

21st Century Policing – Cross Cultural Competency

Lieutenant Matt Smith
Agent Evan Linney
Officer Jeff Pace
Officer Ryan Culver
Officer Briley Stone
Rabbi Mendy Begun



Natural Language Grammatical Inference with Recurrent Neural Networks

Steve Lawrence, Member, IEEE, C. Lee Giles, Fellow, IEEE, and Sandway Fong

Abstract—This paper examines the inductive inference of a complex grammar with neural networks—specifically, the task considered is that of training a network to classify natural language sentences as grammatical or ungrammatical, thereby enabling the same kind of discriminatory power provided by the Principles and Parameters linguistic framework, or Government-and-binding theory. Neural networks are trained, without the division into learned vs. innate components assumed by Chomsky, in an attempt to produce the same judgments as native speakers on sharply grammatical/ungrammatical data. How a recurrent neural network could possess linguistic capability and the properties of various common recurrent neural network architectures are discussed. However, after implementing several judgments and the properties of smaller grammars and training was initially difficult. Nonetheless, after implementing several techniques aimed at improving the convergence of the gradient descent backpropagation-through-time training algorithm, significant learning was possible. It was found that certain architectures are better able to learn an appropriate grammar. The operation of the networks and their training is analyzed. Finally, the extraction of rules in the form of deterministic finite state automata is investigated.

Index Terms—Recurrent neural networks, natural language processing, grammatical inference, government-and-binding theory, networks and their training is analyzed. Finally, the extraction of rules in the form of deterministic finite state automata is investigated.

1 INTRODUCTION

This paper considers the task of classifying natural language sentences as grammatical or ungrammatical. We attempt to train neural networks, without the bifurcation into learned vs. innate components assumed by Chomsky, to produce the same judgments as native speakers on sharply grammatical/ungrammatical data. Only recurrent neural networks are investigated for computational reasons. Computationally, recurrent neural networks are more powerful than feedforward networks and some recurrent architectures have been shown to be at least Turing equivalent [53], [54]. We investigate the properties of various popular recurrent neural network architectures, in particular Elman, Narendra and Parthasarathy (N&P), and Williams and Zipser (W&Z) recurrent networks, and also Frasconi-Cor-Soda (JGS) locally recurrent networks. We find that both Elman and W&Z recurrent neural networks are able to learn an appropriate grammar after implementing techniques for improving the convergence of the gradient descent based backpropagation-through-time training algorithm. We analyze the operation of the networks and investigate a rule approximation of what the recurrent network has learned—specifically, the extraction of rules in the form of deterministic finite state automata.

Previous work [38] has compared neural networks with other machine learning paradigms on this problem—this work focuses on recurrent neural networks, investigates

additional networks, analyzes the operation of the networks and the training algorithm, and investigates rule extraction. This paper is organized as follows: Section 2 provides a brief motivation for the task attempted. Section 3 provides a brief introduction to formal grammars and grammatical inference and describes the data. Section 4 lists the recurrent neural network models investigated and provides details of the data encoding for the networks. Section 5 presents the results of investigation into various training heuristics and the results of training with simulated annealing. Section 6 investigates the operation of the networks. The extraction of rules in the form of deterministic finite state automata is investigated in Section 7 and Section 8 presents a discussion of the results and conclusions.

2 MOTIVATION

2.1 Representational Power
Natural language has traditionally been handled using symbolic computation and recursive processes. The most successful stochastic language models have been based on finite-state descriptions such as *n*-grams or hidden Markov models. However, finite-state models cannot represent hierarchical structures as found in natural language [46]. In the past few years, several smaller natural grammatical inference [9], [21], [19], [20], [68]. Recurrent neural networks have been used for several smaller natural language problems, e.g., papers using the Elman network for natural language tasks include [1], [12], [24], [58], [59]. Neural network models have been shown to be able to

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For information on obtaining reprints of this article, please send e-mail to: tkd@computer.org, and reference IEEECS Log Number 10462.

1. The inside-outside recombination algorithm is an extension of hidden Markov models intended to be useful for learning hierarchical systems. The algorithm is currently only practical for relatively small grammars [40].

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Learning Objectives

1. Define Culture And The Role It Plays In Policing A Society
2. Review Of The Constitution, Learn CVPD Mission Statement And Other Articles That Create The Culture Which Governs Your Conduct Within The Community
3. Heighten Your Sense Of Cultural Awareness In De-escalating Conflict
4. Heighten Your Sense Of Awareness Of How Some Cultures Perceive The Police
5. Discuss How Implicit & Bias-based Policing Contributes To Conflict
6. Discuss Effective Methods Of De-Escalating Conflict



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The Chula Vista Difference



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2014 Obama Administration Executive Order Created A Taskforce On 21st Century Policing Six-Pillar Task Force Recommendations

1. Build Trust And Legitimacy – Foster Trust. Don't Act As If We Occupy An Area
2. Policy Oversight - Align Policies With Community Values –Carotid Banned-knees To Neck
3. Technology And Social Media - Embrace New Technology. Drones, Live 911, Media Platforms
4. Community Policing And Crime Reduction - Prioritize Community Engagement
5. Officer Training And Education - Invest In Training- Mental Health Crisis, Procedural Justice
6. Officer Safety/Wellness - Cultivate The Well-being Of Officers



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Taskforce Recommendations On Procedural Justice And Implicit Bias

1. Fair In Process (Pedestrian Enforcement Due To Fatalities)
2. Transparent In Action (BWC Release)
3. Opportunity For A Voice (Listen And Ask More Questions -They Want To Be Heard-expect Reasonable Resistance)
4. Impartial In Decision Making (All People Are Treated The Same.)
5. Decrease Tension And Increase Trust (Apologize When You Get It Wrong)



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Quick Facts

Number of Cops in U.S.	Number of Agencies	Number of Incidents to Incite a Protest/Riot
Approximately 800,000	Approximately 18,000	1 Action of a Single Officer/Group



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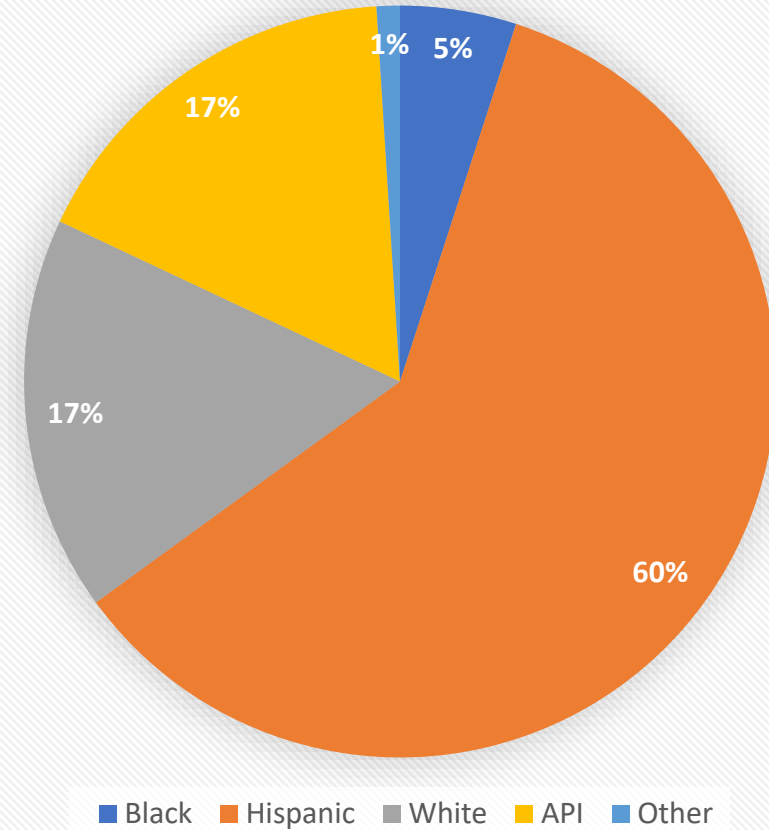
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City of Chula Vista Racial Demographics

- Welcoming City
- Inclusive Of All People
- Diversity And Inclusion A Priority For All City Departments
- PD Is Most Visible Form Of Government

Racial Demographics – 2020
U.S. Census



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Police Culture-Defined

- Culture Is A System Or Behavior That Helps Us Act In An Accepted Or Familiar Way
- Department Leadership Establishes A Policing Culture For Three Primary Reasons:
 1. So Officers Know What's Expected Of Them
 2. So The Community Knows What To Expect Of Officers
 3. So We'll Both Know When We Have Deviated



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Group Activity



- What is your national origin? How do you identify yourself?
- Where did you grow up?
- Name one cultural norm that you experienced in your household.
- What is your political party of choice?
- What languages do you speak?
- What are your hobbies and name one thing that people don't know about you?
- Have you ever had an “encounter” with the police? What happened? What was your opinion of the officer?
- Why did you become a police officer?



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Why Did You Want To Be A Police Officer?



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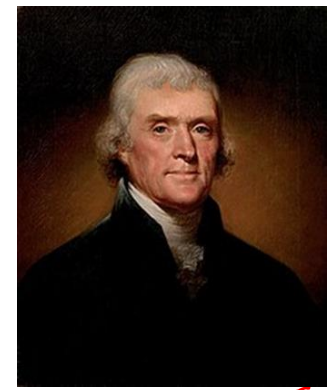


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Why Are You A Police Officer? The Social Contract Theory



"We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. That to secure these rights, Governments are instituted among Men, deriving their just Powers from the Consent of the Governed...."

-Thomas Jefferson



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Our Most Guiding Principle - The Constitution - Ratified In 1789

What Are The Three Parts Of The Constitution?

1. Preamble – We The People...
2. Articles- There Are Seven Articles, Which Among Other Things, Establish Our Three Branches Of Government (Legislative, Executive, And Judicial) And Rules For How Future Amendments To The Constitution Should Be Made. Provides power to States.
3. Amendments –
 1. The First 10 Amendments Are Called The Bill Of Rights
 2. There Have Been 27 Amendments To Date

The Constitution Establishes A Culture Of **DEMOCRACY**



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Conflict/Deviation

- We Define **Conflict** As A Culture Clash. When Someone Does Not Act In The Manner That Has Been Scripted (Prop 64)
- Honor Killings (In Some Cultures, But Not In America)
- Your Career Will Be Defined By Resolving Cultural Conflict.
- Do Good Work And Don't Go "Rogue"



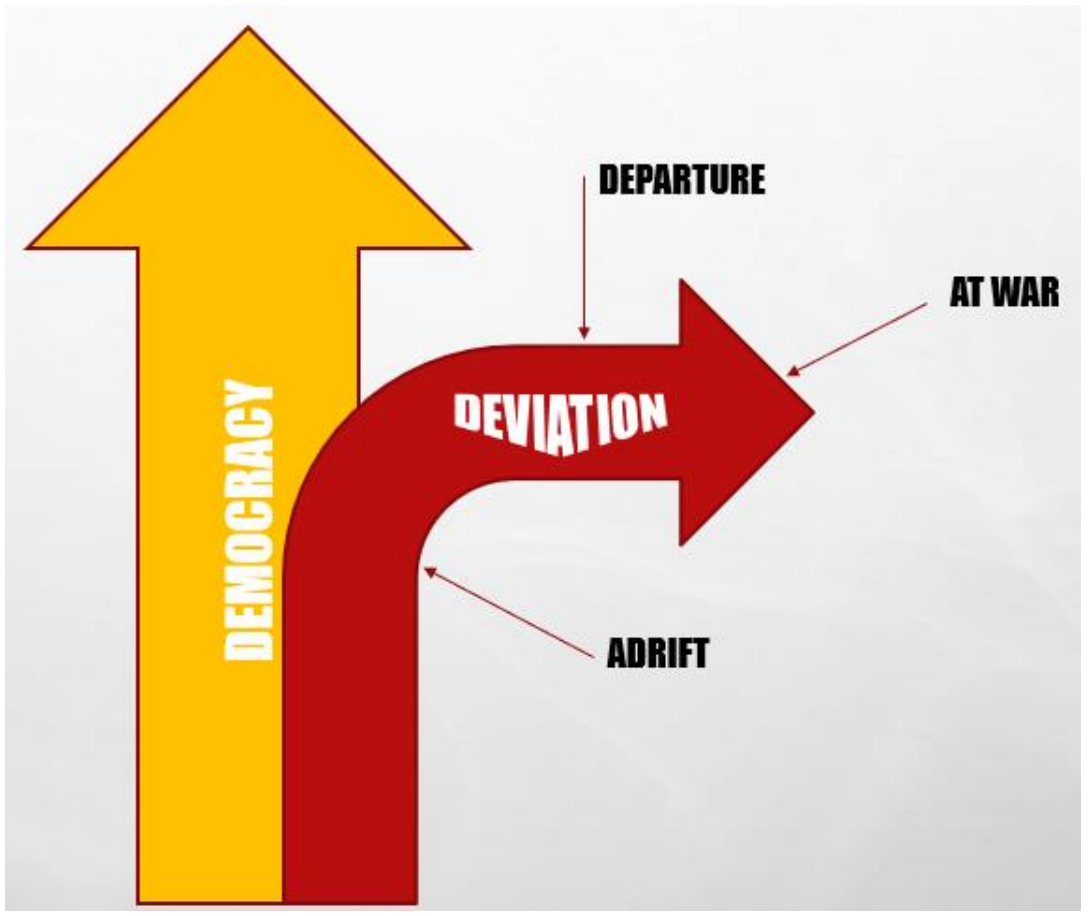
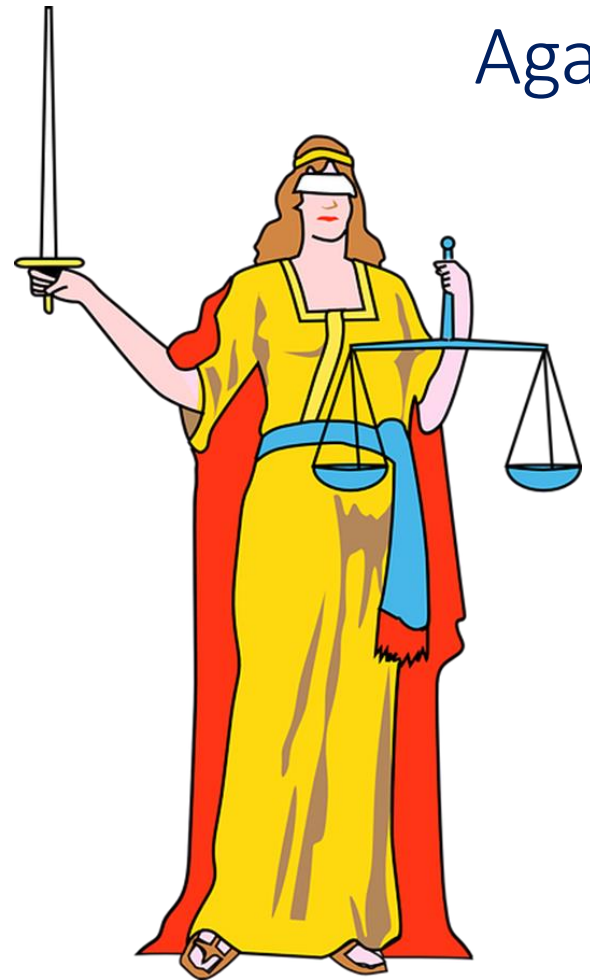
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Policing Is Established To Protect The Culture Of Democracy Against Deviants



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Police Authority and Legitimacy

Oath Of Office



CITY OF CHULA VISTA

OATH OR AFFIRMATION OF ALLEGIANCE
FOR CITY OFFICIALS AND EMPLOYEES

STATE OF CALIFORNIA • CITY OF CHULA VISTA

I, _____, solemnly swear (or affirm) that I will support and defend the Constitution of the United States and the Constitution of the State of California against all enemies, foreign and domestic; that I will bear true faith and allegiance to the Constitution of the United States and the Constitution of the State of California; that I take this obligation freely, without any mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties upon which I am about to enter.

SUBSCRIBED AND SWORN TO ME ON THIS DATE OF _____

Signature of Oath Administrator

Signature of Person Taking Oath

City Clerk
Title of Oath Administrator

Title of Person Taking Oath

Mission Statement



OUR MISSION

The Chula Vista Police Department, in partnership with the Community, is dedicated to providing community policing, with the highest level of professionalism and transparency.

Chula Vista Police Department Employees will provide fair, courteous, and compassionate service to enhance the quality of life in Chula Vista.

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Code Of Ethics

Chula Vista Police Department
Chula Vista PD Policy Manual

LAW ENFORCEMENT CODE OF ETHICS

As a law enforcement officer, my fundamental duty is to serve the community; to safeguard lives and property; to protect the innocent against deception, the weak against oppression or intimidation and the peaceful against violence or disorder; and to respect the constitutional rights of all to liberty, equality and justice.

I will keep my private life unscuffed as an example to all and will behave in a manner that does not bring discredit to me or to my agency. I will maintain courageous calm in the face of danger, scorn or ridicule; develop self-restraint; and be constantly mindful of the welfare of others. Honest in thought and deed both in my personal and official life, I will be exemplary in obeying the law and the regulations of my department. Whatever I see or hear of a confidential nature or that is confided to me in my official capacity will be kept ever secret unless revelation is necessary in the performance of my duty.

I will never act officiously or permit personal feelings, prejudices, political beliefs, aspirations, animosities or friendships to influence my decisions. With no compromise for crime and with relentless prosecution of criminals, I will enforce the law courteously and appropriately without fear or favor, malice or ill will, never employing unnecessary force or violence and never accepting gratuities.

I recognize the badge of my office as a symbol of public faith, and I accept it as a public trust to be held so long as I am true to the ethics of police service. I will never engage in acts of corruption or bribery, nor will I condone such acts by other police officers. I will cooperate with all legally authorized agencies and their representatives in the pursuit of justice.

I know that I alone am responsible for my own standard of professional performance and will take every reasonable opportunity to enhance and improve my level of knowledge and competence.

I will constantly strive to achieve these objectives and ideals, dedicating myself before God to my chosen profession . . . law enforcement.

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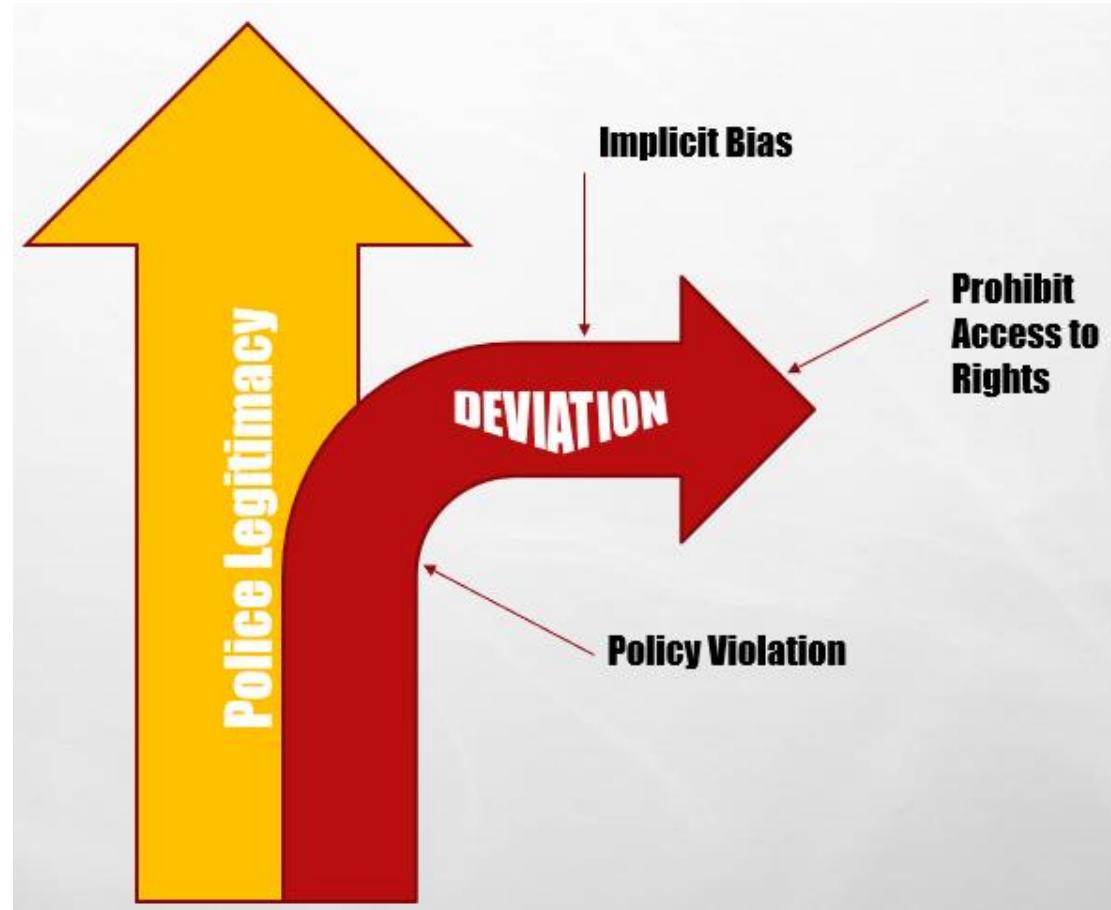


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Maintaining Police Legitimacy



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Avoid Mediocrity



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Michigan Police Chief Neglects The Constitution

CHULAVISTA POLICE CHIEF FIRED OVER CONFRONTATION



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The Dual Mindset Of A Police Officer



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MY AIM IS **TRUE**
BECAUSE I HAVE TRAINED IT

MY MIND IS **SHARP**
BECAUSE I HAVE HONED IT

MY BODY IS **HARD**
BECAUSE I HAVE PUSHED IT

I AM A **WARRIOR**
THROUGH MY SWEAT AND BLOOD

SURVIVE
the
STREETS

WWW.FACEBOOK.COM/SURVIVETHESTREET



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Guardian Mindset



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Procedural and Restorative Justice



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First and Fourth Amendments



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Furry Potato Audits Glendale PD

Furry Potato Arrested

NC TYRANT HUNTER



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Penal Code

148(g) PC

- The fact that a person takes a photograph or makes an audio or video recording of a public officer or peace officer, while the officer is in a public place or the person taking the photograph or making the recording is in a place he or she has the right to be, does not constitute, in and of itself, a violation of subdivision (a), nor does it constitute reasonable suspicion to detain the person or probable cause to arrest the person

69(b) PC

- The fact that a person takes a photograph or makes an audio or video recording of an executive officer, while the officer is in a public place or the person taking the photograph or making the recording is in a place he or she has the right to be, does not constitute, in and of itself, a violation of subdivision (a)



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Procedural Justice



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Restorative Justice “Dust Off”

- Department Members Should Work To Establish Best Practices To Work Collaboratively With The Community To Mitigate Complaints
- Allow Citizens To Review CFS On MDC (Absent CLETS Info) And/Or Have Dispatch Air Descriptions/Nature Of Call On Radio (Inquiry) – So The Citizen Hears The CFS Info
- Emphasize Mission Statement/Values As It Pertains To Transparency
- Work Through Potential Issues With Citizens Before Leaving The Scene
- Debrief Incidents Internally



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Bias-Based Policing



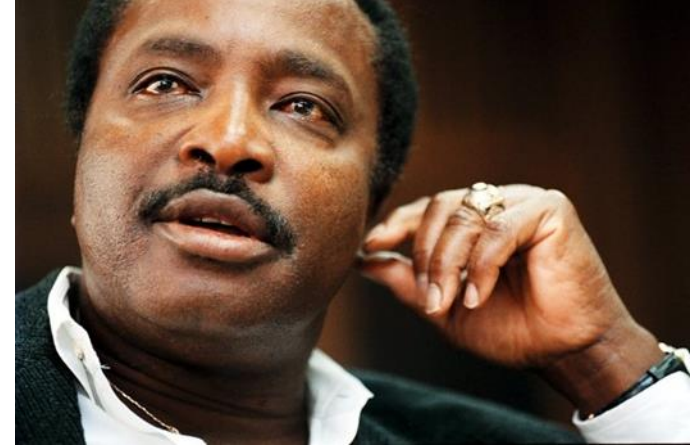
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Implicit Bias & Bias-Based Policing

- Unconscious Attitudes And Stereotypes We Hold Against Others Regarding Race, Gender, Sexuality, Religion, Etc.
- Are You On Probation Or Parole? East/West
- Can You Ask In A Different Manner?
- Sir/Ma'am, Are You Obligate To Report Any Police Contact To Anyone?
- Or Simply Make A Records Check

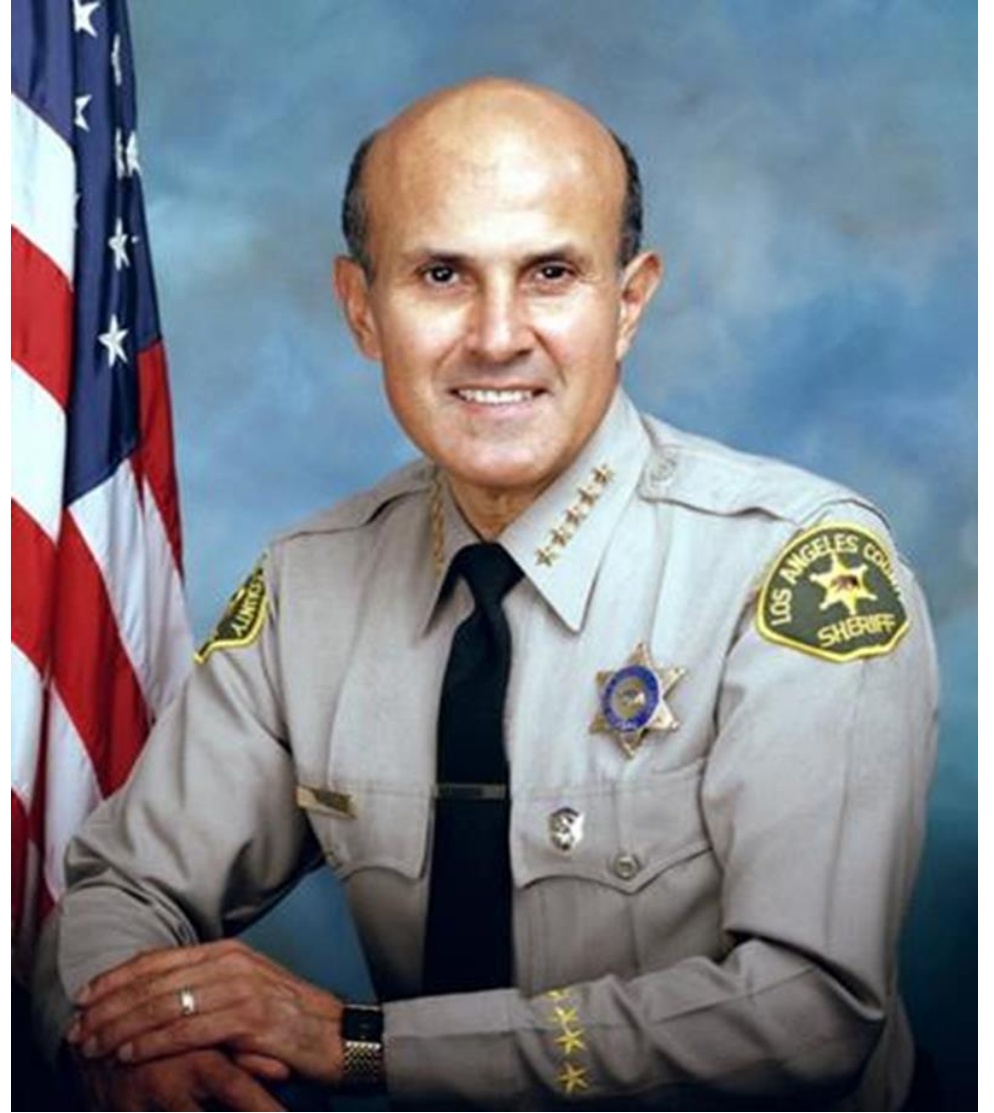


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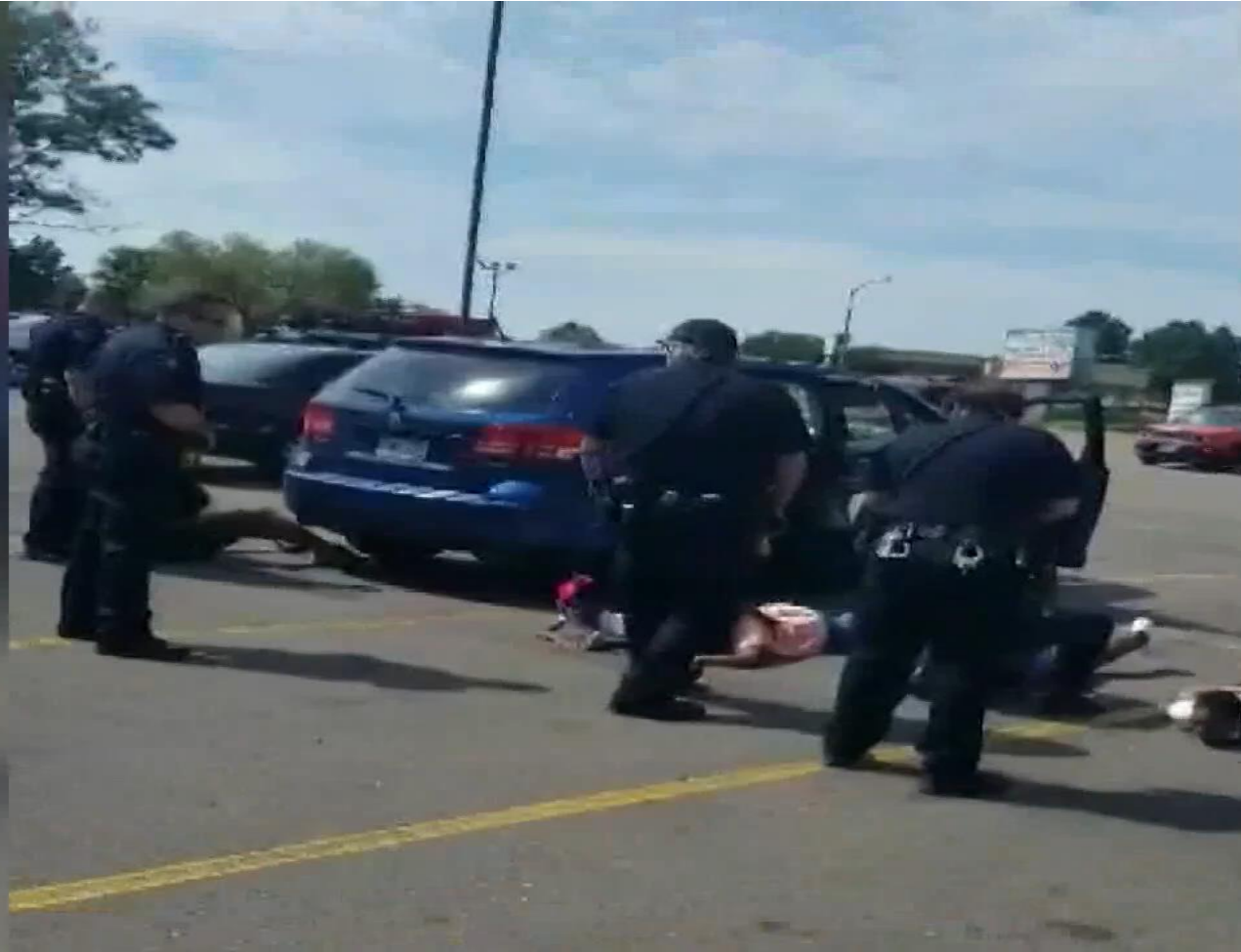
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Use Of Force On Innocent People

9news.com

JENNIFER WURTZ



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Bias-Based Policing



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Cultural Competency – Perception is Reality

abc10.com



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Texas Officers Create A Sub-Culture

GRAPHIC LANGUAGE



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Where Does This Fit On The Police Legitimacy/Deviation Scale



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La Mesa PD Incident



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RENO Bias



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How Many Of Us Are Willing To Die For The Deviation Of Another Officer?

MY BROTHER'S KEEPER

MBK



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YouTube Music



Social Media



**Be Vigilant About Your Social Media Posts,
Likes And Friendings's.**



Remember Your LECO



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Policy 1057 – Employee Speech, Expression And Social Networking

1057.2 POLICY

Public employees occupy a trusted position in the community, and thus, their statements have the potential to contravene the policies and performance of this department. Due to the nature of the work and influence associated with the law enforcement profession, it is necessary that employees of this department be subject to certain reasonable limitations on their speech and expression. To achieve its mission and efficiently provide service to the public, the Chula Vista Police Department will carefully balance the individual employee's rights against the Department's needs and interests when exercising a reasonable degree of control over its employees' speech and expression.



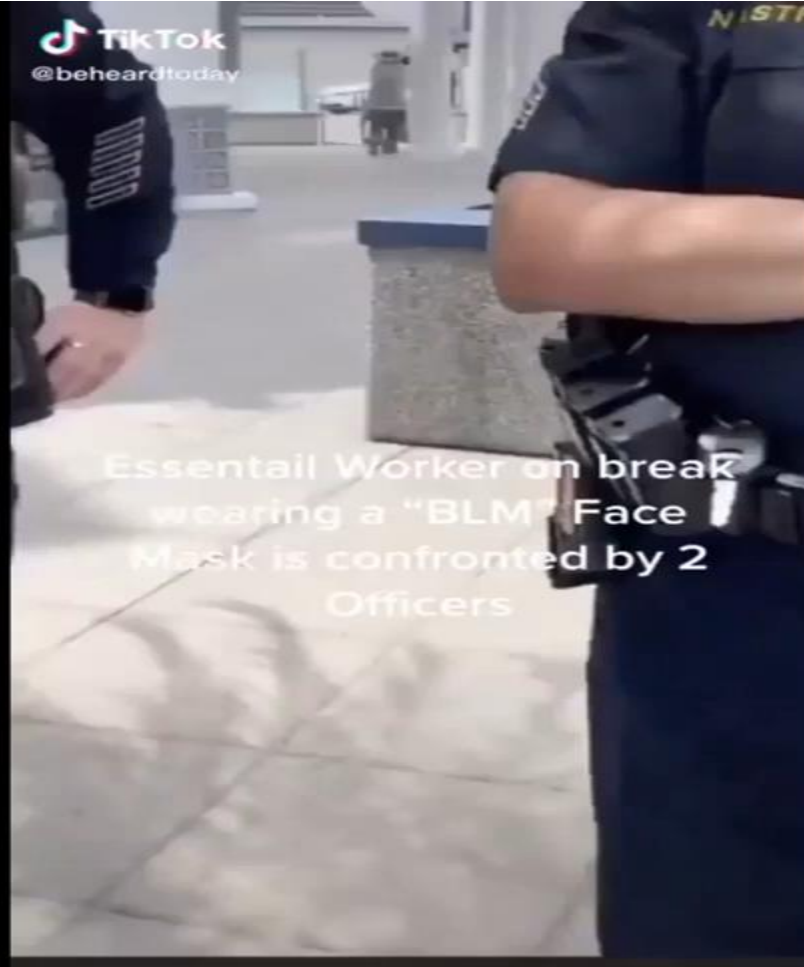
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Does This Support The Mission Statement?



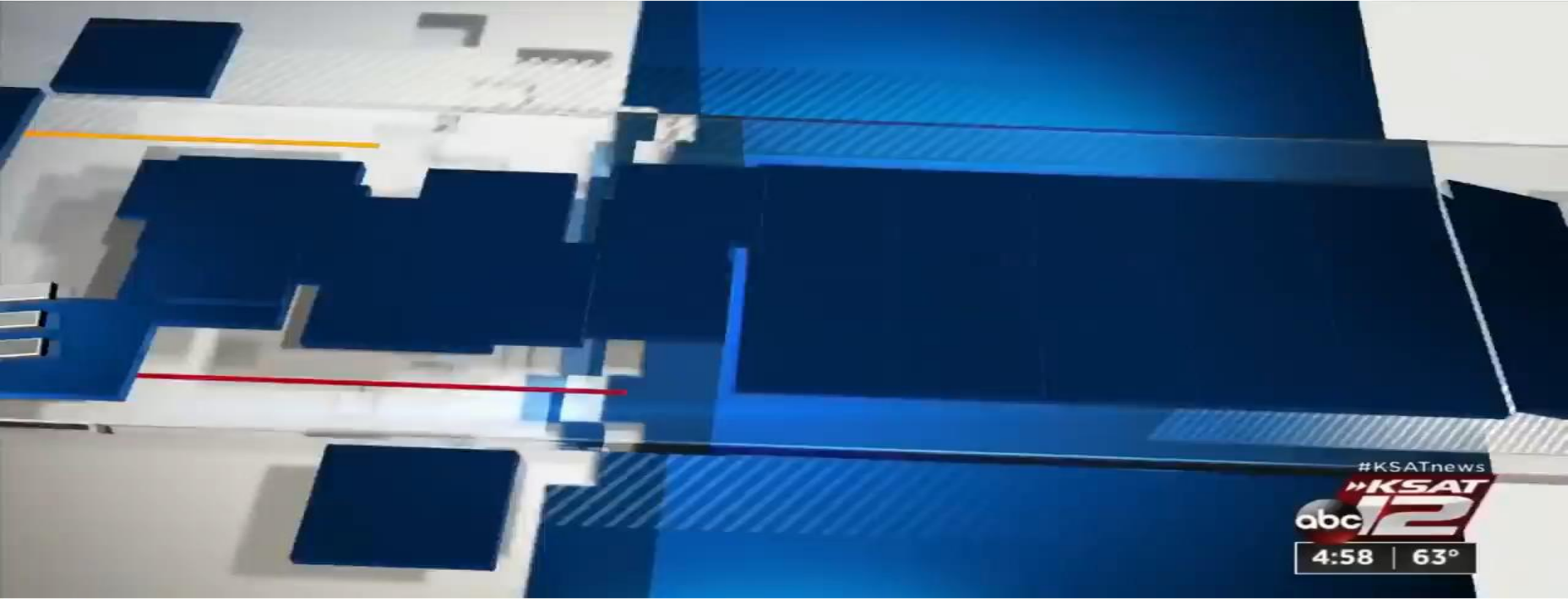
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Do Her Actions Support The Oath Of Office and LECOFE?



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Does This Cross The Line Between Good PR and Inappropriate Behavior?



WEATHER CLERMONT TODAY 88° | TUE 89° | WED 90°

5:14 | 86°



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Do You Want To Make Chief Kennedy Publicly Apologize For Your Actions?



MARIA ARCEGA-DUNN
@FOX5NEWSLD

FOX 5
4:01 | 78°

THE PADRES WILL HOST THE ST. LOUIS CARDINALS ON WEDNESDAY FOR C HEADLINES



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Policy 340 – Standards Of Conduct

- 340.6.9(m) Conduct – Any Other On Or Off Duty Conduct Which Any Member Knows Or Reasonably Should Know Is Unbecoming A Member Of This Department, Is Contrary To Good Order, Efficiency Or Morale, Or Tends To Reflect Unfavorably Upon This Department Or Its Members

“CUBO”

Conduct Unbecoming Of An Officer



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Qualified Immunity



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Officer Wellness

- Communication-
 - Tell you supervisor you need relief
 - Talking radio codes at home
- Peer Support-
- Employee Assistance Program (EAP)
- Psychological Services
- Your health plan
- Routine exercise



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Additional Resources

Game Changer

<https://gamechanger1.org>

National Conflict Resolution
Center

<https://www.ncrconline.com>

San Diego County District Attorney

Cultural Awareness Project Smartphone
Application



National University

[BUILDING OUR TEAM THROUGH COMMUNITY
POLICING | NATIONAL UNIVERSITY \(NU.EDU\)](https://www.nu.edu)

[CARING FOR THE CARETAKERS:
ORGANIZATIONAL WELLNESS FOR LAW
ENFORCEMENT | NATIONAL UNIVERSITY
\(NU.EDU\)](https://www.nu.edu)



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WWCKD

What
Would
Chief Kennedy
Do?



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