2020

Mirandizing Youth: Lessons from Neuroscience.

Irma Pinos

Mirandizing Youth: Lessons from Neuroscience.

Irma Pinos

INTRODUCTION

Adolescents underestimate the of risks of their actions and focus on anticipated gains to a greater extent than adults.[1] The cinnamon and tide pod challenges are amongst some of the most dangerous, widespread challenges that have attracted media attention.[2] The cinnamon challenge encouraged adolescents to eat a spoonful of powdered cinnamon in under a minute without drinking anything, which resulted in internal irritation.[3] The tide pod challenge dared adolescents to eat detergent pods, which almost led to deaths.[4]

These types of risky behaviors among adolescents are what inspired legislators to introduce juvenile courts in the nineteenth century.[5] Since the introduction of juvenile courts, "the law has historically reflected the same assumption that children characteristically lack the capacity to exercise mature judgment and possess only an incomplete ability to understand the world around them."[6] Consequently, legislatures began to enact laws reflective on that fact that adolescents lack the legal capacity to make certain decisions until they reached the categorical age limit of eighteen.[7]

---

[1] Barry C. Feld, *Competence and Culpability: Delinquents in Juvenile Courts, Youths in Criminal Courts*, 102 MINN. L. REV. 473, 557 (2017).
[2] James Grimmelmann, *The Platform is the Message*, 2 GEO. L. TECH. REV. 217, 220 (2018).
[3] *Id.*
[4] *See*, Nina Golgowski, *There is Really Dumb Reason Why Some Teens are Eating Tide Pods*, HUFF POST (Jan. 17, 2018), https://www.huffpost.com/entry/tide-p (explaining that "[o]ver the last few years, there has been a rise in poison control centers responding to cases of intentional exposure to liquid laundry packets among people between the ages of 13 and 19").
[5] Feld, *supra* note 1, at 496.
[6] *See*, J. D. B. v. North Carolina, 564 U.S. 261, 273 (2011).
[7] *Id.*

Voting, driving, drinking, smoking, and even the privilege of viewing certain movies are among many of the activities that the law prohibits adolescents from enjoying until they reach the age of eighteen. Legal contracts provide another example. When an adolescent is a party to a contract, a majority of the courts apply the infancy doctrine, which renders a contract voidable if the adolescent decides to withdraw.[8] The infancy doctrine is aimed at protecting "minors from foolishly squandering their wealth through improvident contracts with crafty adults who would take advantage of them in the marketplace."[9] Other courts require a minor's parent or legal guardian to co-sign the contract, thus restricting adolescent's from entering into a binding contract without adult approval.[10] Even in tort law, adolescents are held to a different standard than adults.[11] For example, a successful negligence claim is established when a person inadvertently creates a "substantial and unjustifiable risk" and deviates from the standard of care of what a reasonable person would do in that situation.[12] For minors, courts do not look at what a reasonable person would do but what a reasonable prudent minor of the same age, intelligence, maturity, and experience would do under the circumstances.[13] This standard of care is different than the objective reasonable person because a minor's subjective experience and characteristics are considered when determining whether the minor's behavior was reasonable.[14]

Courts have reasoned that it would be monstrous to hold that a minor of inexperience to the same degree as a person of mature years and accumulated experience.[15] Yet, the law has been incongruent and refused to implement these findings to distinguish adolescents from adults in the

[8] Natalie M. Banta, *Minors and Digital Asset Succession*, 104 IOWA L. REV. 1699, 1711 (2019).
[9] *Id.*
[10] *Id.* at 1712.
[11] J. D. B., 564 U.S. at 294.
[12] Kim Taylor-Thompson, *Symposium: Children, Crime, and Consequences: Juvenile Justice in America: States of Mind/States of Development,* 14 STAN. L. & POL'Y REV 143, 160.
[13] *Id.*
[14] J. D. B., 564 U.S. at 294.
[15] *See*, Robinson v. Lindsay, 598 P.2d 392, 412 (1979).

context of *Miranda* right waivers and police interrogations.[16] This distinguish is important because police use interrogation techniques designed for adults.[17] As a result, the law fails to protect adolescent's from involuntarily waiving their *Miranda* rights notwithstanding the differences between adolescents and adults in risk, perception, appreciation of consequences, and impulsivity.[18] This Article argues that numerous legal doctrines distinguish between adolescents and adults for good reason and that the law should apply a similar distinction to police administration of youth *Miranda* warnings. The Article further maintains that neuroimaging findings should be implemented prior to police interrogation to help determine whether an adolescent has properly waived his or her rights.

This Article proceeds in five parts. Part I uses case law to demonstrate how the Supreme Court distinguishes adolescents from adults. Part II introduces *Miranda* waivers and explains how the waivers expose adolescents to harsh police interrogations. After analyzing the problem, Part III proposes legal reforms to address this issue, including the proposal that adolescents undergo fMRIs testing prior to police interrogation to determine whether they voluntarily, knowingly, and intelligently waived their *Miranda* rights. Part IV explores the current problems with using fMRIs to validate *Miranda* waivers among youths. Researchers find that fMRIs findings are not currently accepted in the legal context as a lie detector and thus may not be accepted in the *Miranda* waiver context either. This Article recognizes that likelihood but will show that neuroimaging findings to validate *Miranda* waiver is a possibility for the future. Part V concludes by explaining why it is critical to implement legal reforms that prevent false confessions among adolescents.

---

[16] *See*, Fare v. Michael C., 442 U.S. 707 (1979) (applying the adult *Miranda* Waiver standard, which is a knowing, intelligent, and voluntary waiver under the totality of the circumstances, to adolescents).

[17] Marco Luna, *Juvenile False Confessions: Juvenile Psychology, Police Interrogation Tactics, and Prosecutorial Discretion*, 18 NEV. L.J. 291, 304 (2017).

[18] Tamar R. Birckhead, *The Age of the Child: Interrogating Juveniles After Roper v. Simmons*, 65 WASH & LEE L. REV. 385, 416 (2008).

I. HOW THE SUPREME COURT DISTINGUISHES ADOLESCENTS FROM ADULTS.

In *Roper v. Simmons*[19], a seventeen-year-old defendant burglarized and then murdered a victim, by tying her up and throwing her off a bridge.[20] The question presented to the Supreme Court in *Roper* was whether it was permissible under the Eighth Amendment to execute a juvenile younger than eighteen.[21] The Court provided three reasons why states could not punish juveniles as severely as adults.[22] First, "a lack of maturity and an underdeveloped sense of responsibility are found in youth more often than in adults and are more understandable among the young."[23] Second, "juveniles are more vulnerable or susceptible to negative influences and outside pressures, including peer pressure."[24] Third, "a juvenile's character is not as well formed as that of an adult."[25] The Court reasoned that an adolescent's character is transitional and that, therefore, there is a great likelihood that the youth can be reformed by the time they reach adulthood, the death penalty should not apply to adolescents.[26]

In its 2010 decision in *Graham v. Florida*[27], the Court, prohibited the states from imposing life sentences without parole to adolescents convicted of nonhomicide offenses under the Eight Amendment.[28] The Court rejected the argument that the sentencing authority should take the offender's age into consideration as part of a case-by-case inquiry and weighing it against the seriousness of the crime.[29] Instead, the Court created a categorical rule that precludes the

[19] Roper v. Simmons, 543 U.S. 551 (2005).
[20] *Id.* at 556.
[21] *Id.* at 555.
[22] *Id.* at 556.
[23] *Id*. at 569.
[24] *Id.*
[25] *Id.*
[26] *Id. at 570.*
[27] Graham v. Florida, 560 U.S. 48 (2010).
[28] *Id*. at 95.
[29] *Id*. at 77.

imposition of life sentences without parole for offenders who are under the age of eighteen at the time that they committed the crime at issue.[30] Although, the Court initially limited this rule for to non-homicide offense, it revisited the issue in *Miller v. Alabama*[31] revisited this issue in 2012 and extended *Graham's* analysis and holding to homicide offenses as well.[32]

In *Miller*, a 14-year-old boy, who claimed to be God, killed his friend by striking him with a bat and then lit a fire with the intent of destroying evidence.[33] The Court held that the Eighth Amendment forbids the imposition of a sentence of life without the possibility of parole for adolescents convicted of murder without first making an individualized culpability assessment.[34] Instead, the Eighth Amendment requires judges to weigh the offender's youthfulness as one mitigating factor among others such as immaturity, impetuosity, home environment, and degree of participation in the offense.[35] The Court recognized it is possible that a sentencing authority might encounter the rare juvenile offender who exhibits such irretrievable depravity that rehabilitation is impossible and life without parole is justified but that such outcome would be uncommon.[36] The Court reasoned that, "age limitations protect adolescents from their own improvident acts."[37] The Supreme Court's reasoning in *Roper, Graham,* and *Miller* provides the basis for applying a heightened standard to an adolescent's waiver of their *Miranda* rights. Youths who waive their *Miranda* rights without understanding the full extent of the consequences are exposed to police tactics that lead to self-incrimination and false confessions.

[30] *Id.*
[31] Miller v. Alabama, 567 U.S. 460 (2012).
[32] *Id.* at 489.
[33] *Id.* at 468.
[34] *Id.* at 476.
[35] *Id.* at 477.
[36] *Id.* at 479.
[37] J. D. B., 564 U.S. at 273.

II. MIRANDA WAIVERS EXPOSE ADOLESCENTS TO HARSH POLICE INTERROGATION

Miranda warnings are specifically designed to protect the individual against the coercive nature of custodial interrogations.[38] In 1966, the Supreme Court held in *Miranda v. Arizona*[39] that suspects should be advised of their rights against self-incrimination prior to a police interrogation.[40] The Court required police to warn a suspect that he or she has a right to remain silent, that any statement he or she does makes may be used as evidence against them, and that he or she has a right to an attorney during any part of the interrogation.[41] Once police appraise suspects of these, a suspect may waive them so long as their waiver is voluntarily, knowingly, and intelligently.[42] Courts evaluate the suspect waivers using the totality of the circumstances test. [43]

A. Miranda warnings were intended for adults and do not protect adolescents

In *Fare v. Michael C.*, the court held that the totality of the circumstances test is also adequate to determine whether there has been a waiver of *Miranda* rights even when an adolescent is involved.[44] The Supreme Court, therefore, does not require special procedures to protect juveniles during pre-interrogation procedures.[45] Instead, it instructed courts to use a the totality of the circumstances test to evaluate the adolescent capacity to understand the warnings given him and understand the consequences of waiving his or her rights.[46] The Supreme Court also failed to provide lower courts with guidance as to how to weigh each enumerated factor.[47] This has

[38] Naomi E. S. Goldstein, *Waving Good-Bye to Waiver: A Developmental Argument Against Youths' Waiver of Miranda Rights*, 21 N.Y.U. J. LEGIS. & PUB. POL'Y 1, 47 (2018).
[39] Miranda v. Arizona, 384 U.S. 436 (1966).
[40] *Id.* at 471.
[41] *Id.* at 444.
[42] *Id.* at 475.
[43] *Id.*
[44] Fare, 442 U.S. at 725.
[45] *Id.*
[46] *Id.*
[47] Nashiba F. Boyd, Comment, *I didn't do it, I was forced to say that I did: The Problem of Coerced Juvenile Confessions and Proposed Federal Legislation to Prevent Them*, 47 HOW. L.J. 395, 412 (2004) (noting that, "the Supreme Court did not address whether age should be more important than prior experience in the court system nor

caused some judges to find valid waiver by children as young as ten who have had no prior police interaction, and show limited intelligence, without parental assistance.[48]

Other lower courts have held that juveniles can feel restrained during interrogations more than an adult and emphasize a youths' immaturity, inexperience, and heightened vulnerability.[49] Adolescents are taught from a young age that the police will help you and therefore, they try to answer questions in a way that they believe will please the officer.[50] Juvenile interrogation involves a person who is not equal to the police in knowledge and understanding of the consequences of the questions and answers being recorded and who is unable to know how to protect his own interests or how to get the benefits of his constitutional rights.[51]

In *Gallegos v. Colorado,* the Supreme Court held that a juvenile subject of police interrogation cannot be compared with an adult in full possession of his senses and knowledgeable of the consequences of his admissions.[52] In *J.D.B. v. North Carolina*., the Court acknowledged that "a reasonable child subjected to police interrogation will sometimes feel pressured to submit when a reason adult would feel free to go."[53] In fact, studies have found police can comply with the technical requirements of *Miranda* and yet predispose suspects to waive.[54] "Police may nod while reading the warning to cue the suspect to agree, warn in a way that obscured their adversarial relationship with the suspect, and blend the warning into a conversation.[55]

whether mental capacity should be considered if age is a factor.")

[48] Barry Feld, *Behind Closed Doors: What Really Happens When Cops Question Kids,* 23 CORNELL J. L. & PUB. POL'Y 395, 403.

[49] *See*, J.D.B. 564 U.S. at 272; Gallegos v. Colorado, 370 U.S. 49, 52 (1962) (finding that special care in scrutinizing the record must be used when police are interrogating minors).

[50] Boyd, *supra* note 47, at 403.

[51] Gallegos, 370 U.S. at 54 (1962).

[52] *Id.*

[53] J.D.B., 564 U.S. at 272.

[54] Feld, *supra* note 48, at 425.

[55] *Id.*

Pressure and trickery from the police combined with the complexity of the warning makes matters worse for adolescents. In order to try and address this problem, some jurisdictions have adopted specialized *Miranda* warnings for juveniles that utilize terms and language that are purportedly easier for children and youth to understand.[56] This has resulted in some juvenile warnings being twice as long as standard adult versions thus requiring greater reading ability.[57] Others youth warnings are written at a post-college reading level, likely leaving the vast majority of adolescents unable to comprehend their meaning."[58]

The reality is that even when the police informs an adolescent of their rights, youths often are not likely to understand their meaning.[59] Studies have found that over sixty percent of the juveniles (compared to thirty-seven percent of adults) misunderstood at least one key word in the *Miranda* warning.[60] Police do not explain concepts such as appointment of counsel and the use of statements against you to juveniles, who lack the requisite background knowledge to make adequate meaning out of those terms.[61] To understand the standard language in a *Miranda* warning, suspects need a reading level varying between the 6th and 10th grade, or higher, which is above the literacy level of most of those police arrest.[62]

---

[56] Goldstein, *supra* note 38, at 47.
[57] *Id.*
[58] *Id.*
[59] *See,* Gallegos 370 U.S at 54. (explaining that [a]dolescents cannot be compared with an adult in full possession of his senses and knowledgeable of the consequences of his admissions. [Adolescents] would have no way of knowing what the consequences of his confession ... A lawyer could have given the petitioner the protection which his own immaturity could not."
[60] *See*, Laurel LaMontagne, *Children Under Pressure: The Problem of Juvenile False Confessions and Potential Solutions*, 41 W. ST. U. L. REV. 29, 41 (2013). (citing Thomas Grisso, *Juveniles' Capacities to Waive Miranda Rights: An Empirical Analysis*, 68 CAL. L. REV. 1134, 1137 (1980) (Grisso conducted a study where he administered a vocabulary test to adolescents to test their comprehension of words during a *Miranda* warning and found that 63% misunderstood at least one of the crucial words used in the standard *Miranda* form.)).
[61] *Id.*
[62] *Id.* at 40.

In *People v. Gonzalez*[63] a sixteen-year-old boy, confessed to an attempted murder.[64] Despite having his IQ of sixty-seven, ability to read on a first-grade level, and testimony explaining that he waived his rights only so that the police would stop questioning him, the court determined that he properly waived his *Miranda* rights.[65] In doing so, the court cited precedent in which courts had held that juveniles with an IQ even lower than sixty-seven had knowingly waived their *Miranda* rights.[66] The problem is that courts wrongfully assumes that an adolescents without counsel would fully understand and appreciate the advice or formalized warnings given by the police.

B. Once adolescents foolishly waive their Miranda rights, they become vulnerable to police interrogation.

When They See Us is a Netflix documentary that revisits the Central Park jogger case and highlights what went wrong during the police interrogation that caused five adolescents to falsely confess.[67] In the Central Park jogger case, these five adolescents males (known as the Central Park Five), served time in prison for the rape of a young woman who was jogging through Central Park.[68] Four were African American and one was Hispanic.[69] The techniques police use to instigate the teens to confess should be flagged as overbearing, deceitful, and wrong.[70] The police automatically assumed the Central Park Five were guilty based on their nonverbal and verbal communication despite the fact the DNA found on the victim did not match any of the youth

[63] People v. Gonzalez, 351 Ill. App. 3d 192 (2nd Dist. 2004).
[64] *Id.* at 193.
[65] *Id.* at 197.
[66] *Id.* at 203 (citing People v. Ball, 322 Ill. App. 3d 521 (1st Dist. 2001); People v. Clements, 135 Ill. App. 3d 1001(1st. Dist. 1985) as precedent where the courts have rendered a waiver valid despite the fact the defendants had IQs ranging from 58-60)).
[67] WHEN THEY SEE US (Netflix 2019) (*When They See Us* is a four-part miniseries based on the wrongful convictions of Antron McCray, 15; Kevin Richardson, 14; Yusef Salaam, 15; Raymond Santana, 14; and Korey Wise, 16).
[68] *Id.*
[69] *Id.*
[70] Gonzalez, 351 Ill. App. at 192.

suspects.[71] Each of the teenagers claimed that he had waived his *Miranda* rights and agreed to a police interrogation because he thought the police would allow him to leave after.[72]

Instead, the police proceeded to convince the adolescents that the evidence against them was so overwhelming by, among other things, telling them their fingerprints were found on the shorts of the victim.[73] This made the teenagers believe their only option was to confess to the crime.[74] After spending gruesome years spent in prison for a crime they did not commit, the truth eventually came to light and exonerated the Central Park Five.[75] Many were left in awe to wonder why five teens would confess to a crime they did not commit. After conducting some studies, researchers discovered that some groups such as females or racial minorities are more susceptible during police interrogations to avoid conflict with those in power.[76]

What police fail to realize is that, during interrogation, adolescents tend to become vulnerable, avoid making eye contact, respond in monosyllables, and provide nonlinear narratives that are difficult to follow.[77] As a result of their inexperience, these adolescents often exhibit behaviors that investigators are trained to associate with deception.[78] Despite years of training even experts are poor lie detectors because there is no behavior unique to deception.[79] Police officers nonetheless believe that an adolescent's odd behavior is an indicative of their guilt, which triggers police to double down to attempt to obtain an adolescent's confession. Police have gone

---

[71] Matthew B. Johnson, *The Central Park Jogger Case– Police Coercion and Secrecy in Interrogation*, J. OF ETHNICITY IN CRIM. JUST. (2005).
[72] Luna, *supra* note 17, at 304.
[73] *Id.*
[74] *Id.*
[75] Kate Storey, *'When They See Us' Shows the Disturbing Truth About How False Confessions Happen* (June 1, 2019), https://www.esquire.com/entertainment/a27574472/when-they-see-us-central-park-5-false-confessions. (reporting that, "[i]n 2002, after prison sentences that ranged from six to thirteen years, they were all released when a murderer and serial rapist confessed to the assault and his DNA matched with that found on the jogger."
[76] Feld, *supra* note 48, at 412.
[77] Birckhead, *supra* note 18, at 417.
[78] *Id*. at 411.
[79] Megan Glynn Crane, *Childhood Trauma's Lurking Presence in the Juvenile Interrogation Room and the Need for a Trauma-Informed Voluntariness Test for Juvenile Confessions*, 62 S.D. L. REV. 626, 648 (2017).

as far as fabricating results of a polygraph examination to induce a youth confession.[80] Involuntary *Miranda* waivers combined with problematic police techniques cause adolescents to suffer enhanced anxiety and stress, which results can provoke the desire to leave the interrogation and induce a false confession.

1. The Reid Technique Causes Adolescents to Misrepresent the Facts and Potentially Incriminate Themselves.

The Reid Technique is a tool that interrogators use to make the suspect feel powerless in his surroundings.[81] It emphasizes three psychological processes: isolation, confrontation, and minimization.[82]

> Isolation heightens stress and anxiety. Confrontation, fatigue, sleep deprivation increase susceptibility to social influences, impair complex decision-making, heighten suggestibility. Minimization techniques provide a moral justification upon which some suspects seize to escape from isolation and despair. Confronting suspects with strong assertion of guilt and presenting them with false evidence increase their sense of hopelessness, and well as the likelihood that even innocent people will confess.[83]

Adolescents tend to live in the present and spend little time reflecting on the future. As a result, they have the tendency to foolishly agree to whatever the police say in order to go home without taking into consideration the long-term consequences of their actions.[84] In addition, *Roper* and *Graham* emphasized an adolescent's susceptibility to social influences.

---

[80] *See*, People v. Mays, 174 Cal. App. 4th 156, 166 (2009) (permitting the usage of mock polygraph test during police interrogations and allowing the police to fabricate the written test results, show defendant the fake results, and tell defendant the results showed he failed the test).

[81] Barry Feld, *Police Interrogations of Juveniles: An Empirical Study of Policy and Practice* 97 CRIM. L & CRIMINOLOGY 219, 243 (2006).

[82] *Id.*

[83] *Id.*

[84] Birckhead, *supra* note 16, at 416.; see also, WHEN THEY SEE US (Netflix 2019) (where police told the five adolescents that if they confessed, they would be able to go home).

A study conducted by two renown false confession researchers, Saul Kassin and Jennifer Perillo used the Reid Technique on student volunteers.[85] The study required the students to type fast and avoid hitting the ALT key.[86] If they pressed the ALT key, the computer would crash and all the experimental data would be lost.[87] The students, however, did not know the computer was set up to crash, regardless of whether they pressed the ALT key.[88]

When the computer crashed, the experimenter asked each student whether they had pressed the ALT key and acted upset when "all the experimental data was lost."[89] The experimenter proceeded to request that the student sign a confession.[90] A quarter of the innocent participants were so the shocked by the accusation that they falsely confessed to pressing the ALT key.[91] In another study, the researched administered the same test but, this time, there was another person in the room who claimed to have witnessed the student hitting the ALT key.[92] In this scenario, the participants false confession rate jumped from 25 percent to 80 percent.[93]

It easy to imagine the level of susceptibility to which an adolescent is exposed to during police interrogations, where police dominate the setting, control information, and create psychological pressures.[94] Yet, despite this reality about police interrogations, most adolescents fail to invoke their constitutional *Miranda* right.[95] In order to protect vulnerable adolescents from problematic police interrogation, the law must demand a new protocol.

---

[85]Gretchen Gavett, *Study Offers Disturbing False Confession Insights*, FRONTLINE (August 12, 2011), https://www.pbs.org/wgbh/frontline/article/study-offers-disturbing-false-c/; *see also*, Perillo, et. al., *Inside interrogation: the lie, the bluff, and false confessions* L. & HUM. BEHAV., 2 (2010) (for a more thorough description of the study).
[86] *Id.*
[87] *Id.*
[88] *Id.*
[89] Gavett *supra* note 85.
[90] *Id.*
[91] *Id.*
[92] *Id.*
[93] Gavett *supra* note 85.
[94] Feld, *supra* note 48, at 407.
[95] *Id.*

2. The Reality of the Reid Technique When Used on Adolescents

"Nobody told me that police are allowed to lie during interrogations."[96] Those were the words of fourteen-year-old Michael Crowe after he was exonerated for the murder of his younger sister.[97] Police had told him they had evidence that proved that he had killed his sister. Young Michael believed the police when they told him that they found his hair in his sister's hand and that he failed voice stress analysis test.[98] It was not long before Michael fell victim to these overzealous interrogation tactics and confessed to the murder without knowing that everything the police had told him was a lie.[99] Instead, Michael believed the police and started to convinced himself that maybe he had just, "blocked the whole thing out."[100]

Similarly, a 17-year-old high school senior Martin Tankleff awoke to discover his mother stabbed to death and his father alive but unconsciousness in their home.[101] Police took Tankleff in for questioning because, with blood on his hands, they suspected that he was involved.[102] Tankleff endured long hours of interrogation, during which police lied to him and even contended that his Tankleff's own father had accused him of the attack. Confused, Tankleff confessed to the crime and said that, "he must had blocked it out."[103]

Police appear to be able to easily convince adolescents that they simply have forgotten about a gruesome crime they committed by coercing them with lies. Youths are unaware that, under *Frazier v. Cupp*[104] police officers are permitted to misrepresent facts to suspects about

[96] Luna, *supra* note 17, at 302.
[97] *Id.*
[98] *Id.*
[99] *Id.*
[100] Luna, *supra* note 17, at 302.
[101] MICHIGAN ST. U. C. L., THE NATIONAL REGISTRY OF EXONERATIONS, MARTIN TANKLEFF (2012), https://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=3675.
[102] *Id.*
[103] *Id.*
[104] Frazier v. Cupp, 394 U.S. 731 (1969).

evidence.[105] They may even introduce false evidence such as fingerprints, blood, hair, eyewitness identification, or failed polygraphs, to the suspect.[106] In fact, standard police manuals encourage interrogators to exploit a suspect's weakness.[107] The use of deception combined with prolonged interrogations are intended to psychologically wear anyone down. It is little surprise, then, that they are particularly effective at breaking the will of susceptible juveniles.[108]

III. PRIOR TO POLICE INTERROGATION, YOUTHS SHOULD UNDERGO NEUROIMAGING TO DETERMINE WHETHER THEY VOLUNTARILY, KNOWINGLY, AND INTELLIGENTLY WAIVED THEIR *MIRANDA* RIGHTS.

Categorical prohibitions prevent youths from participating in certain activities such as voting, driving and consuming alcohol until they reach the age of eighteen. *Graham and Roper* also adopted a categorical prohibition on executing and sentencing adolescents to life without parole for nonhomicide offenses under the age of eighteen. Some scholars maintain that such categorical prohibition avoids discretionary bias because the law does not need to make individualized assessments of maturity.[109] It can be argued that creation of a categorical age prohibition for adolescents for *Miranda* waivers is not practical because it would cause delays in police stations.[110] Imagine a scenario where a police officer has an adolescent in custody who appears to be between the age of fifteen and eighteen. If the adolescent does not have an identification and refuses to concede their age, a police officer will have trouble applying a categorical rule. In addition, and as Justice O'Connor's argued in her *Roper* dissent, certain youths

[105] *Id.* at 739
[106] *Id.*
[107] Goldstein, *supra* note 38, at 35.
[108] *Id.*
[109] Birckhead, *supra* note 16, at 390; *see also*, Barry C. Feld, *Competence, Culpability, and Punishment: Implications of Atkins for Executing and Sentencing Adolescents*, 32 HOFSTRA L. REV. 463, 468. (stating that, "although some offenders older than age eighteen also may lack the criminal responsibility we ascribe to adults, age eighteen provides a natural legal divide because so many other competence-related rules already draw the line there."
[110] *Id.*

may achieve adult-level competencies prior to reaching eighteen years of age, while many others may not attain maturity even as adults.[111]

Other scholars argue that culpability is not an objectively measurable concept. They contend that it is, instead a subjective judgment thus favoring individualized discretion instead of a categorical age prohibition.[112] *Miller's* holding, in fact, supports an individualized assessment rather than a categorical age prohibition[113]. In *Miller*, the court held that courts can use factors such as an adolescent's immaturity, impetuosity, home environment, and degree of participation in the offense to make an individualized culpability assessment.[114] Miller, therefore, supports the application of neuroimaging to ascertain whether a particular adolescent voluntarily, knowingly, and intelligently waived his or her *Miranda* rights.

The rapidly evolving field of neuroscience has provoked scholars to recognize the importance of implementing neuroscience in the criminal justice system.[115] Some scholars have argued that neuroscience findings make is clear that a history of childhood trauma will render youth at even greater risk of making an involuntary or false confession.[116] Therefore, scholars suggest that the court should add history of trauma to the totality of the circumstance test.[117] While this Article focuses on youth administered *Miranda* warnings and not childhood trauma, the main thrust of the article is that neuroimaging technology should be used to protect adolescents in the criminal justice system.

---

[111] Roper, 543 U.S. at 588.
[112] *See*, Miller, 567 U.S. at 475.
[113] *Id.*
[114] *Id*. at 479.
[115] Crane, *supra* note 79, at 628.
[116] *Id.* at 667.
[117] *Id*. at 668.

A. Neuroimaging studies suggests that an adolescent's brain does not mature until adulthood.

Neuroimaging studies on the brain are based the development of the average brain. It does not take into account that there is a considerable variation in brain structure and function among individuals of a particular age.[118] Although this is true, neuroimaging techniques have allowed researchers to study the brain and examine what "on average" makes adolescents act so impulsively.[119] Advances in magnetic resonance imaging (MRI) and functional magnetic reasoning imaging (fMRI) have allowed researchers to study the development of the prefrontal cortex of the frontal lobe region of the brain leading to the discovery that it is one of the last parts of the brain to reach maturity.[120] By using electroencephalogram (EEG) technology, researchers have demonstrated that the prefrontal region of the brain matures between ages seventeen to twenty-one.[121]

> During this time, white matter increases in the frontal lobe - this increase in white matter can be attributed to a process called myelination. During myelination, a white, fatty, insulating material known as myelin wraps around the axon of the neuron. Axons are the parts of the neurons that conduct an electrical impulse, known as an action potential. The action potential, in turn, permits the neuron to release a chemical signal known as a neurotransmitter (like serotonin, dopamine, or glutamate) that has effects on various brain functions like cognition, learning, and short-term memory. As these processes become more efficient, the developing adolescent exhibits greater control over thoughts and behavior.[122]

This is critical for adolescents because the frontal executive part of the brain is associated with impulsivity, difficulties in concentrating, and impairments in decision-making.[123] A study used 935 individuals between the ages of 10 and 30 to establish that adolescents engage in risky

---

[118] OWEN D. JONES: LAW AND NEUROSCIENCE 20 (Vicki Been et al. eds., 2014).
[119] *Id.* at 548.
[120] *Id.* at 74.
[121] *Id.*
[122] LaMontagne, *supra* note 60, at 35.
[123] *Id.*

behaviors more frequently than adults.[124] "The presence for risky behavior such as shoplifting, unprotected sex, and smoking raised by a third of a standard deviation between ages 10-16, and then declined by half standard deviation by age 26."[125] Societal pressure, peer pressure, and puberty are attributed to these risky behaviors.[126] Now, new neuroimaging studies make it easier to comprehend why "youths weigh costs and benefits differently, discounting negative future consequences and prefer an immediate, albeit smaller, reward than adults do, who can better delay gratification."[127] Instead of using the prefrontal cortex of the brain's frontal lobe, adolescents rely on the amygdala part, which develops more rapidly than the brain system that supports self-control.[128] The amygdala area controls emotional and instinctual behavior such as the fight or flight response during stressful situations.[129]

B. Implementing Functional Magnetic Resonance Imaging prior to an adolescent being Mirandized will protect vulnerable adolescents from erroneously waiving their rights.

Prior to police Mirandization of an adolescent, Functional Magnetic Resonance Imaging (fMRI) technology can help determine which parts of the adolescent's brain are involved in a particular mental process.[130] The (fMRI) is a brain imagining technique developed in the 1990's that measures brain activity by detecting changes associated with blood flow. [131] Scientists have become increasingly confident that they can utilize fMRI data to determine what area of the brain an individual is using by measuring which parts of the brain are experiencing greater blood flow.[132]

---

[124] *Id.*
[125] *Id.*
[126] Jones, *supra* note 116, at 551.
[127] Feld, *supra* note 1, at 557.
[128] Luna, *supra* note 17, at 297.
[129] *Id.*
[130] Hannah Devlin, *What is Functional Magnetic Resonance Imaging (fMRI)?*, PSYCH CENTRAL (Oct. 2018, https://psychcentral.com/lib/what-is-functional-magnetic-resonance-imaging-fmri/).
[131] *Id.*
[132] Zachary E. Shapiro, *Truth, Deceit, and Neuroimaging: Can Functional Magnetic Resonance Imaging Serve as a Technology-Based Method of Lie Detection*? 29 HARV. J. L. & TEC 527, 529 (2016).

This is because an fMRI records brain states in parallel with ongoing mental activity and behavior, thus permitting the establishment of correlational links between them.[133] This research will serve as a guide to see whether an adolescent is using the prefrontal cortex or amygdala part of their brain during a *Miranda* waiver.

The (fMRI) can also detect whether an adolescent is lying about understanding their *Miranda* rights.[134] Studies indicate that the right orbitofrontal/inferior frontal, the right middle frontal, and the right anterior cingulate are the regions of the brain that are most consistently activated by deception.[135] Using (fMRI), researchers analyzed a subject's brain activity and were able to identify correctly when the subject's brain activity able to correctly tell when the subjects were being deceptive with a ninety percent accuracy.[136]

> The hypothesis underlying fMRI as a lie detector is that telling the truth is the natural or normal response of the brain and one would not expect to see increased activity over and above the normal background level of brain activity. Lying, however, requires the person to first recall the truth, then suppress the truth while creating a lie that might plausibly fit the objective facts, and finally, verbalize the falsehood. This increased neural activity demands more energy. To supply the energy demand, more oxygenated blood is directed to those regions of the brain processing the lie. This relative difference in energy demand, called the blood oxygenation level-dependent ("BOLD") differential by neuroscientists, is detectable by an fMRI scan. Comparing the BOLD differential between subjects known to be telling the truth with those deliberately lying allows researchers to hypothesize that an increased BOLD response in certain regions of the brain when the subject is answering questions is an indication of deception.[137]

Before the start of a youth's police interrogation, this Article proposes that the court should require the installation of fMRI machines in police stations where a medical physician would administer the exam. A physician will conduct a short verbal comprehensive test. The first

---

[133] Elena Rusconi, *Prospects of functional magnetic resonance imaging as lie detector*, NCBI (Sep. 2013 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3781577/).
[134] Jones, *supra* note 116, at 20.
[135] *Id.*
[136] *See*, United States v. Semrau, 693 F.3d 510, 517 (6th Cir. 2012).
[137] William Woodruff, *Evidence of Lies and Rules of Evidence: The Admissibility of fMRI-Based Expert Opinion of Witness Truthfulness*, 16 N.C. J.L. & TECH. 105, 109 (2014).

question will ask the adolescent to explain *Miranda* rights in their own words. The following questions will be directed to see whether an adolescent understands the complexity of these rights. The fMRI will activate which areas of the brain the adolescent is utilizing in response to these inquires to determine if the adolescent can intelligently, knowingly, and voluntarily waive their rights. If the adolescent's brain scan shows no brain activity or shows that an adolescent is using primarily the amygdala region then that youth should be deemed unable to voluntarily waive their *Miranda* rights without a legal representative.

IV. POTENTIAL PROBLEMS THAT COULD RESULT FROM USING NEUROIMAGING PRIOR TO AN ADOLESCENT'S *MIRANDA* WAIVER.

As explained above, the use of fMRIs prior to the adolescent's *Miranda* waiver could prove beneficial to adolescents, prosecutors and courts. Adolescents will have assurance that their vulnerability will not be used against without a proper *Miranda* waiver. Prosecutors will also benefit from the use of fMRI's in this context because they will not have to argue as to why an adolescent's interrogation should be admissible when they have strong evidence the adolescent properly waived their *Miranda* rights. fMRI's findings will also alleviate the courts from balancing the myriad factors under the totality test approach to determine if a minor voluntarily, knowingly, and intelligently waived their *Miranda* rights. Instead, the courts can rely on the fMRI's findings to draw a proper conclusion.

A. fMRI's Current Accuracy and Cost Makes it Difficult for Courts to Allow the Use of fMRI's During a Youth's Miranda Waiver.

This Article proposes that fMRI findings are likely to be introduced as circumstantial, demonstrative evidence relevant to a youth's *Miranda* waiver that must be accompanied by expert testimony. The admissibility of expert testimony such as physicians and researchers who testify about fMRI findings is governed by Federal Rule of Evidence (FRE) 702 and the Supreme Court's

seminal decision in *Daubert v. Merrell Dow Pharm., Inc.,*.[138] Under *Daubert*, the factors that may be considered in determining whether the methodology is valid are: (1) whether the theory or technique in question can be and has been tested; (2) whether it has been subjected to peer review and publication; (3) its known or potential error rate; (4) the existence and maintenance of standards controlling its operation; and (5) whether it has attracted widespread acceptance within a relevant scientific community.[139] fMRI provides the basis of the expert's opinion by applying neuropsychological models, and statistical principles in order to draw probabilistic conclusions about an individual's brain activity.[140]

It seems that Under the *Daubert* factors using fMRI findings to explain whether a youth properly waived their *Miranda* rights seems plausible. One of the most important critiques raised by these scholars, and recognized in court proceedings, is that there exists a long chain of inference from the fMRI scanner to the courtroom.[141] For instance, just because a particular pattern of neural activity is associated, on average at the group level, with impaired decision-making, it does not necessarily follow that a defendant before the court whose brain scans produce the same neural patterns necessarily has such a cognitive deficit.[142] Even assuming fMRIs finding pass all the *Daubert* factors to establish whether a youth properly waived their *Miranda* rights, the cost associated with this procedure is too high. The cost of a single, state of the art MRI machine can exceed over three million dollars.[143] Not only would the cost to hire a doctor to administer the test

[138] 509 U.S. 579, (1993).
[139] *Id.* at 594.
[140] Justin Amirian, *Weighing the Admissibility of fMRI Technology Under FRE 403: For the Law, fMRI Changes Everything -- and Nothing* 41 FORDHAM URB. L. J., 715, 730 (2016).
[141] Owen D. Jones, *Law and Neuroscience in the United States,* INTERNATIONAL NEUROLAW: A COMPARATIVE ANALYSIS, October 2012, at 349, 356.
[142] *Id.*
[143] Eric Reed, *How Much Does an MRI Cost?*, *THE STREET* (May 2019 https://www.thestreet.com/lifestyle/health/how-much-does-an-mri-cost-14972340).

in every police station be excessive but the cost of a single scan is not within the police department's budget to make this a realistic reform.

B. Although it seems plausible in 2019, the development of these new neuroimaging may allow the justice system to administer them in the future.

Neuroscientific evidence is increasingly reaching United States courtrooms in a number of legal contexts.[144] For example, fMRI brain scans in civil brain injury cases are often admitted.[145] However, using fMRI brain scans to detect lies are not. In 2010, the U.S federal court heard its first evidentiary hearing in *United States v. Semrau*[146] where the court looked at the *Daubert* factors to determine whether or not the court should allow the admissibility of fMRI lie detection evidence.[147] In *Semrau,* a psychologist faced Medicare fraud and the prosecutor had the burden to show that the psychologist knowingly violated the law.[148] The psychologist entire defense was that a fMRI lie detector finding showed he was generally truthful when, during the test, he said he did not knowingly commit fraud.[149] The judge ultimately found at the fMRI lie detector satisfied factors one and two of the *Daubert* factors, but failed to meet factors three and four.[150] Both factors three and four discuss the potential error rate and the existence and maintenance of standards controlling its operation.

It seems that using fMRI brain scans to determine a youth's *Miranda* waiver may fail the third and fourth *Daubert* factors as well. fMRI findings are successful in a controlled environment but their ability to alleviate the issues that persist in the criminal justice system is unknown.[151] fMRIs are usually administered by physicians in a hospital setting or by researchers conducting a

[144] Jones, *supra* note 141, at 349.
[145] *Id.*
[146] 693 F.3d 510 (6th Cir. 2012).
[147] *Id.* at 516.
[148] *Id.* at 524.
[149] *Id.* at 515.
[150] *Id.* at 522.
[151] Jones, *supra* note 116, at 20.

study in a controlled setting. Calculating an overall successful rate during a youth's *Miranda* waiver will be difficult because instead of conducting the exam in a controlled setting, the test would be administered during factual scenarios. Unfortunately, there just is not enough research that demonstrates whether fMRI testing will be successful in a criminal justice setting.[152]

This however does not mean it will not be successful in the future. Researchers are already publishing studies on neuroscience and law in the context of responsibility, sentencing, evidence, neuro-prediction, addiction, juvenile justice, psychopathy, legal and moral reasoning, emotions, memory, lie detection, pain detection, risk assessment, behavioral genetics, health law, and more.[153] It will not be long before they are considering fMRI findings not only for medical determination and lie detectors but for a youth's *Miranda* waiver as well.

V. IT IS CRITICAL TO IMPLEMENT LEGAL REFORMS THAT PREVENT FALSE JUVENILE CONFESSIONS.

Currently, fourteen states use fourteen as the cut off age for trying an adolescent as an adult, while six states set the bar at thirteen.[154] Kansas and Vermont allow ten-year-olds to be tried as adults.[155] Twenty-three other states have no cut off age, thus allowing any minor to be tried as an adult."[156] In order to protect adolescents from being tried as adults, we need to prevent injustice at the beginning of the legal process starting with the administration of their *Miranda* rights.

Research studies on police interrogation report that ninety percent of adolescents waive their *Miranda* rights.[157] The largest empirical study of juvenile interrogations concluded that over

[152] Woodruff, *supra* note 132, at 223.
[153] Jones, *supra* note 141, at 352.
[154] LaMontagne, *supra* note 60, at 50.
[155] *Id.*
[156] *Id.*
[157] *Feld*, *supra* note 1, at 511.

ninety-two percent adolescents have waived their rights.[158] After adolescents waive their *Miranda* rights, they are two to three times more likely than adults to falsely confess during interrogations than adults.[159] In a study of one hundred twenty-five proven false confessions, sixty-three percent of false confessors were under the age of twenty-five and thirty-two percent were under eighteen.[160] As discussed earlier, an adolescent's brain is not fully developed in areas relating to judgment, evaluation of risk, and decision-making, which provokes them to respond to pressures of interrogation by inferring that a confession is the only way out. Thus, it is important to implement different legal reforms to prevent false confessions among adolescents.

A. Recording everything from beginning to end and having an attorney present during a Miranda waiver will allow adolescents to feel protected.

Recording a youth's entire police interrogation is necessary to protect both adolescents and police from false claims of abuse.[161] This Article proposes that in addition to the interrogation the police should also record *Miranda* warnings when given to adolescents. A recording creates an objective record and will provide the court with an independent basis to resolve credibility disputes about *Miranda* warnings, and waivers instead of relying on a police officer's memory.[162] This approach will eliminate false evidence and lower the risk of adolescents feeling susceptible.

In addition, having an attorney present will reduce a youth's susceptibility during interrogating. "Providing youth with an adult trained in the law whose exclusive job is to inform the juvenile of his legal rights and protect his legal interests eliminates the problem of parental conflict and coercion."[163] As stated earlier, some adolescents are unable to comprehend their

[158] *Id.*
[159] *Id.*
[160] *Id.*
[161] *Id.* at 458.
[162] Goldstein, *supra* note 38, at 55.
[163] *Id.*

Miranda warnings and, as such, may not even know how to ask for a lawyer. Having an attorney present would ensure that an adolescent has his rights fully explained to him, and the consequences of a waiver made plain, before the juvenile decides to assert or waive his rights.

B. The police in the US should use the PEACE method approach instead of the Reid Technique when interrogating adolescents.

Categorically prohibiting police from confronting adolescents with false evidence will prevent police officers from prying with an adolescent's vulnerability. Innocent people who waive their rights due to a presumed guilt or disbelief in their own innocence, may falsely confess because they believe that police possess overwhelming evidence.[164] In the United Kingdom, police officers are prohibited from using the Reid technique on youths.[165] Instead, they follow a less confrontational approach that encourages suspects to share their open-ended side of their story before asking questions.[166] This technique is called the PEACE (Preparation and Planning, Engage and Explain, Account, Closure, and Evaluate) method.[167] Research supports the theory that less confrontational police interviewing can lower the rate of false confessions without affecting the rate of true confessions.[168]

Finally, until the neuroimaging advances further and can be introduced in a police interrogation setting, all states should consider procedural safeguards to protect adolescents from involuntarily waiving their *Miranda* rights. For instance, New Mexico completely barred the *Miranda* waiver by children under the age of thirteen and created a rebuttable presumption against waiver validity for children under fourteen but gives no protection for older adolescents.[169] This

[164] *Feld*, *supra* note 81, at 415.
[165] *Feld*, *supra* note 48, at 313.
[166] *Id.*
[167] *Id.*
[168] *Id.*
[169] Goldstein, *supra* note 38, at 61.

law aims to protect younger adolescents. The remaining states predominantly treat adolescent suspects like adults during interrogation despite the Supreme Court's recognition of the need for special protections for interrogating adolescents.

CONCLUSION

It is important to prioritize keeping adolescents safe from police coercion. One way to do so is by making sure that adolescent suspects fully understand their *Miranda* rights. For now, even implementing a short verbal comprehensive test to see if an adolescent understands the *Miranda* waiver might help with a youth's involuntary waiver. Asking the police officer to administer a series of questions to see if a juvenile understands his or her *Miranda* rights will not cost the police department money. In fact, these series of questions will help police officers demonstrate that a waiver was voluntary or allow the police to know whether or not they should proceed with an interrogation.

Although mandating that police conduct neuroimaging testing prior to Mirandizing minors seems out of reach for 2019, neuroimaging in the criminal justice system may be implemented sooner than later. Neuroscientific evidence is increasingly reaching U.S. courtrooms in a number of legal contexts, and this trend is likely to continue for the foreseeable future.[170] There is precedent from the Supreme Court that suggests neuroscience developments may become more accepted just like they did in *Roper*. In *Semrau*, the judge wrote in a footnote that "in the future, should fMRI-based lie detection undergo further testing, development, and peer review, improve upon standards controlling the technique's operation, and gain acceptance by the scientific community for use in the real world, this methodology may be found to be admissible even if the error rate is not able to be quantified in a real world setting."[171] Currently, No Lie MRI and Cephos

[170] Jones, *supra* note 141, at 370.
[171] *Id.* at 359.

are two companies that are currently working on refining fMRI technology so that it can be admitted in court and commercially marketed.[172] Lab studies currently have almost ninety percent accuracy rating.[173] These companies are working on improving the accuracy to ninety-five percent or higher which should be high enough to satisfy the Supreme Court's standards for the admission of scientific evidence.[174] Juveniles will continue to be minimized unless the justice system finds a way to administer *Miranda* waivers without risking youth's from involuntarily waiving them. Thus, using neuroimaging to *Mirandize* youths in the future may be one way to secure individual rights for youths during police interrogations.

[172] Jones, *supra* note 118, at 20.
[173] *Id.*
[174] *Id.*