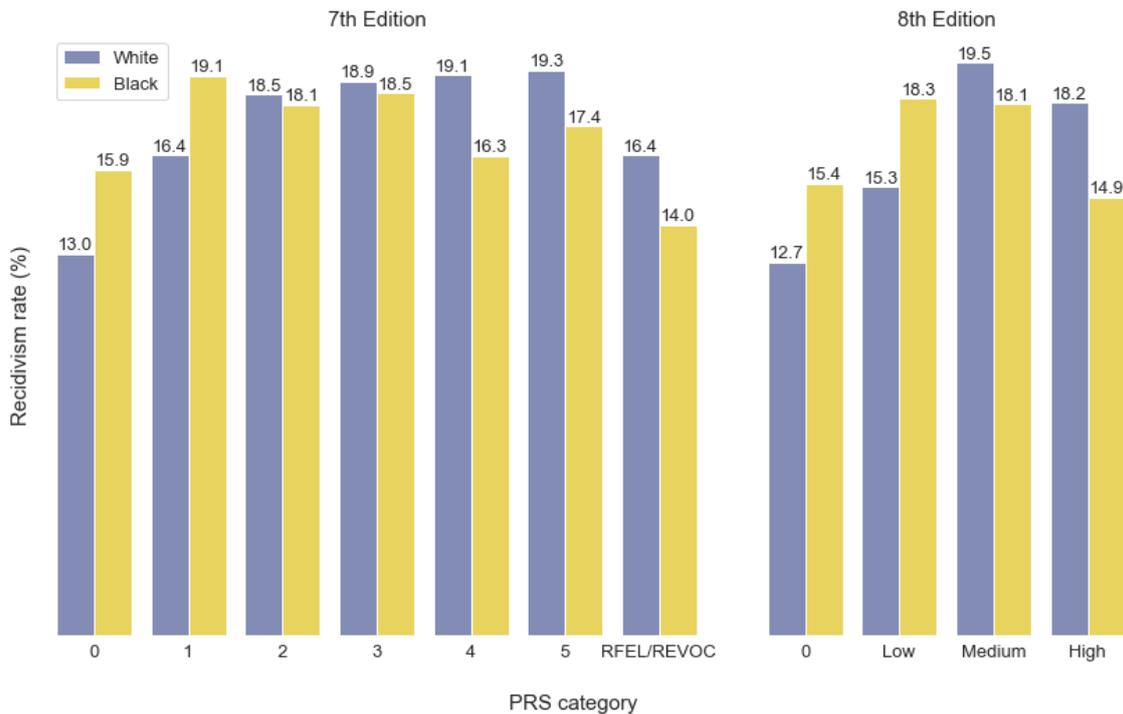
Figure 35: Felony to Any Offense Recidivism by PRS and Race

Felony-to-felony recidivism rates are also similar between races, at 8.3% and 9.5% for White and Black offenders, respectively. Felony-to-felony recidivism shows a generally increasing trend across PRS categories for White offenders, other than a slight dip in category 4 in the 7th edition (Figure 36). Between PRS versions, the 8th edition PRS categories show a much stronger relationship with recidivism rates for White offenders compared to the 7th edition. However, neither edition seems predictive of recidivism for Black offenders; recidivism rates actually decrease across categories 2 through RFEL/REVOC for 7th edition scores and across all categories for 8th edition scores. This is particularly surprising since the RFEL/REVOC category is assigned to repeat felony offenders. White offenders in RFEL/REVOC recidivate at around 4 percentage points more than Black offenders in the same category. This suggests that having multiple prior felony convictions is less predictive of recidivism for Black offenders than for White offenders. This could potentially be driven by disproportionate categorization of Black offenders into the RFEL/REVOC category, or disparate sentencing outcomes leading to differences in recidivism rates between the two races.
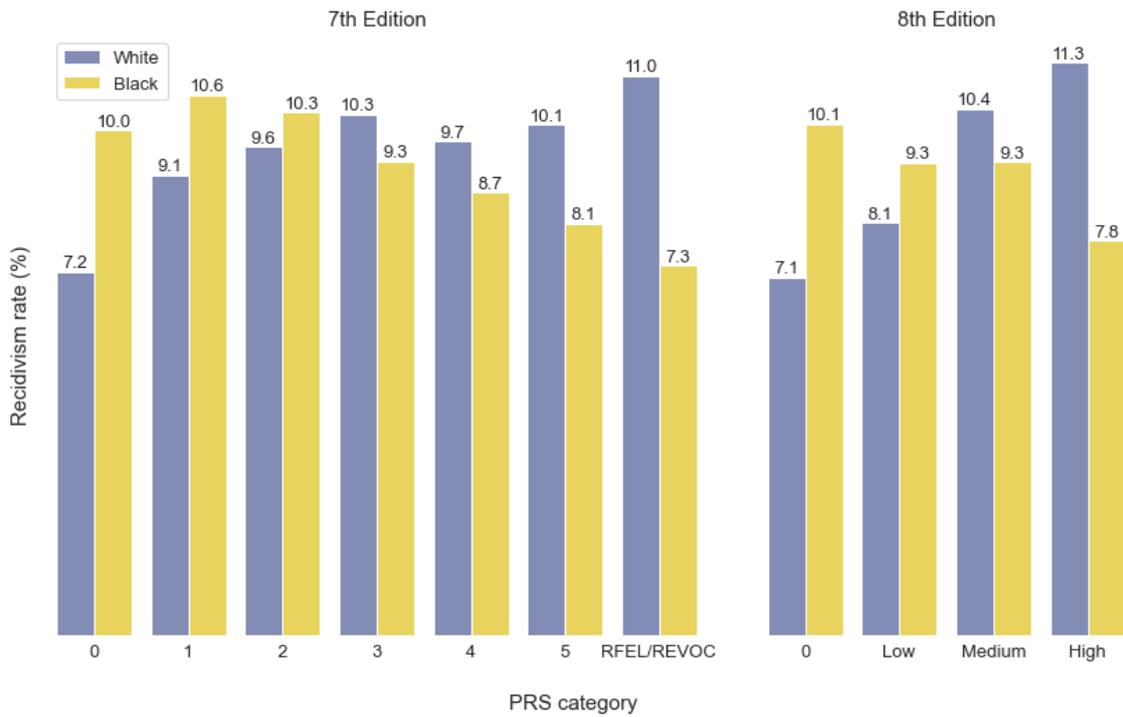
Figure 36: Felony to Felony Recidivism by PRS and Race

5.3.5 Drug Crimes

There are a total of 315,670 drug-related convictions in the dataset. Similar to previous findings, the largest proportion of cases were committed by individuals with little or no prior criminal history, with 48.4% and 40.9% of cases in category 0 in the 7th and 8th edition PRS scores.
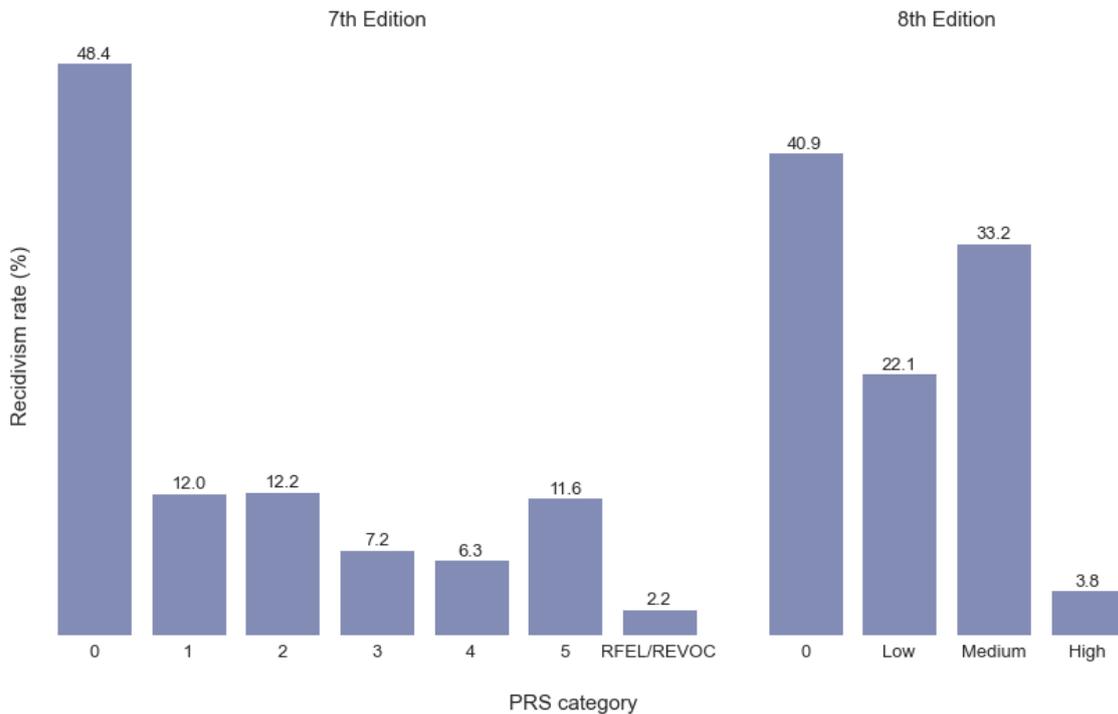
Figure 37: PRS Distribution for Drug Convictions

Among all drug convicts, 21.7% recidivated within the three-year window. This is higher than the overall average recidivism rate of 18.8% across the entire dataset, suggesting that convicts of drug crimes are more likely to recidivate than average. The drug-to-drug crime recidivism rate, however, is lower than average at 13.1%.

Overall recidivism rates (i.e., drug recidivating to any crime) do not show a strong correlation with PRS categories for either edition. In fact, as seen in figure 38, there is a generally downward trend in recidivism rates across PRS categories, with the exception of the increase between the first two categories in both PRS editions. Drug-to-drug recidivism also do not show any strong correlation with PRS categories, except between 0 and 1 or 0 and Low. Similar to overall recidivism rates, there appears to be a slightly decreasing trend after the 1/Low categories.
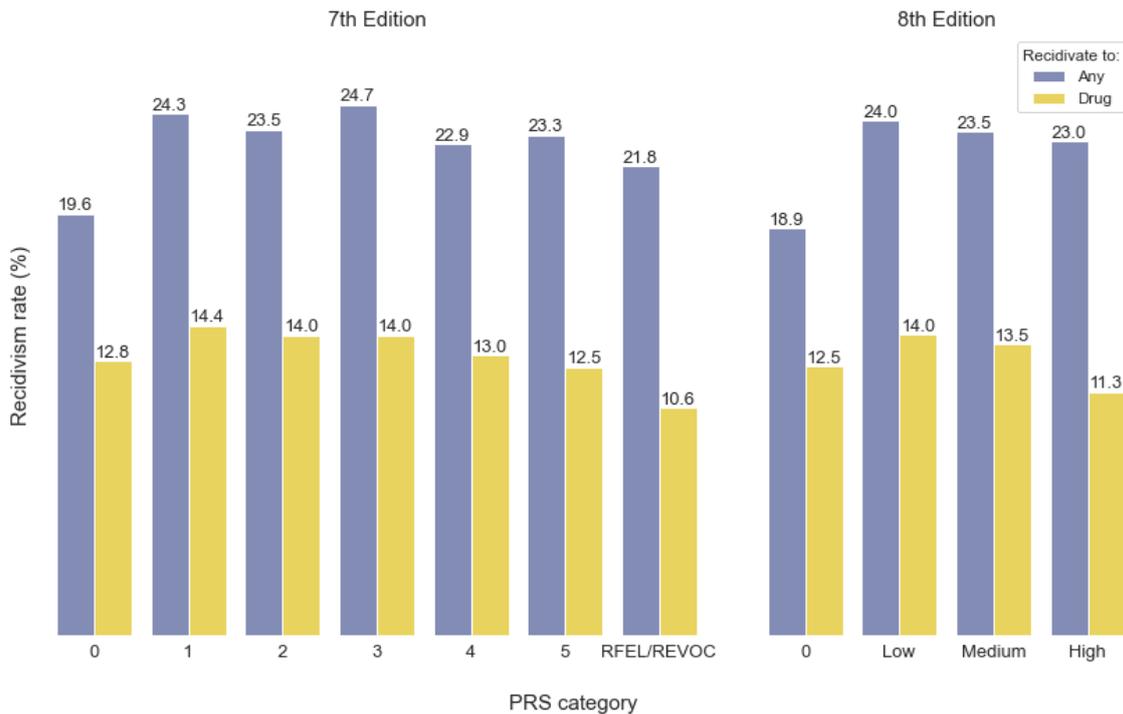
Figure 38: Drug Recidivism by PRS and Recidivistic Event Type

183,856 drug convictions were for White offenders, compared to 109,432 convictions for Black offenders. The overall recidivism rate is similar across both racial groups, at 22.6% for White offenders compared to 21.8% for Black offenders. The drug-to-drug recidivism rates are 13.1% and 14.0% for White and Black offenders, respectively. By PRS categories, White offenders recidivate to all crimes at a slightly higher rate than Black offenders, which is consistent across most PRS categories with the exception of PRS 0 in the 7th edition (Figure 39). PRS 8th edition is more predictive of overall recidivism rates for White offenders convicted of drug crimes, showing an increase in recidivism across all four categories. Neither editions show a strong correlation with increasing overall recidivism rates for Black offenders. For drug-drug recidivism, Black offenders recidivate slightly more across all PRS categories in both editions, with the exception of category High (8th ed., Figure 40). Neither PRS versions show a consistent positive correlation with drug-drug recidivism rates for either race.
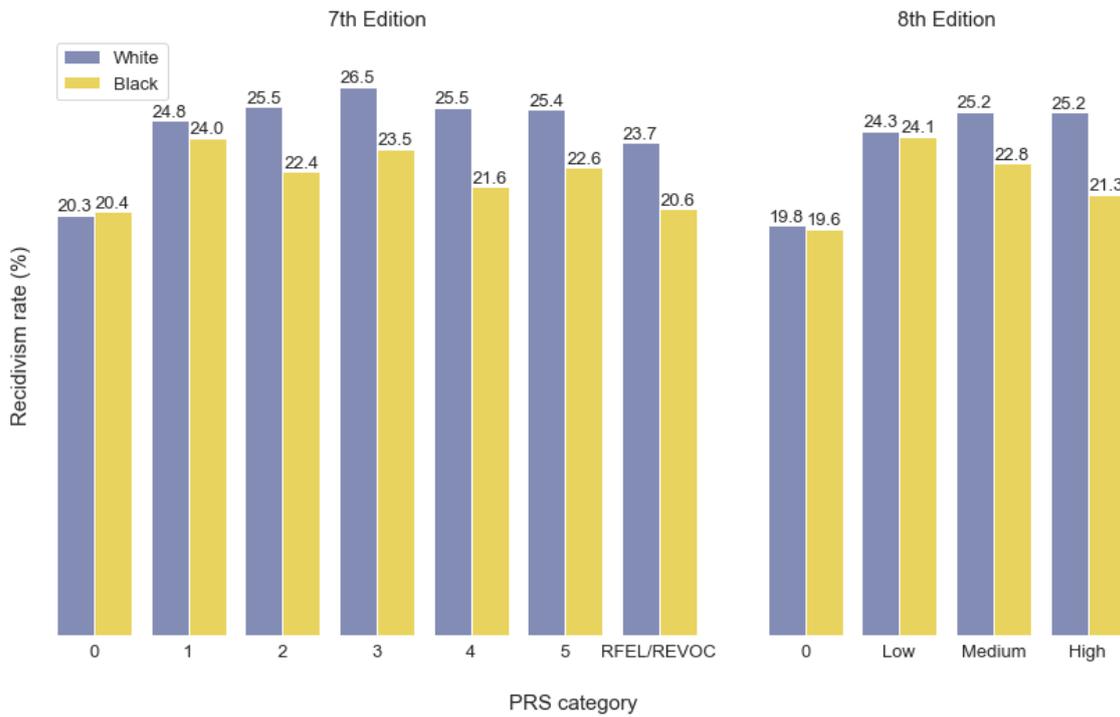
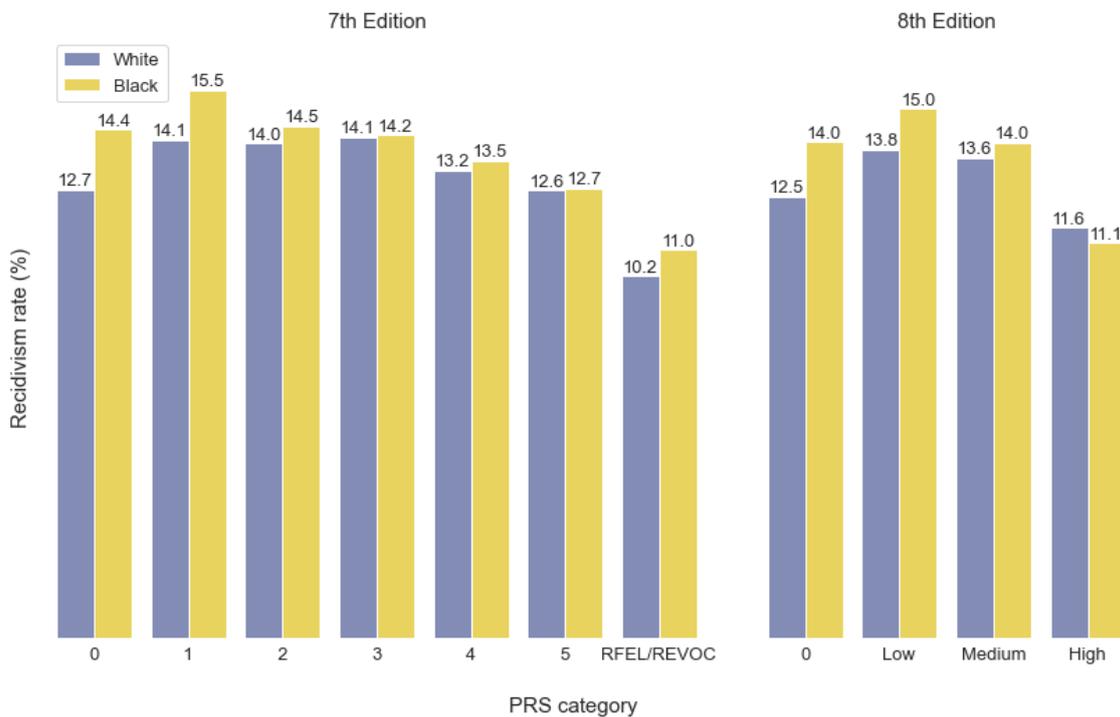Figure 39: Drug to Any Offense Recidivism by PRS and Race

Figure 40: Drug to Drug Offense Recidivism by PRS and Race

5.3.6 Drug Misdemeanors

Drug misdemeanors, defined as drug crimes with an Offense Gravity Score of 4 or below, make up around three quarters (78.7%, n=193,555) of all drug convictions. Offenders of drug misdemeanor offenses have a higher overall recidivism rate than for all drug convictions (24.7%, compared to 21.7%). However, the drug-misdemeanor—to—drug-misdemeanor recidivism rates are lower than the drug-to-drug recidivism rates, at

11.2% (compared to 13.1%).

Figure 41 presents drug misdemeanor recidivism by PRS and recidivistic event type. There is a generally increasing trend between overall recidivism rates and PRS categories for both editions, with PRS 8th edition showing a stronger relationship. The recidivism rates for drug-misdemeanor—to—drug-misdemeanor stay relatively flat across all PRS categories for both editions.
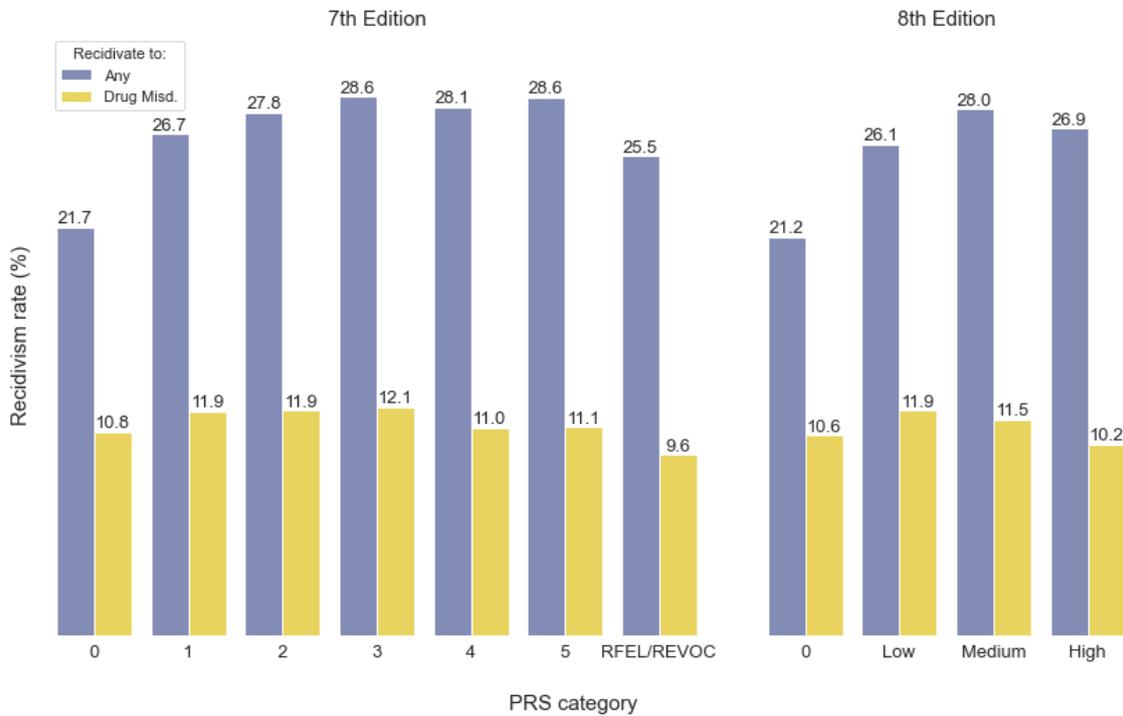

Figure 41: Drug Misdemeanor Recidivism by PRS and Recidivistic Event Type

5.3.7 DUIs

The last crime category included in this analysis is Driving Under the Influence (DUI). DUIs account for 251,777 convictions in the dataset. Similar to previous crime types, most convictions were for individuals with little or no prior criminal record, with 61.5% and 48.7% of all cases in PRS category 0 for the 7th and 8th editions, respectively. Interestingly, the distribution of DUI convictions across the 8th edition PRS categories follows a downward trend across all four categories, which is quite different from the overall PRS category distributions of the entire dataset.
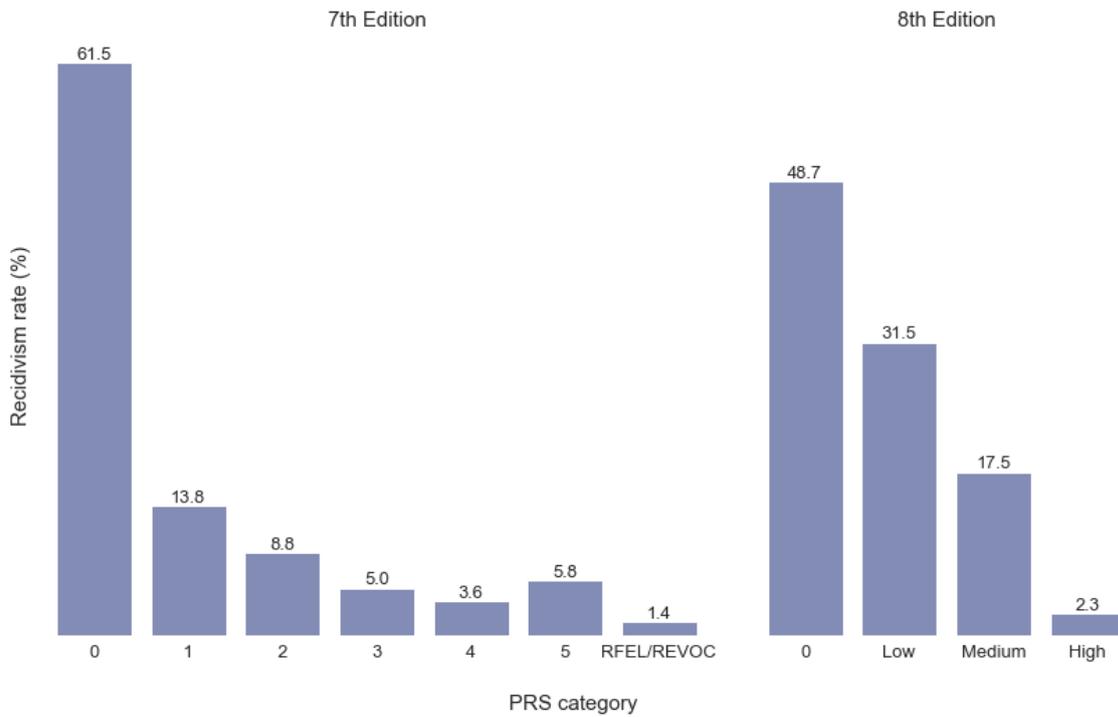

Figure 42: PRS Distribution for DUI Convictions

The overall DUI recidivism rate (recidivating to any crime) is lower than average at 13.2%, whereas the DUI-to-DUI recidivism rate is about half of that, at 7.4%. Generally, DUI cases that recidivate to any crime show an increasing relationship between PRS and recidivism, for both editions, except RFEL/REVOC. DUI-to-DUI recidivism rates remain quite flat across PRS categories in both editions, suggesting that there is no relationship between an offender's prior criminal history and their likelihood to commit multiple DUI offenses.
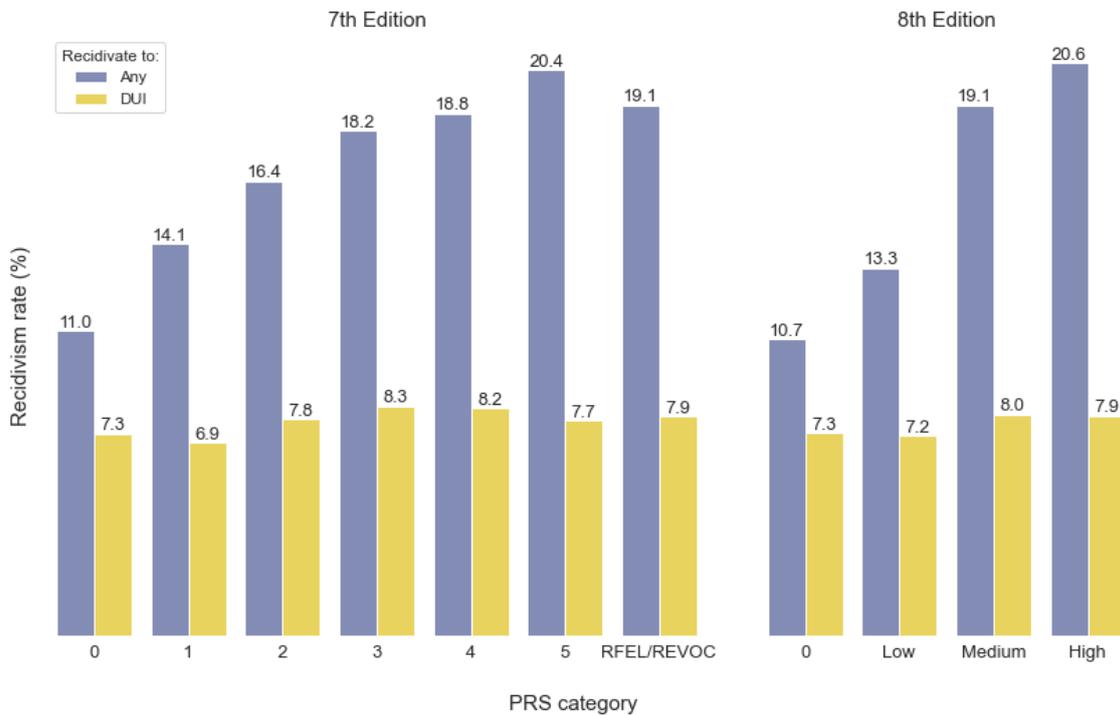

Figure 43: DUI Recidivism by PRS and Recidivistic Event Type

White offenders make up a much larger share of DUI cases than Black offenders, accounting for 218,414 cases as opposed to 28,149 for Blacks. The overall recidivism rates for a DUI case to any offense is higher for Black offenders (16.9%) than White offenders (12.9%), although the DUI-to-DUI recidivism rates are similar across both groups (7.0% and 7.6% respectively). By PRS category, overall recidivism rates is higher for Black offenders across all PRS categories except for RFEL/REVOC and High (figure 44). The DUI-to-DUI recidivism rate is slightly higher for White offenders across all PRS categories, but the difference is quite small in magnitude (figure 45).
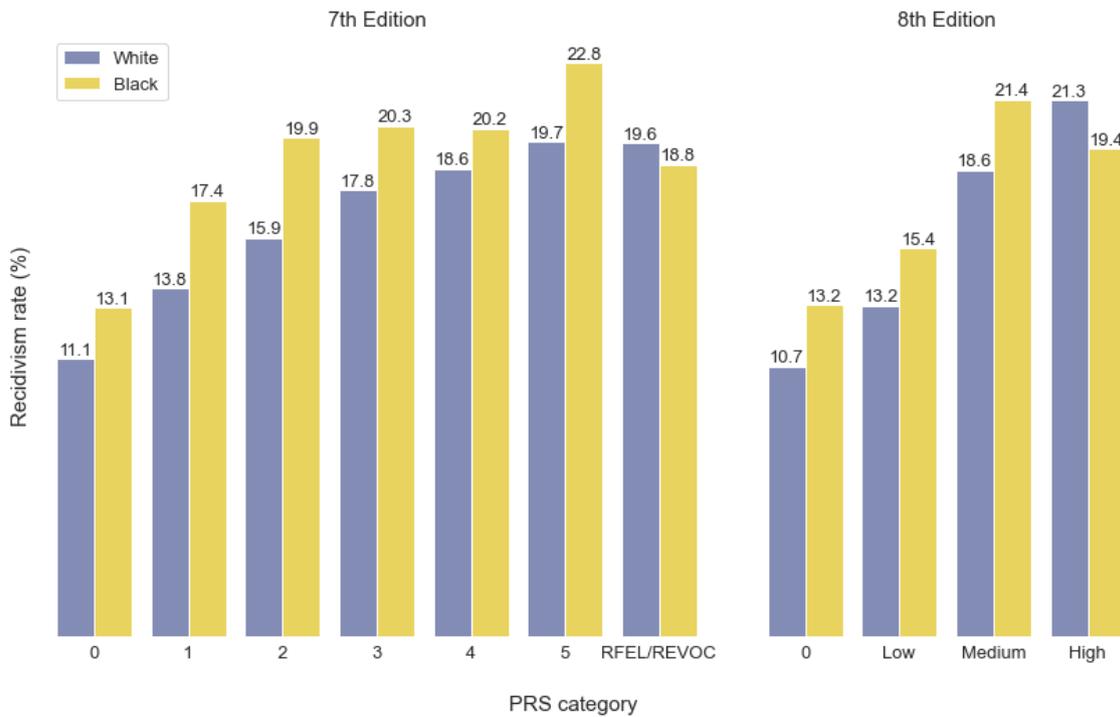

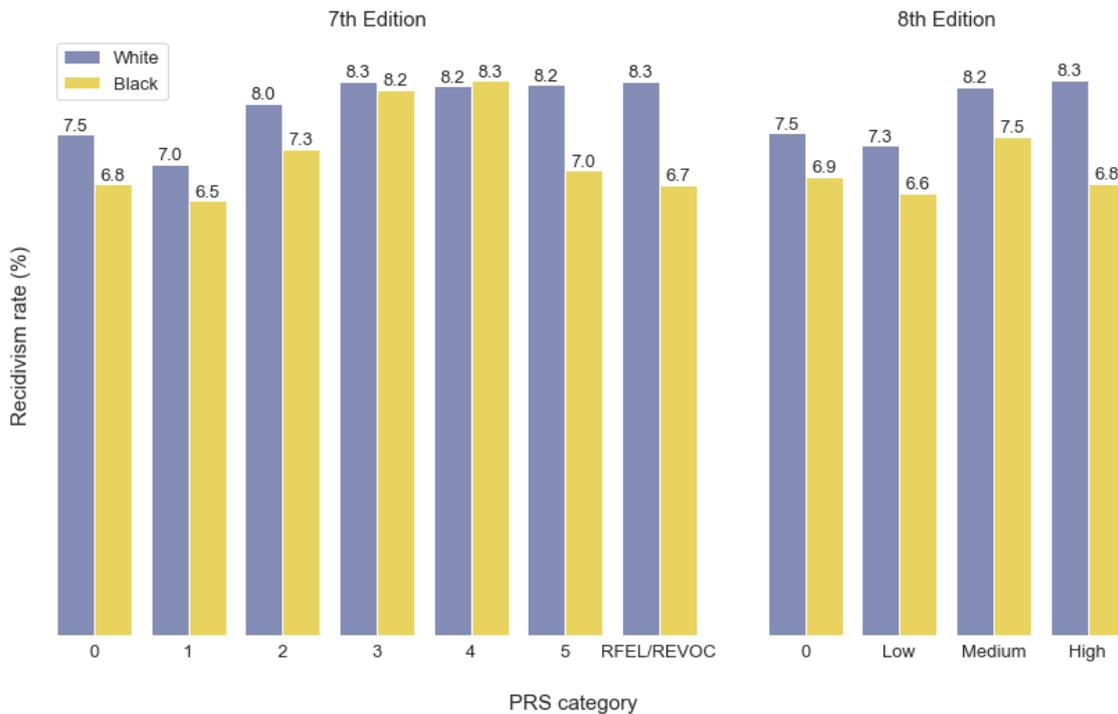Figure 44: DUI to Any Offense Recidivism by PRS and Race

Figure 45: DUI to DUI Offense Recidivism by PRS and Race

5.4   Disparate Impact

The Sentencing Guidelines' are intended to create consistent sentencing outcomes. Notwithstanding, in practice, disparate outcomes may persist. This section analyzes potential disparate sentencing outcomes between Black and White convicts. [26]

5.4.1   Racial Distributions

Figure 46 below shows that Black offenders typically fall into higher PRS categories than their White counterparts, despite being younger than White offenders, on average (as shown in Figure 15 above). For White offenders, 57.1% fall into the PRS 0 categories of the 7th edition, while only 41.2% of Black offenders fall into these categories for the respective editions. The biggest difference in distribution (other than the 0 category) is for category 5, where 16.1% of Black offenders fall into compared to only 7.1% of White offenders. A higher percentage of Black offenders also fall into the RFEL/REVOC of the PRS 7th edition.

The finding that the distribution of PRS categories skews higher for Black offenders compared to White offenders highlights potential disparities in the criminal justice system, but sorting out the reasons for these differences are complex. The major challenge in this regard is distinguishing between differences in offending rates between races and differences in arrest, charging, and sentencing practice between races. [27][28]Further research into the causes of this disparity would be useful.

5.4.2   Sentence Type and Length Disparities

A key concern for PCS is the equitable application of Sentencing Guidelines across offenders of different racial subgroups during the sentencing process. Since sentences are ultimately determined by the judge assigned to each judicial proceeding, there is inevitably a human factor in this decision-making process

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[26]Note that other racial groups are not included since reporting for these groups tend to be inconsistent and thus unreliable, per conversations with PCS.

[27]National Research Council. 2014. The Growth of Incarceration in the United States: Exploring Causes and Consequences. Washington, DC: The National Academies Press.https://doi.org/10.17226/18613.

[28]National Research Council. 2018. Proactive Policing Effects on Communities and Crime. Washington, DC: The National Academies Press.
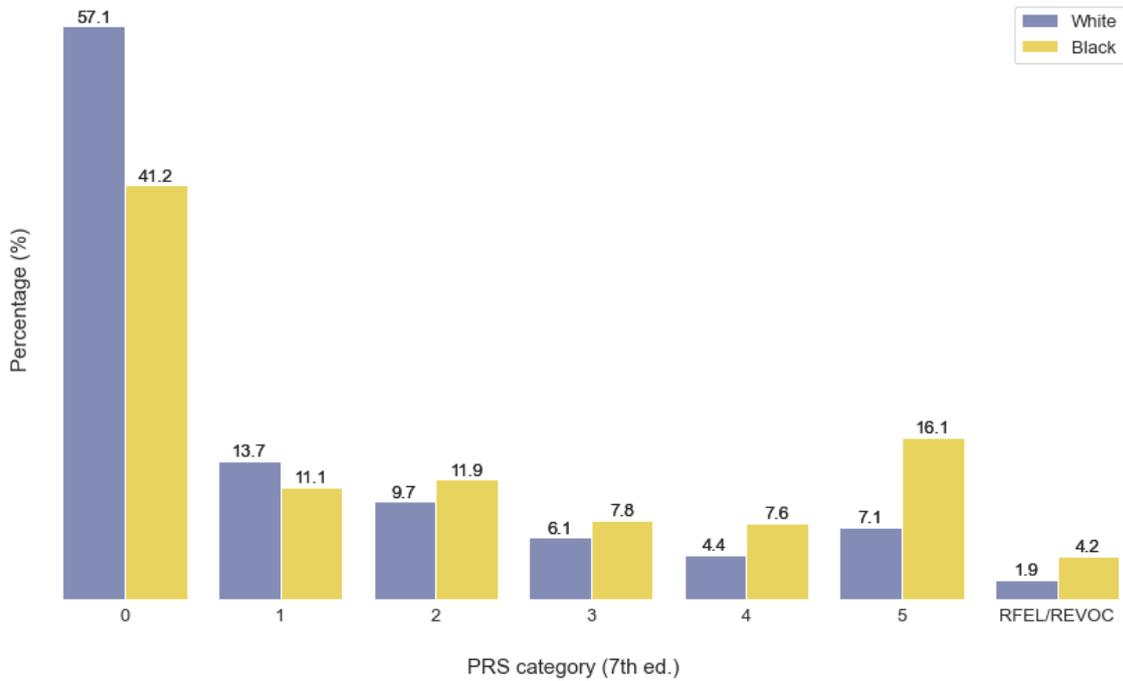
Figure 46: PRS Distribution by Race

that can be a source of disparate impact for minority groups. This section delves into this issue by analyzing potential disparities in sentencing type and incarceration length between Black and White offenders. It is important to note here that the following analyses are conducted on sentencing outcomes based on the current 7th edition Sentencing Guidelines, so only results using 7th edition PRS categories are shown.

Figure 47 below presents the percentage of offenders who receive an incarceration sentence within each PRS category, by offender race. It is clear that across all 7th edition PRS categories except 0, Black offenders are more likely to receive an incarceration sentence compared to White offenders, but the differences are small. Notwithstanding, this difference is still meaningful since the premise of sentencing guidelines is to ensure equal sentencing outcomes across the same PRS category. This suggests that sentencing guidelines alone cannot ensure equitable sentencing; additional reforms in the application of guidelines would be needed to reduce disparate outcomes.
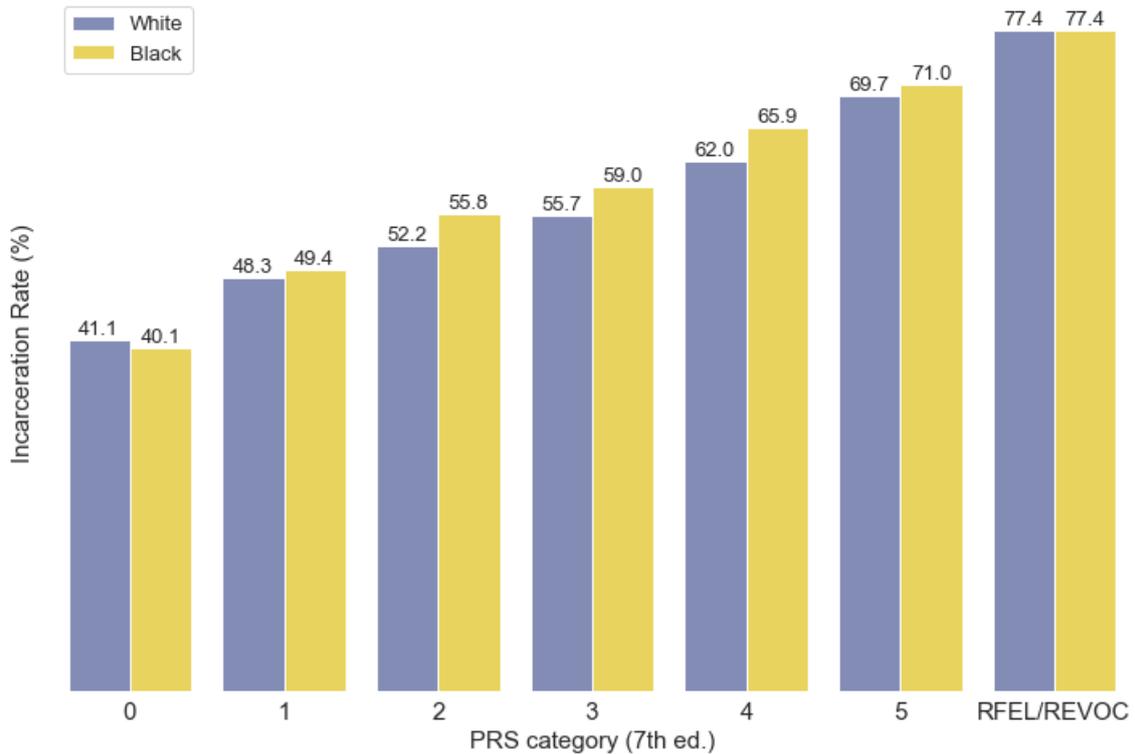
Figure 47: Incarceration Rate by PRS and Race

5.4.3 Sentence Length by PRS Category

The following series of plots show, in order, the mean, median, and 90th percentile sentence lengths (in months) for offenders with an incarceration sentence (i.e., state prison or county jail). This includes 162,150 cases for Black offenders and 399,427 for White offenders. First, comparing Figure 48 and Figure 49, it is apparent that there is typically a long right tail in sentence lengths for both Black and White offenders across all PRS categories—the average sentence is notably higher than the median sentence, reflecting the impact of rightward skew in sentence lengths within each PRS and race subgroup. Second, regardless of the method of aggregation used (mean, median, or 90th percentile), Black offenders receive materially longer sentences than White offenders within each 7th edition PRS category. On average, Black offenders receive sentences that are twice as long as White offenders in the same PRS category, across categories 0 through 3 (Figure 48).

The only exception to the aforementioned trend of Black offenders receiving longer sentences is in the RFEL/REVOC category when using median or 90th percentile values for comparison (Figures 49 and 50). However, using median sentence lengths for comparison, the difference in sentence lengths is much more drastic within PRS 0, with Black offenders receiving almost four times as long of an incarceration sentence than White offenders in the same category. Looking at 90th percentile comparisons, it is apparent that the higher range of sentence lengths for Black offenders in lower PRS categories (0 through 4) are consistently twice as long than for their White counterparts, equating to an incarceration sentence that is around 1 year (12 months) longer.
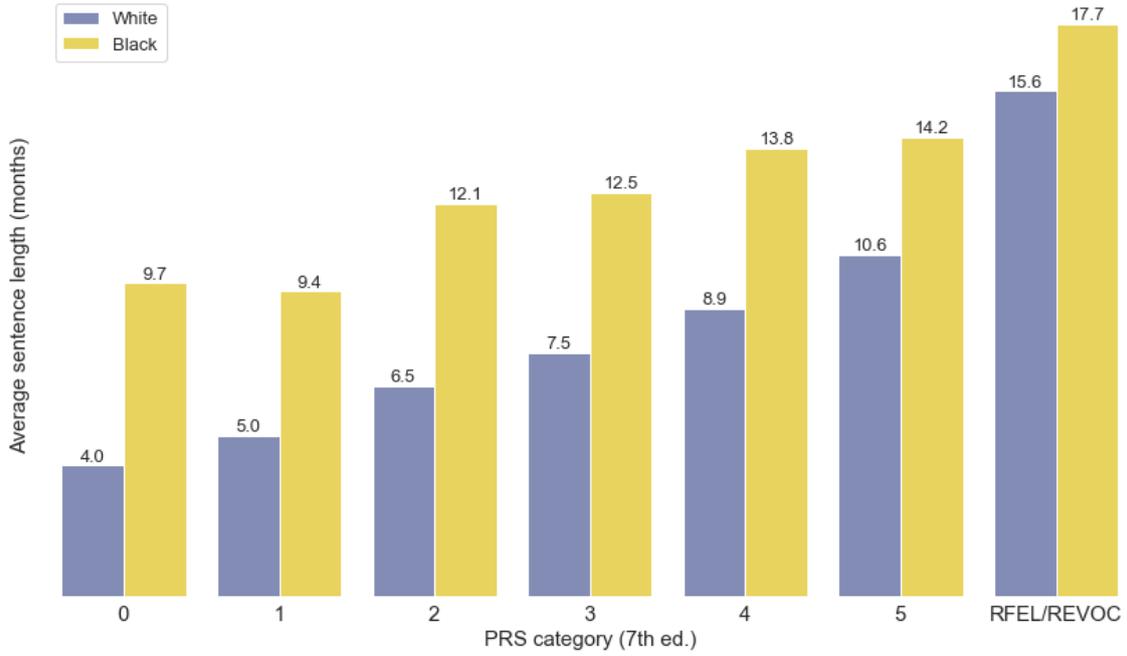
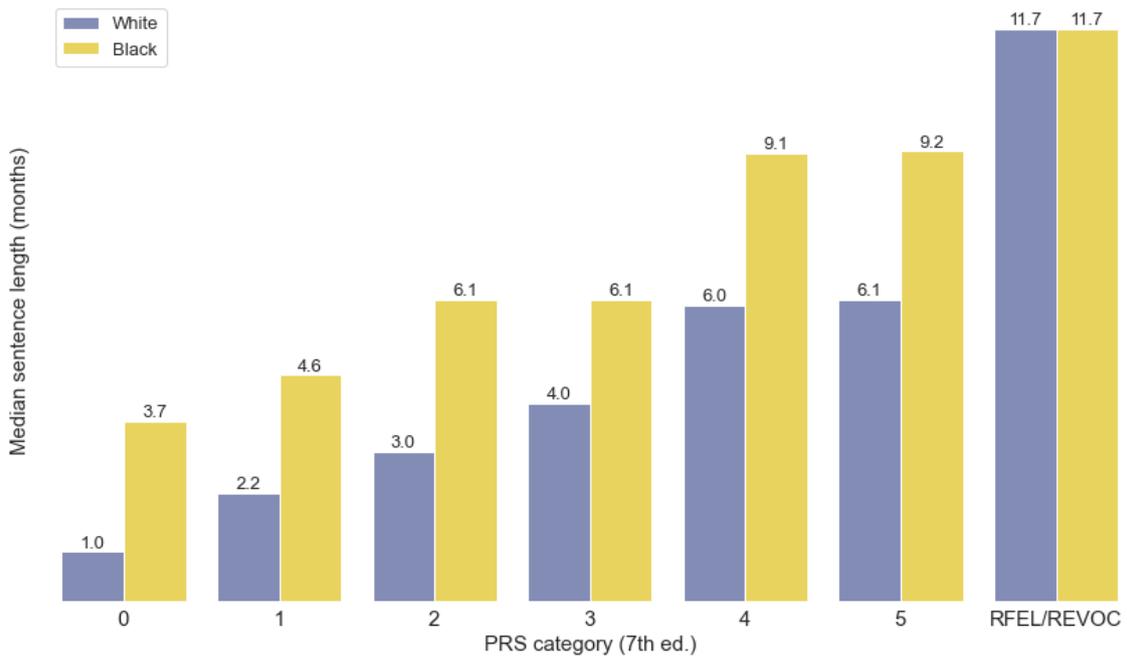Figure 48: Mean Sentence Length by PRS and Race

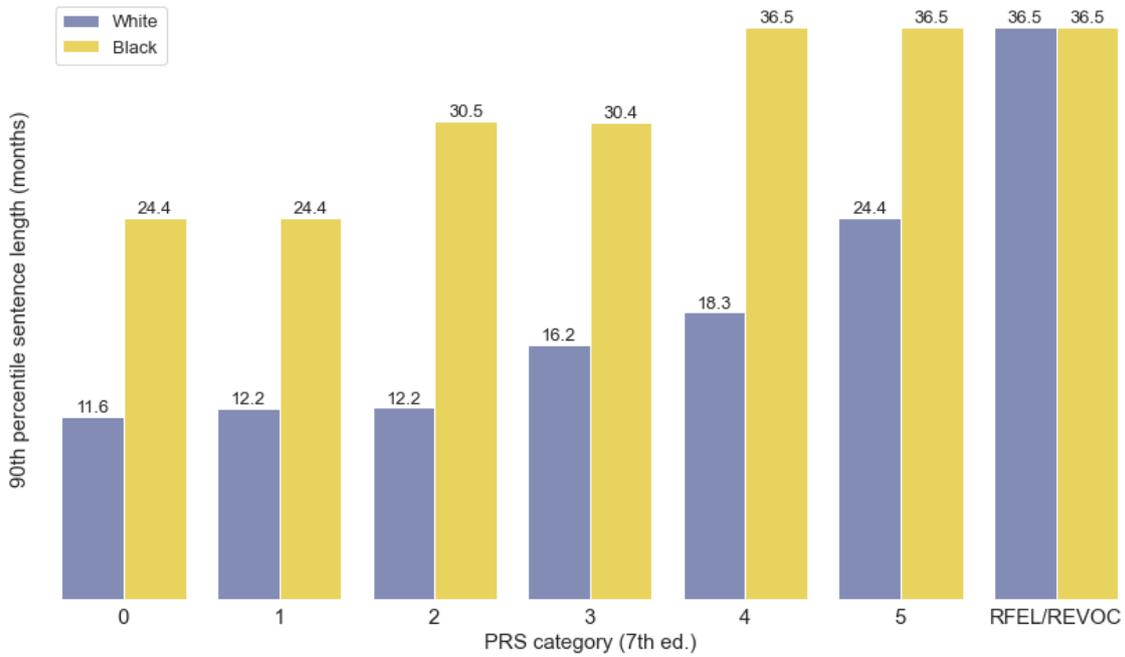Figure 49: Median Sentence Length by PRS and Race

Figure 50: 90th Percentile Sentence Length by PRS and Race

Figures 51 and 52 compare the average sentence lengths for non-recidivistic and recidivistic cases. The figures show that, after accounting for recidivism, Black offenders still consistently receive longer average sentences than White offenders for the same Prior Record Scores. A comparison of the two plots also shows that average sentences tend to be longer for non-recidivating offenders than recidivating offenders, for both races and across all PRS categories. There are 130,262 and 327,528 non-recidivistic cases for Black and White offenders, respectively. Among recidivistic cases, 31,888 were for Black offenders, compared to 71,899 for White offenders.
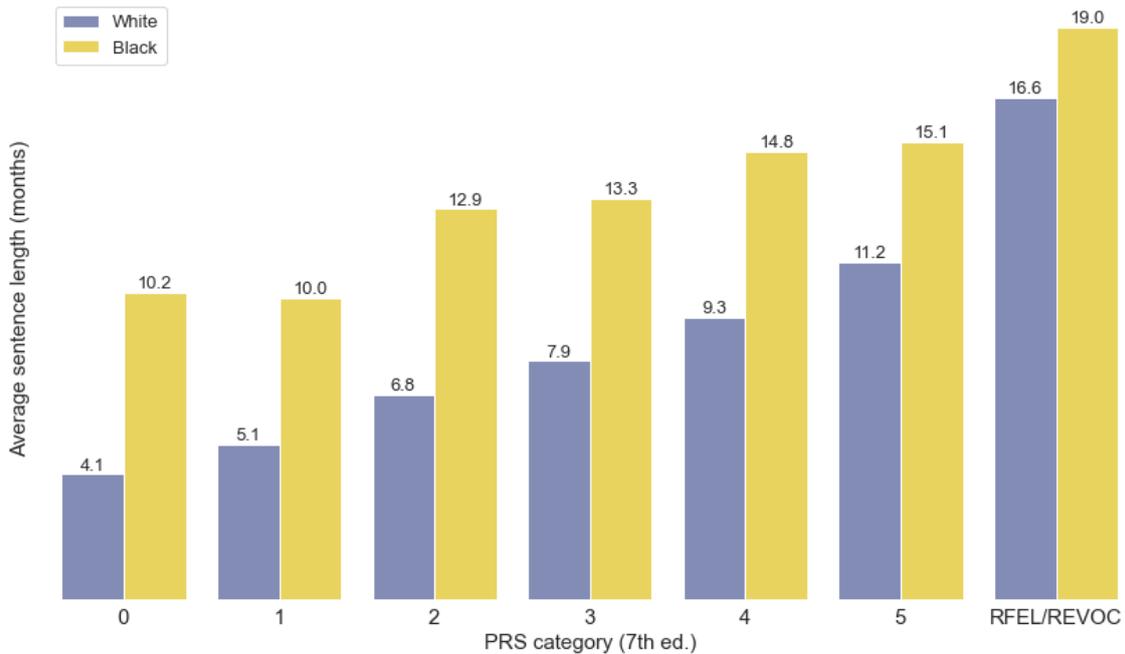

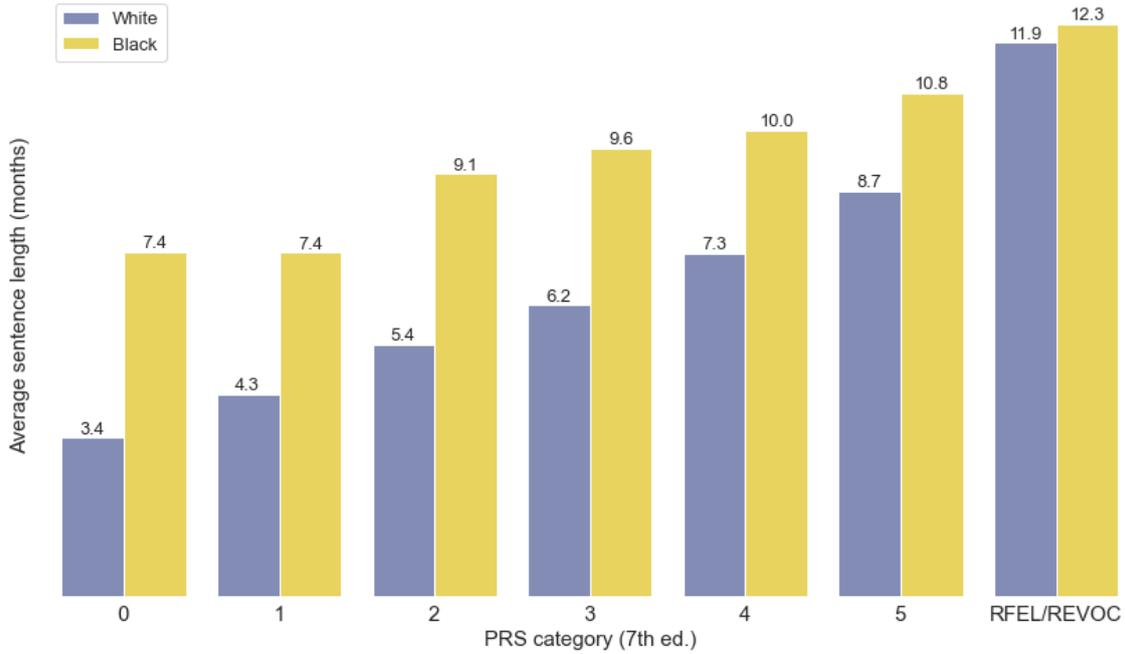Figure 51: Mean Sentence Length, Recidivistic Cases

Figure 52: Mean Sentencing Length by PRS and Race, Non-Recidivistic Cases

5.4.4 Sentence Length by OGS

Figures 53 , 54 , and 55 compare the mean, median, and 90th percentile incarceration sentence lengths in months by Offense Gravity Scores for Black and White offenders. Across the majority of OGS categories, Black offenders receive a longer incarceration sentence than White offenders, regardless of the aggregation metric used. Although the difference in magnitude may be small here, a difference of one to two months in total incarceration time is not insignificant. OGs categories 9 and 12 are exceptions; within these categories, White offenders receive either a slightly longer or the same length of sentence than their Black counterparts when measured using mean, median, or 90th percentile metrics. Additionally, using the median sentence lengths for comparison, there is no noticeable difference in sentence lengths for the lower OGS categories (1 through 3; Figure 54).
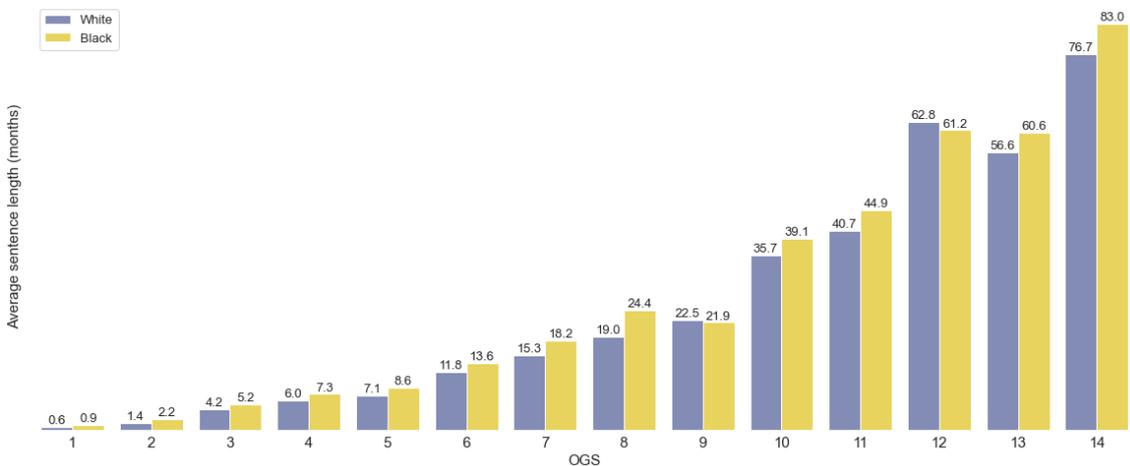

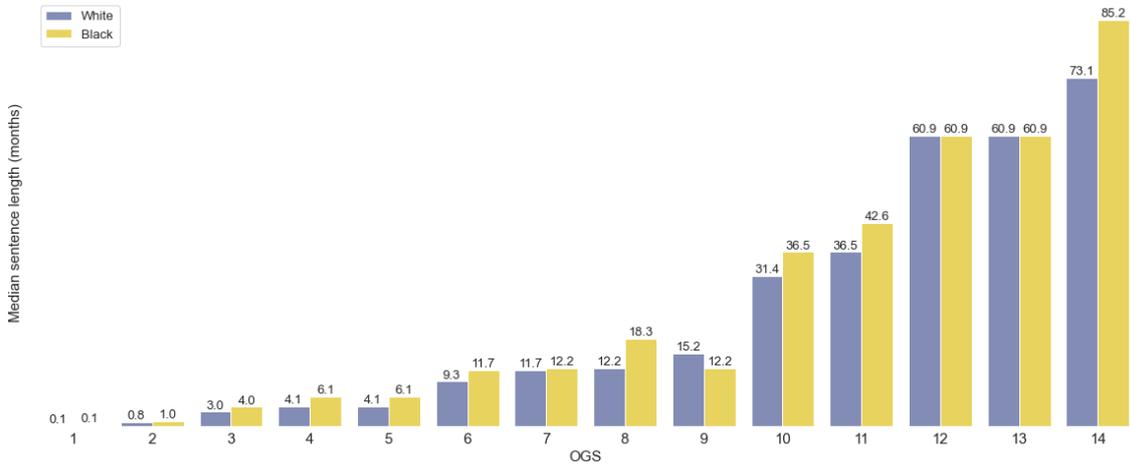Figure 53: Mean Sentence Length by OGS and Race
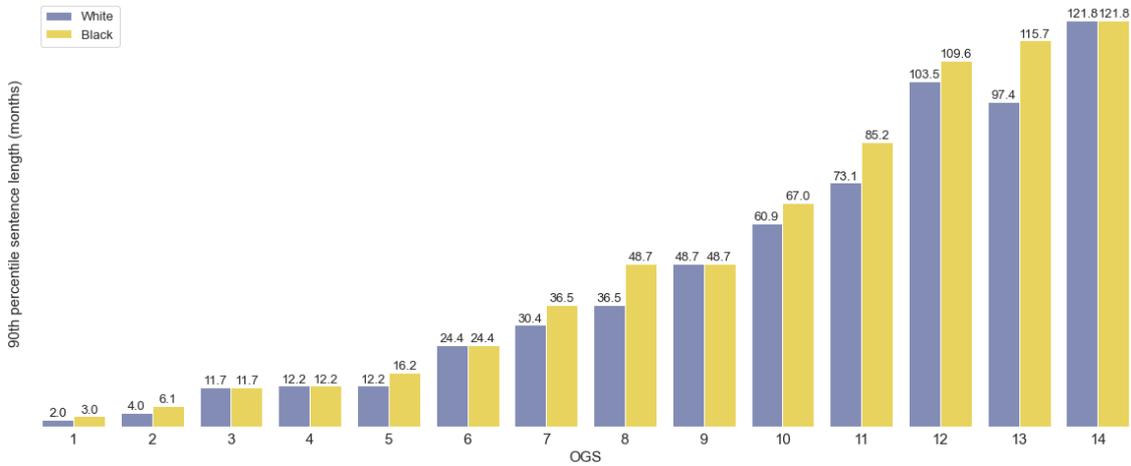
Figure 54: Median Sentence Length by OGS and Race

Figure 55: 90$^{\text{th}}$ Percentile Sentence Length by OGS and Race

5.4.5   Sentence Length by Age, Race, and Sex

PCS is particularly concerned with potential disparate impact on young, Black males within the current sentencing system (under 25 years old). This section analyzes sentence lengths for young Black males compared to young White males and older Black males. A comparison with young Black females is not included due to insufficient sample size.

Young Black Males vs. Young White Males

47,660 cases with incarceration sentences were committed by young Black males (8.0% of all incarceration cases), and 87,331 (14.6%) were committed by young White males. An analysis of average sentence lengths for the two subgroups show that young Black males tend to receive longer incarceration sentences compared to their White counterparts across all PRS categories (Figure 56). The difference is particularly prominent in PRS 0 through 3, where the average sentence is around double for young Black males than for their White counterparts.
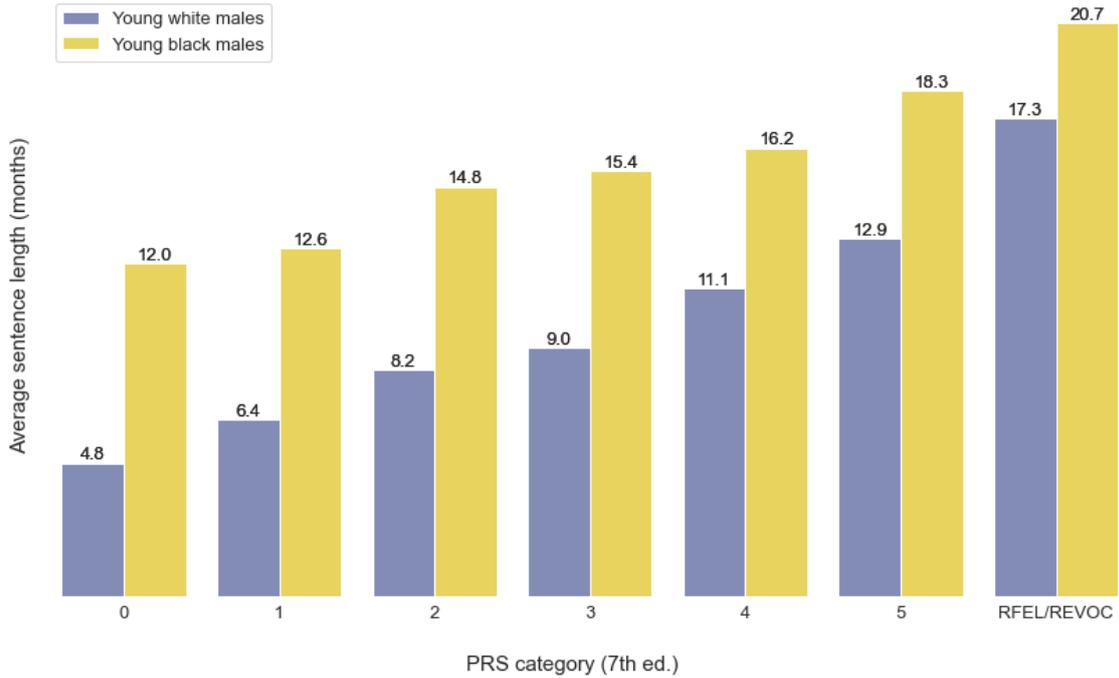
Figure 56: Mean Sentence Length by PRS by Race (Young Offenders)

Using median sentencing length for comparisons (Figure 57), the difference between young Black males and young White males is even more pronounced in PRS category 0, with Black offenders receiving six times as long as the median sentence than their White counterparts in the young males cohort. The relative difference in median sentence lengths is also more pronounced across categories 2 through 4.
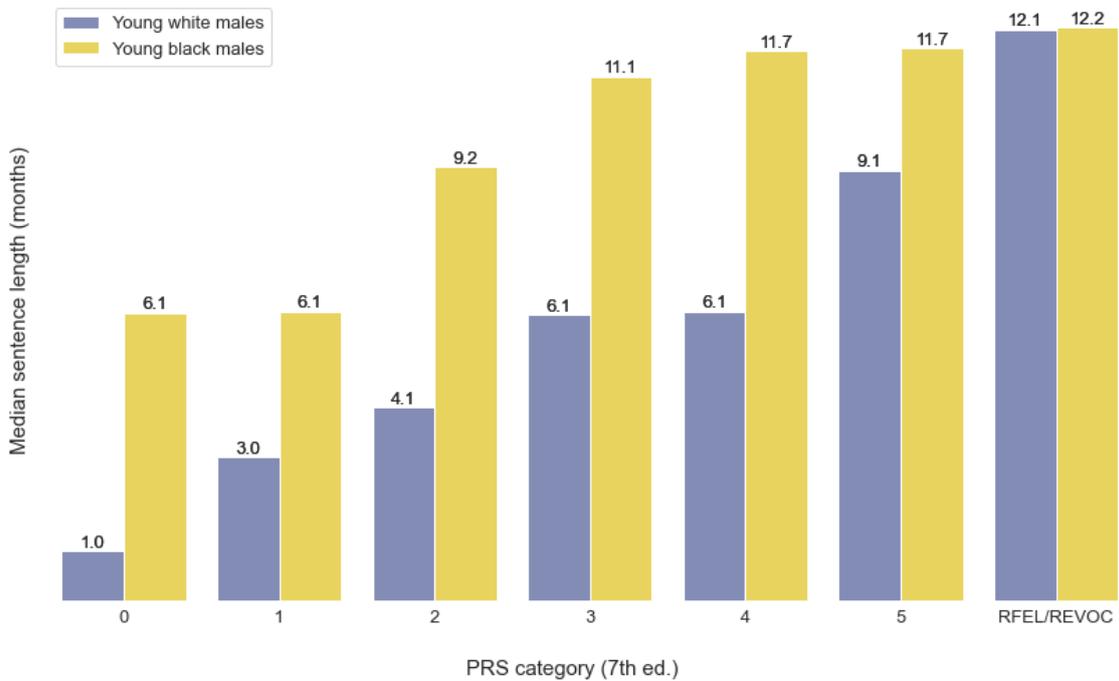
Figure 57: Median Sentence Length by PRS by Race (Young Offenders)

Using the 90th percentile sentence lengths, it is interesting to see that on the upper range of the distribution, young Black males consistently are incarcerated to around three years of incarceration, regardless of PRS

category. The 90th percentile distribution for young White males, in contrast, generally follows the expected trend of increasing sentence lengths across increasing PRS categories.
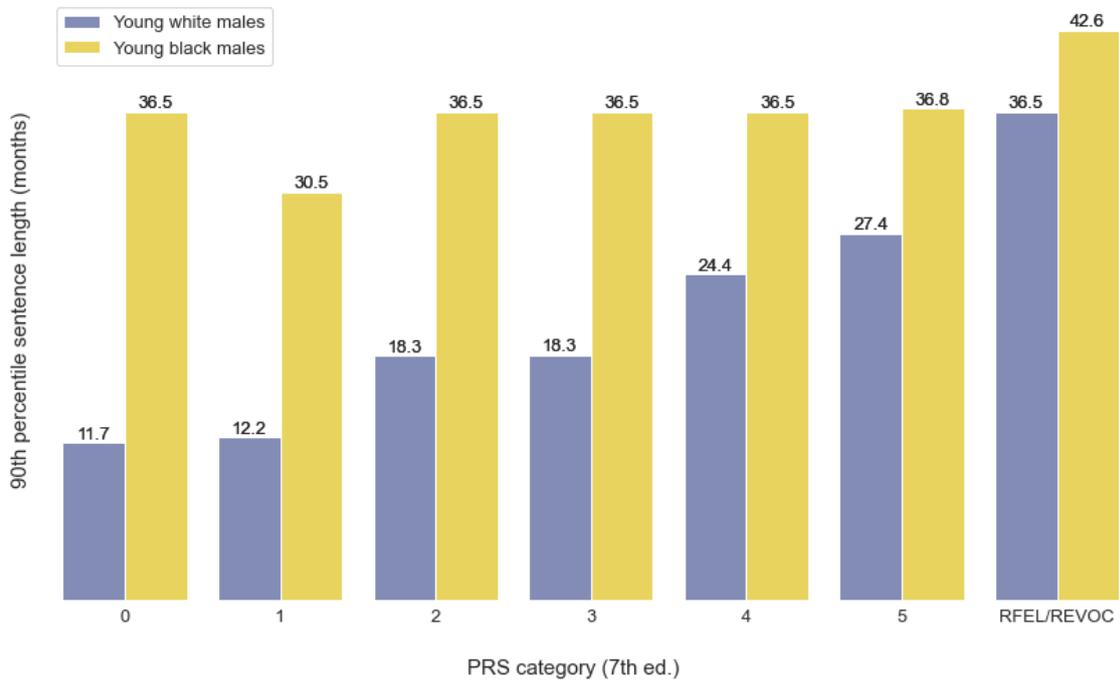
Figure 58: 90th Percentile Sentence Length by PRS and Race (Young Offenders)

Young Black Males vs. Older Black Males

As noted earlier, young Black males who are under 25 account for 8.0% of all incarceration cases. Remaining Black males (aged 25 and older) account for 15.9% of incarceration cases (95,338 cases). On average, young Black males receive longer sentences than Black males over the age of 25, across all PRS categories, but both subgroups receive longer average sentences in each PRS category than young White males (Figure 56 above). Although age is a predictor of recidivism, which may justify younger offenders receiving longer sentences than older offenders, this difference in incarceration lengths between age groups should certainly not be out-sized by the difference in incarceration lengths between young offenders of different races. These results suggest that young, Black males are particularly at risk of being disparately impacted by more severe sentencing outcomes.

Using median sentence length for comparison, the difference for young Black males is nearly double that of older Black males in categories 0 through 3.

Figure 59: Mean Sentence Length by PRS and Age (Black Offenders)

Figure 60: Median Sentence Length by PRS and Age (Black Offenders)

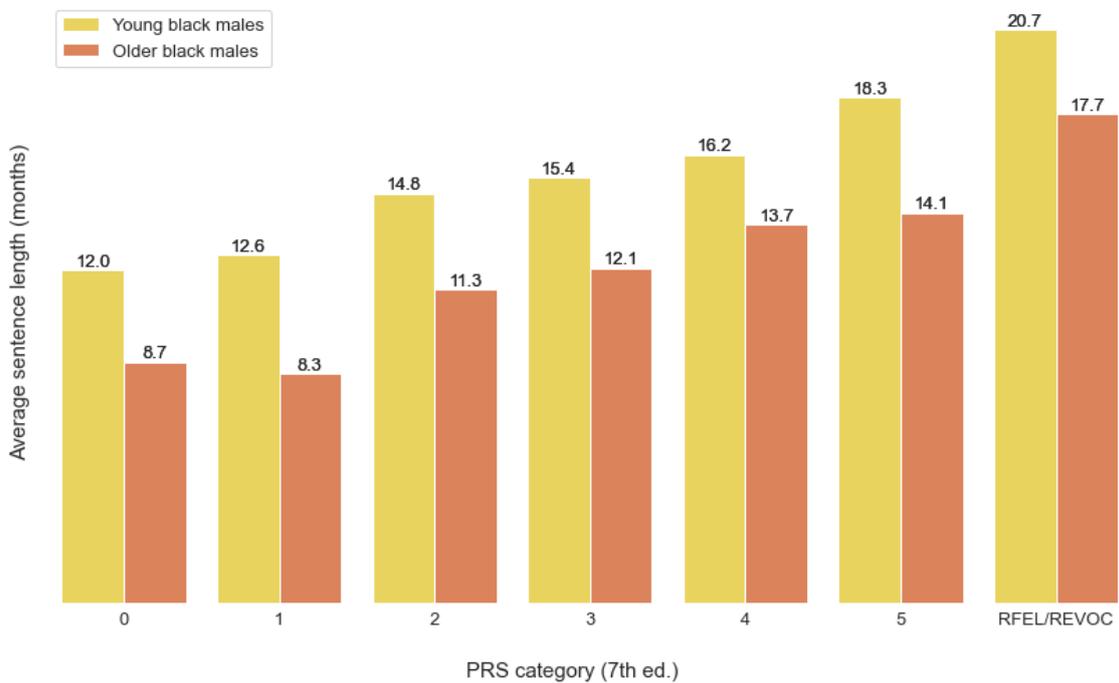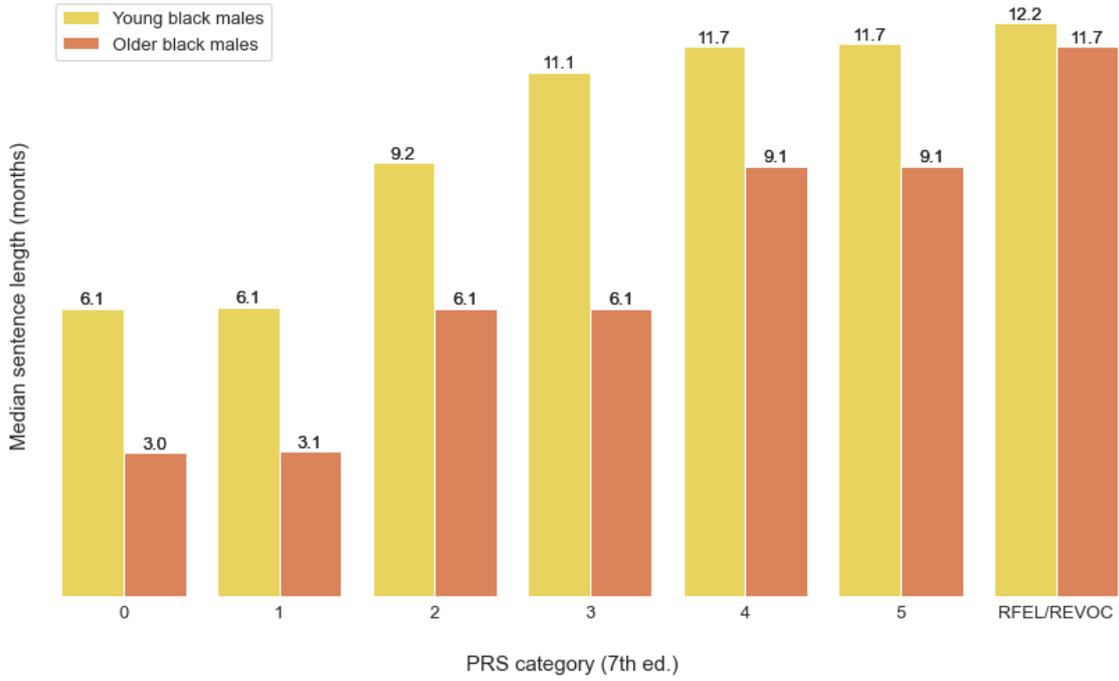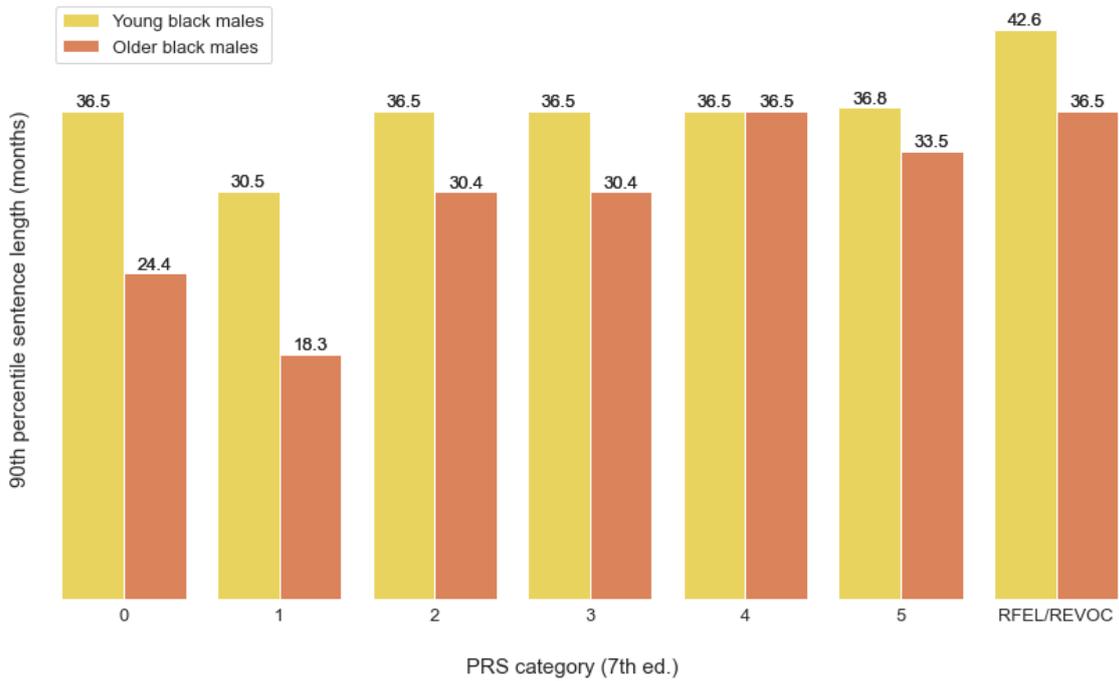Figure 61: 90th Percentile Sentence Length by PRS and Age (Black Offenders)

5.4.6   Sentence Length by PRS and OGS

The previous analyses focus on each axis of the sentencing grid separately. However, in the sentencing process, judges use the intersection of each OGS and PRS combination to reference the appropriate sentencing guidelines and make final determinations. To better understand any potential disparate impact in sentencing for Black versus White offenders, this section presents results for a series of difference-in-means T-tests comparing the average sentencing length **(in days)** for each PRS and OGS combination for Black and White offenders. The following three subsections present the results for this analysis for all cases, as well as various subsets of cases.

In all of the figures in this section of our analysis, the numbers displayed in the cells represent the difference in average incarceration sentencing length (in days) for Black versus White offenders. Orange cells indicate that Black offenders have a **longer** average incarceration sentencing length than their white counterparts for the given PRS-OGS combination. Blue cells, in contrast, indicate that Black offenders have a **shorter** average incarceration sentencing length than their White counterparts. As an example, a blue cell with the number -10 indicates that Black offenders' average incarceration length is 10 days shorter than the average incarceration length for their White counterparts within the corresponding PRS-OGS combination. Put differently, for the given PRS-OGS combination, White offenders' average incarceration sentencing length is 10 days **longer** than their Black counterparts. The intensity of the color in a cell indicates the magnitude of the difference in incarceration lengths (e.g., a difference of 20 days would be a darker color than a difference of 5 days). Lastly, empty cells in the grid indicates that the findings for that PRS-OGS combination are **not** statistically significant at the α = 0.05 level.

All Cases

Figure 62 shows that, generally, average sentence lengths for Black offenders are longer than for White offenders in lower PRS categories and for lower OGS scores. In the lower right corner of high PRS and low OGS combinations, there are cases where White offenders receive longer sentences. Note that this represents a fairly small portion of actual cases in the dataset; as seen earlier in figure 10, the vast majority of cases in the dataset are in lower PRS categories (0-3). A table with the total number of cases within each OGS and PRS combination is included in Table 8 in Appendix II for reference. These findings suggest that, across most cases, Black offenders with little or no prior criminal histories are disproportionately given longer sentences than White offenders.
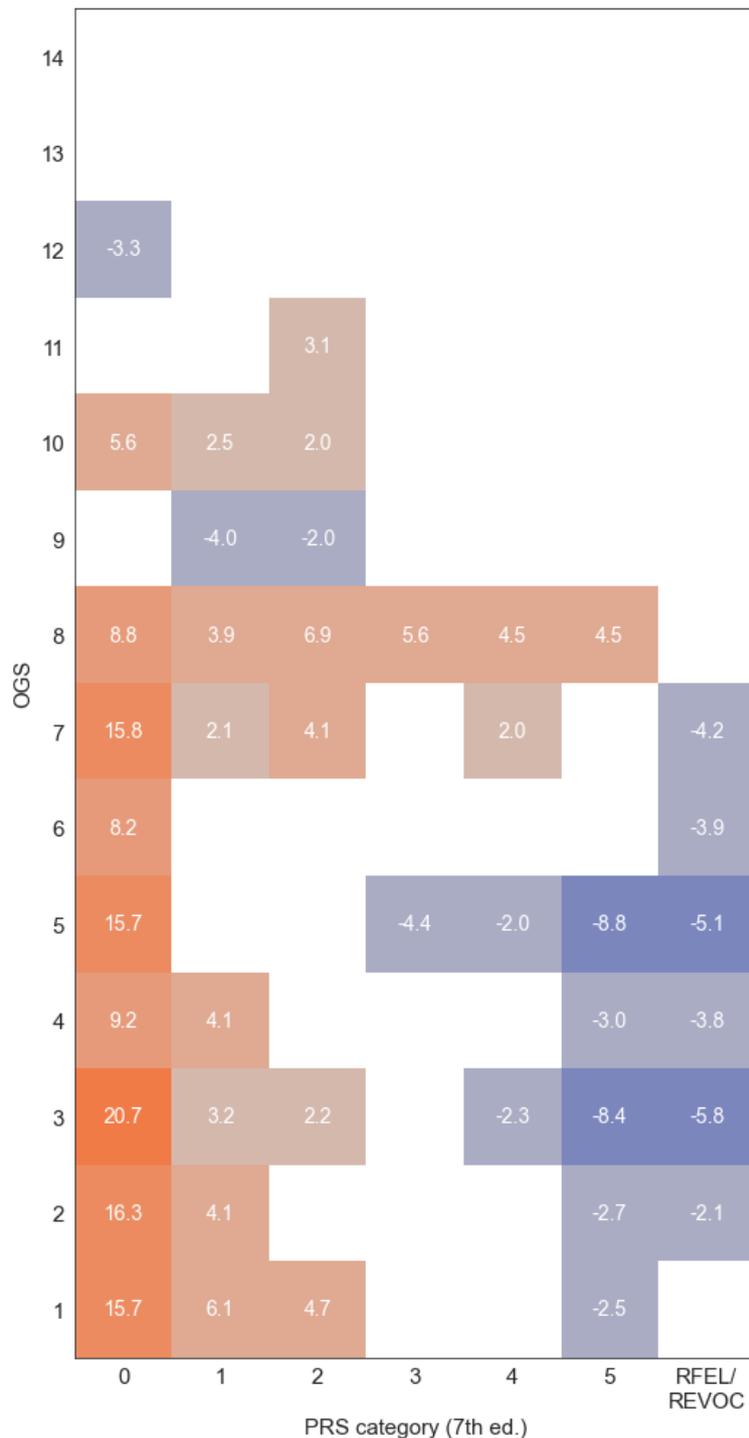
Figure 62: Difference in Mean Incarceration Length (days), All Cases

Non-Recidivistic vs. Recidivistic Cases

Figure 63 shows the difference in average sentence length analysis for non-recidivistic cases (left panel; sentences given and served by offenders who do not recidivate), compared to recidivistic cases (right panel). The previously observed patterns in differences in sentence length by race persist. These results again show that Black offenders with little or no prior criminal history (PRS 0) who do not recidivate are still sentenced to longer incarceration across most OGS categories than their non-recidivating White counterparts. For non-recidivating offenders, the biggest difference is for PRS 0 and OGS 3 of 18.6 days. For recidivating offenders, the magnitude of the differences is much smaller in comparison, with a maximum difference of 9.3 days (PRS

o and OGS 3). This suggests that the disparate impact faced by Black offenders in terms of average incarceration sentence length is more extreme for offenders who do not eventually recidivate compared to those who do.

(a) Non-Recidivistic Cases

(b) Recidivistic Cases

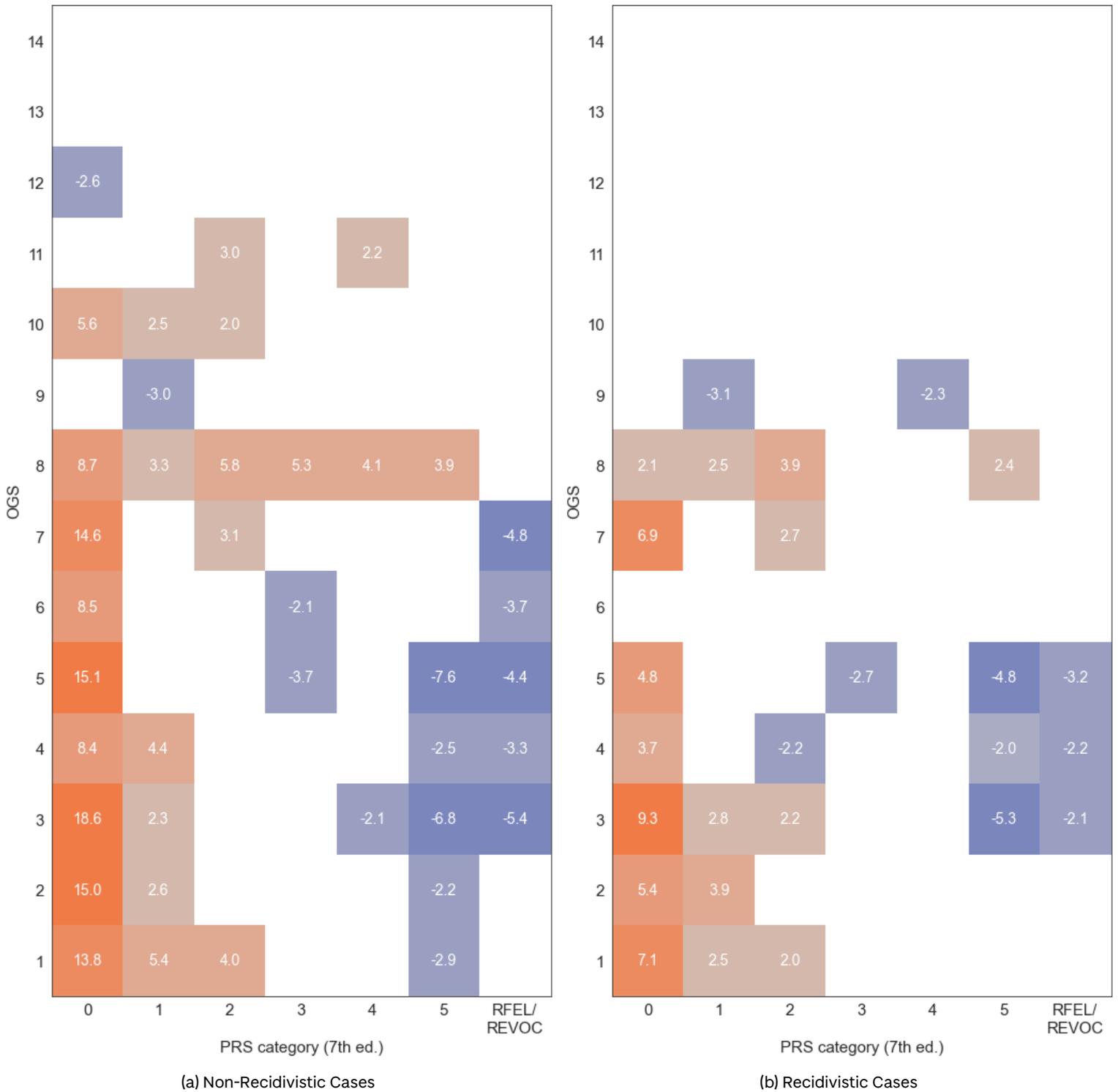Figure 63: Difference in Mean Incarceration Length (days), Non-Recidivistic vs. Recidivistic Cases

Philadelphia vs. Non-Philadelphia Cases

Due to differences in reporting requirements, a significant portion of conviction data from Philadelphia is not represented in these results. Specifically, the provided dataset includes all Pennsylvania felony and misdemeanor offenses sentenced in Courts of Common Pleas that were submitted to PCS. Philadelphia Municipal Court sentences, which include driving under the influence (DUI) and other misdemeanor offenses, are not required to be reported to the Commission. To isolate the effects of this missing data, Figure 64 shows the difference in means analysis results for cases from Philadelphia (left) compared to cases excluding Philadelphia (right).

On the left panel, it is apparent that across the reported cases with incarceration sentences from Philadelphia, Black offenders receive longer average sentences across almost all PRS categories in combination with most OGS categories. The only case in which White offenders receive a longer average sentence is for PRS 3 and OGS 2. However, it should be noted that the less serious cases sentenced in minor courts are not reported by Philadelphia to PCS, so these findings may not be representative of all sentencing outcomes within the county of Philadelphia.

Excluding cases from Philadelphia, the results from the right panel are fairly similar to overall findings in the previous section, with the exception of OGS 5, where White offenders are receiving slightly longer sentences across all PRS categories except PRS 0.
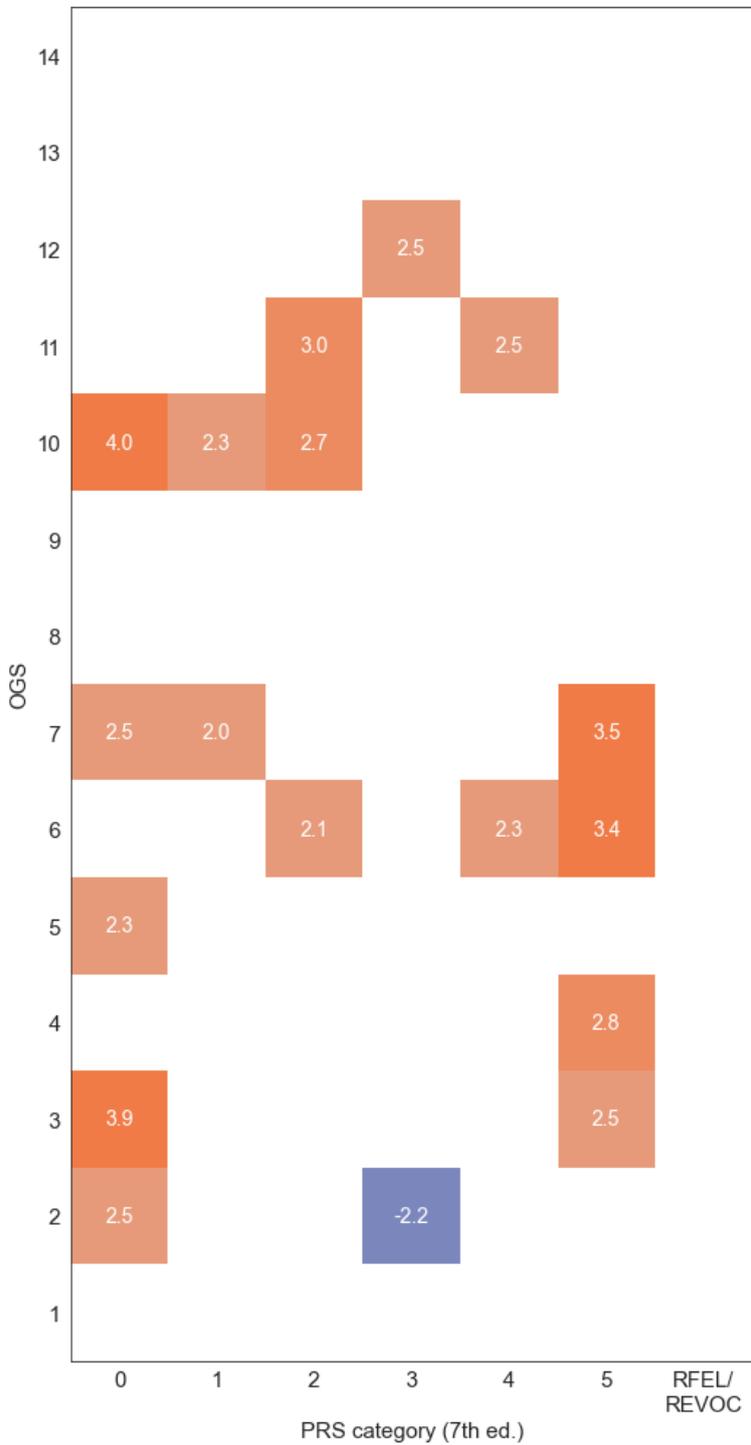
(a) Philadelphia Cases
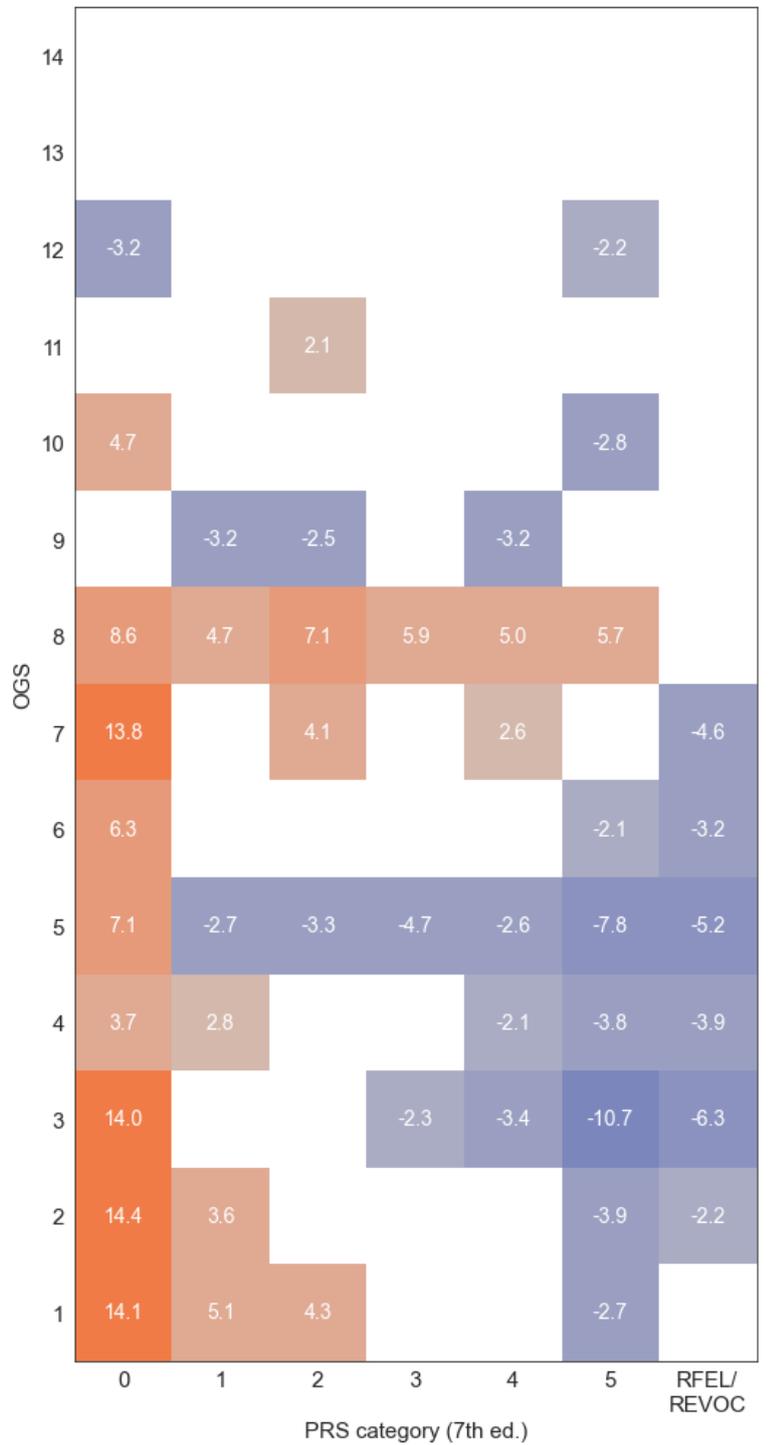
(b) Non-Philadelphia Cases

Figure 64: Difference in Mean Incarceration Length (days), Philadelphia and Non-Philadelphia cases

Single Charge Cases

An offender may be charged with one or multiple offenses, depending on the nature and severity of their crime. Specifically, sentencing for single charge cases are typically less severe than sentencing for cases with multiple charges. Per conversations with PCS, Black offenders are more likely to be charged with multiple charges within a JP, which may conflate the comparison in average incarceration sentence lengths by race. As such, further discretization of the dataset into single- and multiple-charge cases may disambiguate these outcomes.

Figure 65 shows the difference in sentence length comparison for single-charge cases only. Results largely reflect findings from the overall analysis, although the magnitude of differences reduce slightly across almost all PRS and OGS combinations.
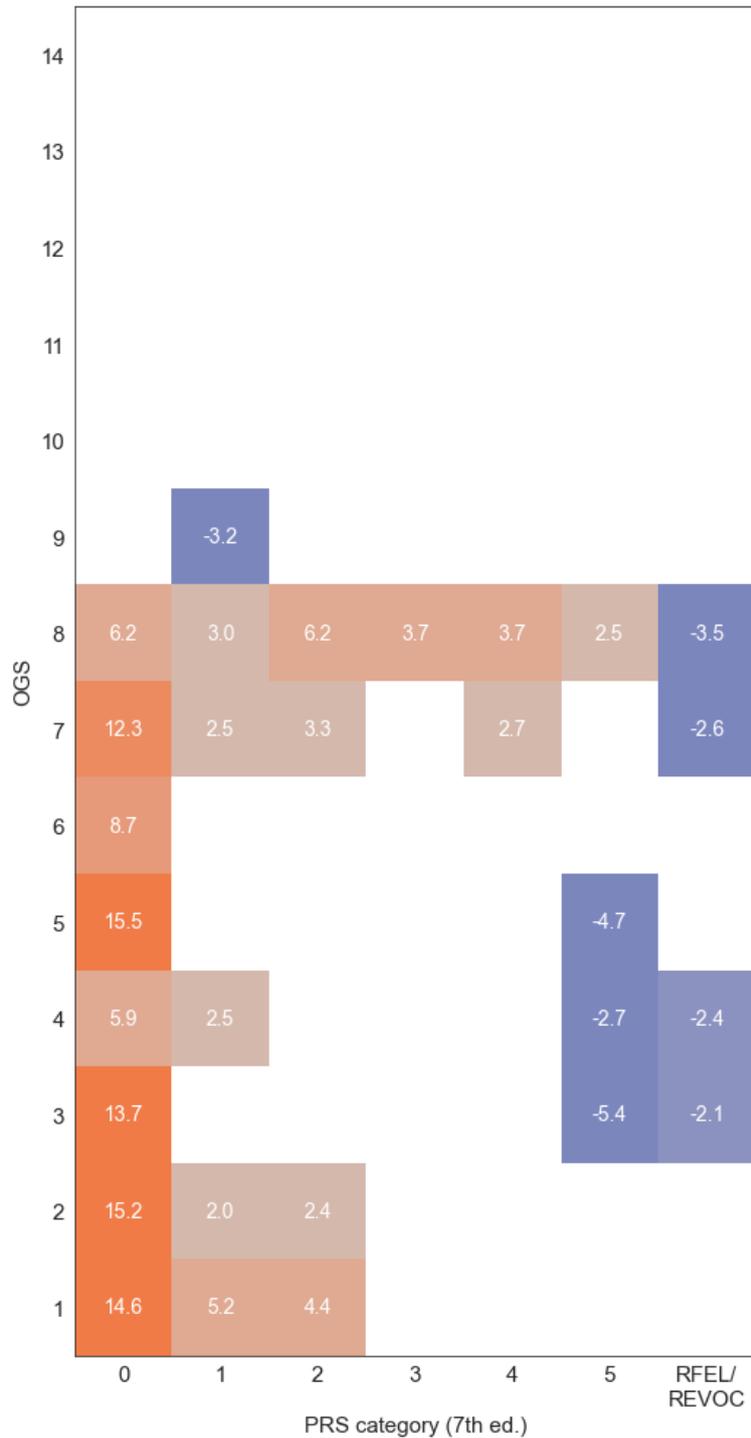
Figure 65: Difference in Mean Incarceration Length (days), Single Charge Cases

Concurrent vs. Consecutive Charges

Within cases with multiple charges, judges must choose between two different methods of assigning incarceration sentences. They may decide on a severe sentence for the most serious outcome, with other charges being sentenced as "guilty without further penalty" or as an incarceration sentence to be served concurrently with the main charge's sentence. With a concurrent sentence, the offender serves all incarceration sentences at the same time. As an alternative, the judge may choose instead to assign consecutive (i.e., aggregated) sentences. In these cases, the individual must serve the duration of each sentence sequentially, one after the other. Since concurrent sentences are served at the same time, judges sometimes

increase the sentence length of the main charge to account for the additional charges associated with the Judicial Proceeding. Figure 66 displays the difference in average sentence length analysis for concurrent- versus consecutive-charge cases in the left and right panels, respectively.[29]

Differentiating between concurrent and consecutive cases reduces the magnitude of differences in average incarceration length. Compared to the maximum difference in average incarceration length across all cases (Figure 66, 20.7 days), the maximum difference is smaller in both concurrent and consecutive cases, at 11.4 and 6.2 days respectively. These differences are also smaller than those observed across single-charge cases. Although racial differences in sentencing outcomes still occur, this observation suggests that that the sentencing outcomes for cases with multiple charges are relatively more consistent when controlling for the incarceration sentence relationship between charges. However, additional research into why Black offenders tend to be charged with multiple charges, as well as whether there are racial differences between cases that receive a concurrent versus a consecutive charge, would be necessary to further contextualize this finding.

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[29]Note that cases with both consecutive and concurrent sentences are flagged as consecutive sentences in this analysis.
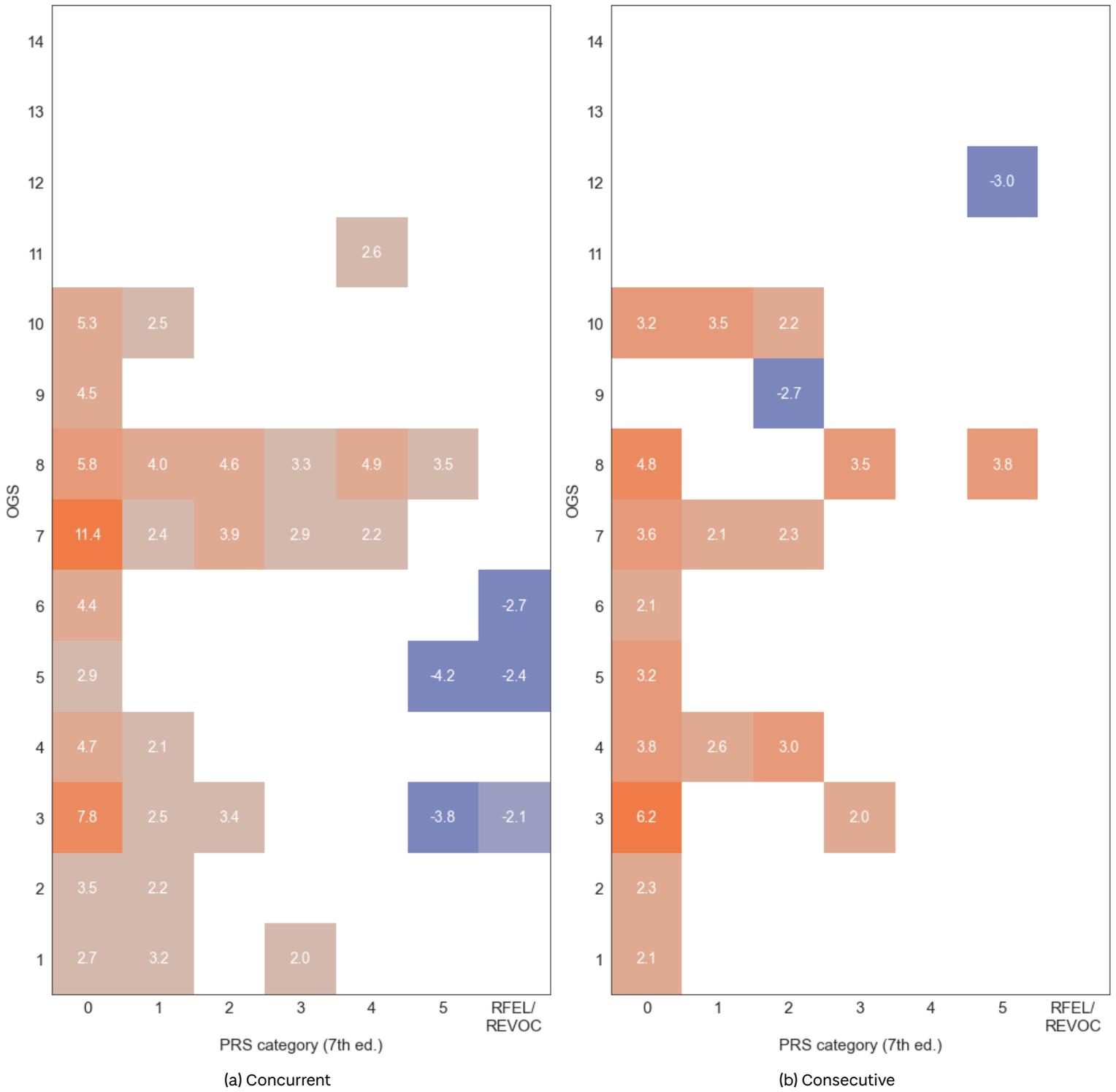
Figure 66: Difference in Mean Incarceration Length (days), Concurrent and Consecutive cases

6   Conclusions and Recommendations

There are three key findings from this study. First, the proposed 8th edition PRS categories are better at predicting recidivism rates than the 7th edition. In both editions, there is a significant increase in recidivism rates between category 0 and the next tier up. For the 8th edition, the increase in recidivism rates across categories Low to Medium is also a meaningful increase, whereas the recidivism rates for the 7th edition categories start to plateau around category 2. The 8th edition categories are also better at predicting recidivism for all race (i.e., White and Black) and sex subgroups, as well as for adults over 25.

Overall, this finding provides some support for using prior record history as a proxy for recidivism risk, and using PRS to determine sentencing guidelines. However, the increase in recidivism rates between categories Low and Medium is quite small (3 percentage points). Additional fine-tuning in the design of PRS categories may help create a more meaningful change in recidivism rates across categories, and provide stronger support for the theoretical foundations of using PRS in sentencing.

One salient finding in our analysis is that age is strongly associated with recidivism, with young adult offenders (18-24) being much more likely to recidivate. However, current PRS categories do not predict recidivism risk for young offenders. The team recommends that PCS consider incorporating age as a risk factor in the sentencing guidelines. One suggestion is the incorporation of more extensive lapsing provisions, which can reduce the effect of older criminal records when determining PRS categories and thus reduce the penalty on older offenders.

The second key finding is that most offenders committing violent crimes, sex crimes, and firearms offenses are first-time offenders, and they typically recidivate at a lower rate than average. For violent offenders, the 8th edition PRS categories have higher predictive power for general recidivism and for recidivism to another violent crime. 8th edition categories are also a strong predictor of general recidivism for sex offenders. Neither PRS editions show a strong correlation with recidivism trends for firearms offenses. In all three crime categories, general recidivism rates are below the baseline average of 18.8%. Recidivism rates to the same crime type are below 3% for all three crime types. This suggests that policy discourse concerning public safety should focus on first-time offenders for these three crime types. In particular, the notion of repeat offenders that recidivate to the same crime type is somewhat of a myth.

The third key finding is that Black offenders are more likely to have higher PRS than White offenders despite being younger on average, and are also more likely to receive an incarceration sentence across most PRS categories. Additional research into why Black offenders tend to be in higher PRS categories would help reveal some of the structural and non-structural factors that lead to these different distributions. This would be critical in the effort to reduce disparate impact within the sentencing system, as higher PRS categories are likely to result in more severe sentences.

Moreover, the average incarceration sentence length for Black offenders is higher in almost all PRS categories. If PRS is used as an indicator for recidivism risk, this means that even when offenders are assessed to have similar levels of recidivism risk, Black offenders are still disproportionately penalized with a more severe incarceration sentence. At lower PRS 7th edition categories, Black offenders receive almost double the incarceration sentence lengths than their White counterparts. Young, Black males are also significantly impacted, receiving longer average sentence lengths than both young White males and older Black males. When comparing average incarceration lengths by PRS and OGS combinations, Black offenders with little to no prior criminal records (PRS category 0) receive materially longer sentences.

It is evident that Black offenders are disproportionately penalized during the sentencing process, especially first-time offenders and young Black men. This issue persists even when comparing sentencing outcomes by PRS and OGS combinations, concentrating around the lower PRS and OGS ranges where the majority of cases within the dataset lies. This suggests that guidelines alone are not adequate in ensuring equitable sentencing across racial groups. The team recommends that PCS consider developing monitoring metrics that can be accessed, reviewed, and used in a dynamic manner to address ongoing policy and implementation concerns through data-driven strategies. Additionally, general awareness of this issue can be increased across the key stakeholders, to ensure that guidelines are applied equally during the sentencing process.

7 Appendices

7.1 Appendix I: Data Cleaning Methodology

This appendix provides additional technical details on the data cleaning process and methodology for operationalizing the definition of recidivism. Table 7 provides more information on the variables used in our recidivism dataset.

7.1.1 Overview of Original Dataset

As noted in the Methodology section of the report, each row within this dataset uniquely identifies a charge/offense, and each judicial proceeding (JPR_ID) in the dataset is associated with a collection of charges. This sequence below is the general organization of the dataset:

- A collection of charges/offenses $\rightarrow$ convicted during one judicial proceeding (JPR_ID).

- A collection of judicial proceedings (JPR_IDs) $\rightarrow$ are associated with one individual (ID_VARIABLE).
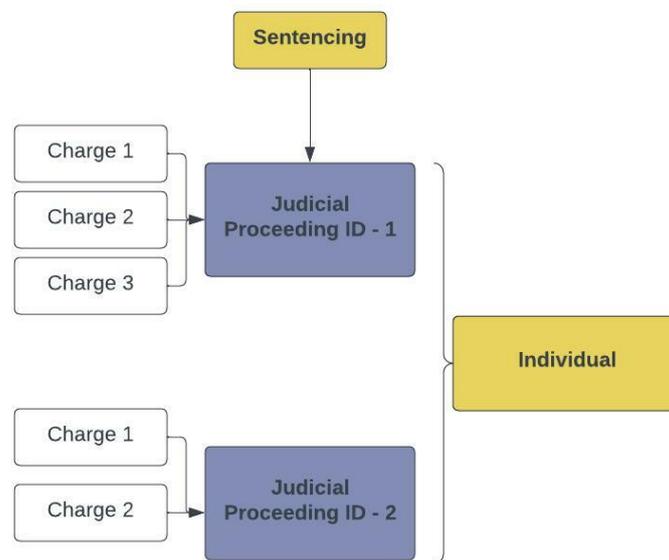
Note
1. Sentencing occurs on the Judicial Proceeding ID level and may include an incarceration sentence.
2. Sometimes multiple Judicial Proceeding IDs may be sentenced on the same date

Figure 67: Original Dataset Structure

7.1.2 Initial Data Cleaning

Prior to any data transformations and implementation of the recidivism definition as described above, the provided dataset was examined and processed for data quality issues. Issues such as inconsistent capitalization in the Prior Record Score column for "RFEL" and "REVOC" were corrected. As suggested by PCS, the "REVOC" category was further subsumed into the "RFEL" category due to the low number of cases in the "REVOC" category. There were also two different variables for "offense label" in the dataset ("OFN_LABEL" and "ofn_label"), which were combined into a single column after verifying for potentially conflicting information.

Date Variable Conversions

A Python date-time conversion function was used to convert date variables (DOF, DOS, DOB, DOB2) in the dataset.[30] Due to a peculiarity of this function, an artifact was discovered where dates prior to the year 2001 were sometimes converted to the wrong century (e.g., 2064 instead of 1964). Although this issue did not impact the Date of Offense and Date of Sentence columns, several date anomalies were discovered for the Date of Birth columns. In these cases, the team used best judgment and logical deductions based on the Date of Offense and Age at Offense variables to correct the dates as necessary.

The team also discovered several cases where the Date of Offense occurs after the Date of Sentence. Per conversations with PCS, these are likely data entry errors. Impacted cases were removed from the dataset at the client's suggestion.

Accounting for "JP_CC_Bug"

According to the data documentation, a software bug in 2016 caused the Incarceration Minimum (INC_MIN) calculation across a given judicial proceeding to be unreliable. Since this variable is associated with the Minimum Incarceration for Judicial Proceeding variable (JP_MIN) used to determine time incapacitated, PCS suggested removing these observations to ensure overall data reliability.

Records impacted by the software bug are indicated by the JP_CC_BUG variable. The team first identified individuals (ID_VARIABLE) impacted by this bug, and removed all observations for these individuals that occurred after the date associated with the JP_CC_BUG (i.e., after 2016). This process ensures that the offense impacted by the bug is still counted as a case of recidivism if the offender had a prior offense within three years, but removes any further analysis for recidivism as the time incapacitated and risk window could not be determined for this current offense. The caveat here is a potential undercount of recidivism, as the offender could potentially have committed a subsequent offense within the risk window that has been dropped from the dataset. However, as the total number of individuals impacted (around 7.5%) is quite low, the team determined that this would not substantially impact the overall recidivism rates calculated in the analyses.

Accounting for Missing PRS scores

The Prior Record Score column had missing values for 18 offenders. All records for these 18 individuals were removed from the analysis.

7.1.3 Demographic Variables

The key demographic variables used for our analyses include Date of Birth, Sex, and Race. We conducted several additional data cleaning steps to ensure the data are consistent and unique at the individual level prior to using these variables for analysis.

For Date of Birth, two variables were reported in the dataset: DOB and DOB2. Upon conversations with the client team, it was determined that DOB is the more authoritative variable. We thus only used DOB2 information when the DOB for all observations for a given individual is missing.

For Sex information, there were several cases of conflicting information between various combinations of values between observations for the same individual (e.g., "Female" and "Unknown", "Female" and "Male"). For any conflicts between a sex category and Unknown, the observed sex category is used for that individual. For conflicts between "Male" and "Female" values for the same individual, we assigned them as "Unknown" for this variable, as the individual's sex cannot be determined in the current dataset.

In the provided dataset, seven different race categories were present in the OFF_RACE variable. Conversations with clients indicated that the team was most interested in the categories Black and White, and all other races could be combined into an Other category. Additionally, due to a change in the definition of race versus ethnicity, the Hispanic category has declined since 2008. Within this context, we conducted the following data cleaning steps for this variable. For any individual with multiple races observed on different records, we replaced "Hispanic" with "Black" or "White" if either value was present, or "Other" if not. For any individual with conflicting race information between categories (e.g., "Black" and "White", "Black" and

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[30] pd.to_datetime()

"Asian"), we labeled that individual as "Unknown."

Following these demographic cleaning steps, the final demographic dataset had a unique record for each individual. This was ultimately combined with the recidivism dataset for further analysis.

7.1.4 Operationalizing Recidivism

This section describes the technical details associated with converting the dataset from offense- level observations to Date of Sentence-level observations. By converting the unique unit of analysis for the dataset, we are then able to implement the recidivism definition as described above.

Consolidating Data at the Individual & Judicial Proceeding Level

The first step of establishing the criminal histories and timelines for all individuals in the dataset is to collapse the dataset for each Judicial Proceeding (JPR_ID). A JPR_ID represents a unique instance for which one or more offenses were sentenced for an individual, on the same date, by the same judge. For this project, a unique judicial proceeding refers to a distinct JPR_ID associated with a given individual (ID_VARIABLE).

Multiple Dates of Offense

Because each JPR_ID can include multiple charges with different Dates of Offense for each charge, the earliest Date of Offense across all associated charges is used as the Date of Offense associated with the JPR_ID.

Multiple Dates of Sentencing

For a small number of observations (0.2% of all unique judicial proceedings), multiple Dates of Sentencing (DOS) are associated with a single judicial proceeding. These cases include scenarios in which an individual's sentence was adjusted at a later date. In these cases, the latest Date of Sentencing is kept as the associated DOS for the judicial proceeding, which is then used to determine the risk window start date for the individual.

A special case arises if an incarceration sanction was a part of this judicial proceeding. Specifically, in cases where the minimum sentence length is adjusted on a later date for a given judicial proceeding, the elapsed time between the two Dates of Sentence should also be taken into account as time already served. In order to create a reliable risk window for these cases, the newest sentence (JP_MIN associated with the *latest* Date of Sentence) is used as the minimum incarceration time, and is added to the *earliest* Date of Sentence to calculate the At-Risk Date.

Additional Consolidation Details

When consolidating the dataset at the judicial proceeding level, it is imperative to capture any incarceration sanction that was given to one or multiple offenses during that particular judicial proceeding. The Incarceration Sanction Exists (INC_SANCTION_EXISTS) flag is retained and aggregated in the dataset, where the JP is flagged as having an incarceration sanction if at least one offense has an INC_SANCTION_EXISTS value of "Y". For judicial proceedings with incarceration sanctions, the maximum JP_MIN observed across the JP is retained to calculate incapacitation time.

As multiple offenses can be adjudicated in a given judicial proceeding, there are also multiple Offense Gravity Scores associated with each JP. In this study, only the most serious OGS (maximum OGS score) is retained for subsequent analysis. This is in alignment with the stated policy within the Sentencing Guidelines, which states: "[w]here crimes merge for sentencing purposes, the court shall consider the sentencing guidelines only on the offense assigned the higher Offense Gravity Score."[31]

Data Consolidation at the Individual & Date of Sentencing Level

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[31]"204 Pa. Code § 303.1. Sentencing guidelines standards.". PA Code And Bulletin. Accessed May 4.
https://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/204/chapter303/s303.1.html&d=reduce

As noted previously, a small percentage of cases (around 4.3%) had multiple judicial proceedings for the same individual occurring on the same Date of Sentence. The next step is thus to aggregate the data once more at the Date of Sentence level.

Data consolidation steps in this process are similar to those related to collapsing the data to each unique judicial proceeding. The earliest Date of Offense, the maximum Offense Gravity Score, and the maximum incarceration time (JP_MIN) is retained.

Next Date of Offense Calculation

Once the data are organized at the individual and Date of Sentencing level, we were able to leverage the subsequent Date of Offense (if any) for a given observation to determine whether this observation should be flagged for recidivism. First, the dataset was sorted at the individual and Date of Offense level in chronological order. For a given individual, if a subsequent Date of Offense exists, then this next Date of Offense was captured in the Next Date of Offense (NEXT_DOF) variable. An example of this implementation is given below:

ID_VARIABLE	DOF	NEXT_DOF
1234	September 7, 2001	March 4, 2009
1234	March 4, 2009	N/A

Table 6: NEXT_DOF Calculation

In Table 5 above, we can see that individual 1234 has two dates of offense, September 7, 2001 and March 4, 2009. Therefore, the second Date of Offense after the first offense (September 7, 2001) is captured in the NEXT_DOF category. This creates a longitudinal linkage across rows so that the data is able to capture the criminal histories of each of the individuals in the recidivism dataset.

Identifying the Recidivism Risk Window

The crucial first step in creating an indicator for recidivism in the dataset was to determine the date at which it would be possible for an individual to recidivate, referred to throughout the remaining portion of this report as the "At-Risk Date". The At-Risk Date for each individual in the dataset was calculated as follows:

1. If an individual is serving a life sentence or has a JP_MIN that is greater than 20 years, then their At-Risk Date was set to be far in the future (12/31/2035). This ensures that these individuals are not included in the analyses, as they are incapacitated from recidivating throughout the duration of available data.

2. If an individual did **not** receive an incarceration for any of their charges on a given Date of Sentencing, then their At-Risk Date is set to be the Date of Sentencing.

3. If the individual **did** receive an incarceration sanction, their At-Risk Date is set to the date equivalent to their Date of Sentencing plus their incarceration sentence (JP_MIN). The logic is that individuals with an incarceration sanction are not at risk for recidivism until after they have served the minimum sentence for the current conviction.

The At-Risk Date calculation procedure is summarized below in Figure 68.

Figure 68: At-Risk Date Calculation

Checking for Free Time

Our baseline definition of recidivism in our dataset is whether an individual has committed another offense within three years after their At-Risk Date. Given the timeframe of data was originally provided, there are individuals whose At-Risk Date is within three years of the last date in the dataset (December 31, 2019). For these individuals, as well as for individuals who are serving long minimum incarceration sentences, we are unable to make a determination of whether those individuals recidivated. We can only determine recidivism for cases that have enough "free time" (i.e., a fully observable risk window) in our dataset. Cases with an At-Risk Date within three years of December 31, 2019 were therefore excluded from the analysis.

Flagging Recidivistic Cases

Once the At-Risk Dates for all individuals in the dataset were calculated and observations without enough free time removed, we created an indicator flag for whether an observation is a recidivistic case. We first created a variable that captured the amount of time it took for an individual to recidivate. This variable was calculated by taking the difference between the Next Date of Offense and the At-Risk Date for a given observation. If the time-to-recidivate is greater than zero and less than or equal to three years, this observation is flagged as a recidivistic case.

7.1.5 Data Dictionary

Variable Name	Description
ID_VARIABLE	A unique, anonymized identifer associated with each individual in the dataset.
NEW_DOS	If a judicial proceeding (JP) has more than one date of sentencing associated with it, then NEW_DOS is set equal to the **latest** date of sentencing associated with the JP. Otherwise, NEW_DOS is equal to the singular date of sentencing associated with the JP.
NEW_DOF	The minimum date of offense associated with a given individual—date of sentencing combination.
PRS	Prior Record Score in the 7th Edition Sentencing Guidelines
OGS	Offense Gravity Score
PRS8	Prior Record Score in 8th Edition Sentencing Guidelines.

ADJ_JPMIN	For judicial proceedings with multiple dates of sentencing, the ADJ_JPMIN is equal to the JP_MIN associated with the most recent date of sentencing minus the amount of time served. Time served is equal to the difference between the most recent date of sentencing associated with a judicial proceeding minus the earliest date of sentencing associated with a judicial proceeding. After consolidating ADJ_JPMIN values at the judicial proceeding level, the ADJ_JPMIN is aggregated at the ID_VARIABLE–Date of Sentencing level by taking the maximum ADJ_JPMIN value across all of the judicial proceedings with the same date of sentencing for an individual.
LATEST_JPMIN	If a judicial proceeding has multiple dates of sentencing, then the LATEST_JPMIN is equal to the JP_MIN associated with the most recent date of sentencing.
CTY_PHL	Offender was sentenced in Philadelphia, 1 = Yes, 0 = No
INCMIN	Total Maximum Incarceration Time in months.
NEW_INC_SANCTION_EXISTS	1 = If at least one incarceration sanction exists for a given ID_VARIABLE–Date of Sentencing combination, 0 otherwise.
CHARGE_COUNT	The number of charges sentenced for the judicial proceeding with the most serious sanction for a given individual.
INC_REL_NUMERIC	The relationship between incarceration sanctions associated with the same judicial proceeding. 1 = Concurrent, 2 = Consecutive
OFN_LIFE_DEATH	Life or death sentence for a given offense
JP_LIFE_DEATH	Life or death sentence in the judicial proceeding. The values the variable can take on are Yes or No.
MS_SANCTION	Most serious sanction for offense, 1 = State prison, 2 = State intermediate punishment, 3 = County jail, 4 = Restrictive intermediate punishment, 5 = Probation
SEXTIER_NUMERIC	Sex crime tier level, 3 = Offenses that are comparable or more severe than: aggravated sexual abuse, abusive sexual act against a minor under 13, or involves kidnapping a minor. Adult offenders must register for life, 2 = crimes that are comparable or more severe than: sex trafficking, coercion and enticement, transportation with intent to engage in criminal sexual activity, or abusive sexual contact. Adult offenders must register for 25 years, 1 = sex crimes not included in the other tiers. Adult offenders must register for 15 years, or 10 years with a clean record
FIREARMS	Conviction type was firearms crime, 1 = Yes, 0 = No
VIOLENCE	Conviction type was violent, 1 = Yes, 0 = No
DRUGOFFENSE	Conviction type was drug relevant crime, 1 = Yes, 0 = No
DUI	Conviction type was DUI crime, 1 = Yes, 0 = No
AT_RISK_DT	The date at which an individual is deemed eligible to be able to recidivate. Please see Figure 68 for more details on how this date was calculated for each individual in our dataset.
NEXT_DOF	The date of offense that follows a previous date of offense for a given individual. If an individual only has 1 date of offense, then NEXT_DOF is NA.
TIME_TO_RECIDIVATE	The number of **days** between the next Date of Offense (NEXT_DOF) for an offender and the offender's At Risk Date (AT_RISK_DT).
RECIDIVISM_3Y	Re-conviction for any crime that was committed within 3 years of being convicted for a prior criminal offense, 1 = Yes, 0 = No
RECIDIVISM_5Y	Re-conviction for any crime that was committed with 5 years of being convicted for a prior criminal offense, 1 = Yes, 0 = No
DOB	Offender Date of Birth

OFF_RACE	Offender Race
OFF_SEX	Offender Sex

Table 7: List of Variables & Descriptions in the Recidivism Dataset

7.2 Implementing the 8th edition PRS Categories

To assist in the comparison of existing PRS categories and proposed new PRS categories, PCS provided the capstone team with STATA code to generate the new PRS categories with variables present in the provided dataset. The team implemented the code logic in Python with no alterations except the following: the "REVOC" category was combined with the "RFEL" category as a single category of "High", similar to the combination of "REVOC" and "RFEL" into a single group for the 7th edition PRS analyses.

7.3 Appendix II: Supplemental Analyses

The following chart provides the age group distribution for the offender's **age on the date of the risk window start date**. All previous age-based analyses in the report utilize age at the time of offense.
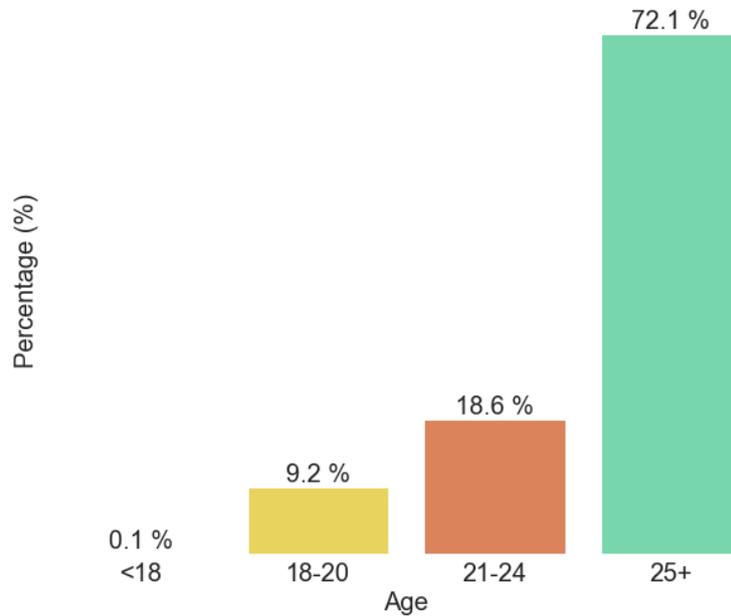

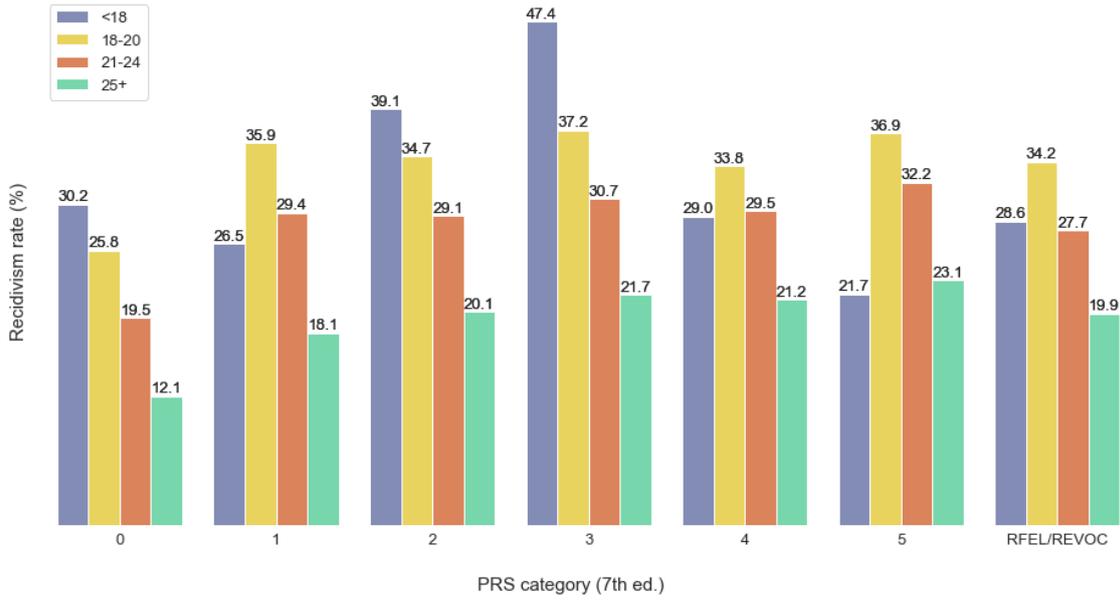Figure 69: Age Group Distribution by Age at Risk Window Start Date

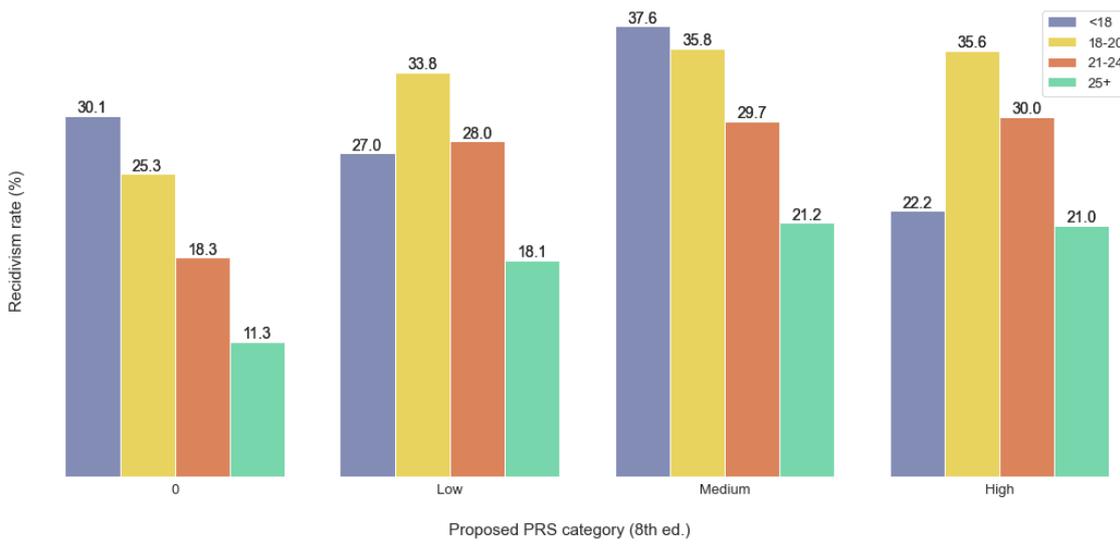Figure 70: Recidivism by PRS and Age at Risk (7th ed.)

Figure 71: Recidivism by PRS and Age at Risk (8th ed.)

The next two figures compare the incarceration sentence lengths for Black versus White offenders for non-recidivistic cases using the median and 90th percentile, respectively.
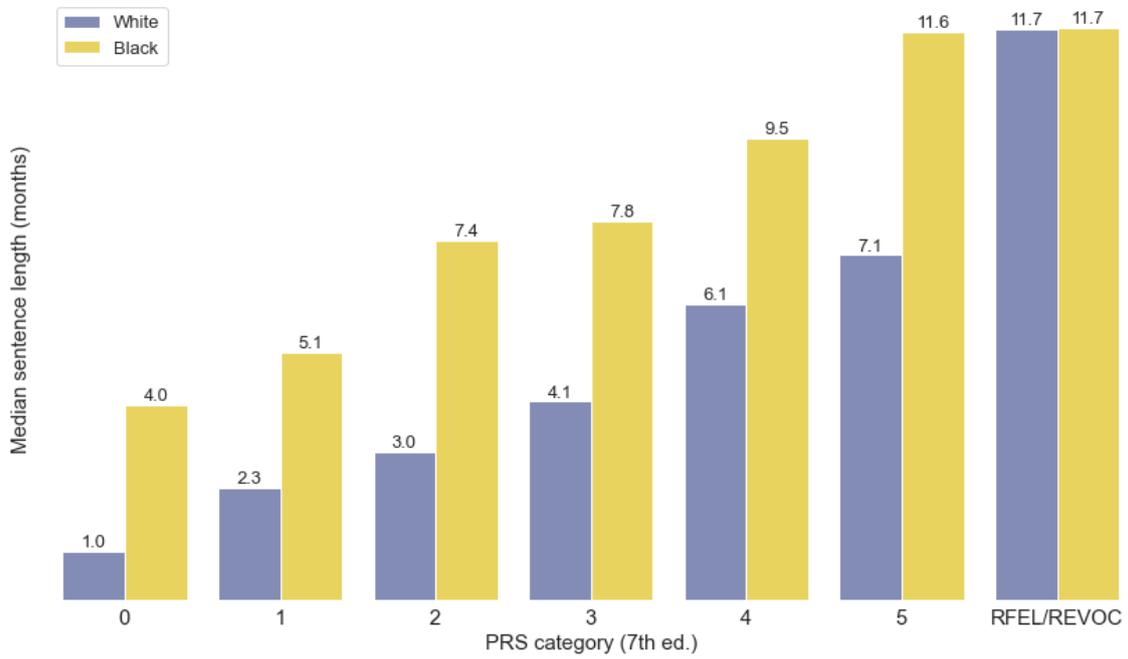

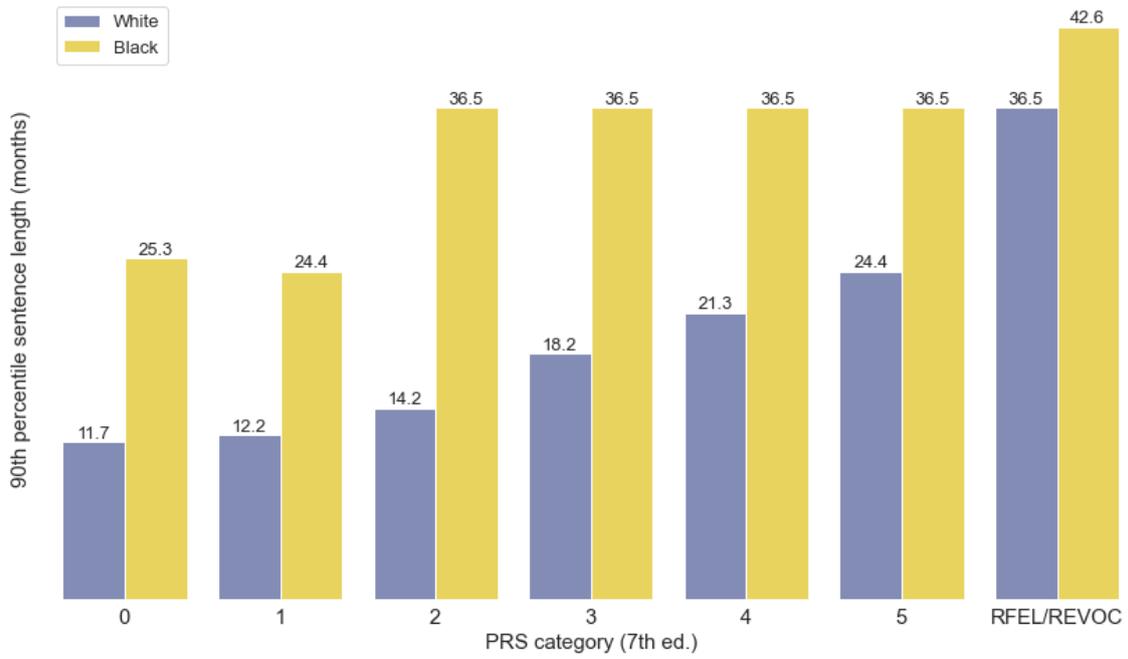Figure 72: Median Sentence Length by PRS and Race, Non-Recidivistic Cases

Figure 73: 90th percentile entence Length by PRS and Race, Non-Recidivistic Cases

The final two figures compare the incarceration sentence lengths for Black versus White offenders for recidivistic cases using the median and 90th percentile, respectively.
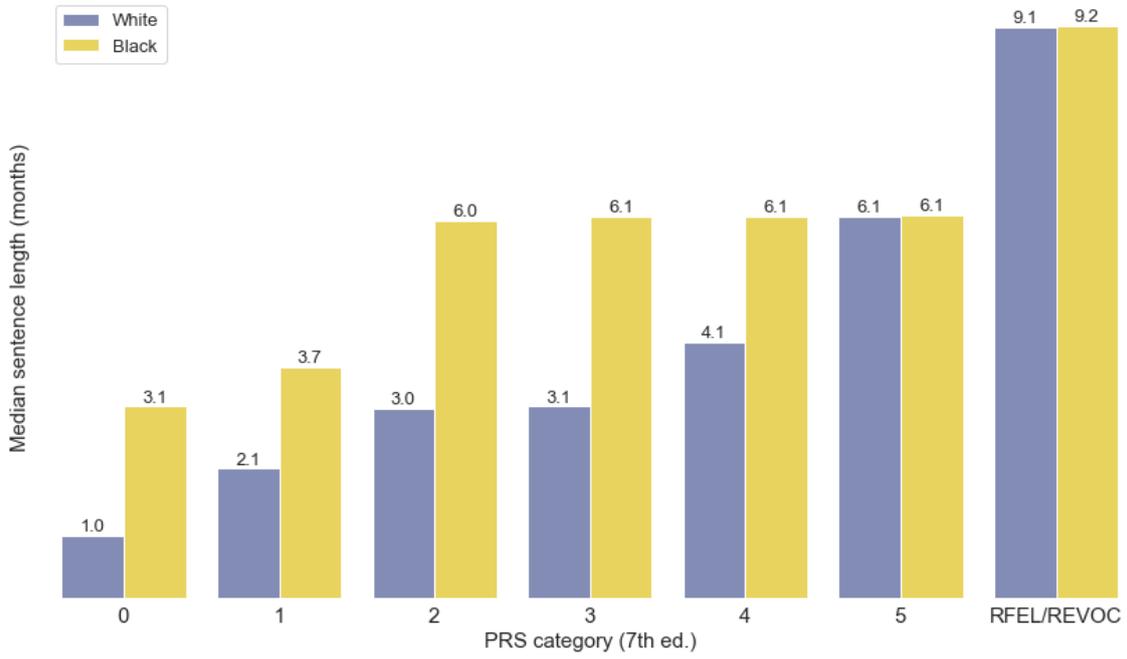
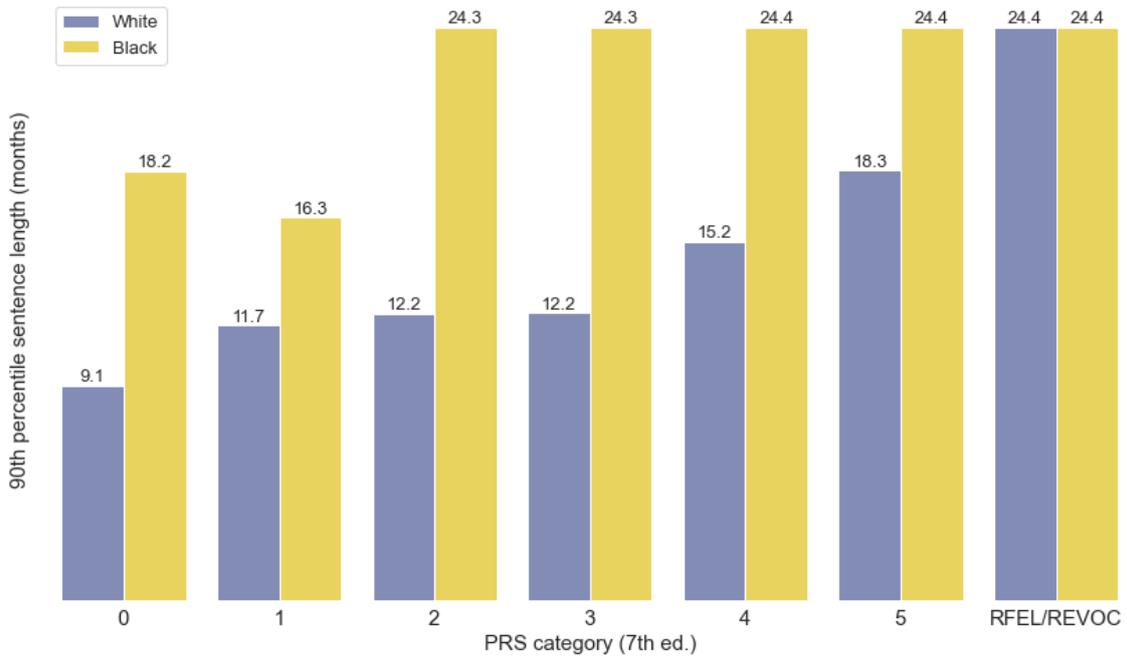Figure 74: Median sentence Length by PRS and Race, Recidivistic Cases

Figure 75: 90th Percentile Sentence Length by PRS and Race, Recidivistic Cases

PRS								
		0	**1**	**2**	**3**	**4**	**5**	**RFEL/REVOC**
	14	600	84	93	43	49	52	10
	13	267	50	32	27	21	38	9
	12	1,564	280	247	145	168	236	107
	11	3,037	562	677	369	365	607	155
	10	7,328	1,616	2,085	1,342	1,453	2,273	777
	9	4,834	1,535	1,424	876	781	1,144	450
OGS	**8**	8,921	2,025	2,191	1,349	1,396	2,313	584
	7	16,301	4,237	4,993	3,192	3,036	5,553	1,751
	6	16,655	4,931	6,694	4,065	4,327	8,034	1,750
	5	40,534	14,688	12,001	8,305	6,845	13931	3862
	4	6,926	2,226	1,924	1,653	1,433	2,672	891
	3	49,200	19,360	16,650	12,080	11,569	26,793	7,073
	2	40,661	9,335	6,585	4,713	3,767	8,435	2,864
	1	69,677	15,341	11,220	6,900	5,423	9,530	3,280

Table 8: Number of Cases per PRS and OGS Combination for All Cases