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Identifying Patterns Across the Six Canonical Factors Underlying Wrongful Convictions

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Article abstract

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Identifying Patterns Across the Six Canonical Factors Underlying Wrongful Convictions

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I Introduction

Scholars have long-recognized six “canonical factors” that contribute to wrongful convictions: mistaken witness identification, perjury or false accusations, false confessions, false or misleading forensic evidence, official misconduct, and inadequate legal defense.¹ Wrongful conviction scholarship has relied largely upon real exoneration cases to examine these six factors in context, whereas more “specialized literature” has focused on variables that are related to each of these individual factors.² Although these approaches offer some insight into the origins and characteristics of wrongful convictions, they can also be overly simplistic because they cannot illuminate patterns or comorbidities across the six canonical factors. In an attempt to address this gap in knowledge, we apply latent class analysis to identify systematic patterns among the six canonical factors in recorded wrongful convictions from the National Registry of Exonerations (“NRE”). We then examine individual and case factors that are associated with these classes. By doing so, we advance our current understanding of how wrongful convictions occur via a systematic observation of the patterns and relationships across the six canonical factors and other relevant factors.

We begin this paper with a brief discussion about the current state of wrongful conviction research, the history of exonerations in the United States and the identification of the six canonical factors. We know that these factors do not occur in isolation, and that they can have a distinct

¹ Acker, James R & Allison D Redlich. *Wrongful Conviction: Law, Science, and Policy*, 2nd ed (Durham, North Carolina: Carolina Academic Press, 2019).

² Gould, Jon B & Richard A Leo. “One Hundred Years Later: Wrongful Convictions After a Century of Research” (2010) 100:3 J Crim L & Criminology 825; Leo, Richard A. “The Criminology of Wrongful Conviction: A Decade Later” (2017) 33:1 J Contemporary Crim Just 82, <https://doi.org/10.1177/1043986216673013>.

impact on the trajectory of a wrongful conviction.³ Indeed, there are myriad sociopolitical, organizational, and cognitive factors that govern criminal procedure.⁴ To demonstrate how these factors might co-occur to produce a wrongful conviction, we briefly summarize a recorded exoneration, and then provide an overview of each of the six factors. We then discuss what is currently believed about the interactions among some of these six canonical factors and the importance of taking a comprehensive approach to this investigation.

A. The State of Wrongful Convictions & Exonerations

A wrongful conviction refers to a case in which a factually innocent individual has been convicted either by trial or via a guilty plea.⁵ While the operational definition of “wrongful convictions” varies dramatically, the term generally means that a person was convicted for a crime they did not commit. Specifically, an innocent person may be wrongfully convicted for a crime committed by someone else (i.e., “wrong-person” cases) or a crime that did not actually occur (i.e., “no-crime” cases).⁶

Exonerations included in the NRE occur post-conviction and are official acts (e.g., pardon, acquittal, dismissal, certificates of innocence, posthumous exonerations) that relieve an individual of all criminal responsibility for the crime for which they were previously convicted.⁷ Exonerations are typically based on “new” evidence of innocence that was not available at the time of conviction, or that officials failed to disclose to the court.⁸ In essence, exonerations are the antithesis of a conviction. Specifically, while a conviction is a formal judgement of “guilty”, an exoneration is a formal judgement of “not guilty”.⁹

³ *Ibid*; Redlich, Allison D et al, eds. *Examining Wrongful Convictions: Stepping Back, Moving Forward* (Durham, North Carolina: Carolina Academic Press, 2014).

⁴ Acker & Redlich, *supra* note 1.

⁵ Zalman, Marvin. “Wrongful Convictions” in J Mitchell Miller, ed, *21st Century Criminology: A Reference Handbook* (Thousand Oaks, CA: Sage, 2009) 842; Zalman, Marvin & Robert J Norris. “Measuring Innocence: How to Think About the Rate of Wrongful Conviction” (2021) 24:4 New Crim L Rev 601, <https://doi.org/10.1525/nclr.2021.24.4.601>.

⁶ See Henry, Jessica S. *Smoke but No Fire: Convicting the Innocent of Crimes that Never Happened* (Oakland, CA: University of California Press, 2020).

⁷ Gross, Samuel R & Michael Shaffer. *Exonerations in the United States, 1989–2012: Report by the National Registry of Exonerations* (2012), <https://dx.doi.org/10.2139/ssrn.2092195>; *Glossary and Criteria for Exoneration*, online: National Registry of Exonerations <https://www.law.umich.edu/special/exoneration/Pages/glossary.aspx>; Nowotny, Jordan, Amy Shlosberg & Thomas McAndrew. “Understanding Public Views of Wrongful Conviction Frequency and Government Responsibility for Compensation: Results from a National Sample” (2022) 34:2 Crim Just Pol’y Rev 140, <https://doi.org/10.1177/08874034221106747>; Redlich et al, *supra* note 3.

⁸ Colvin, Eric. “Convicting the Innocent: A Critique of Theories of Wrongful Convictions” (2009) 20:2-3 Crim LF 173, <https://doi.org/10.1007/s10609-009-9100-6>.

⁹ Gross, Samuel R et al. “Exonerations in the United States 1989 through 2003” (2005) 95:2 J Crim L & Criminology 523.

The “modern era” of wrongful conviction scholarship began in 1989 with the first DNA exoneration in the U.S.¹⁰ DNA evidence can offer relative scientific certainty that a defendant is factually innocent of the convicted crime.¹¹ As of August 2022, the Innocence Project reports 375 exonerations in which DNA testing exculpated a wrongly convicted person.¹² The most recent report of exonerations published by the NRE found that roughly 37% of exonerations were, at least in part, due to post-conviction DNA testing.¹³ However, DNA evidence is rare, present in roughly 10% of felony conviction cases;¹⁴ DNA is likely to be present in even fewer misdemeanor cases, which represent the vast majority of criminal convictions.¹⁵ Thus, examining exoneration cases that both involve DNA and those that do not will provide a more representative picture of wrongful convictions.¹⁶

The National Registry of Exonerations, which catalogues all known exonerations (both DNA and non-DNA) since 1989, is the largest available sample of wrongful convictions. As of November 2022, the NRE provides a detailed account of 3,290 exonerations including the causes and characteristics of each case. While exonerations are certainly unrepresentative of *all* wrongful convictions, the NRE’s dataset is the most frequently cited source in the quantitative study of wrongful convictions.¹⁷ Studying exonerations as a “proxy” has allowed researchers to better understand the causes and correlates of wrongful convictions and continues to be the most promising method available to develop evidence-based policy recommendations.¹⁸

As the number of exonerations reported by the NRE continues to increase, questions regarding the effectiveness and integrity of our criminal justice system grow.¹⁹ One thing is for certain: there is a profound difference between the imperfect and infrequent measure of recorded exonerations and the true incidence of wrongful convictions.²⁰ In the last three decades, scholars

¹⁰ Gross & Shaffer, *supra* note 7; Norris, Robert J et al. “Thirty Years of Innocence: Wrongful Convictions and Exonerations in the United States, 1989-2018” (2020) 1:1 Wrongful Conviction L Rev 2, online: <https://wclawr.org/index.php/wclr/article/view/11>.

¹¹ Medwed, Daniel S. *Wrongful Convictions and the DNA Revolution* (Cambridge: Cambridge University Press, 2017), <https://doi.org/10.1017/9781316417119>.

¹² *DNA Exonerations in the United States*, online: Innocence Project <<https://innocenceproject.org/dna-exonerations-in-the-united-states/>>.

¹³ Gross & Shaffer, *supra* note 7.

¹⁴ *Ibid.*

¹⁵ Gross, Samuel R. “Errors in Misdemeanor Adjudication” (2018) 98:3 B U L Rev 999.

¹⁶ Leo, *supra* note 2.

¹⁷ Gross, Samuel R. “Convicting the Innocent” (2008) 4:1 Ann Rev L & Soc Sci 173, <https://doi.org/10.1146/annurev.lawsocsci.4.110707.172300>.

¹⁸ *Ibid.*; Gross, Samuel R, & Barbara O’Brien. “Frequency and Predictors of False Conviction: Why We Know So Little, and New Data of Capital Cases” (2008) 5:4 JELS 927, <https://doi.org/10.1111/j.1740-1461.2008.00146.x>; Gould & Leo, *supra* note 2; Norris et al (2020), *supra* note 10.

¹⁹ Gross & Shaffer, *supra* note 7; Zalman, Marvin. “Criminal Justice System Reform and Wrongful Conviction: A Research Agenda” (2006) 17:4 Crim Just Pol’y Rev 468, <https://doi.org/10.1177/0887403406292740>.

²⁰ Gross & Shaffer, *supra* note 7.

have put forth great effort to better understand the causes of wrongful conviction in an attempt to minimize and remedy their detrimental impact on innocent individuals, as well as the justice system. Yet, there is still much work to be done and as we move forward, we rely on datasets cataloguing exonerations as a proxy to gain insight into how and why these miscarriages of justice occur.²¹

B. The Six Canonical Factors

Case studies have consistently and persistently revealed six “canonical” factors related to wrongful convictions.²² These factors include: mistaken witness identification (MWID), false confession (FC), perjury or false accusation (P/FA), false or misleading forensic evidence (F/MFE), official misconduct (OM), and inadequate legal defense (ILD).²³ Because the pervasiveness of wrongful convictions remains a “dark figure”, our ability to determine the degree to which these factors necessarily “cause” wrongful convictions is limited.²⁴ Nevertheless, the frequency with which these factors appear in exoneration cases suggests that identifying solutions to minimize their impact would inevitably reduce wrongful conviction rates.²⁵

²¹ Norris et al (2020), *supra* note 10.

²² *Ibid*; Gross & Shaffer, *supra* note 7.

²³ Bonventre, Catherine L. “Wrongful Conviction and Forensic Science” (2020) WIREs Forensic Science, online: <https://wires.onlinelibrary.wiley.com/doi/epdf/10.1002/wfs2.1406>; Fessinger, Melanie B et al. “Informants v Innocents: Informant Testimony and Its Contribution to Wrongful Convictions” (2020) 48:2 Cap U L Rev 149; Garrett, Brandon. *Convicting the Innocent: Where Criminal Prosecutions Go Wrong* (Cambridge, MA: Harvard University Press, 2011), <https://doi.org/10.4159/harvard.9780674060982>; Gross, Samuel R et al. “Government Misconduct and Convicting the Innocent: The Role of Prosecutors, Police, and Other Law Enforcement” (2020), University of Michigan Public Law Research Paper No. 21-003, <https://doi.org/10.2139/ssrn.3698845>; Leo, Richard A. “Rethinking the Study of Miscarriages of Justice: Developing a Criminology of Wrongful Conviction” (2005) 21:3 J Contemporary Crim Just 201, <https://doi.org/10.1177/1043986205277477>; Norris et al (2020), *supra* note 10; Pezdek, Kathy. “Fallible Eyewitness Memory and Identification” in Brian L Cutler, ed, *Conviction of the Innocent: Lessons from Psychological Research* (Washington: American Psychological Association, 2012) 105, <https://doi.org/10.1037/13085-005>; Scherr, Kyle C, Allison D Redlich & Saul M Kassin. “Cumulative Disadvantage: A Psychological Framework for Understanding How Innocence Can Lead to Confession, Wrongful Conviction, and Beyond” (2020) 15:2 Perspectives on Psych Sci 353, <https://doi.org/10.1177/1745691619896608>; Stenzel, Carla. “Eyewitness Misidentification: A Mistake that Blinds Investigations, Sways Juries, and Locks Innocent People Behind Bars” (2016) 50:3 Creighton L Rev 515; Yaroshefsky, Ellen, & Laura Schaefer. “Defense Lawyering and Wrongful Convictions in Allison D Redlich, James R Acker, Robert Norris & Catherine L Bonventre, eds, *Examining Wrongful Convictions: Stepping Back, Moving Forward* (Durham, North Carolina: Carolina Academic Press, 2014); Zalman (2009), *supra* note 5.

²⁴ Norris, Robert J, Catherine L Bonventre & James R Acker. *When Justice Fails: Causes and Consequences of Wrongful Convictions* (Durham, North Carolina: Carolina Academic Press, 2018); Poveda, Tony G. “Estimating Wrongful Convictions” (2001) 18:3 JQ 689.

²⁵ Zalman (2009), *supra* note 5.

The goal of most scholars engaged in the study of wrongful convictions is primarily to improve the reliability of evidence, minimize the opportunities for error, and effectuate meaningful changes to policy and procedure.²⁶ To do so, many studies on the six canonical factors isolate the impact of a particular factor on the path to wrongful conviction.²⁷ However, most wrongful convictions are the result of an agglomeration of the six canonical factors and these factors do not usually occur in isolation.²⁸ While each can have a distinct impact on the trajectory of a wrongful conviction, not one of the canonical factors is “independently sufficient” to cause these massive failures of the criminal justice system on their own.²⁹ In the following section, we demonstrate how critical the relationships across the six canonical factors can be in producing a wrongful conviction outcome.

II Investigating the Six Canonical Factors

A. The Factors in Context: The Case of Frederick Clay

On November 19th, 1979, Frederick Clay was arrested and charged with first-degree murder for the shooting of cab driver Jeffrey Boyajian. Around 4AM three days prior, another cab driver named Richard Dwyer saw three men cross the street and climb into Boyajian’s taxi, which was parked directly in front of Dwyer’s cab. Dwyer watched as the cab drove away. Boyajian drove the three men to the Archdale Housing Development, a public housing community in which Clay and Phillippa Sweatt resided. Phillippa was in her kitchen making coffee for her son, Neal, when she heard a commotion in the parking lot. From 80 feet away, Phillippa allegedly saw Boyajian being pulled out of his taxi by three assailants. Relying on the dim light of a single streetlamp, she could barely make out the shadowy figures, though unmistakably she heard five shots.

Official (police) misconduct, false forensic science, and mistaken identifications. The three critical eyewitnesses, Dwyer, Phillippa, and Neal, were only able to provide height estimates for the three men given their limited visual exposure to the culprits. Over the course of three days, they were shown the same photographic lineup more than three times: it included twelve boys the detective knew to reside or spend time around Archdale. None of the witnesses were able to make an initial identification.

Both Dwyer and Neal were asked to undergo hypnosis to enhance their memories. In recordings of the session, the “investigative hypnologist” is heard asking the witnesses to “zoom in” and “slow the frames down” as if their memories were like high-definition videos (a common

²⁶ Leo (2005), *supra* note 23; Norris et al (2020), *supra* note 10; Norris et al (2018), *supra* note 24.

²⁷ Poveda, *supra* note 24.

²⁸ Gould & Leo, *supra* note 2; Redlich et al, *supra* note 3.

²⁹ Doyle, James M. “An Etiology of Wrongful Convictions: Error, Safety, and Forward-Looking Accountability in Criminal Justice” in Julia Carrano & Marvin Zalman, eds, *Wrongful Conviction and Criminal Justice Reform* (New York: Routledge) 70, <https://doi.org/10.4324/9780203066997-11>.

misconception that has been repeatedly debunked).³⁰ After his first hypnosis session, Dwyer immediately identified Frederick Clay as the shorter man who had shot Jeffrey Boyajian. Although Neal Sweatt's hypnosis session failed to result in a positive identification of Clay, police were convinced that he had witnessed what happened on the morning of the murder. Two days later, on their third and final visit to the Sweatt residence, police made Neal a promise: if he cooperated, they would move his family out of Archdale. The Sweatts were the only white family living in Archdale at the time. The neighborhood was also in the vicinity of racial riots resulting from the desegregation of public schools in Boston. Following the officers' promise, Neal Sweatt also identified Frederick Clay as the gunman.

Perjury, official (prosecutorial) misconduct, and an inadequate legal defense. On the eve of the trial, Diane Moses, a potential defense witness, was subpoenaed as a witness for the prosecution. At trial, she corroborated Clay's alleged guilt by claiming to have witnessed him confess. However, Moses had been interviewed early during the initial investigation, and at that time, she told police she heard that two other men had confessed to the crime. Police returned later and told Moses that if she did not assist them with their case, she would be arrested for prostitution and her children would be placed in foster care. The prosecution did provide Clay's defense lawyer with the police reports mentioning Moses' initial interview, but the attorney chose not to investigate whether these other two men from Archdale were actually responsible for the murder of Jeffrey Boyajian. Clay was ultimately found guilty and was sentenced as an adult to life-without-parole.

Compounding factors. The case of Frederick Clay was complex and involved five of the six factors that have been shown to underlie wrongful convictions: false or misleading forensic evidence, mistaken witness identifications, perjury or false accusations, official misconduct, and inadequate legal defense (the one omitted factor is false confessions). The way in which prosecutors (and law enforcement) stitched together a case against Clay clearly illustrates how one of these factors can lead to another. When faced with a serious case for which there was little evidence, police relied on questionable forensic "science" techniques to build evidence. With the help of an investigative hypnologist, police were able to record one positive, but mistaken, identification of a suspect—Clay. This emboldened them to encourage perjured testimony, a form of official misconduct, from a second eyewitness as well as Moses. Compounding these mistakes, Clay's legal defense was ineffective as his attorney failed to pursue other potential leads (just as the police failed to do).

B. Mistaken Witness Identification (MWID)

In 26% of the exonerations listed by the NRE, mistaken witness identification (MWID) contributed to the wrongful conviction of an innocent person.³¹ The Innocence Project found MWID was present in approximately 69% of DNA exoneration cases, of which 77% involved multiple identification procedures (i.e., witnesses were shown a photo more than once) and 42%

³⁰ Winter, Alison. "The Rise and Fall of Forensic Hypnosis" (2013) 44:1 *Studies in Hist & Phil of Sci Part C: Studies in Hist & Phil of Biological & Biomedical Sci* 26, <https://doi.org/10.1016/j.shpsc.2012.09.011>.

³¹ *Detailed Case View* (2022) [Data set], online: National Registry of Exonerations <https://www.law.umich.edu/special/exoneration/Pages/detailist.aspx>.

were cross-race misidentifications (i.e., the witness and the culprit were of different ethnicities).³² Eyewitness evidence is frequently used to identify, charge, and convict suspects, and can be especially critical in cases that lack physical evidence.³³ Just the same, both scholars and the courts recognize the fallibility of eyewitness identification.³⁴ Put simply, mistaken witness identification (MWID) occurs when a witness misidentifies an innocent suspect as the perpetrator of the crime and can contaminate several stages of criminal procedure.³⁵

Explanations of eyewitness error often point to the general fallibility of human memory,³⁶ which can be exacerbated by other factors (e.g., cross-race identifications),³⁷ as well as suggestive identification procedures by police.³⁸ Take for example the case of Frederick Clay. The suggestive and manipulative identification procedures employed by investigators included repeated photo lineups, as well as “forensic” hypnosis. Both potential identifications were also being made cross-race. At trial, eyewitness testimony can have a strong impact on jurors’ decision making.³⁹ Specifically, while research suggests the relationship between accuracy and confidence can be weak, the confidence of an eyewitness remains a strong predictor of jurors’ verdict decisions.⁴⁰

During Clay’s trial, one of the key witnesses told jurors that he was still 80% confident in his identification, despite not being able to provide an identification during the first lineup. Other than the two MWIDs, the prosecution had very little evidence against Clay, further demonstrating just how compelling eyewitness evidence can be. The topics of eyewitness memory, identification

³² Innocence Project, *supra* note 12.

³³ Wells, Gary L, Amina Memon & Steven D Penrod. “Eyewitness Evidence: Improving Its Probative Value” (2006) 7:2 Psych Sci in the Public Interest 45. <https://doi.org/10.1111/j.1529-1006.2006.00027.x>.

³⁴ Acker & Redlich, *supra* note 1; Wells, Gary L et al. “Policy and Procedure Recommendations for the Collection and Preservation of Eyewitness Identification Evidence” (2020) 44:1 Law & Hum Behav 3, <https://doi.org/10.1037/lhb0000359>.

³⁵ Jackson, Kaitlin & Samuel R Gross, *Tainted Identifications* (22 Sept 2016), online: National Registry of Exonerations <<https://www.law.umich.edu/special/exoneration/Pages/taintedids.aspx>>; NRE, *supra* note 31.

³⁶ Loftus, Elizabeth F. “Planting Misinformation in the Human Mind: A 30-year Investigation of the Malleability of Memory” (2005) 12:4 Learning & Memory 361.

³⁷ Brigham, John C et al. “The Influence of Race on Eyewitness Memory” in Rod C L Lindsay et al, eds, *The Handbook of Eyewitness Psychology, Vol. 2: Memory for People* (Mahweh, New Jersey: Lawrence Erlbaum Associates Publishers, 2007) 271, <https://doi.org/10.4324/9780203936368>.

³⁸ Wells, Gary L & Deah S Quinlivan. “Suggestive Eyewitness Identification Procedures and the Supreme Court’s Reliability Test in Light of Eyewitness Science: 30 Years Later” (2009) 33:1 Law & Hum Behav 1, <https://doi.org/10.1007/s10979-008-9130-3>.

³⁹ Cutler, Brian L, Steven D Penrod & Hedy R Dexter. “Juror Sensitivity to Eyewitness Identification Evidence” (1990) 14:2 Law & Hum Behav 185, <https://doi.org/10.1007/BF01062972>; Stenzel, *supra* note 23.

⁴⁰ Cutler et al, *supra* note 39; Slane, Crystal R & Chad S Dodson. “Eyewitness Confidence and Mock Juror Decisions of Guilt: A Meta-Analytic Review” (2022) 46:1 Law & Hum Behav 45, <https://doi.org/10.1037/lhb0000481>; Wells et al (2020), *supra* note 34.

procedures, perceived witness credibility, etc. have been studied for nearly 50 years in the modern era.⁴¹

C. Perjury or False Accusation (P/FA)

Of course, not all witness misidentifications occur purely by accident. Remarkably, 62% of exonerations documented by the National Registry of Exonerations involved perjury or false accusations.⁴² Perjury or false accusations (P/FA) refer to cases in which a witness *intentionally* misidentifies or misrepresents statements from an innocent person with the specific intention of incriminating them.⁴³ Jailhouse informants can be a regular source of P/FA via alleged secondary confessions, claiming that the defendant disclosed involvement in the crime while incarcerated with them.⁴⁴ P/FA is often rewarded with something (e.g., leniency, sentence/charge reductions, retracting threatened charges, etc.), which challenges the overall reliability of this type of testimony.⁴⁵ Nevertheless, jurors find secondary confessions (via jailhouse informants) to be more important to their verdicts than other types of testimony and evidence (e.g., eyewitness, character, etc.)⁴⁶ At Frederick Clay's trial, Diane Moses provided a secondary confession on the stand. It would take nearly thirty years for her to recant her testimony, claiming it was borne out of fear due to threats from the police.

D. False Confessions (FC)

False *primary* confessions, as opposed to false secondary confessions, have been involved in approximately 12% of all known exonerations, and about 28% of DNA-based exonerations according to the NRE.⁴⁷ A false confession (FC) is a verbal admission of guilt by an innocent person.⁴⁸ There are several reasons why an innocent person might confess to a crime they did not commit: as a result of an extreme interrogation, to protect someone else, as a result of mental

⁴¹ As such, the literature is vast; for overviews, we refer readers to Wells, Gary L. "Eyewitness Identification: Probative Value, Criterion Shifts, and Policy Regarding the Sequential Lineup" (2014) 23:1 *Current Directions in Psych Sci: J Am Psych Soc'y* 11, <https://doi.org/10.1177/0963721413504781>; Wells, Gary L. "Psychological Science on Eyewitness Identification and Its Impact on Police Practices and Policies" (2020) 75:9 *American Psychologist* 1316, <https://doi.org/10.1037/amp0000749>; Wells, Gary L et al. "Eyewitness Identification Procedures: Recommendations for Lineups and Photospreads" (1998) 22:6 *Law & Hum Behav* 603, <https://doi.org/10.1023/A:1025750605807>; Wells et al (2020), *supra* note 34.

⁴² NRE, *supra* note 31.

⁴³ Gross & Shaffer, *supra* note 7.

⁴⁴ Fessinger et al, *supra* note 23.

⁴⁵ Neuschatz, Jeffrey S et al. "The Effects of Accomplice Witnesses and Jailhouse Informants on Jury Decision Making" (2008) 32:2 *Law & Hum Behav* 137, <https://doi.org/10.1007/s10979-007-9100-1>.

⁴⁶ Wetmore, Stacy A, Jeffrey S Neuschatz, & Scott D Gronlund. "On the Power of Secondary Confession Evidence" (2014) 20:4 *Psych, Crime & L* 339, <https://doi.org/10.1080/1068316X.2013.777963>.

⁴⁷ NRE, *supra* note 31.

⁴⁸ See generally Kassin, Saul M et al. "Police-Induced Confessions: Risk Factors and Recommendations" (2010) 34:1 *Law & Hum Behav* 3, <https://doi.org/10.1007/s10979-009-9188-6>.

illness, etc.⁴⁹ A false confession can also adversely affect subsequent investigatory procedures, escalating biases and governing the way in which successive case information is interpreted.⁵⁰

E. False or Misleading Forensic Evidence (F/MFE)

Roughly 23% of known exonerations have involved false or misleading forensic science (F/MFE).⁵¹ Forensic science as a whole has an arguably paradoxical relationship with exonerations. On one hand, forensic DNA testing has been used to help exonerate over 500 innocent people.⁵² On the other hand, forensic science has contributed to hundreds of wrongful convictions through unreliable methods, testing errors, or the misapplication of findings.⁵³ F/MFE is often used by the prosecution to bolster its cases. In fact, investigations finding issues with forensic evidence typically indicate that these errors favored the prosecution. An investigation into testimony provided by an elite FBI forensic unit found that these examiners overstated the findings of their hair and clothing analyses almost universally (over more than twenty years before 2000)—100% of these errors favored the prosecution.⁵⁴ Further, many previously-accepted forensic techniques used to acquire convictions lacked the scientific validity to be retained in court today (e.g., bite mark analysis⁵⁵ and hypnosis).⁵⁶ In fact, many states have banned the use of hypnosis to enhance eyewitness memory. Research has shown that hypnosis actually *reduces* memory accuracy, and can artificially inflate eyewitness confidence, as clearly illustrated in Frederick Clay's case.⁵⁷

F. Official Misconduct (OM)

Official misconduct (OM) has contributed to 57% of known exonerations. OM occurs when a government official contributes to the wrongful conviction of an innocent person by violating accepted protocols or laws.⁵⁸ OM typically involves officials constructing false evidence

⁴⁹ Kassir, Saul M. "The Psychology of Confession Evidence" (1997) 52:3 Am Psychologist 221, <https://doi.org/10.1037/0003-066X.52.3.221>.

⁵⁰ Leo, Richard A. "The Justice Gap and the Promise of Criminological Research" (2014) 15:3 Criminology, Crim Just, L & Soc'y 1; Scherr et al, *supra* note 23.

⁵¹ NRE, *supra* note 31.

⁵² *Ibid.*

⁵³ Bonventre, *supra* note 23; Garrett, Brandon L & Peter J Neufeld. "Invalid Forensic Science Testimony and Wrongful Convictions" (2009) 95:1 Va L Rev 1.

⁵⁴ Hsu, Spencer S. "FBI admits flaws in hair analysis over decades", *Washington Post* (18 Apr 2015), online: <https://www.washingtonpost.com/local/crime/fbi-overstated-forensic-hair-matches-in-nearly-all-criminal-trials-for-decades/2015/04/18/39c8d8c6-e515-11e4-b510-962fcfab310_story.html>.

⁵⁵ Saks, Michael J et al. "Forensic Bitemark Identification: Weak Foundations, Exaggerated Claims" (2016) 3:3 JLB 538, <https://doi.org/10.1093/jlb/lsw045>.

⁵⁶ Norris et al (2018), *supra* note 24; Winter, *supra* note 30.

⁵⁷ Mazzoni, Giuliana & Steven J Lynn. "Using Hypnosis in Eyewitness Memory: Past and Current Issues" in Michael P Toglia, J Don Read, David F Ross, Rod C L Lindsay, eds, *The Handbook of Eyewitness Psychology. Vol I: Memory for Events* (London: Taylor and Francis Group, 2017) 321.

⁵⁸ NRE (Glossary), *supra* note 7.

of guilt, or concealing evidence of innocence.⁵⁹ In Frederick Clay's case, OM converged and interacted with MWID through suggestive identification procedures (e.g., showing witnesses the same photographic lineup up to five times), threatening a witness to provide perjured testimony (i.e., Diane Moses), and concealing substantive evidence of innocence (i.e., information regarding an alternative suspect). It is important to note that in many cases, officials justify their misconduct in "benevolent" ways—believing that their actions will ensure that a truly guilty person does not escape a guilty verdict.⁶⁰

G. Inadequate Legal Defense (ILD)

Approximately 26% of exonerees had an inadequate legal defense (ILD). ILD occurs when a defendant's attorney fails to uphold constitutional standards of zealous representation.⁶¹ post-conviction, defendants can attempt to appeal based on ineffective assistance of counsel. Defendants must, however, be able to demonstrate their representation was (1) reasonably deficient and (2) had an adverse effect on the conviction⁶²—a notoriously difficult standard to meet.

ILD is also intrinsically related to the other canonical factors. Zealous representation could challenge the admissibility of questionable evidence, arguing that unreliable witness identifications or questionable forensic evidence should be inadmissible at trial. Frederick Clay's trial might have gone differently had his attorney attempted to suppress the identification resulting from hypnosis, and to investigate alternative suspects.

H. Shifting the Paradigm: The Relationships Across the Six Canonical Factors

Researchers have recently started to identify the interactions that might exist across these canonical factors, though these investigations are typically limited to examining two factors at a time. For example, Garrett and Neufeld examined the prevalence of F/MFE in exonerations and found that most of these convictions were also supported with MWID.⁶³ They also found that OM was present in approximately 17% of MWID exonerations and 57% of FC exonerations. They also hypothesized that ILD may exacerbate the impact that unreliable forms of evidence (i.e., MWID, P/FA, F/MFE) have in wrongful convictions. Theoretically, effective lawyering could be an antidote for many of these other factors—an effective and zealous attorney could help to prevent wrongful convictions by invalidating false forensic evidence, challenging unreliable witnesses, or fighting to exclude unreliable confessions. Yet Gould et al. found that innocent defendants were more vulnerable to an ILD, having either a lack of experience or conflicts of interest.⁶⁴ Further,

⁵⁹ Gross & Shaffer, *supra* note 7; Gross et al (2020), *supra* note 23.

⁶⁰ Covey, Russell. "Police Misconduct as a Cause of Wrongful Convictions" (2013) 90:4 Wash U L Rev 1133.

⁶¹ Norris et al (2018), *supra* note 24.

⁶² *Strickland v Washington*, 466 U.S. 668 (1984), online: <https://supreme.justia.com/cases/federal/us/466/668/>.

⁶³ Garrett & Neufeld, *supra* note 53.

⁶⁴ Gould, Jon B et al. "Predicting Erroneous Convictions" (2014) 99:2 Iowa L Rev 471.

Garrett and Neufeld examined DNA exoneration cases involving F/MFE and discovered that the defense rarely obtained their own experts to challenge the validity of this evidence.⁶⁵

Similarly, in a study of DNA exonerations, Kassin et al. discovered that FCs were often the first type of evidence obtained in multiple-error convictions, and were often accompanied by F/MFE, MWID, and P/FA.⁶⁶ Confession evidence was significantly more likely to be corroborated by F/MFE (~67%), followed by MWID (45%) and P/FA (24%).⁶⁷ These findings suggest FCs may have a powerful influence over subsequent investigations and increase the risk of a wrongful conviction.⁶⁸ Emerging research on “forensic confirmation biases”⁶⁹ further makes clear that these six factors do not exist in isolation. Thus, we presume that certain factors are more likely to co-occur and that some can lead to others.

III The Present Study

To date, no work has systematically examined the relationships across *all* six canonical factors underlying wrongful convictions. While scholarship on the individual factors has substantially improved our understanding of errors in criminal procedure, it has been primarily limited to their isolated impact. The goal of the present study is to build upon current wrongful conviction literature by taking a more comprehensive approach, examining patterns across these six canonical factors that pave the path to a wrongful conviction. We apply latent class analysis (LCA) as a data-driven approach to identifying underlying subgroups (or latent classes) of exonerations. Each class possesses a distinct pattern across the six canonical factors underlying wrongful convictions and exonerations are assigned to the class to which they are most likely to belong. LCA can provide a more nuanced understanding of the heterogeneity underlying wrongful convictions by taking into account all six canonical factors simultaneously. By identifying the patterns across these factors (i.e., latent classes), we can examine whether these patterns correspond to other variables (e.g., exoneree demographics, measures of case severity). By so doing, we achieve a better understanding of the relationships between the canonical factors and case/exoneree characteristics. By identifying exoneration latent classes, as opposed to relying on analyses that would be limited to examining one or two canonical factors at a time, we can determine if individual and/or case factors are more or less present in the classes.

⁶⁵ Garrett & Neufeld, *supra* note 53.

⁶⁶ Kassin, Saul M, Daniel Bogart & Jacqueline Kerner. “Confessions that Corrupt: Evidence from the DNA Exoneration Case Files” (2012) 23:1 Psych Sci 41, <https://doi.org/10.1177/0956797611422918>.

⁶⁷ *Ibid.*

⁶⁸ See also Scherr et al, *supra* note 23, describing how false confessions cumulatively disadvantage individuals across multiple stages.

⁶⁹ Dror, Itiel E, Saul M Kassin & Jeff Kukucka. “New Application of Psychology to Law: Improving Forensic Evidence and Expert Witness Contributions” (2013) 2:1 J App Res in Memory & Cognition 78, <http://dx.doi.org/10.1016/j.jarmac.2013.02.003>.

IV Method

A. Sample

The NRE is widely regarded as the most comprehensive list of known exonerations in the United States. The database includes exonerations from 1989 to the present and is frequently referenced in wrongful conviction scholarship. Exonerations are recorded after a post-conviction review of new evidence by a court or government official. After receiving a pardon, acquittal, or dismissal, the individual is relieved of all criminal responsibility for the original conviction.⁷⁰

The analysis was based on data from the National Registry of Exonerations that was downloaded on November 3, 2021. At that time, there were a total of 2,880 exonerees.⁷¹

B. Variables

We relied largely on the variables included within the NRE dataset. In addition to the six canonical factors, the NRE also provides information regarding exoneree demographics, measures of case severity, and process/evidence-related variables.

Latent Class Indicators. Our latent class indicators consisted of the six canonical factors related to wrongful convictions: mistaken witness identification (MWID), false confession (FC), perjury or false accusation (P/FA), false or misleading forensic evidence (F/MFE), official misconduct (OM), and inadequate legal defense (ILD). The six canonical factors were treated (within the NRE data) as dichotomous variables (0 = absent; 1 = present). The official definitions of each factor provided by the NRE are presented in Table 1.

Covariates. One of the advantages of accessing the NRE repository to study wrongful convictions is the considerable detail provided in their dataset. In addition to the six canonical factors, the NRE includes several other variables. We used these variables to examine whether they were significantly associated with any of the patterns across the six canonical factors (i.e., the classes).⁷² Thus, exoneree demographics, measures of case severity, and process/evidence-related variables were included as covariates. *Exoneree demographics* included juvenile status (coded as adult [18 years of age or older] = 0, juvenile = 1), race/ethnicity (Black, Hispanic, White, or Other), and sex (female = 0, male = 1). *Measures of case severity* included: life or death sentence (neither = 0, yes = 1), misdemeanor (no = 0, yes = 1), federal case (no = 0, yes = 1), homicide (no = 0, yes = 1). We also examined the minimum and maximum sentence the defendant received (coded continuously). *Process/evidence-related variables* included: co-defendant confession (no = 0, yes = 1), jailhouse informant (no = 0, yes = 1), innocence organization (no = 0, yes = 1), guilty plea case (no = 0, yes = 1), and no crime case (no = 0, yes = 1). We also included time to conviction, which provided a number in years for the time to conviction (i.e., date of conviction minus the date

⁷⁰ Gross & Shaffer, *supra* note 7; NRE, *supra* note 31; Nowotny et al, *supra* note 7; Redlich et al, *supra* note 3.

⁷¹ This dataset can be accessed here: <https://osf.io/wvyfb/>.

⁷² Rossmo, Kim K & Joycelyn M Pollock. "Confirmation Bias and Other Systemic Causes of Wrongful Convictions: A Sentinel Events Perspective" (2014) 11:2 Northeastern U L Rev 790.

that the crime occurred). Time to exoneration provided a number in years for the time to exoneration (i.e., date of exoneration minus the date of conviction). Table 1 provides more detailed definitions and criteria for the covariate tags.

Table 1

Variable Definitions

Variable	Definition
Latent Class Indicators	
False Confession (FC)	“A confession is a statement made to law enforcement at any point during the proceedings which was interpreted or presented by law enforcement as an admission of participation in or presence at the crime, even if the statement was not presented at trial. A statement is not a confession if it was made to someone other than law enforcement. A statement that is not at odds with the defense is not a confession. A guilty plea is not a confession”
False or Misleading Forensic Evidence (F/MFE)	“Faulty or misleading expert or forensic evidence may have led to a factually erroneous conclusion, at any stage of the investigation or adjudication, that contributed to the defendant's false conviction”
Inadequate Legal Defense (ILD)	“The exoneree’s lawyer at trial provided obviously and grossly inadequate representation”
Mistaken Witness Identification (MWID)	“At least one witness mistakenly identified the exoneree as a person the witness saw commit the crime”
Official Misconduct (OM)	“Police, prosecutors, or other government officials significantly abused their authority or the judicial process in a manner that contributed to the exoneree's conviction”
Perjury or False Accusation (P/FA)	“A person other than the exoneree committed perjury by making a false statement under oath that incriminated the exoneree in the crime for which the exoneree was later exonerated, or made a similar unsworn statement that would have been perjury if made under oath”
Covariates	
Exoneree Demographics	
Sex	The exoneree’s sex (male, female)
Juvenile status	Exoneree was a juvenile (i.e., 17 years of age or younger) at the time of conviction

Race	The race of the exoneree was recoded as Black, Hispanic, White and Other (consisting of a small percentage of Native American, Asian, and NRE's 'other')
Case Severity	
Federal Case (FC)	Exoneree was convicted in a federal case
Homicide (H)	"Exoneree was convicted of either murder or manslaughter"
Life or death sentence	Whether the exoneree had received a life (with or without parole) sentence, death sentence, or neither
Minimum sentence	The low-end range of the Exoneree's possible sentence or, if no range was provided, the actual sentence
Maximum sentence	The high-end range of the Exoneree's possible sentence or, if no range was provided, the actual sentence
Misdemeanor	Exoneree was convicted of a misdemeanor
Processing/Evidence-related	
Co-defendant confession (CDC)	"A codefendant of the exoneree, or a person who might have been charged as a codefendant, gave a confession that also implicated the exoneree"
Guilty Plea (P)	The exoneree falsely pled guilty to original charges
Innocence organization (IO)	"An innocence organization helped secure the exoneration. This only includes innocence organizations that are independent of government bodies - it does not include CIUs or Innocence Commission"
Jailhouse informant (JI)	"A witness who was incarcerated with the exoneree testified or reported that the exoneree confessed to him or her"
No Crime (NC)	"The exoneree was convicted of a crime that did not occur, either because an accident or a suicide was mistaken for a crime, or because the exoneree was accused of a fabricated crime that never happened"
Time to conviction	The time (in years) from exoneree's charge to conviction
Time to exoneration	The time (in years) from exoneree's original conviction to exoneration

Note. The definitions in quotations come directly from the NRE's *Glossary* (2022). For more information and other definitions, see

<https://www.law.umich.edu/special/exoneration/Pages/glossary.aspx>

C. Data Analysis

Latent class analysis (LCA) was used to identify and distribute exonerations into latent classes based upon distinct patterns across the six canonical factors (i.e., latent class indicators). LCA uses categorical indicator variables to identify unobserved patterns, also known as latent classes.⁷³ Given that the number of latent classes is unknown, a series of LCA models with varying numbers of latent classes were fitted with statistical software program *Mplus* 8.4.⁷⁴ The fit of these models was compared based on multiple information criteria, including Akaike's information criterion (AIC),⁷⁵ Bayesian information criterion (BIC)⁷⁶ and sample-size-adjusted BIC (saBIC).⁷⁷ The model with the smallest values for the information criteria was considered the best-fitting model. In addition, we also adopted the Lo-Mendell-Rubin (LMR) likelihood ratio test,⁷⁸ adjusted LMR, and the bootstrap likelihood ratio test (BLRT)⁷⁹ to evaluate model fit. These tests compare the fit of a k -class model versus a $(k-1)$ -class model; p -values that are below the employed alpha value (e.g., .05) indicate that the k -class model has significantly better fit than the $(k-1)$ -class model.

Based on the best-fitting model, LCA estimated the probability of case membership for each class and categorized cases into the most likely latent class. The probability of endorsing each indicator (i.e., canonical factor) was reported by latent class. Finally, chi-square analyses and analyses of variance (ANOVA) were used to examine whether the identified latent classes differed by exonerate demographics, case severity, and processing/evidence-related variables (i.e., covariates). The goal of this step was to examine if particular latent classes were significantly associated with particular covariates.⁸⁰

⁷³ Weller, Bridget E, Natasha K Bowen & Sarah J Faubert. "Latent Class Analysis: A Guide to Best Practice" (2020) 46:4 J Black Psych 287, <https://doi.org/10.1177/0095798420930932>; Wu, Shiyu et al. "Patterns and Social Determinants of Substance Uses Among Arizona Youth: A Latent Class Analysis Approach" (2020) 110 Child & Youth Serv Rev 104769, <https://doi.org/10.1016/j.childyouth.2020.104769>.

⁷⁴ Muthén, Linda K & Bengt O Muthén. *Mplus User's Guide. Eighth Edition* (Los Angeles: Muthén & Muthén, 1998-2017).

⁷⁵ Akaike, Hirotogu. "Information Theory and an Extension of the Maximum Likelihood Principle" in B N Petrov & F Csaki, eds, *Second International Symposium on Information Theory* (Budapest, Hungary: Akademiai Kiado, 1973) 267; Akaike, Hirotogu. "Factor Analysis and AIC" (1987) 52:3 Psychometrika 317, <https://doi.org/10.1007/BF02294359>.

⁷⁶ Schwarz, Gideon. "Estimating the Dimension of a Model" (1978) 6:2 Annals of Statistics 461.

⁷⁷ Sclove, Stanley L. "Application of Model-Selection Criteria to Some Problems in Multivariate Analysis" (1987) 52:3 Psychometrika 333, <https://doi.org/10.1007/BF02294360>.

⁷⁸ Lo, Yungtai, Nancy R Mendell & Donald B Rubin. "Testing the Number of Components in a Normal Mixture" (2001) 88:3 Biometrika 767.

⁷⁹ McCutcheon, Allan L. *Latent Class Analysis* (Thousand Oaks, CA: Sage, 1987).

⁸⁰ Weller et al, *supra* note 71.

V Results

A. Latent Class Analysis of the Six Canonical Factors

A four-class model provided the best overall fit statistics for the patterns identified across the six canonical factors in this dataset ($N = 2,880$).⁸¹ Specifically, the four-class LCA model had the smallest BIC value. Although the five-class model was shown to have best fit according to AIC, saBIC, LMR, aLMR, and BLRT, the improvement in fit from the four-class to the five-class model was relatively small (e.g., saBIC only decreased by 8 as opposed to 114 from the three-class to the four-class model). Therefore, the four-class model was considered the best-fitting model.

Table 2

Results of Model Fit Comparisons

Model	AIC	BIC	saBIC	LMR	aLMR	BLRT	Mixing Proportions
1-Class	19975	20011	19992				
2-Class	18954	19032	18990	<.001	<.001	<.001	.39/.61
3-Class	18794	18913	18850	.0116	.0123	<.001	.50/.19/.31
4-Class	18661	18822	18736	<.001	<.001	<.001	.30/.19/.19/.32
5-Class	18634	18836	18728	.0023	.0026	<.001	.29/.17/.08/.30/.17

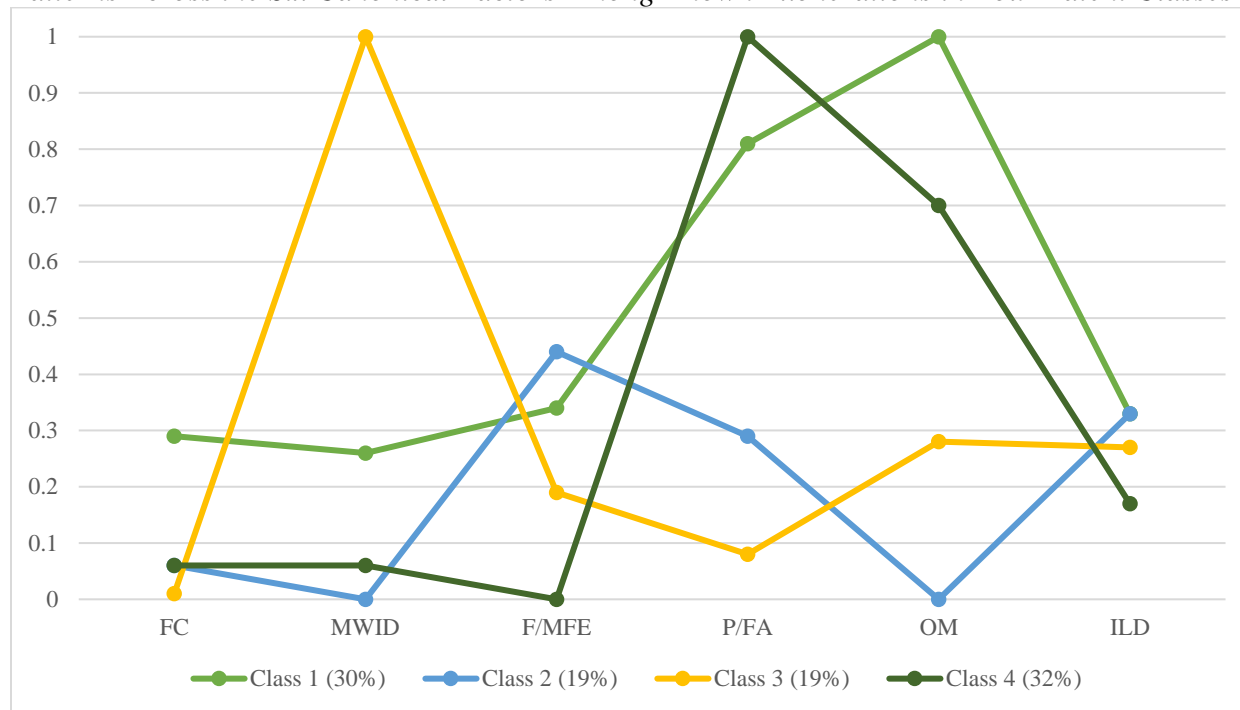
Note. AIC = Akaike's information criterion; BIC = Bayesian information criterion; saBIC = sample size adjusted BIC; LMR = the Lo-Mendall-Rubin test; aLMR = the adjusted LMR test; BLRT = bootstrap likelihood ratio test. *P*-values were reported for LMR, aLMR, and BLRT. Mixing proportions were based on the most likely latent class membership.

The distinct patterns across the six canonical factors in known exonerations for all four latent classes are shown in Figure 1. The largest proportion of cases were classified into Class 4 (32%), followed closely by Class 1 (30%). Class 2 and Class 3 equally accounted for the remaining cases (19% for each). Each of the four classes were labeled to reflect our interpretation of their profiles. The following is our substantive interpretation of the four latent classes.

⁸¹ See Table 2 for model fit statistics.

Figure 1

Patterns Across the Six Canonical Factors Among Known Exonerations in Four Latent Classes



Note. Class 1 = Investigative Corruption; Class 2 = Failures to Investigate; Class 3 = Witness Mistakes; Class 4 = Intentional Errors.

Investigative Corruption. Class 1 accounted for 30% of exonerations. This class is characterized by a very high probability of OM followed by a high probability of P/FA. Class 1 also had a higher probability of FC than all the other classes (though the overall probability of FC was relatively low). Additionally, these cases had the second-highest probability of ILD, F/MFE, and MWID overall. Class 1 was labeled *Investigative Corruption* as these cases were largely compromised by government officials abusing their powers in blind pursuit of the “truth”.

Failures to Investigate. Class 2 accounted for 19% of exonerations. Overall, this class was characterized by relatively low probabilities across the six factors and had the lowest probability of OM and MWID. However, these cases had the highest probability of F/MFE and were tied for the highest ILD relative to the other classes. Class 2 was labeled *Failures to Investigate* as it is characterized by the highest probability of ineffective counsel in conjunction with a tendency to rely on unreliable forensic evidence.

Witness Mistakes. Class 3 accounted for 19% of exonerations. This class was characterized by the highest probability of MWID and relatively low probabilities for all other factors. Thus, Class 3 was labeled *Witness Mistakes*.

Intentional Errors. Class 4 accounted for 32% of exonerations. This class was primarily characterized by the highest probability of P/FA and the second-highest probability of OM across all the classes. Class 4 had the lowest probability of ILD and F/MFE. Class 4 was labeled

Intentional Errors given the prevalence of P/FA and OM (i.e., intentional acts that contribute to wrongful convictions), accompanied with relatively low probabilities for the other four (typically less intentional) factors.

B. Covariates Associated with Class Membership

Chi-square analyses and ANOVA were conducted with covariates by class membership. All associations between latent class membership and exoneree demographics, measures of case severity, and process/evidence-related variables were significant at $p < .05$. While the universal significance of the covariate analyses could be due, in part, to the size of the study sample (i.e., $N = 2,880$ cases), we also observed significant variations in class membership by these covariates.

Associations between exoneree demographics and latent class membership. Juvenile status significantly differed across the four latent classes, $X^2(3, N = 2880) = 29.05, p < .0001$. However, the effect size for this association, Cramer's V , was relatively weak, $= .10$.⁸² Nevertheless, a greater proportion of juvenile exonerees were associated with the *Investigative Corruption* (42.11%) class than adult exonerees (28.23%). Sex also had a moderate effect on latent class membership, $X^2(3, N = 2880) = 123.92, p < .0001, V = .21$. Specifically, a greater proportion (43.03%) of female exonerees were classified within the *Failures to Investigate* class (16.96% male). In contrast, male exonerees (20.92%) had a stronger association with *Witness Mistakes* than female exonerees (2.39%). Next, we examined the association of exoneree race with class membership. Again, the results were statistically significant with a small to medium effect size, $X^2(9, N = 2879) = 123.06, p < .0001, V = .12$. Black (24.86%) and Hispanic (24%) exonerees were more strongly associated with *Witness Mistakes* than white exonerees (10.72%). When compared to the proportion of white exonerees (24.76%) and exonerees classified as "Other" (36%), a smaller percentage of cases involving Black (15.06%) and Hispanic (23.14%) exonerees were associated with *Failures to Investigate*.

Associations between measures of case severity and latent class membership. Federal court cases were significantly associated with class membership, though the effect size was small, $X^2(3, N = 2880) = 25.92, p < .0001, V = .09$. A larger proportion (49.21%) of federal cases were associated with *Intentional Errors*. Homicide cases also had a significant association with latent class membership, $X^2(3, N = 2880) = 354.91, p < .0001$, and had a strong effect size, $V = .35$. As such, a larger percentage of homicide cases (47.83%) were classified as *Investigative Corruption* compared to non-homicide cases (16.07%). There was also a statistically significant association between misdemeanor crimes and class membership ($p < .0001$ ⁸³) with approximately 68.63% of cases being classified within *Failures to Investigate* as opposed to 17.42% of non-misdemeanor cases classified within the same class. Life or death sentencing was significantly associated with latent class membership, $X^2(3, N = 2876) = 157.67, p < .0001$, with a medium to strong effect size, $V = .23$. Specifically, there were more life sentences identified in cases that fell within the *Investigative Corruption* class than the other classes. Cases of exoneration based on *Failures to Investigate*, and *Intentional Errors* had fewer life sentences. Finally, *Investigative Corruption* and

⁸² Cohen, Jacob. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed (New York: Routledge, 1988), <https://doi.org/10.4324/9780203771587>.

⁸³ Fisher's Exact test was adopted given that two out of eight cells had an observed frequency below 5.

Witness Mistakes have a higher mean minimum and maximum sentence than *Intentional Errors*. Further, *Intentional Errors* had higher mean minimum and maximum sentence than *Failures to Investigate*.

Associations between process/evidence-related variables and latent class membership. The following process/evidence-related variables were significantly associated to class membership with a medium to large effect size: no crime case ($p < .0001$), jailhouse informant ($X^2(3, N = 2880) = 84.07, p < .0001, V = .17$), innocence organization ($X^2(3, N = 2880) = 100.38, p < .0001, V = .19$), co-defendant confession ($X^2(3, N = 2880) = 216.16, p < .0001, V = .27$), and guilty plea case ($X^2(3, N = 2880) = 370.69, p < .0001, V = .36$). Greater proportions of no-crime cases were associated with *Failures to Investigate* (36.92%) and *Intentional Errors* (46.57%). *Investigative Corruption* was associated with a greater proportion of cases that involved innocence organizations (39.34%), a co-defendant confession (54.18%), and a jailhouse informant (53.55%). A greater proportion of guilty plea cases were associated with *Failures to Investigate* (43.81%) as opposed to cases that did not involve guilty pleas (12.80%). Finally, exonerations classified as *Investigative Corruption* had a longer time to conviction than *Failure to Investigate* and *Witness Mistakes* and time to conviction for *Intentional Errors* was longer than *Witness Mistakes*. All class comparisons were significant ($p < .0001$) for time to exoneration. Classes with the longest to shortest time to exoneration were as follows: *Investigative Corruption*, *Witness Mistakes*, *Intentional Errors*, and *Failures to Investigate*.

VI Discussion

In this paper, we used latent class analysis to evaluate patterns across the six canonical factors related to wrongful conviction in known exoneration cases. While a small body of research has examined the relationship between some of the six canonical factors,⁸⁴ none have looked at the patterns across all six factors simultaneously. Thus, to our knowledge, this is the first study to systematically examine the ways in which these six factors can interact to pave the road to a wrongful conviction. In addition, we were able to identify the relationships across defendant and case characteristics and each latent class. Below, we present our major findings:

1. We identified four latent classes, across the six factors, with a total of 2,880 wrongful convictions. We labeled each class to reflect our interpretation of their profiles given the patterns exhibited: *Investigative Corruption* (Class 1), *Failures to Investigate* (Class 2), *Witness Mistakes* (Class 3), and *Intentional Errors* (Class 4).
2. The *Investigative Corruption* and *Intentional Errors* classes revealed that OM and P/FA often co-occur. Specifically, where there is official misconduct, there is often perjury or false accusations (and vice versa). *Investigative Corruption* had the highest means for minimum and maximum sentences, the most life or death sentences, and the longest average times to conviction and exoneration.
3. The *Witness Mistakes* class demonstrated that when mistaken witness identifications have been recorded, little else is needed for a wrongful conviction. This class was defined by the highest probability of MWID and low probabilities across the remaining five factors.

⁸⁴ Garrett & Neufeld, *supra* note 53; Gould et al, *supra* note 63; Kassin et al, *supra* note 65.

4. *Failures to Investigate*, which accounted for 19% of exonerations, had relatively low probabilities across all six factors. This class was significantly and strongly associated with false guilty pleas; it was also significantly associated with no-crime cases and misdemeanors.

A. Differential Characteristics and Consequences of Misconduct During Investigations and Adjudication

In an overwhelming proportion of cases, we identified patterns indicating that OM and P/FA often co-occur. Specifically, in two of the classes that emerged in our latent class analysis, *Investigative Corruption* and *Intentional Errors*, OM and P/FA had high rates of incidence. These findings are consistent with previous literature on the mechanisms associated with misconduct and perjury.⁸⁵ In many ways, the responsibility of officials and the function of false accusation are intrinsically linked. For instance, police and prosecutors can procure perjury, permit perjury, and commit perjury.⁸⁶ Consistent with the structure of these classes, the highest proportion of cases involving jailhouse informants and co-defendant confessions were associated with *Investigative Corruption* and *Intentional Errors*; both of these tags had a relatively negligible association with the other two classes. However, we uncovered several differences between *Investigative Corruption* and *Intentional Errors*, which have important implications for identifying potential targets for reform.

Several differences in the pattern of these two classes encompassing misconduct imply that they emerge at different stages of criminal procedure. During initial investigatory stages, if police or prosecutors lack the evidence needed to issue an arrest or secure a conviction, they may feel compelled to commit misconduct in order to isolate a suspect.⁸⁷ During this stage, interrogations can be a go-to tool to identify a suspect, and certain defendants (as well as potential witnesses) are especially susceptible to interrogative techniques.⁸⁸ For instance, Redlich and Goodman found that certain procedures (i.e., presenting false evidence) increased the likelihood that juvenile participant-defendants would falsely confess.⁸⁹ Roughly 42% of exonerees who were under the age of 18 at the time of their conviction were associated with *Investigative Corruption*, which included the highest rate of FC. Thus, consistent with prior literature, it may be that juvenile defendants are disproportionately affected by misconduct in interrogations.⁹⁰ *Investigative Corruption* also included the second-highest rate of F/MFE, another tool on which police can rely to isolate a suspect early in the investigatory process.

Our results also suggest that *Investigative Corruption* is associated with the most serious crimes accompanied by the most severe sentences; 47% of homicides and 41% of life-or-death

⁸⁵ Gross et al (2020), *supra* note 23.

⁸⁶ *Ibid.*

⁸⁷ *Ibid.*

⁸⁸ Kassir, Saul M. "False Confessions: Causes, Consequences, and Implications for Reform" (2008) 17:4 Current Directions in Psych Sci: J Am Psych Soc'y 249, <https://doi.org/10.1111/j.1467-8721.2008.00584.x>.

⁸⁹ Redlich, Allison D & Gail S Goodman. "Taking Responsibility for an Act Not Committed: The Influence of Age and Suggestibility" 27:2 Law & Hum Behav 141, <https://doi.org/10.1023/A:1022543012851>.

⁹⁰ Gross et al (2020), *supra* note 23; Kassir, *supra* note 84.

sentences were associated with this class. Additionally, cases associated with *Investigative Corruption* also had the longest time to conviction and exoneration. At the same time, support from innocence organizations was also most common for the *Investigative Corruption* class. Thus, the silver lining regarding the complexity of these cases might be that they invite outside assistance to disentangle the *Investigative Corruption*.

The highest proportion of cases, however, was associated with *Intentional Errors* (32%) in which the highest rate of P/FA was accompanied by the second-highest rate of OM. But, interestingly, unlike *Investigative Corruption*, *Intentional Errors* included few other factors with the lowest or second-lowest rates of ILD, F/MFE, FC, and MWID.

Intentional Errors accounted for a majority of federal and no-crime cases. The most common type of misconduct associated with federal and no-crime exonerations is concealing exculpatory evidence.⁹¹ While prosecutors have a constitutional duty to disclose evidence that might negate the defendant's guilt, even repeated requests from the most diligent and zealous defense attorney might not be enough to prevent a wrongful conviction.⁹² Given that ILD did *not* contribute to a vast majority of the wrongful convictions within *Intentional Errors*, it is possible that both the prosecution and perjuring witnesses lied to the defense. Indeed, many individuals who commit P/FA will deny the existence of incentives to appear more trustworthy and reliable in their testimony.⁹³ Although the intention of an adversarial system is to level the playing field, the prosecution and defense primarily operate to undermine the other, possibly burying adversarial evidence in the process. While there are many reasons why an individual might falsify their testimony, P/FA and OM seem to operate in conjunction here. Overall, with regard to OM, it appears as though constitutional protections, such as the *Brady* rule, may not be sufficient to protect innocent defendants from being wrongfully convicted.

B. The Remarkable Eyewitness and Critical Concerns with Cross-Racial Identifications

Witness Mistakes included the highest incidence of mistaken witness identifications (by a ~70% margin), with relatively low rates for the remaining five factors. The dominance of MWID in distinguishing this class is consistent with the idea that confident eyewitness identifications can be compelling even in the absence of other evidence. The prevalence of eyewitness errors has led to the development of a series of recommendations to improve the integrity of eyewitness identification procedures; these recommendations attempt to address potential social influences and possible sources of memory contamination.⁹⁴

⁹¹ Gross et al, *supra* note 23.

⁹² *Brady v Maryland*, 373 U.S. 83 (1963), online: <https://supreme.justia.com/cases/federal/us/373/83/>; Uphoff, Rodney J. "Convicting the Innocent: Aberration or Systemic Problem?" (2006) 2006(2) Wis L Rev 739; Yaroshefsky, *supra* note 23.

⁹³ Kirchmeier, Jeffrey L et al. "Vigilante Justice: Prosecutor Misconduct in Capital Cases" (2009) 55:3 Wayne L Rev 1327.

⁹⁴ Wells et al (1998), *supra* note 41; Wells et al (2020), *supra* note 34.

The racial disparity in *Witness Mistakes* was striking. A larger proportion of Black and Hispanic exonerees were associated with *Witness Mistakes*, relative to white exonerees; further, Black defendants accounted for 63% of all the cases associated with *Witness Mistakes*. Witness race is one of the strongest demographic predictors of eyewitness accuracy.⁹⁵ Specifically, witnesses are less accurate in identifying cross-race suspects from a lineup⁹⁶ and it appears that individuals with darker complexions can be objectively more difficult to identify, even outside the context of cross-racial identifications.⁹⁷ Certainly, there are times at which cross-race identifications are necessary. As such, it is critical that the system be aware of these errors; if, for no other reason, to further encourage that investigators build significantly more evidence against a defendant than a confident eyewitness identification (e.g., reasonable suspicion),⁹⁸ particularly in cross-race cases.

C. Underlying Associations with *Failures to Investigate*

Failures to Investigate, which accounted for 19% of exonerations, had relatively low probabilities across the six factors. However, there was a significant relationship between *Failures to Investigate* and several of the examined covariates including: female exonerees, misdemeanor cases, no-crime cases and, importantly, false guilty pleas.

The finding that no-crime cases are more prevalent in *Failures to Investigate* should, perhaps, be unsurprising. It is hard to imagine a well-executed investigation incorrectly concluding a crime occurred when it did not. Instead, no-crime cases often stem from initial suspicions from law enforcement that a victim of fate is actually a criminal (e.g., an accidental fire was due to arson, a child's injury was due to abuse). Although men are more likely to be enmeshed into the justice system, no-crime cases are one of the few criminal categories dominated by women. Specifically, women are more likely to be wrongfully convicted of no-crime cases than men. Thus, when women are accused of crimes, their cases are more likely to be under-investigated or poorly investigated.

⁹⁵ Dodson, Chad S & David G Dobolyi. "Misinterpreting Eyewitness Expressions of Confidence: The Featural Justification Effect" (2015) 39:3 Law & Hum Behav 266, <https://doi.org/10.1037/lhb0000120>; Malpass, Roy S & Jerome Kravitz. "Recognition for Faces of Own and Other Race" (1969) 13:4 J Personality & Soc Psych 330, <https://doi.org/10.1037/h0028434>; Pezdek, Kathy, Matthew O'Brien & Corey Wasson. "Cross-Race (But Not Same-Race) Face Identification is Impaired by Presenting Faces in a Group Rather than Individually" (2012). 36:6 Law & Hum Behav 488, <https://doi.org/10.1037/h0093933>; Wells et al (2006), *supra* note 33.

⁹⁶ Dodson & Dobolyi, *supra* note 91; Meissner, Christian A & John C Brigham. "Thirty Years of Investigating the Own-Race Bias in Memory for Faces: A Meta-Analytic Review" (2001) 7:1 Psych, Pub Pol'y & L 3, <https://doi.org/10.1037/1076-8971.7.1.3>; Pezdek et al, *supra* note 91.

⁹⁷ Kleider-Offutt, Heather M, Alesha D Bond & Shanna E A Hegerty. "Black Stereotypical Features: When a Face Type Can Get You in Trouble" (2017) 26:1 Current Directions in Psych Sci: J Am Psych Soc'y 28, <https://doi.org/10.1177/0963721416667916>.

⁹⁸ Wells, Gary L, Yueran Yang & Laura Smalarz. "Eyewitness Identification: Bayesian Information Gain, Base-Rate Effect Equivalency Curves, and Reasonable Suspicion" (2015) 39:2 Law & Hum Behav 99, <https://doi.org/10.1037/lhb0000125>.

The finding that *Failures to Investigate* are more likely to involve false guilty pleas and misdemeanors supports the contention that plea negotiations can replace criminal investigations; for example, why investigate a defendant when you can convince him to plead guilty? While guilty pleas are, theoretically, supposed to be substantiated by a “factual basis of guilt”, a defendant’s guilty plea can often be considered sufficient to meeting this criterion.⁹⁹ The hearings in which judges review the outcome of plea negotiations (i.e., plea colloquies) have been described as “boilerplate.”¹⁰⁰ They rarely require more than 15 minutes, and defendants are often expected to provide obvious and “perfunctory” responses to typically-scripted questions from a judge to indicate that the plea is being made knowingly, intelligently, and voluntarily.¹⁰¹ At these hearings, evidence is rarely reviewed (particularly in juvenile court), and when evidence is submitted, it often involves little more than the unsubstantiated police report.¹⁰²

Given the efficiency and certainty that guilty pleas offer, prosecutors will often allow defendants to negotiate for lowered charges, even reducing felony-level charges to misdemeanors. In fact, when the popular podcast *Serial* spent its third season profiling a “typical” American courthouse (in Cleveland, OH), a defense attorney recalled a judge telling him, “... in this county, innocence is a misdemeanor.” Clearly, the expectation is that someone facing felony-level charges will negotiate down to a misdemeanor or two, whether that person is guilty or innocent. The prevalence of both false guilty pleas and misdemeanors among *Failures to Investigate* clearly supports this long-standing contention. Given the growing prevalence of guilty pleas in general, this finding is particularly troubling.¹⁰³

D. Conclusions

This paper offers a novel framework for evaluating the patterns among the six canonical factors across known exonerations. Findings reveal four distinct patterns of exonerations: *Investigative Corruption*, *Failures to Investigate*, *Witness Mistakes*, and *Intentional Errors*. *Investigative Corruption* and *Intentional Errors* accounted for more than half of exonerations, revealing distinct and fatal patterns between OM and P/FA. *Witness Mistakes* further supported what was already suspected: eyewitness evidence is a particularly potent form of evidence. While this class had relatively low rates of the other five canonical factors, there was a significant association between the race of the exoneree and class membership. The differences among these classes and *Failures to Investigate* was quite apparent. *Failures to Investigate* had relatively low rates of all six canonical factors but was associated with a majority of guilty-plea cases and

⁹⁹ Redlich, Allison D & Asil Ali Özdoğru. “Alford Pleas in the Age of Innocence” (2009) 27:3 Behav Sci & L 467. <https://doi.org/10.1002/bsl.876>.

¹⁰⁰ Redlich, Allison D, Miko M Wilford & Shawn Bushway. “Understanding Guilty Pleas Through the Lens of Social Science” (2017) 23:4 Psych, Pub Pol’y & L 458, <https://doi.org/10.1037/law0000142>.

¹⁰¹ Redlich, Allison D et al. “Guilty Plea Hearings in Juvenile and Criminal Court” (2022) 46:5 Law & Hum Behav 337, <https://doi.org/10.1037/lhb0000495>.

¹⁰² Turner, Jenia I & Allison D Redlich. “Two Models of Pre-Plea Discovery in Criminal Cases: An Empirical Comparison” (2016) 73:1 Wash & Lee L Rev 285.

¹⁰³ Wilford, Miko M & Brian H Bornstein. “The Disappearing Trial: How Social Scientists Can Help Save the Jury From Extinction” (2021) Psych, Crime & L, advance online publication. <https://doi.org/10.1080/1068316X.2021.1984482>.

misdemeanor cases, potentially revealing the differences among false guilty pleas and wrongful convictions at trial. It is our hope that these results will help scholars better examine the causes and correlates of wrongful conviction through empirically identified “classes”, rather than theoretically defined subgroups. Armed with an increased understanding of wrongful convictions, we may be better equipped to prevent them from occurring.

References

- Acker, James R & Allison D Redlich. *Wrongful Conviction: Law, Science, and Policy*, 2nd ed (Durham, North Carolina: Carolina Academic Press, 2019).
- Akaike, Hirotogu. “Information Theory and an Extension of the Maximum Likelihood Principle” in B N Petrov & F Csaki, eds, *Second International Symposium on Information Theory* (Budapest, Hungary: Akademiai Kiado, 1973) 267.
- Akaike, Hirotogu. “Factor Analysis and AIC” (1987) 52:3 Psychometrika 317, <https://doi.org/10.1007/BF02294359>.
- Bonventre, Catherine L. “Wrongful Conviction and Forensic Science” (2020) WIREs Forensic Science, online: <https://wires.onlinelibrary.wiley.com/doi/epdf/10.1002/wfs2.1406>.
- Brady v Maryland*, 373 U.S. 83 (1963), online: <https://supreme.justia.com/cases/federal/us/373/83/>.
- Brigham, John C, L Brooke Bennett, Christain A Meissner, & Tara L Mitchell. “The Influence of Race on Eyewitness Memory” in Rod C L Lindsay, David F Ross, J Don Read & Michael P Toglia, eds, *The Handbook of Eyewitness Psychology, Vol. 2: Memory for People* (Mahweh, New Jersey: Lawrence Erlbaum Associates Publishers, 2007) 271, <https://doi.org/10.4324/9780203936368>.
- Cohen, Jacob. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed (New York: Routledge, 1988), <https://doi.org/10.4324/9780203771587>.
- Colvin, Eric. “Convicting the Innocent: A Critique of Theories of Wrongful Convictions” (2009) 20:2-3 Crim LF 173, <https://doi.org/10.1007/s10609-009-9100-6>.
- Covey, Russell. “Police Misconduct as a Cause of Wrongful Convictions” (2013) 90:4 Wash U L Rev 1133.
- Cutler, Brian L, Steven D Penrod & Hedy R Dexter. “Juror Sensitivity to Eyewitness Identification Evidence” (1990) 14:2 Law & Hum Behav 185, <https://doi.org/10.1007/BF01062972>.
- Detailed Case View* (2022) [Data set], online: National Registry of Exonerations <https://www.law.umich.edu/special/exoneration/Pages/detailist.aspx>.
- DNA Exonerations in the United States*, online: Innocence Project <<https://innocenceproject.org/dna-exonerations-in-the-united-states/>>.
- Dodson, Chad S & David G Dobolyi. “Misinterpreting Eyewitness Expressions of Confidence: The Featural Justification Effect” (2015) 39:3 Law & Hum Behav 266, <https://doi.org/10.1037/lhb0000120>.

- Doyle, James M. "An Etiology of Wrongful Convictions: Error, Safety, and Forward-Looking Accountability in Criminal Justice" in Julia Carrano & Marvin Zalman, eds, *Wrongful Conviction and Criminal Justice Reform* (New York: Routledge) 70, <https://doi.org/10.4324/9780203066997-11>.
- Dror, Itiel E, Saul M Kassin & Jeff Kukucka. "New Application of Psychology to Law: Improving Forensic Evidence and Expert Witness Contributions" (2013) 2:1 J App Res in Memory & Cognition 78, <http://dx.doi.org/10.1016/j.jarmac.2013.02.003>.
- Fessinger, Melanie B et al. "Informants v Innocents: Informant Testimony and Its Contribution to Wrongful Convictions" (2020) 48:2 Cap U L Rev 149.
- Garrett, Brandon. *Convicting the Innocent: Where Criminal Prosecutions Go Wrong* (Cambridge, MA: Harvard University Press, 2011), <https://doi.org/10.4159/harvard.9780674060982>.
- Garrett, Brandon L & Peter J Neufeld. "Invalid Forensic Science Testimony and Wrongful Convictions" (2009) 95:1 Va L Rev 1.
Glossary and Criteria for Exoneration, online: National Registry of Exonerations <https://www.law.umich.edu/special/exoneration/Pages/glossary.aspx>.
- Gould, Jon B et al. "Predicting Erroneous Convictions" (2014) 99:2 Iowa L Rev 471.
- Gould, Jon B & Richard A Leo. "One Hundred Years Later: Wrongful Convictions After a Century of Research" (2010) 100:3 J Crim L & Criminology 825.
- Gross, Samuel R. "Convicting the Innocent" (2008) 4:1 Ann Rev L & Soc Sci 173, <https://doi.org/10.1146/annurev.lawsocsci.4.110707.172300>.
- Gross, Samuel R. "Errors in Misdemeanor Adjudication" (2018) 98:3 B U L Rev 999.
- Gross, Samuel R et al. "Exonerations in the United States 1989 through 2003" (2005) 95:2 J Crim L & Criminology 523.
- Gross, Samuel R, & Barbara O'Brien. "Frequency and Predictors of False Conviction: Why We Know So Little, and New Data of Capital Cases" (2008) 5:4 JELS 927, <https://doi.org/10.1111/j.1740-1461.2008.00146.x>.
- Gross, Samuel R et al. "Government Misconduct and Convicting the Innocent: The Role of Prosecutors, Police, and Other Law Enforcement" (2020), University of Michigan Public Law Research Paper No. 21-003, <https://doi.org/10.2139/ssrn.3698845>.
- Gross, Samuel R & Michael Shaffer. *Exonerations in the United States, 1989–2012: Report by the National Registry of Exonerations* (2012), <https://dx.doi.org/10.2139/ssrn.2092195>.
- Henry, Jessica S. *Smoke but No Fire: Convicting the Innocent of Crimes that Never Happened* (Oakland, CA: University of California Press, 2020).
- Hsu, Spencer S. "FBI admits flaws in hair analysis over decades", *Washington Post* (18 Apr 2015), online: <https://www.washingtonpost.com/local/crime/fbi-overstated-forensic-hair-matches-in-nearly-all-criminal-trials-for-decades/2015/04/18/39c8d8c6-e515-11e4-b510-962fcfab310_story.html>.

- Jackson, Kaitlin & Samuel R Gross, *Tainted Identifications* (22 Sept 2016), online: National Registry of Exonerations
<<https://www.law.umich.edu/special/exoneration/Pages/taintedids.aspx>>.
- Kassin, Saul M. "The Psychology of Confession Evidence" (1997) 52:3 *Am Psychologist* 221, <https://doi.org/10.1037/0003-066X.52.3.221>.
- Kassin, Saul M. "False Confessions: Causes, Consequences, and Implications for Reform" (2008) 17:4 *Current Directions in Psych Sci: J Am Psych Soc'y* 249, <https://doi.org/10.1111/j.1467-8721.2008.00584.x>.
- Kassin, Saul M, Daniel Bogart & Jacqueline Kerner. "Confessions that Corrupt: Evidence from the DNA Exoneration Case Files" (2012) 23:1 *Psych Sci* 41, <https://doi.org/10.1177/0956797611422918>.
- Kassin, Saul M et al. "Police-Induced Confessions: Risk Factors and Recommendations" (2010) 34:1 *Law & Hum Behav* 3, <https://doi.org/10.1007/s10979-009-9188-6>.
- Kirchmeier, Jeffrey L et al. "Vigilante Justice: Prosecutor Misconduct in Capital Cases" (2009) 55:3 *Wayne L Rev* 1327.
- Kleider-Offutt, Heather M, Alesha D Bond & Shanna E A Hegerty. "Black Stereotypical Features: When a Face Type Can Get You in Trouble" (2017) 26:1 *Current Directions in Psych Sci: J Am Psych Soc'y* 28, <https://doi.org/10.1177/0963721416667916>.
- Leo, Richard A. "Rethinking the Study of Miscarriages of Justice: Developing a Criminology of Wrongful Conviction" (2005) 21:3 *J Contemporary Crim Just* 201, <https://doi.org/10.1177/1043986205277477>.
- Leo, Richard A. "The Justice Gap and the Promise of Criminological Research" (2014) 15:3 *Criminology, Crim Just, L & Soc'y* 1.
- Leo, Richard A. "The Criminology of Wrongful Conviction: A Decade Later" (2017) 33:1 *J Contemporary Crim Just* 82, <https://doi.org/10.1177/1043986216673013>.
- Lo, Yungtai, Nancy R Mendell & Donald B Rubin. "Testing the Number of Components in a Normal Mixture" (2001) 88:3 *Biometrika* 767.
- Loftus, Elizabeth F. "Planting Misinformation in the Human Mind: A 30-year Investigation of the Malleability of Memory" (2005) 12:4 *Learning & Memory* 361.
- Malpass, Roy S & Jerome Kravitz. "Recognition for Faces of Own and Other Race" (1969) 13:4 *J Personality & Soc Psych* 330, <https://doi.org/10.1037/h0028434>.
- Mazzoni, Giuliana & Steven J Lynn. "Using Hypnosis in Eyewitness Memory: Past and Current Issues" in Michael P Toglia, J Don Read, David F Ross, Rod C L Lindsay, eds, *The Handbook of Eyewitness Psychology. Vol I: Memory for Events* (London: Taylor and Francis Group, 2017) 321.
- McCutcheon, Allan L. *Latent Class Analysis* (Thousand Oaks, CA: Sage, 1987).
- McLachlan, Geoffrey J & David Peel. *Finite Mixture Models* (New York: Wiley, 2000).
- Medwed, Daniel S. *Wrongful Convictions and the DNA Revolution* (Cambridge: Cambridge University Press, 2017), <https://doi.org/10.1017/9781316417119>.

- Meissner, Christian A & John C Brigham. "Thirty Years of Investigating the Own-Race Bias in Memory for Faces: A Meta-Analytic Review" (2001) 7:1 Psych, Pub Pol'y & L 3, <https://doi.org/10.1037/1076-8971.7.1.3>.
- Muthén, Linda K & Bengt O Muthén. *Mplus User's Guide. Eighth Edition* (Los Angeles: Muthén & Muthén, 1998-2017).
- Neuschatz, Jeffrey S et al. "The Effects of Accomplice Witnesses and Jailhouse Informants on Jury Decision Making" (2008) 32:2 Law & Hum Behav 137, <https://doi.org/10.1007/s10979-007-9100-1>.
- Norris, Robert J et al. "Thirty Years of Innocence: Wrongful Convictions and Exonerations in the United States, 1989-2018" (2020) 1:1 Wrongful Conviction L Rev 2, online: <https://wclawr.org/index.php/wclr/article/view/11>.
- Norris, Robert J, Catherine L Bonventre & James R Acker. *When Justice Fails: Causes and Consequences of Wrongful Convictions* (Durham, North Carolina: Carolina Academic Press, 2018).
- Nowotny, Jordan, Amy Shlosberg & Thomas McAndrew. "Understanding Public Views of Wrongful Conviction Frequency and Government Responsibility for Compensation: Results from a National Sample" (2022) 34:2 Crim Just Pol'y Rev 140, <https://doi.org/10.1177/08874034221106747>.
- Pezdek, Kathy. "Fallible Eyewitness Memory and Identification" in Brian L Cutler, ed, *Conviction of the Innocent: Lessons from Psychological Research* (Washington: American Psychological Association, 2012) 105, <https://doi.org/10.1037/13085-005>.
- Pezdek, Kathy, Matthew O'Brien & Corey Wasson. "Cross-Race (But Not Same-Race) Face Identification is Impaired by Presenting Faces in a Group Rather than Individually" (2012). 36:6 Law & Hum Behav 488, <https://doi.org/10.1037/h0093933>.
- Poveda, Tony G. "Estimating Wrongful Convictions" (2001) 18:3 JQ 689.
- Redlich, Allison D, James R Acker, Robert Norris & Catherine L Bonventre, eds. *Examining Wrongful Convictions: Stepping Back, Moving Forward* (Durham, North Carolina: Carolina Academic Press, 2014).
- Redlich, Allison D et al. "Guilty Plea Hearings in Juvenile and Criminal Court" (2022) 46:5 Law & Hum Behav 337, <https://doi.org/10.1037/lhb0000495>.
- Redlich, Allison D & Gail S Goodman. "Taking Responsibility for an Act Not Committed: The Influence of Age and Suggestibility" 27:2 Law & Hum Behav 141, <https://doi.org/10.1023/A:1022543012851>.
- Redlich, Allison D & Asil Ali Özdoğru. "Alford Pleas in the Age of Innocence" (2009) 27:3 Behav Sci & L 467. <https://doi.org/10.1002/bsl.876>.
- Redlich, Allison D, Miko M Wilford & Shawn Bushway. "Understanding Guilty Pleas Through the Lens of Social Science" (2017) 23:4 Psych, Pub Pol'y & L 458, <https://doi.org/10.1037/law0000142>.

- Rossmo, Kim K & Joycelyn M Pollock. "Confirmation Bias and Other Systemic Causes of Wrongful Convictions: A Sentinel Events Perspective" (2014) 11:2 Northeastern U L Rev 790.
- Saks, Michael J et al. "Forensic Bitemark Identification: Weak Foundations, Exaggerated Claims" (2016) 3:3 JLB 538, <https://doi.org/10.1093/jlb/lsw045>.
- Scherr, Kyle C, Allison D Redlich & Saul M Kassir. "Cumulative Disadvantage: A Psychological Framework for Understanding How Innocence Can Lead to Confession, Wrongful Conviction, and Beyond" (2020) 15:2 Perspectives on Psych Sci 353, <https://doi.org/10.1177/1745691619896608>.
- Schwarz, Gideon. "Estimating the Dimension of a Model" (1978) 6:2 Annals of Statistics 461.
- Sclove, Stanley L. "Application of Model-Selection Criteria to Some Problems in Multivariate Analysis" (1987) 52:3 Psychometrika 333, <https://doi.org/10.1007/BF02294360>.
- Slane, Crystal R & Chad S Dodson. "Eyewitness Confidence and Mock Juror Decisions of Guilt: A Meta-Analytic Review" (2022) 46:1 Law & Hum Behav 45, <https://doi.org/10.1037/lhb0000481>.
- Stenzel, Carla. "Eyewitness Misidentification: A Mistake that Blinds Investigations, Sways Juries, and Locks Innocent People Behind Bars" (2016) 50:3 Creighton L Rev 515.
- Strickland v Washington*, 466 U.S. 668 (1984), online: <https://supreme.justia.com/cases/federal/us/466/668/>.
- Turner, Jenia I & Allison D Redlich. "Two Models of Pre-Plea Discovery in Criminal Cases: An Empirical Comparison" (2016) 73:1 Wash & Lee L Rev 285.
- Uphoff, Rodney J. "Convicting the Innocent: Aberration or Systemic Problem?" (2006) 2006(2) Wis L Rev 739.
- Weller, Bridget E, Natasha K Bowen & Sarah J Faubert. "Latent Class Analysis: A Guide to Best Practice" (2020) 46:4 J Black Psych 287, <https://doi.org/10.1177/0095798420930932>.
- Wells, Gary L. "Eyewitness Identification: Probative Value, Criterion Shifts, and Policy Regarding the Sequential Lineup" (2014) 23:1 Current Directions in Psych Sci: J Am Psych Soc'y 11, <https://doi.org/10.1177/0963721413504781>.
- Wells, Gary L. "Psychological Science on Eyewitness Identification and Its Impact on Police Practices and Policies" (2020) 75:9 American Psychologist 1316, <https://doi.org/10.1037/amp0000749>.
- Wells, Gary L et al. "Policy and Procedure Recommendations for the Collection and Preservation of Eyewitness Identification Evidence" (2020) 44:1 Law & Hum Behav 3, <https://doi.org/10.1037/lhb0000359>.
- Wells, Gary L, Amina Memon & Steven D Penrod. "Eyewitness Evidence: Improving Its Probative Value" (2006) 7:2 Psych Sci in the Public Interest 45. <https://doi.org/10.1111/j.1529-1006.2006.00027.x>.

- Wells, Gary L & Deah S Quinlivan. "Suggestive Eyewitness Identification Procedures and the Supreme Court's Reliability Test in Light of Eyewitness Science: 30 Years Later" (2009) 33:1 Law & Hum Behav 1, <https://doi.org/10.1007/s10979-008-9130-3>.
- Wells, Gary L et al. "Eyewitness Identification Procedures: Recommendations for Lineups and Photospreads" (1998) 22:6 Law & Hum Behav 603, <https://doi.org/10.1023/A:1025750605807>.
- Wells, Gary L, Yueran Yang & Laura Smalarz. "Eyewitness Identification: Bayesian Information Gain, Base-Rate Effect Equivalency Curves, and Reasonable Suspicion" (2015) 39:2 Law & Hum Behav 99, <https://doi.org/10.1037/lhb0000125>.
- Wetmore, Stacy A, Jeffrey S Neuschatz, & Scott D Gronlund. "On the Power of Secondary Confession Evidence" (2014) 20:4 Psych, Crime & L 339, <https://doi.org/10.1080/1068316X.2013.777963>.
- Wilford, Miko M & Brian H Bornstein. "The Disappearing Trial: How Social Scientists Can Help Save the Jury From Extinction" (2021) Psych, Crime & L, advance online publication. <https://doi.org/10.1080/1068316X.2021.1984482>.
- Winter, Alison. "The Rise and Fall of Forensic Hypnosis" (2013) 44:1 Studies in Hist & Phil of Sci Part C: Studies in Hist & Phil of Biological & Biomedical Sci 26, <https://doi.org/10.1016/j.shpsc.2012.09.011>.
- Wu, Shiyu et al. "Patterns and Social Determinants of Substance Uses Among Arizona Youth: A Latent Class Analysis Approach" (2020) 110 Child & Youth Serv Rev 104769, <https://doi.org/10.1016/j.childyouth.2020.104769>.
- Yaroshefsky, Ellen, & Laura Schaefer. "Defense Lawyering and Wrongful Convictions in Allison D Redlich, James R Acker, Robert Norris & Catherine L Bonventre, eds, *Examining Wrongful Convictions: Stepping Back, Moving Forward* (Durham, North Carolina: Carolina Academic Press, 2014).
- Zalman, Marvin. "Criminal Justice System Reform and Wrongful Conviction: A Research Agenda" (2006) 17:4 Crim Just Pol'y Rev 468, <https://doi.org/10.1177/0887403406292740>.
- Zalman, Marvin. "Wrongful Convictions" in J Mitchell Miller, ed, *21st Century Criminology: A Reference Handbook* (Thousand Oaks, CA: Sage, 2009) 842.
- Zalman, Marvin & Robert J Norris. "Measuring Innocence: How to Think About the Rate of Wrongful Conviction" (2021) 24:4 New Crim L Rev 601, <https://doi.org/10.1525/nclr.2021.24.4.601>.