



COMPLEXITY
SCIENCE
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Crime and Complex Systems

Rafael Prieto Curiel

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17 May 2023





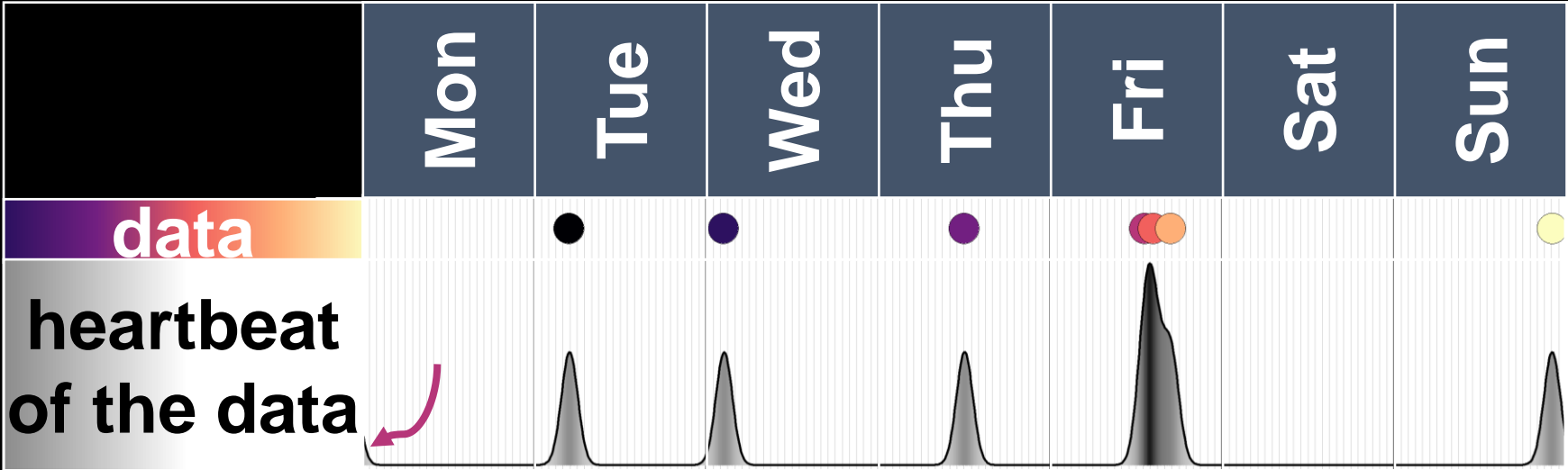


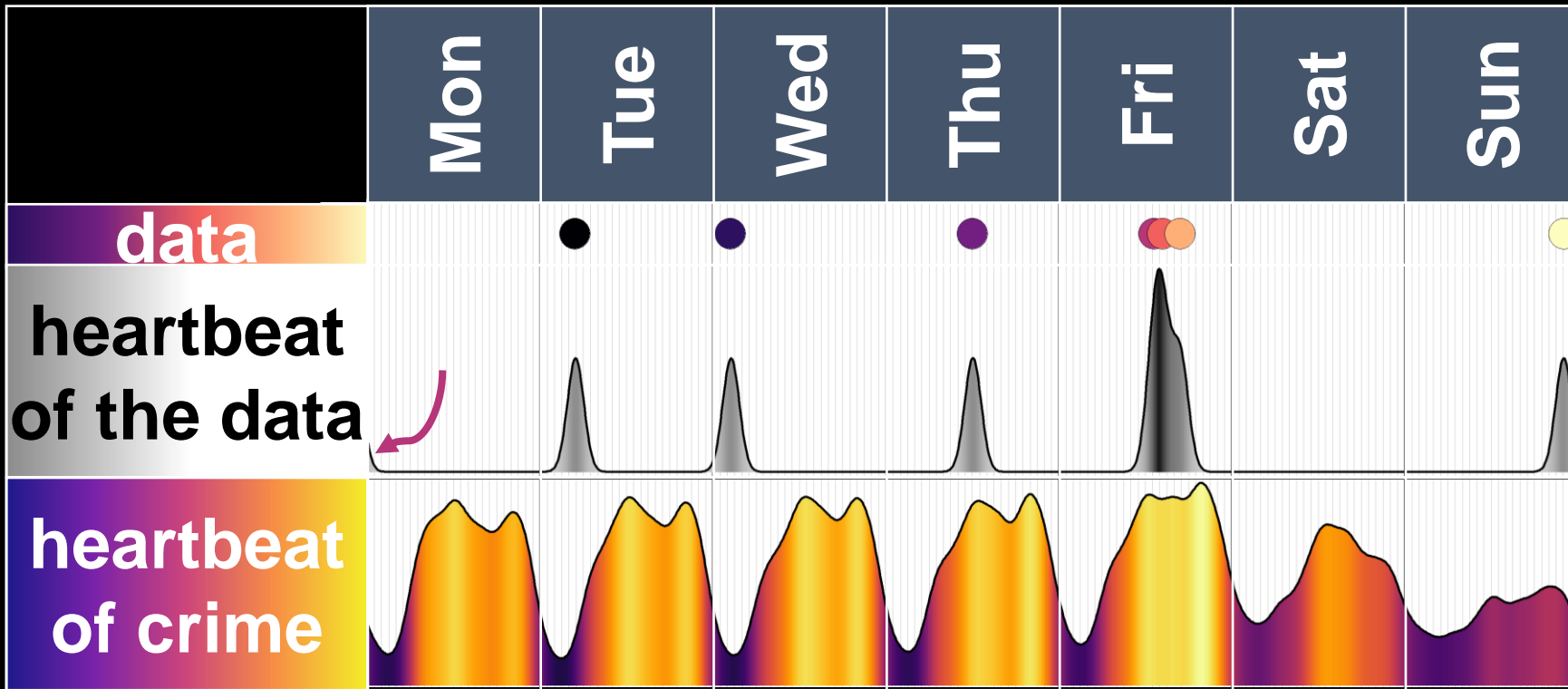


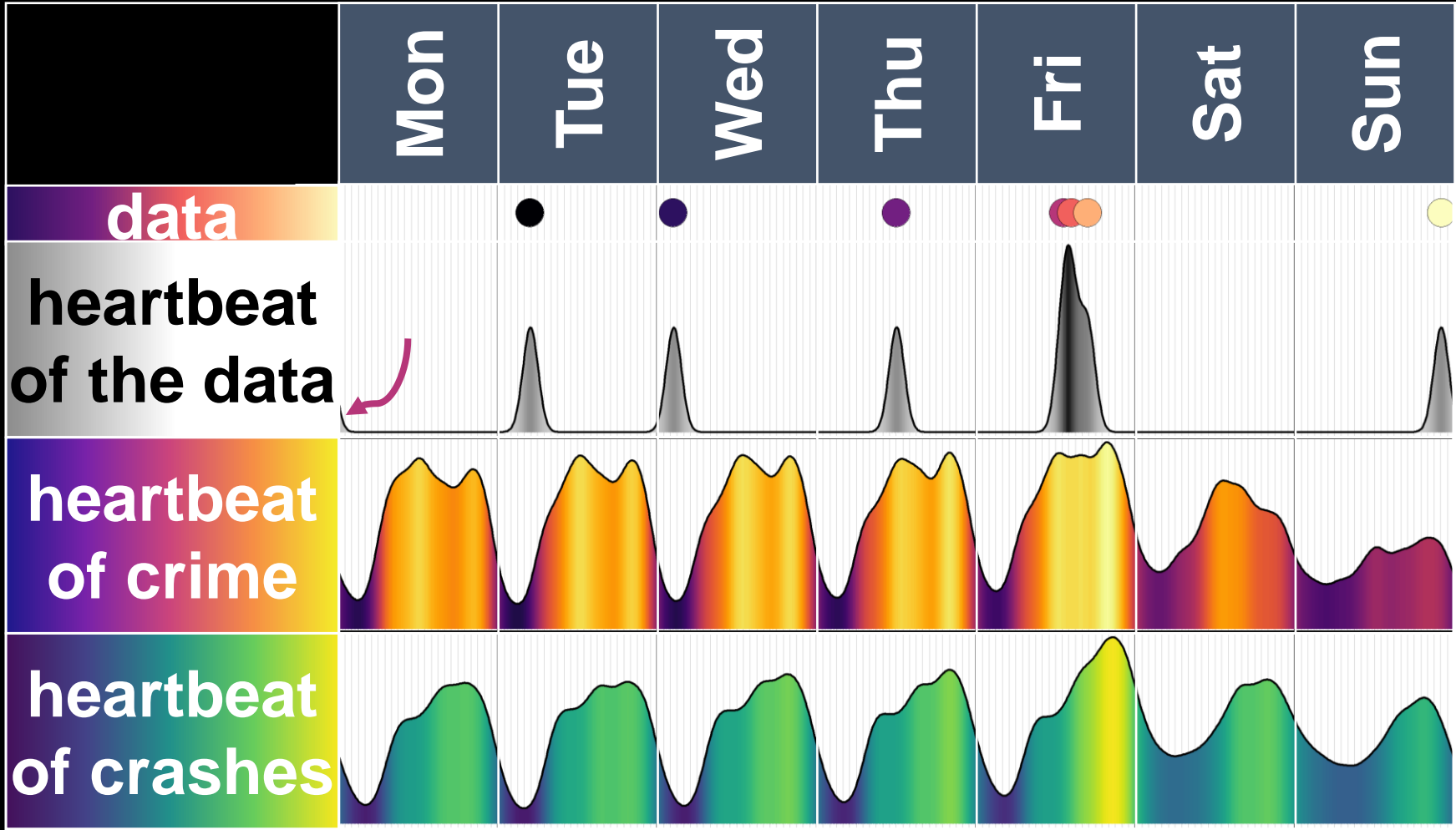


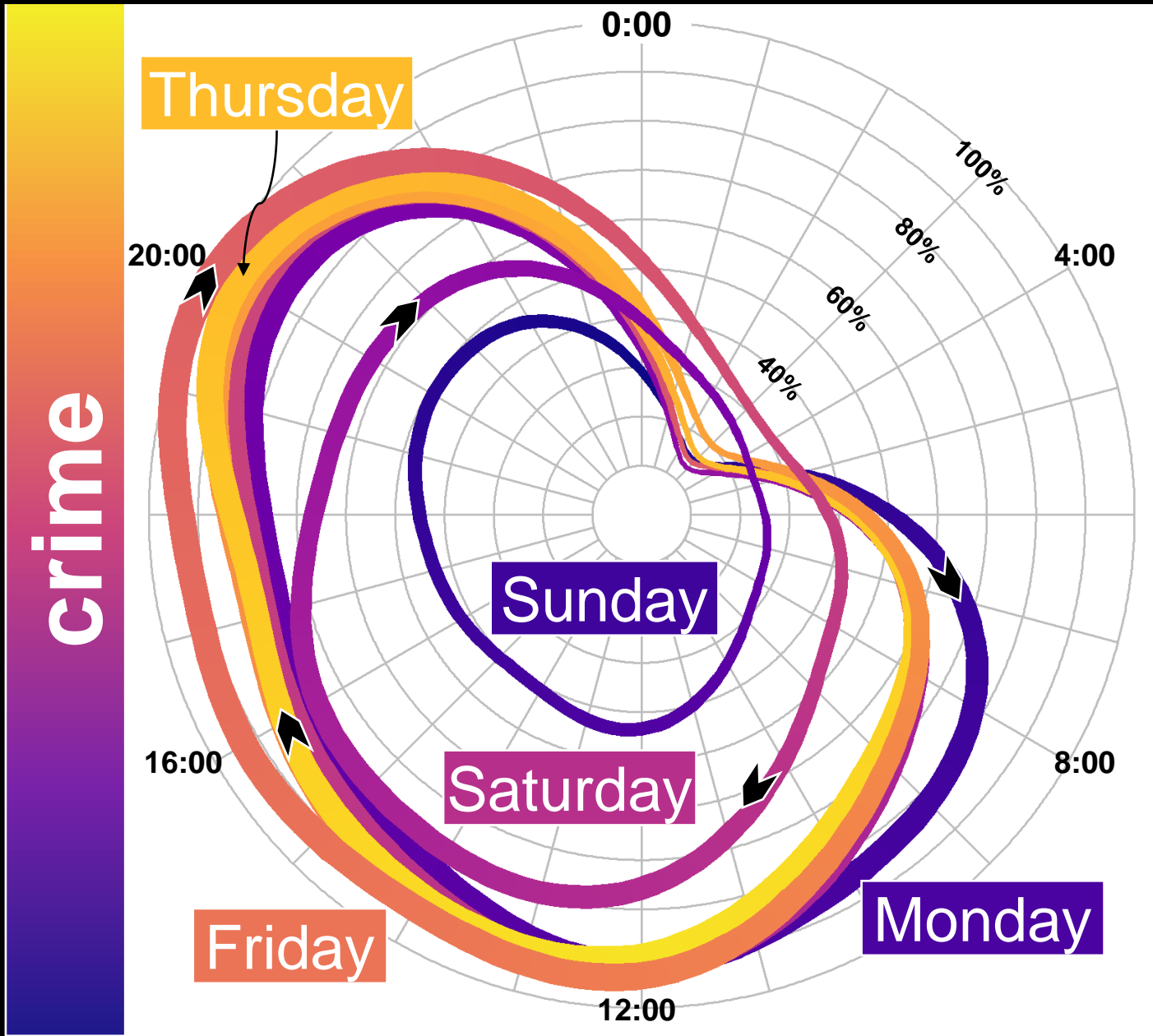


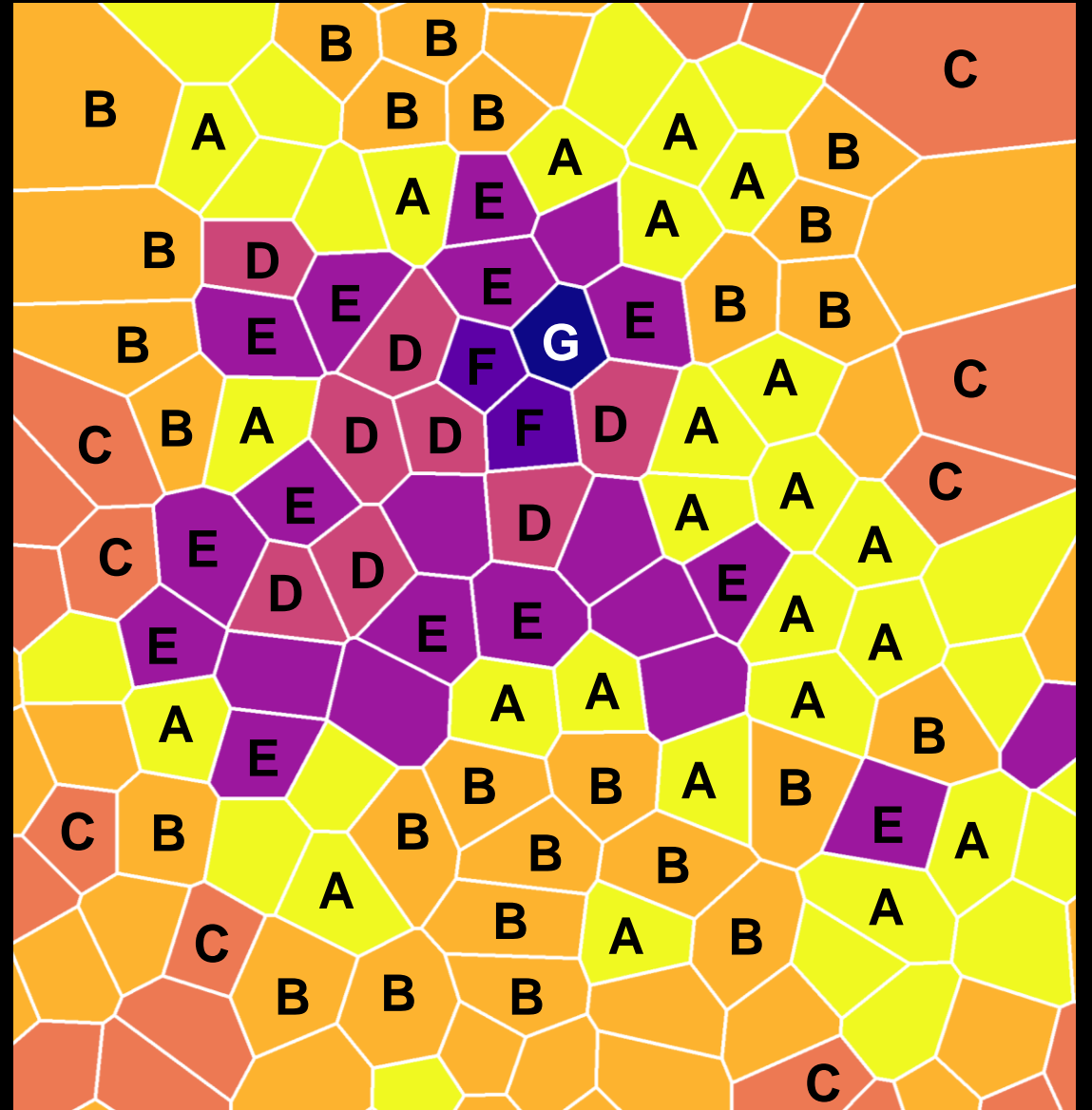
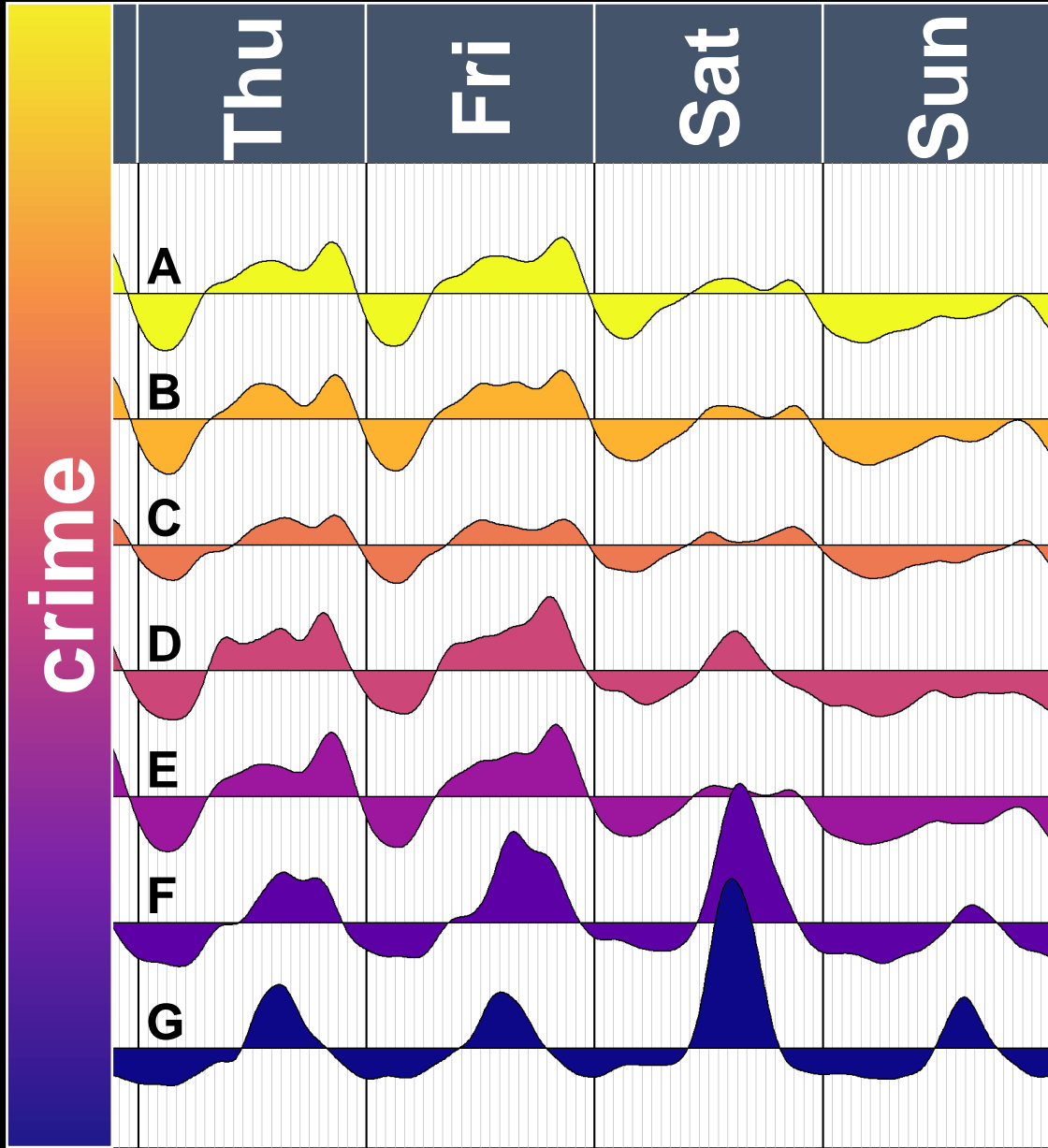
Spatial and temporal patterns of crime

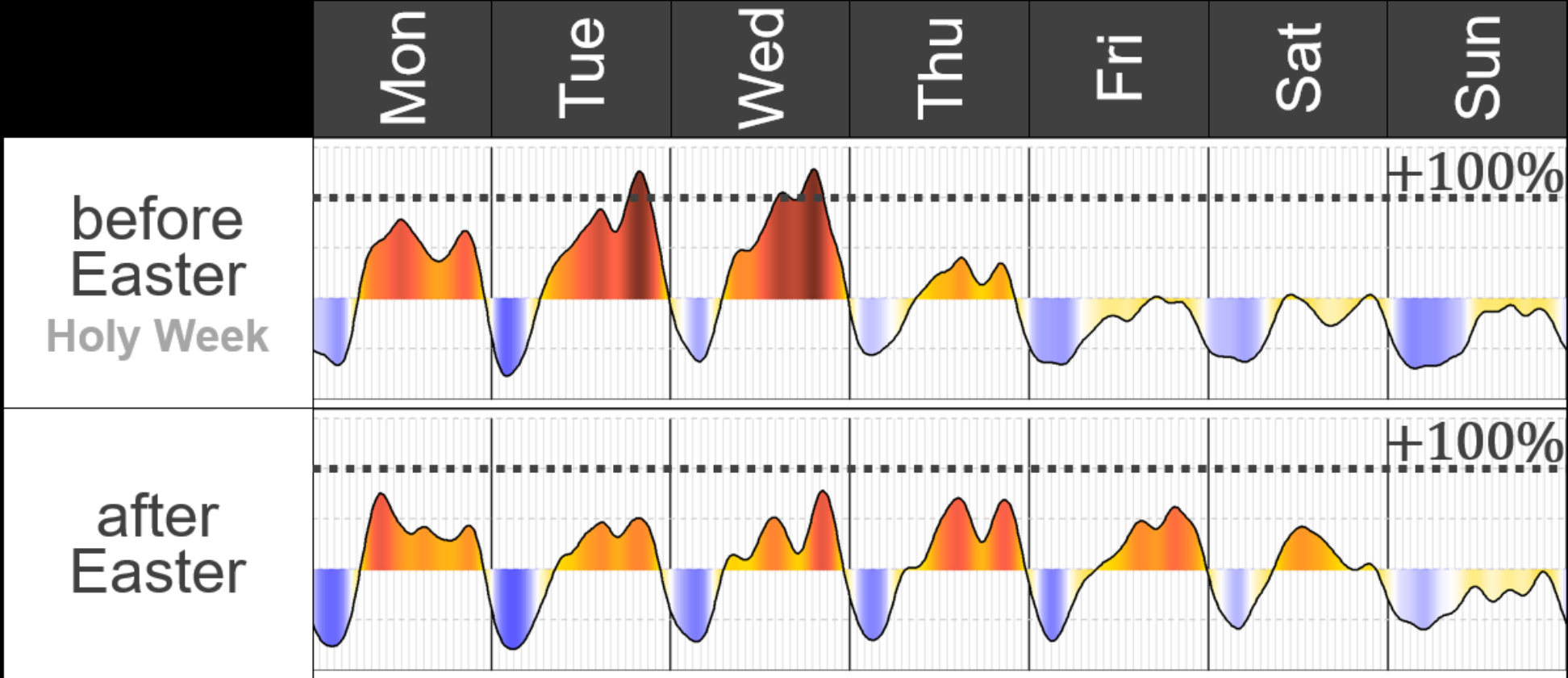












RESEARCH ARTICLE

The heartbeat of the city

Rafael Prieto Curiel^{1*}, Jorge Eduardo Patino², Juan Carlos Duque², Neave O'Clery¹

1 Centre for Advanced Spatial Analysis, University College London, London, United Kingdom, **2** Research in Spatial Economics, Universidad EAFIT, Medellín, Antioquia, Colombia

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ORIGINAL PAPER

Weekly Crime Concentration

Rafael Prieto Curiel¹

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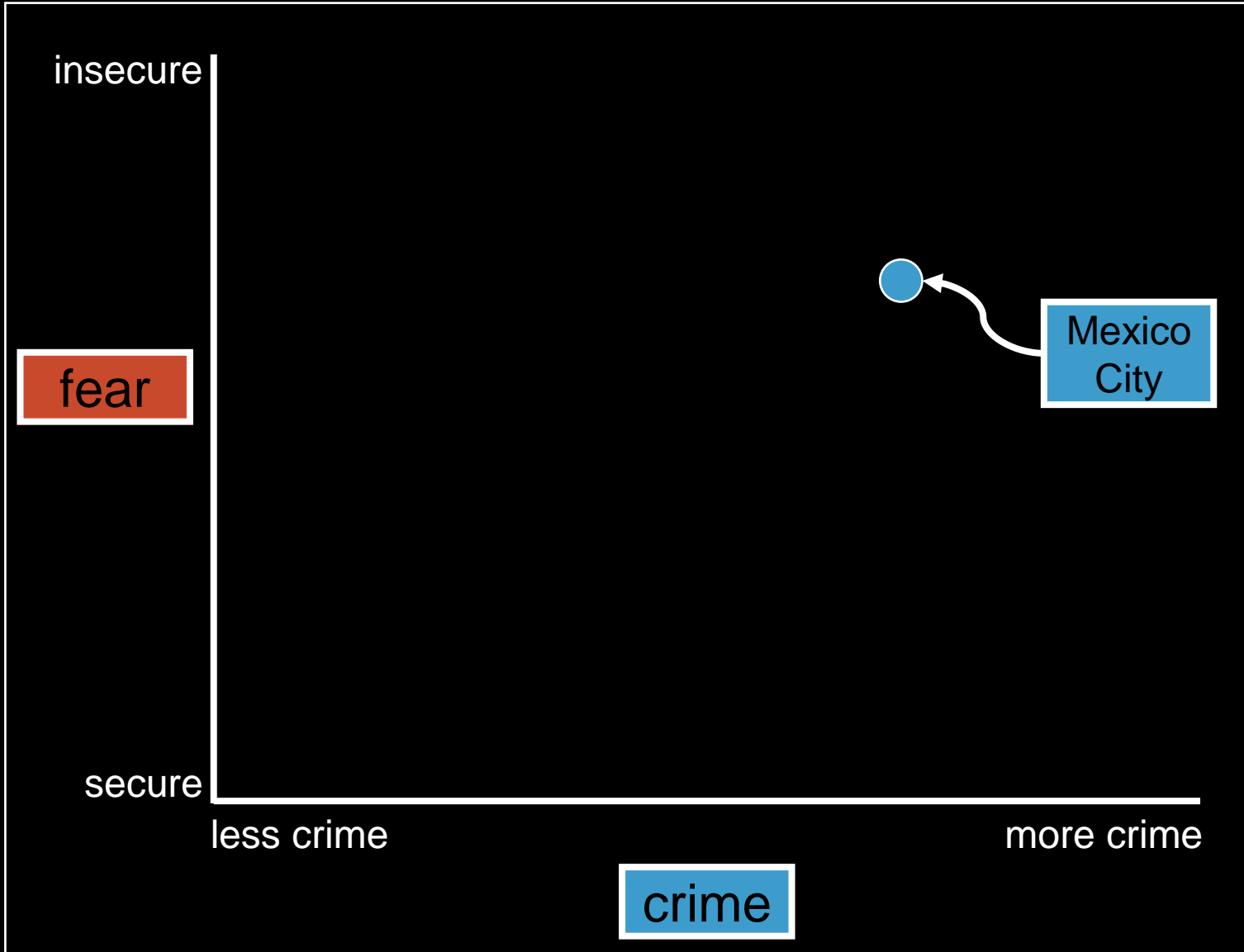
How to identify a criminal suspect?

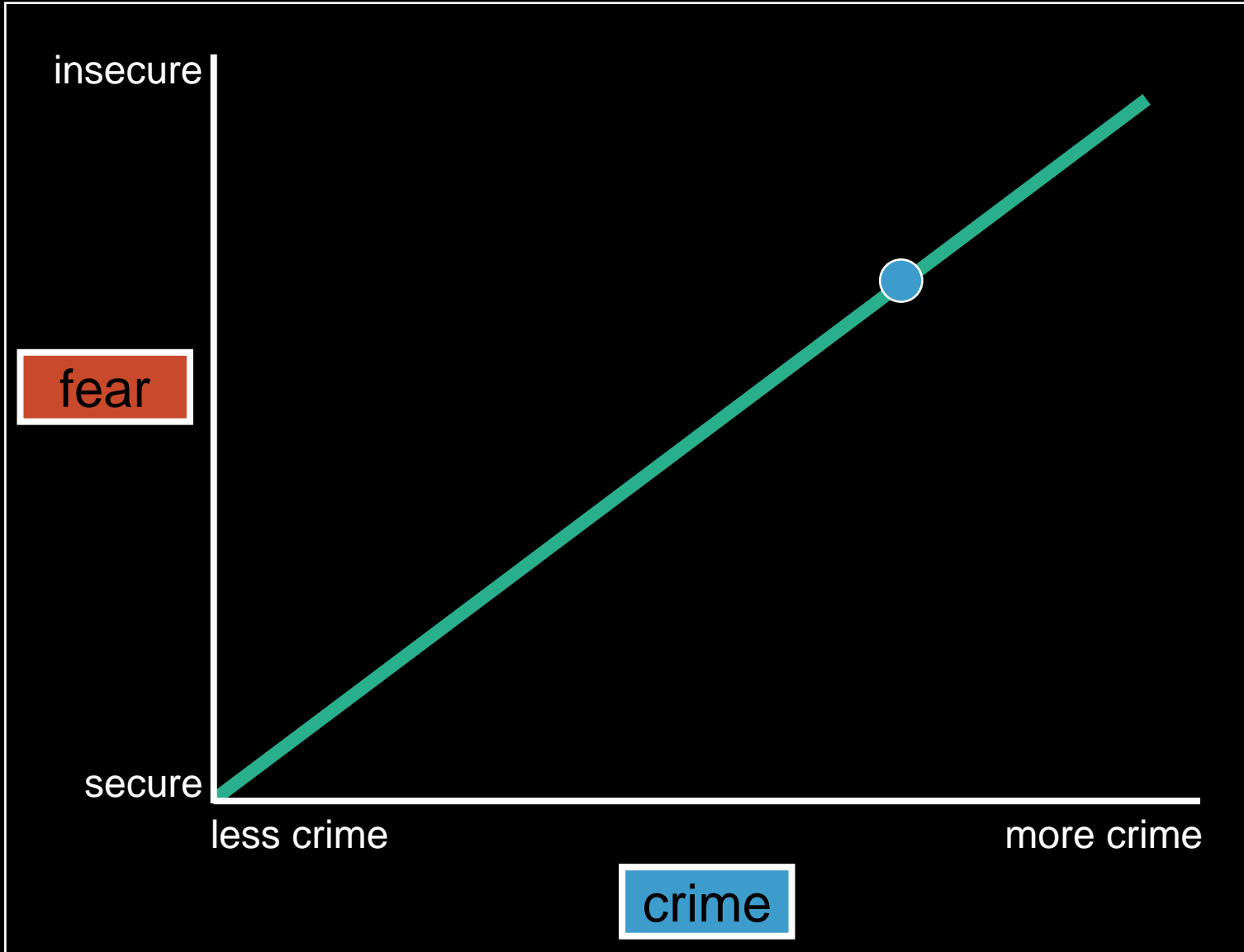


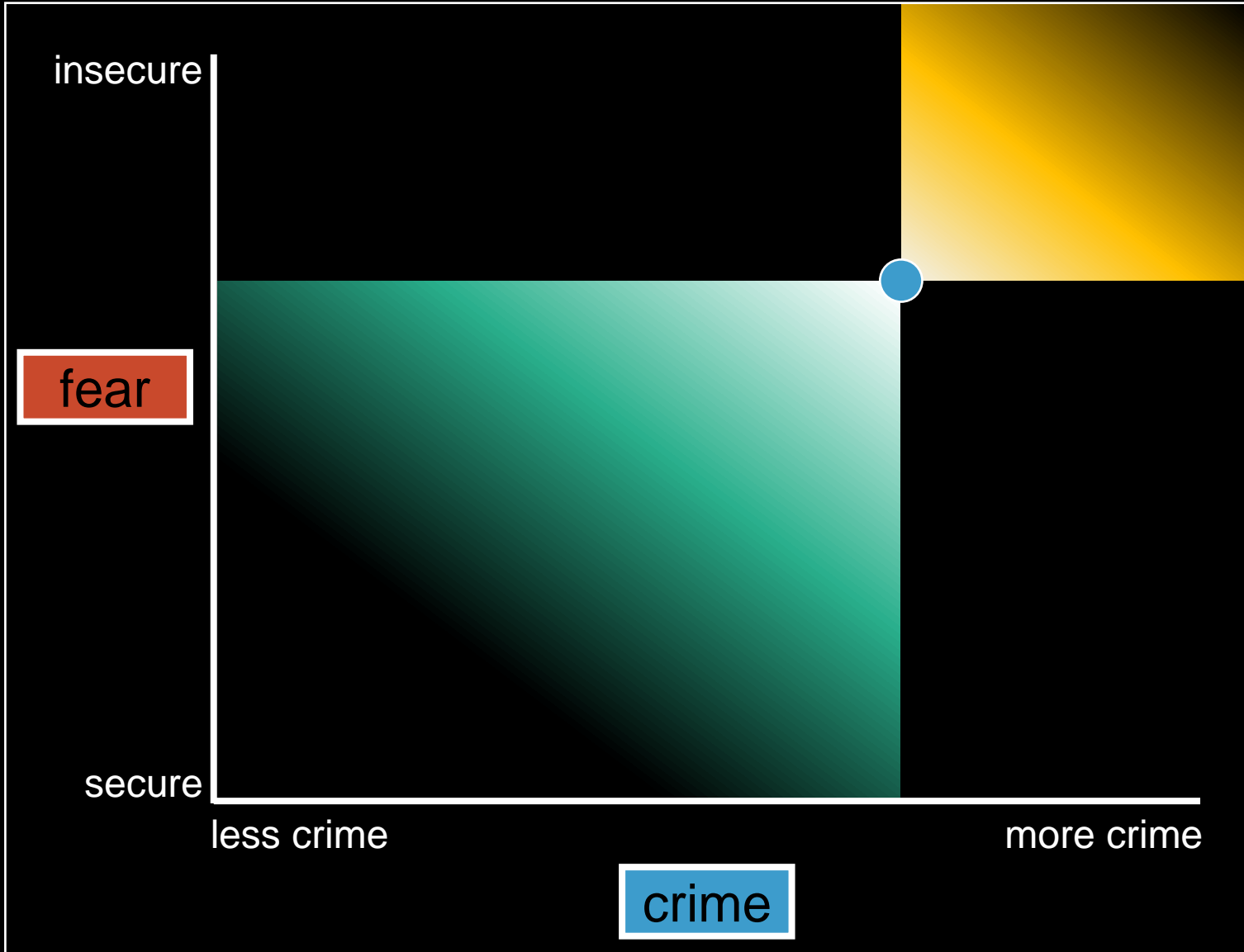
How to identify a criminal suspect?

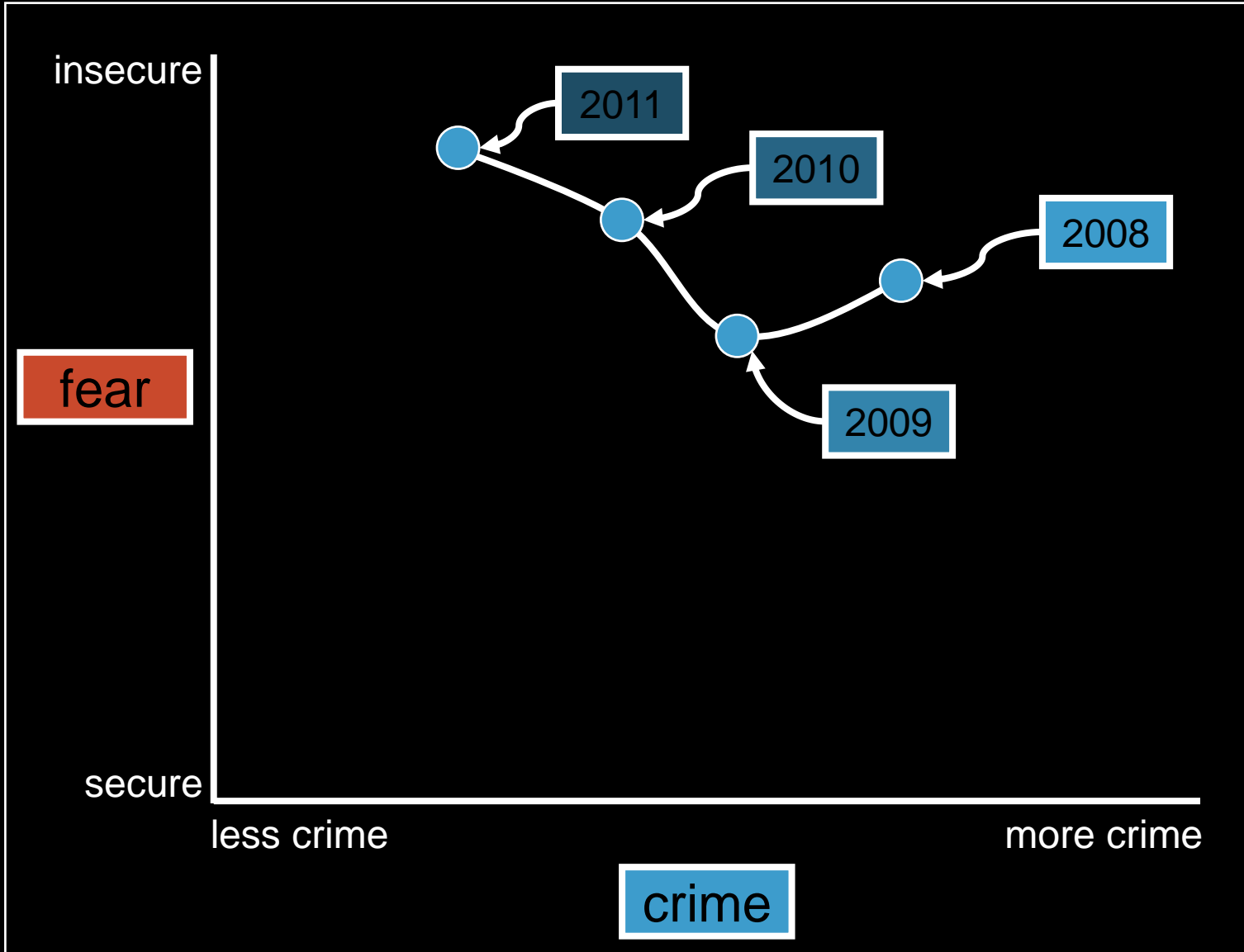


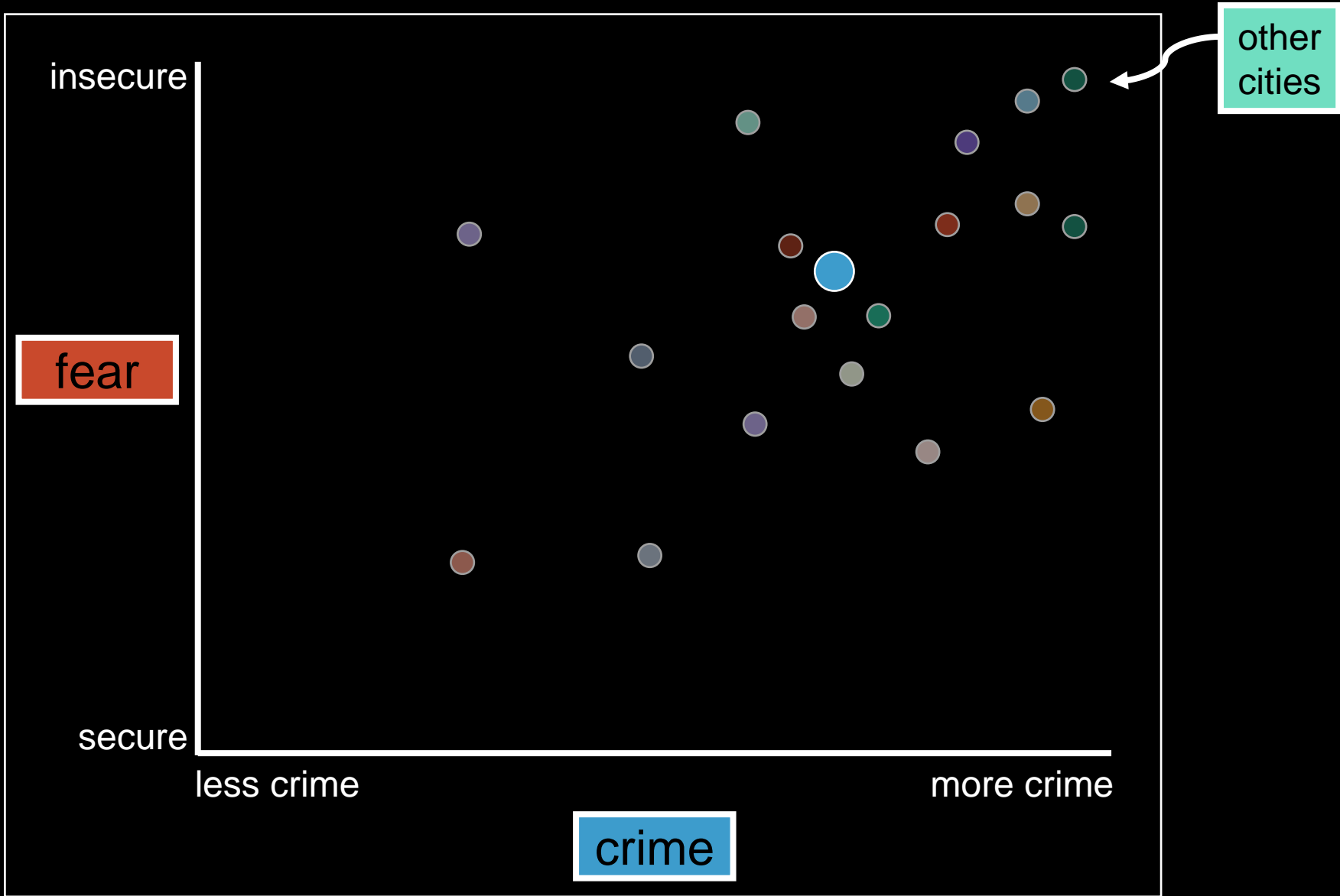
Fear of crime is the problem

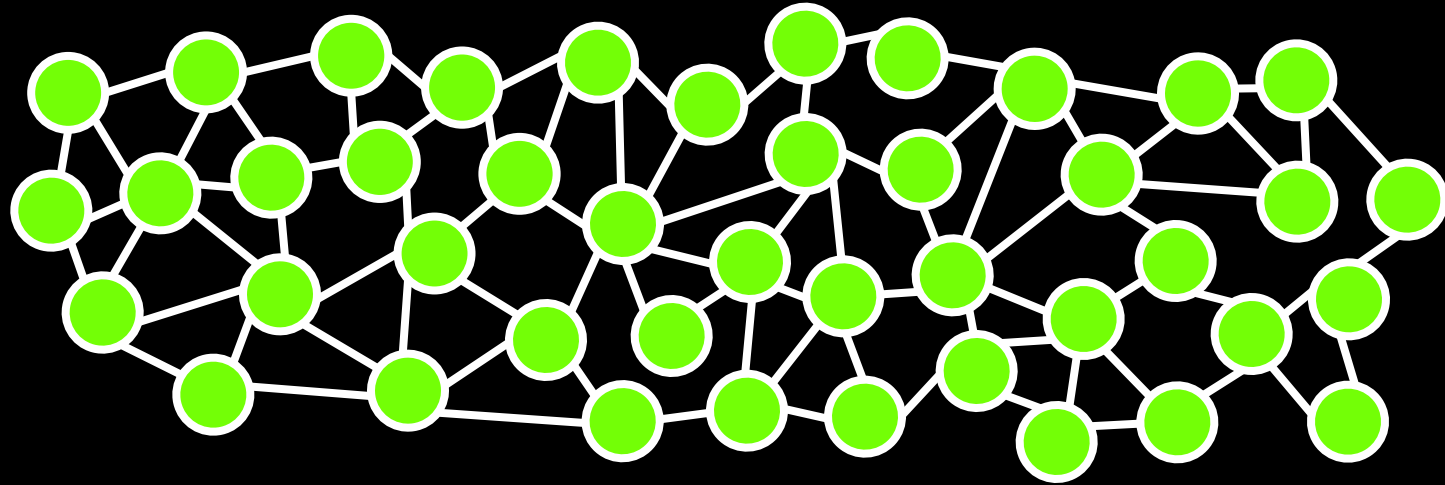


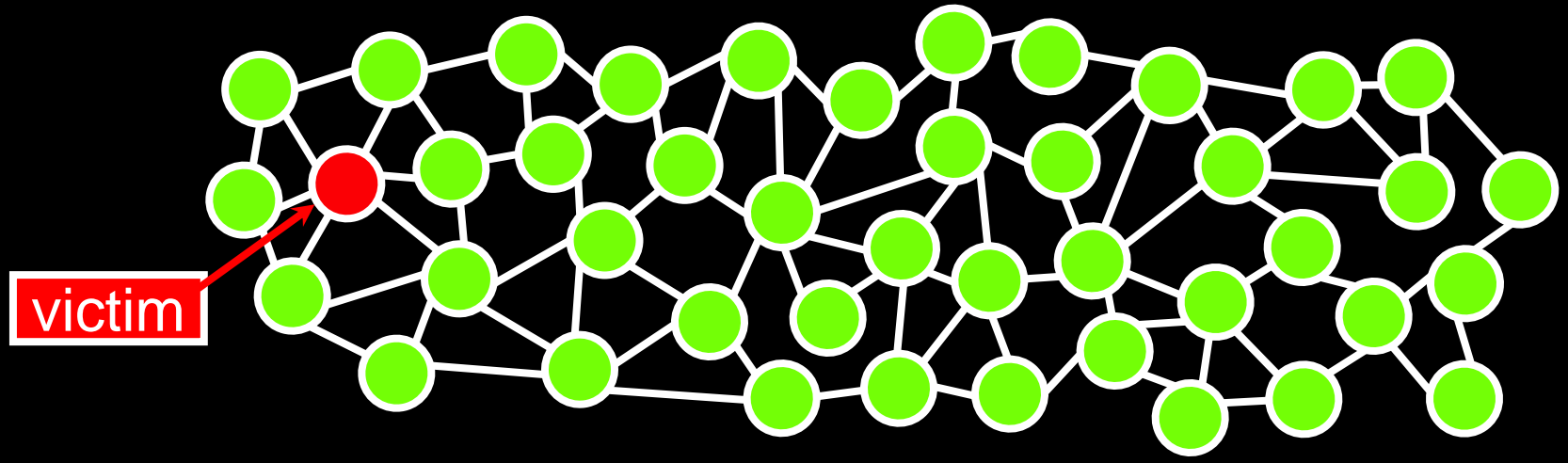


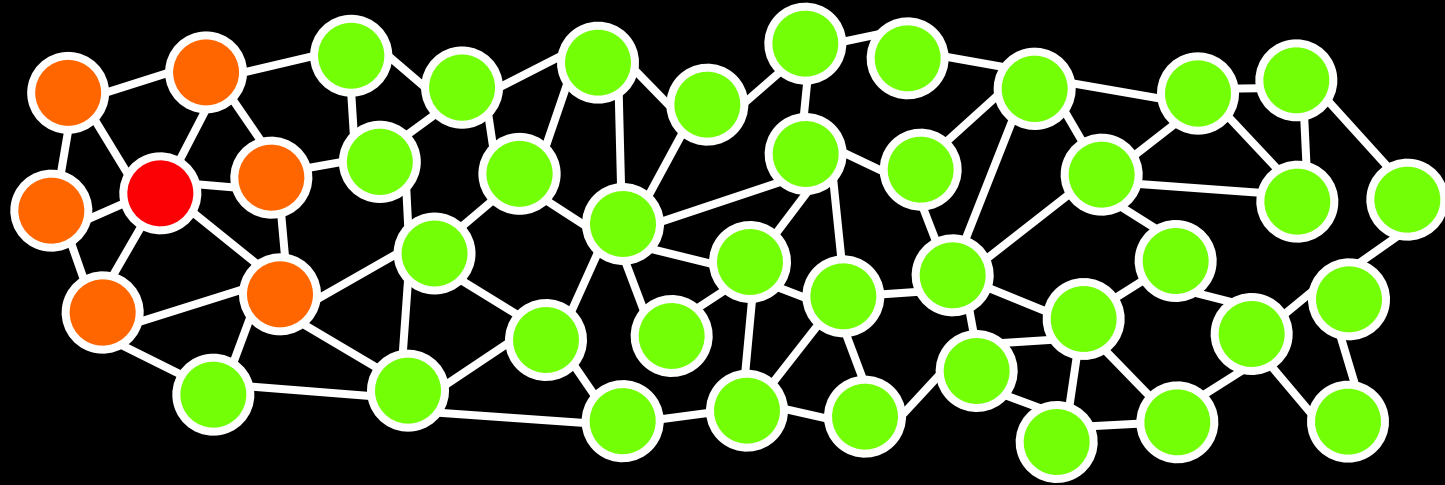


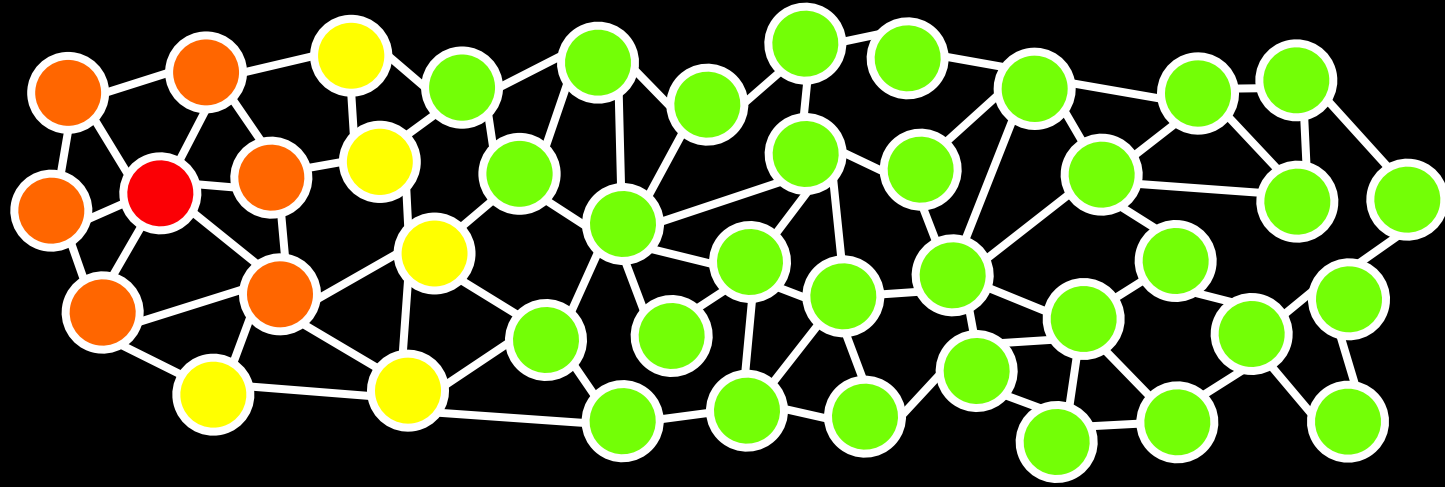


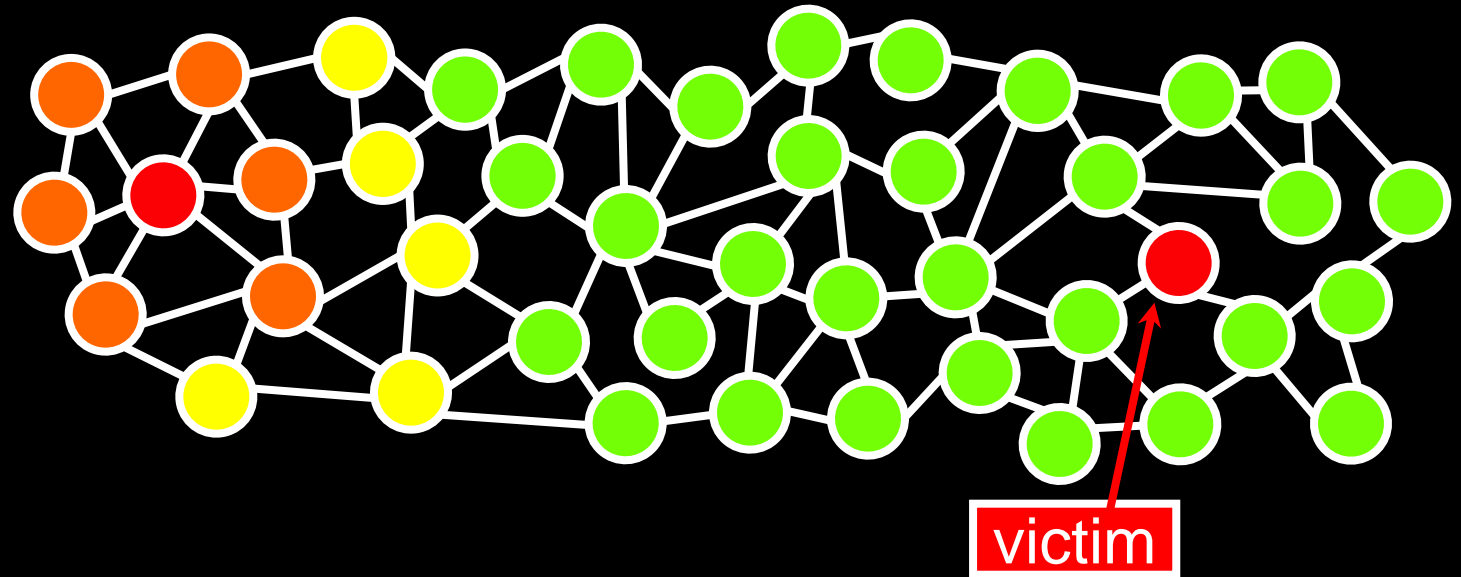


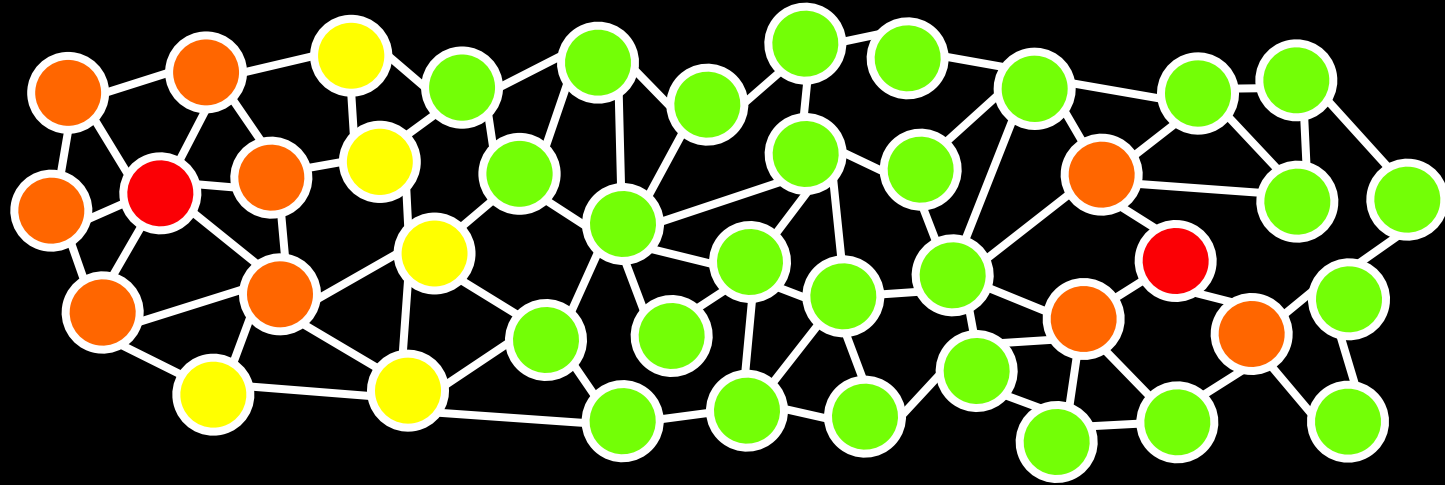


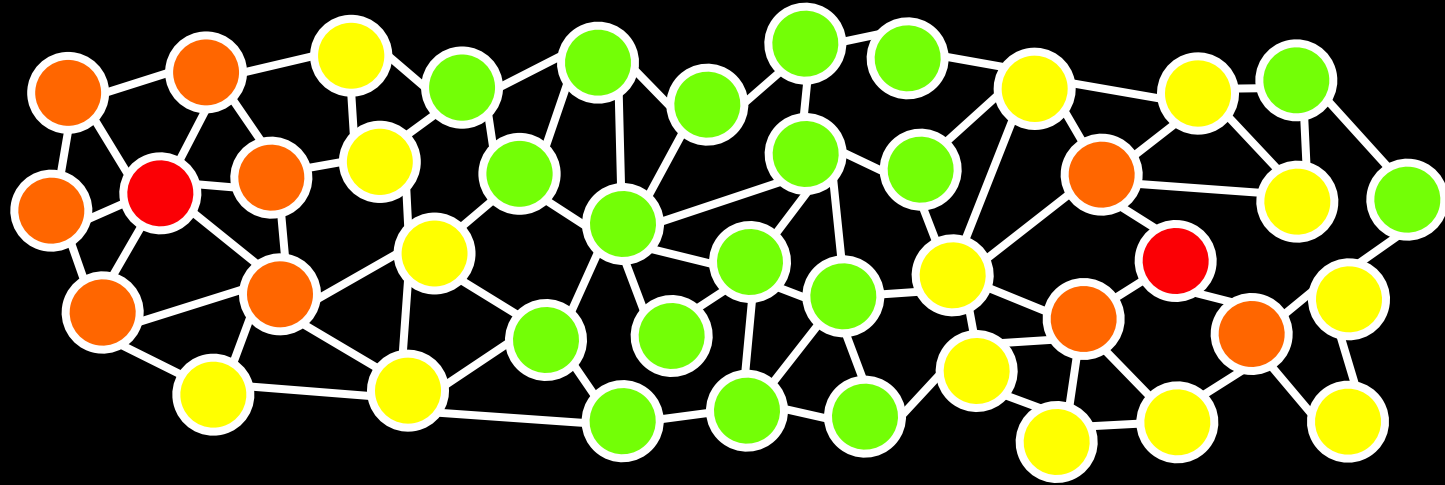


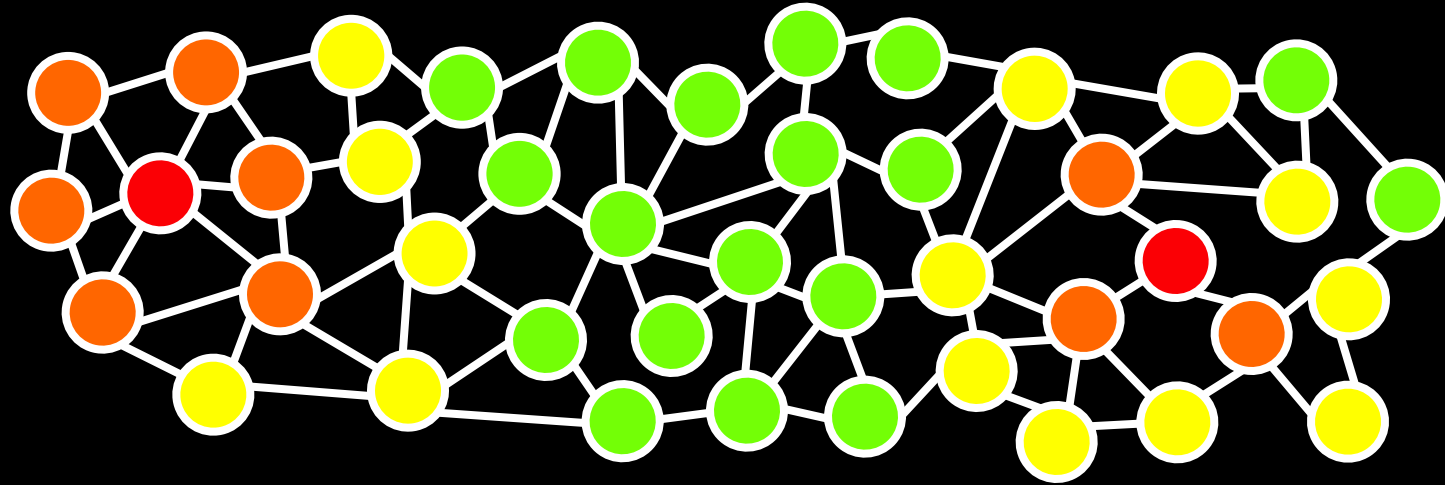




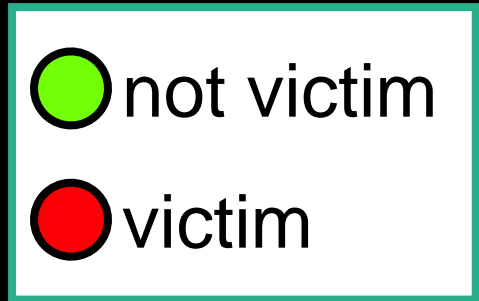


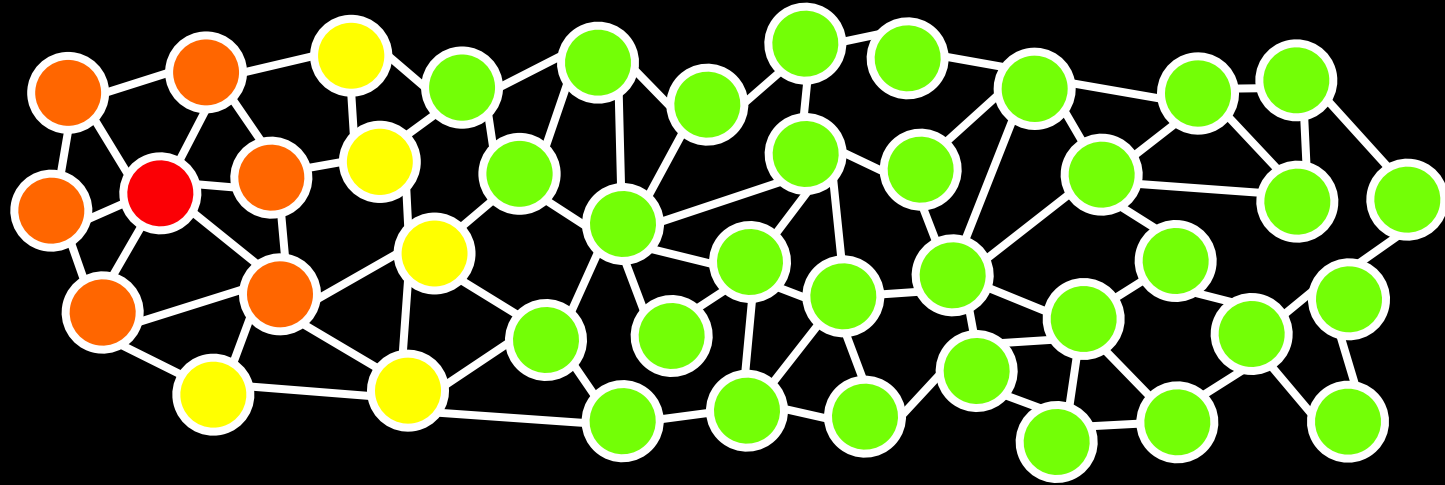


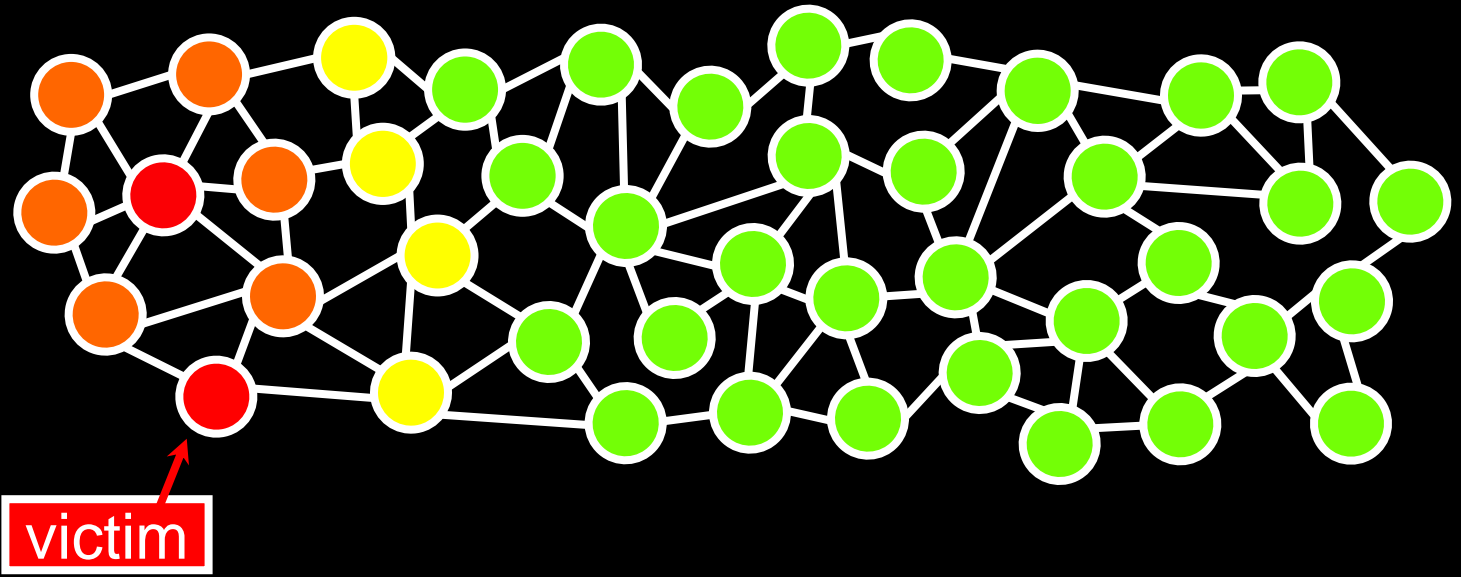


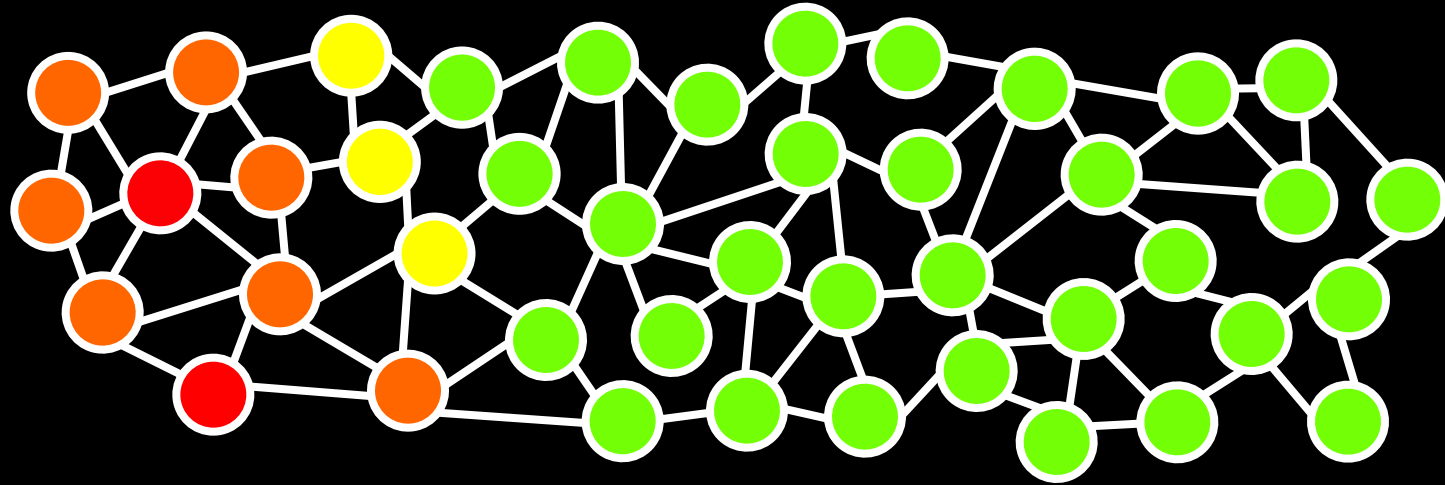


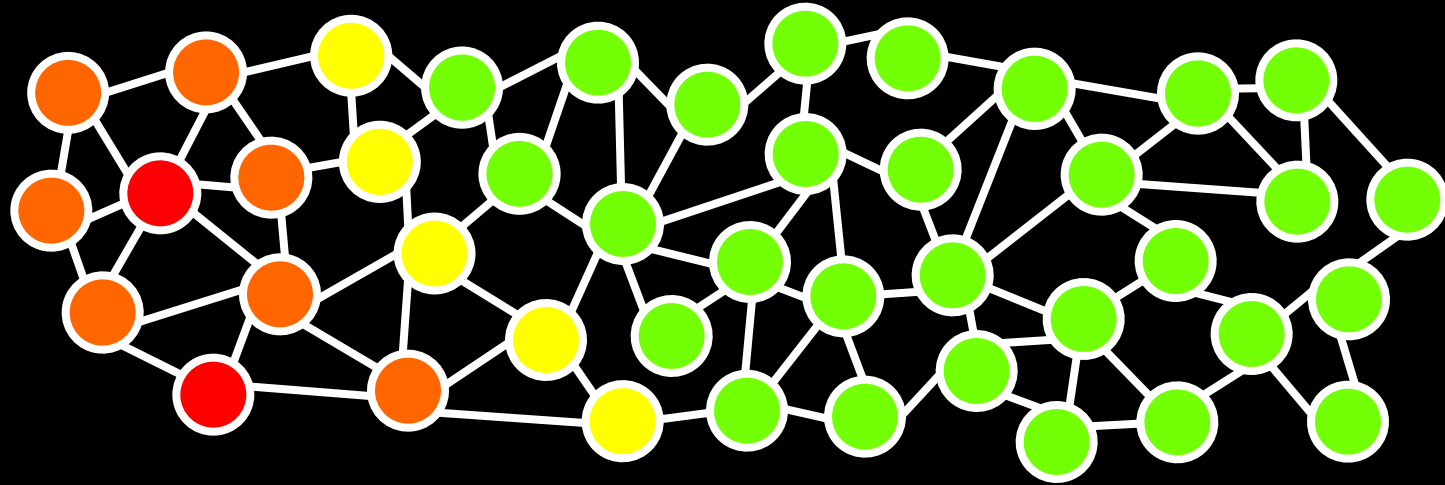
mean fear

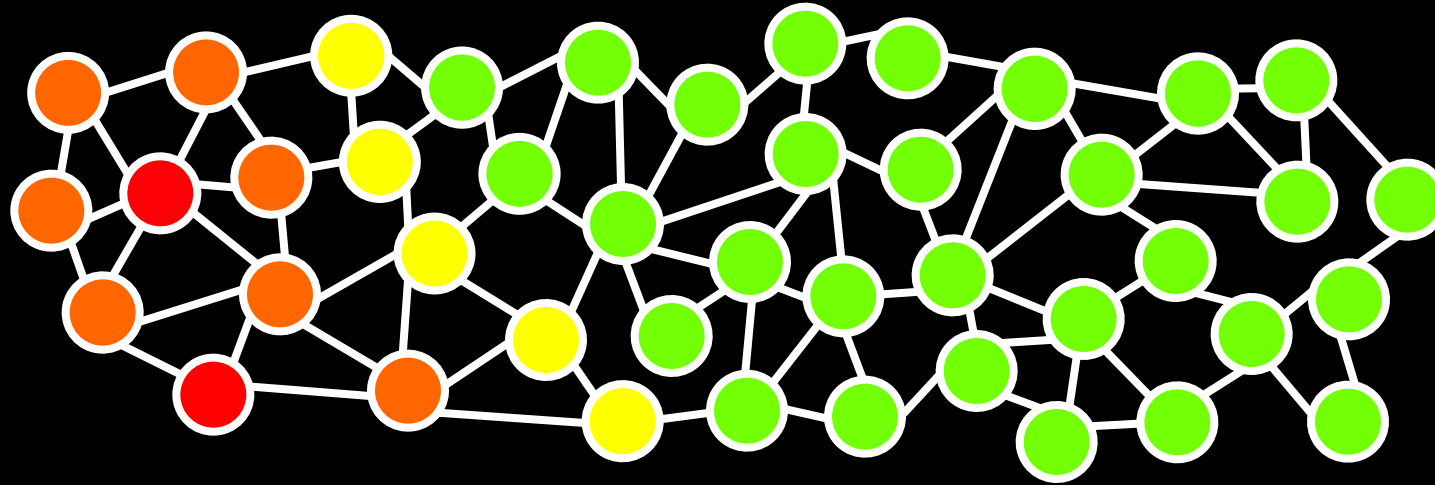






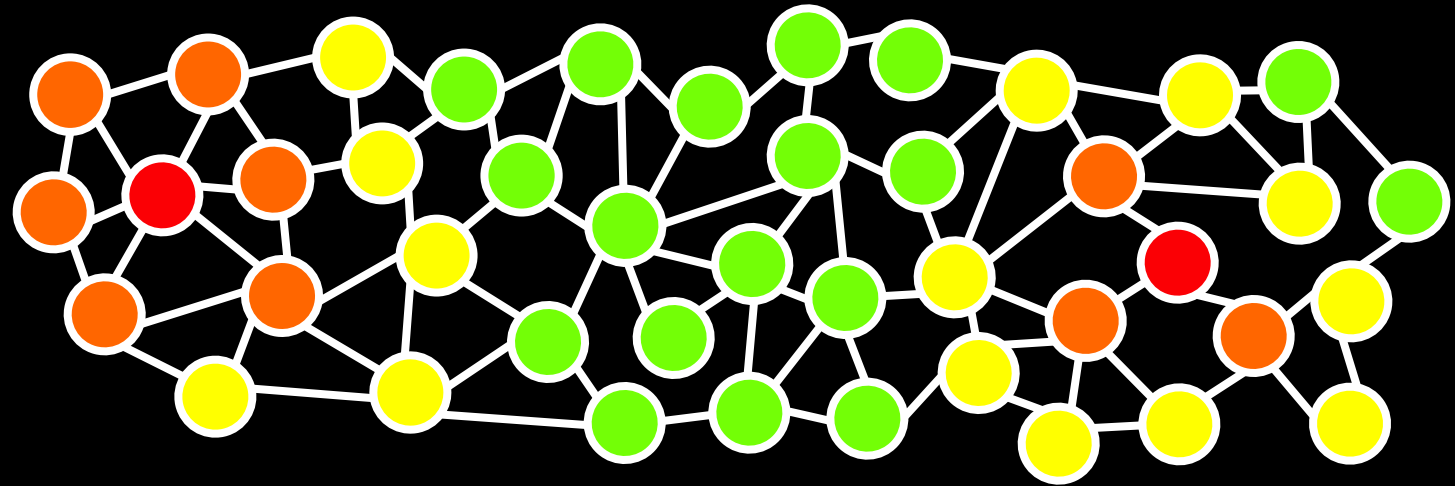




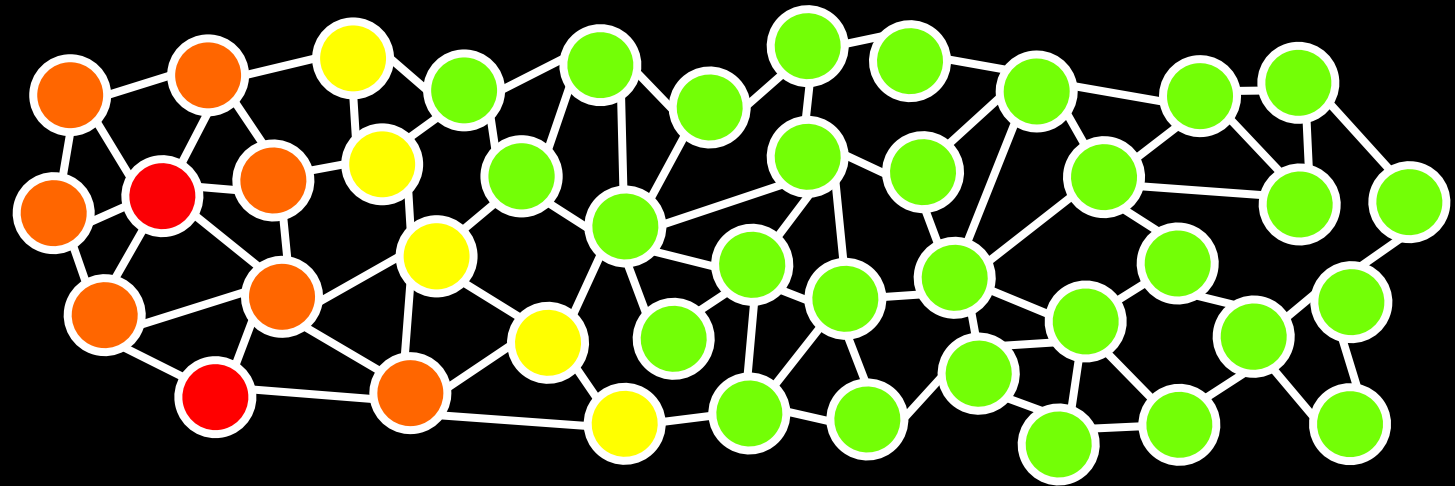


mean fear





mean fear



mean fear

Mathematical model of the fear

fear of crime



secure

insecure

fear of crime s_k



0

1

initial perception

updated perception

initial perception s_k^t

suffered crime ?

YES

NO

victims
 $s_k^{t+1} = 1$

memory decay
 $s_k^{t+1} = \psi s_k^t$
with $\psi < 1$

fearful ($s_j^t > s_k^t$)
 $s_k^{t+1} = s_k^t + \nu(s_j^t - s_k^t)$
with $0 < \nu < 1$

fearless ($s_j^t < s_k^t$)
 $s_k^{t+1} = s_k^t + \mu(s_j^t - s_k^t)$
with $0 < \mu < \nu < 1$

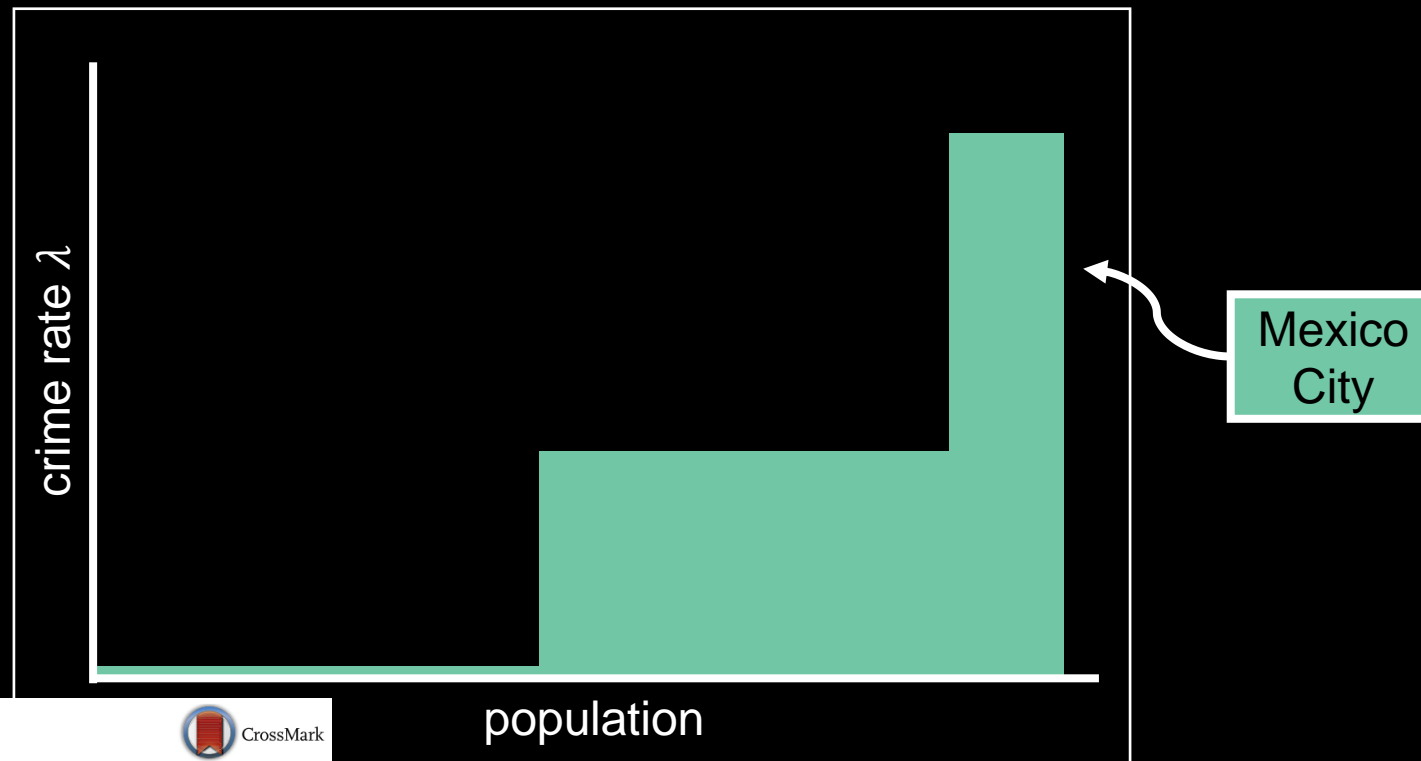


interaction with j ?



Simulate crime and social interactions

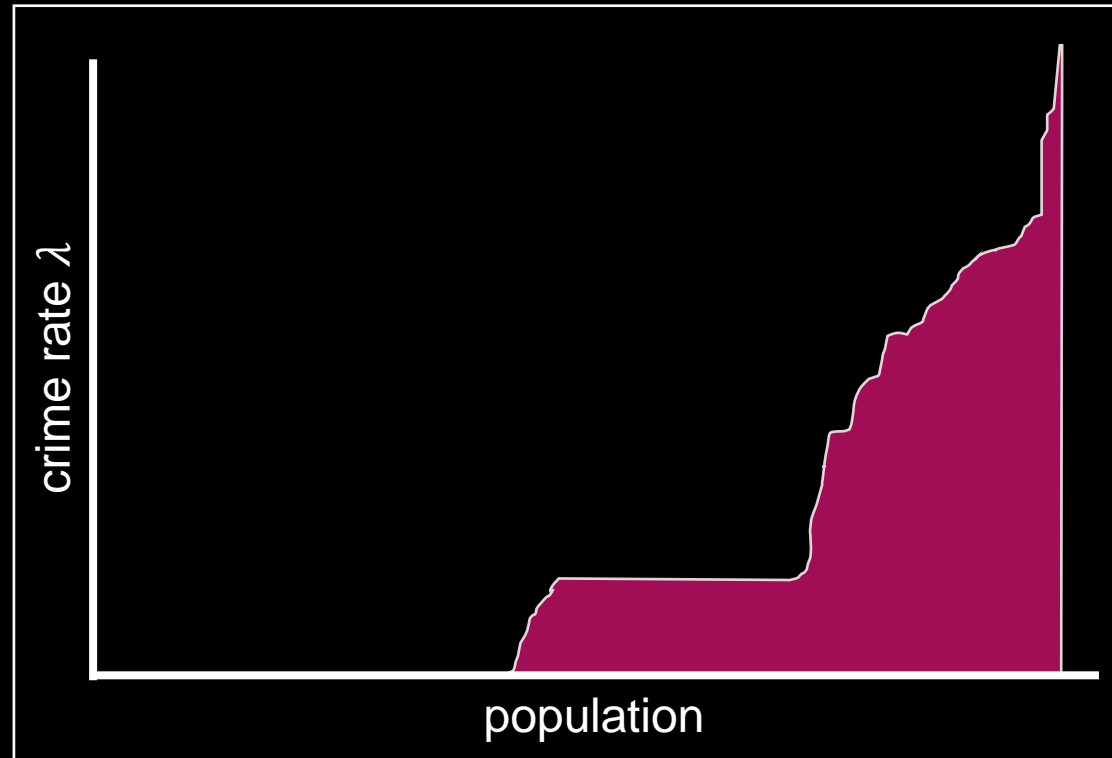
crimes “follow” a Poisson distribution
yearly rate = λ_k



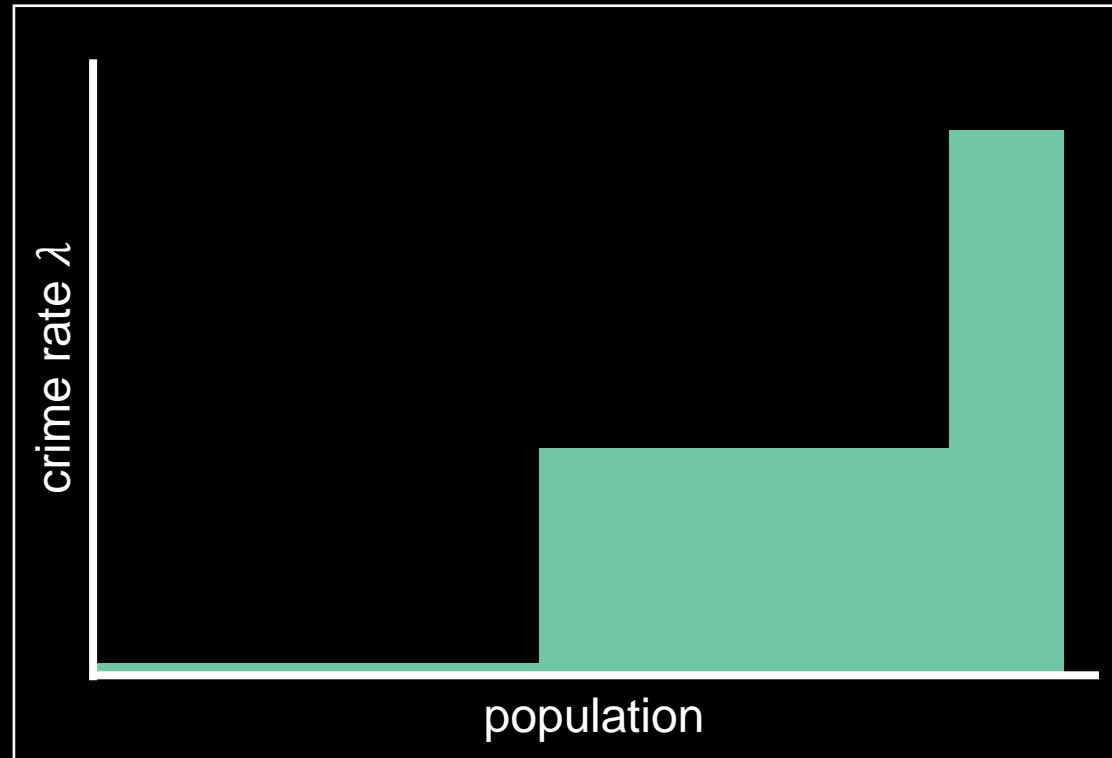
Measuring the Distribution of Crime and Its Concentration

Rafael Prieto Curiel¹  · Sofia Collignon Delmar² · Steven Richard Bishop¹

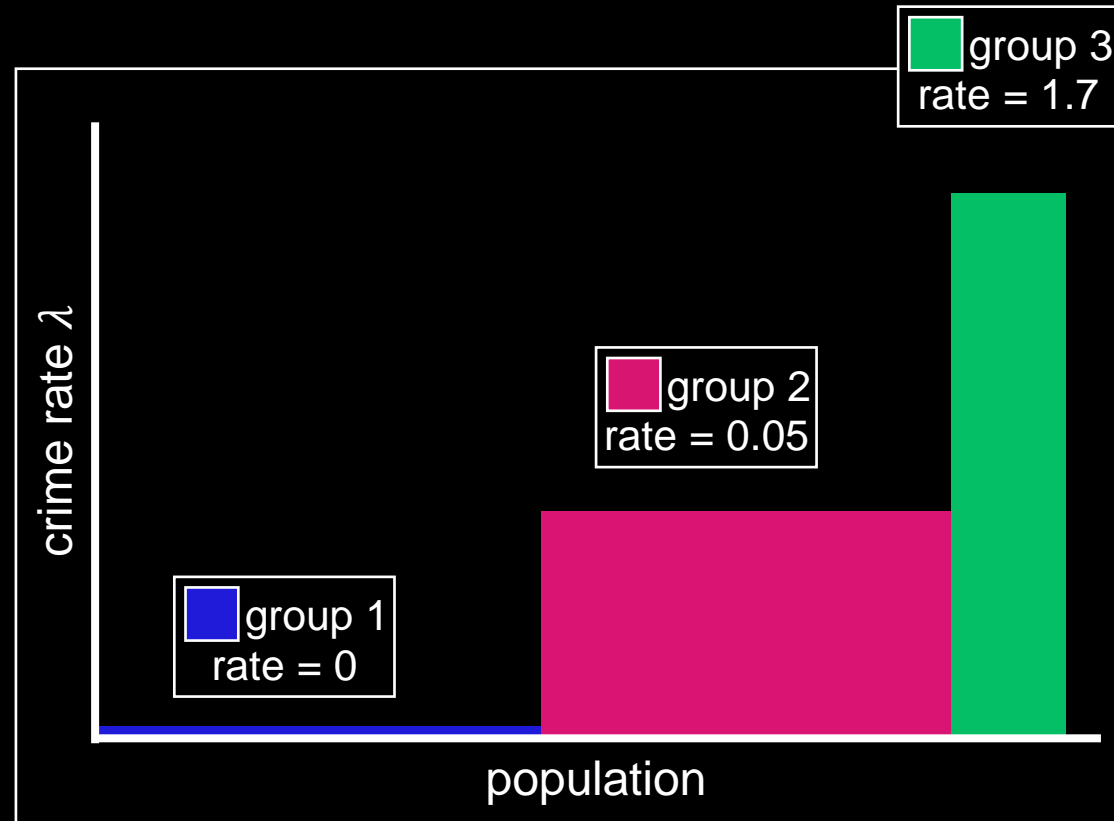
crimes “follow” a Poisson distribution
yearly rate = λ_k

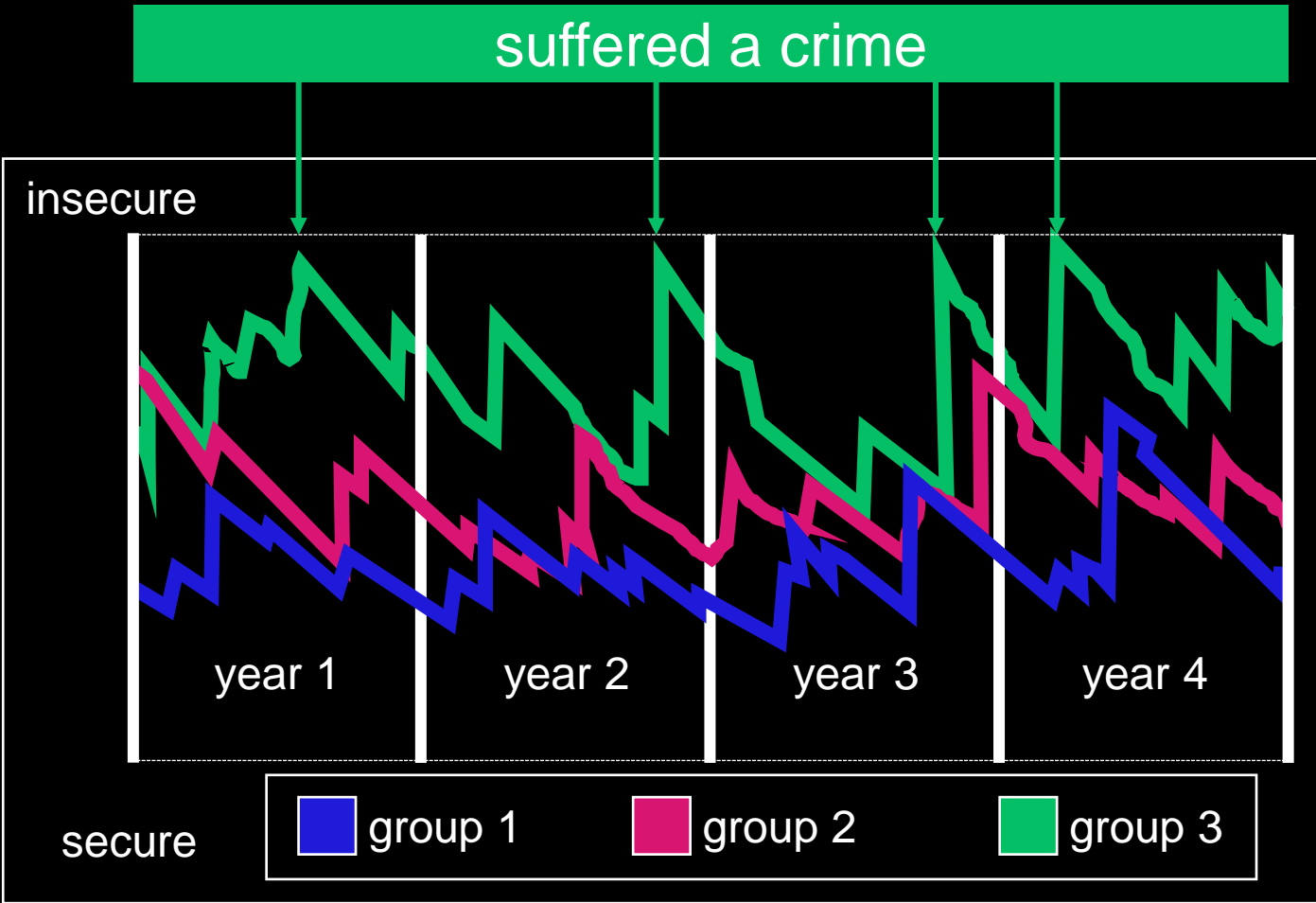


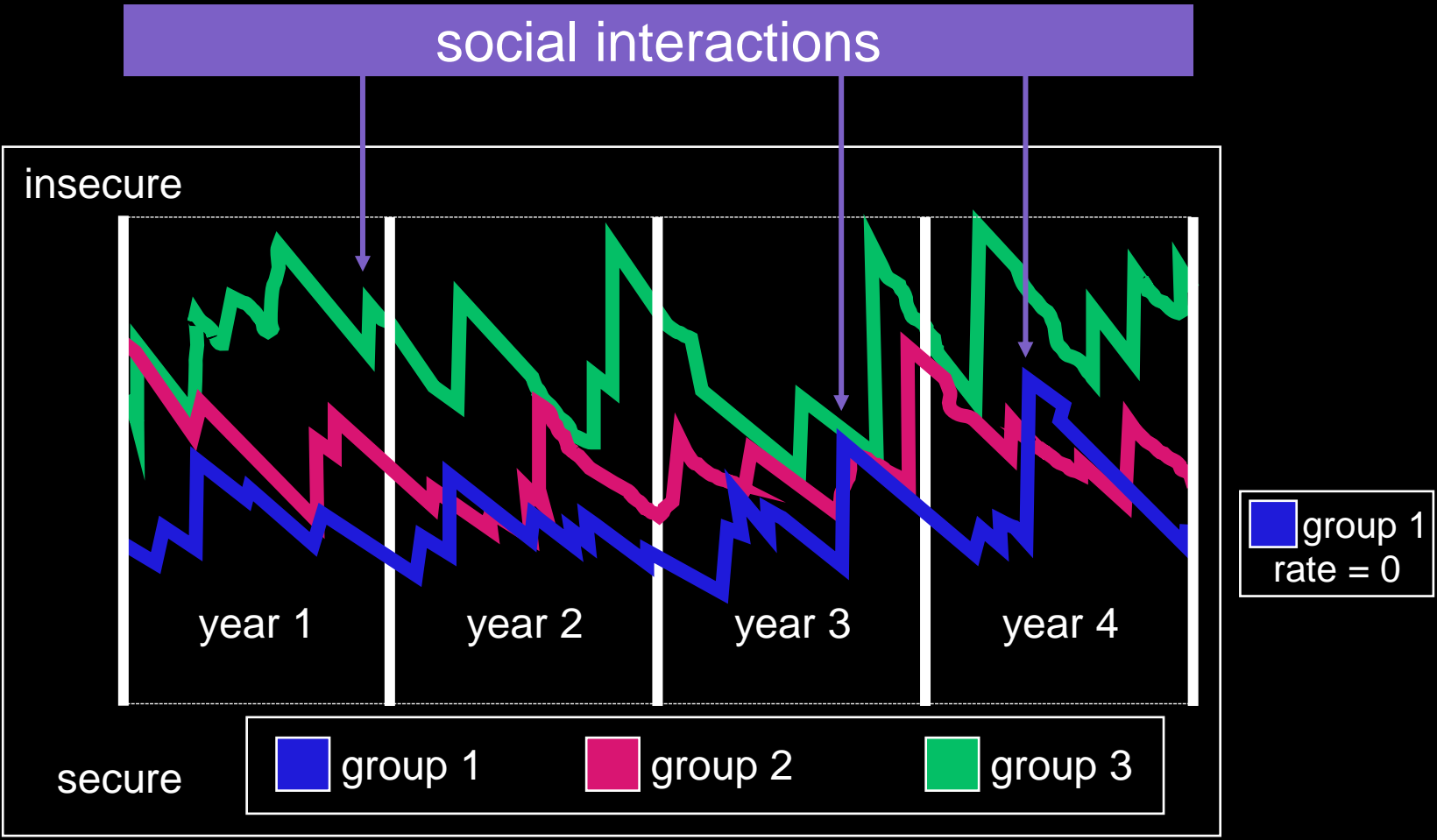
crimes “follow” a Poisson distribution
yearly rate = λ_k

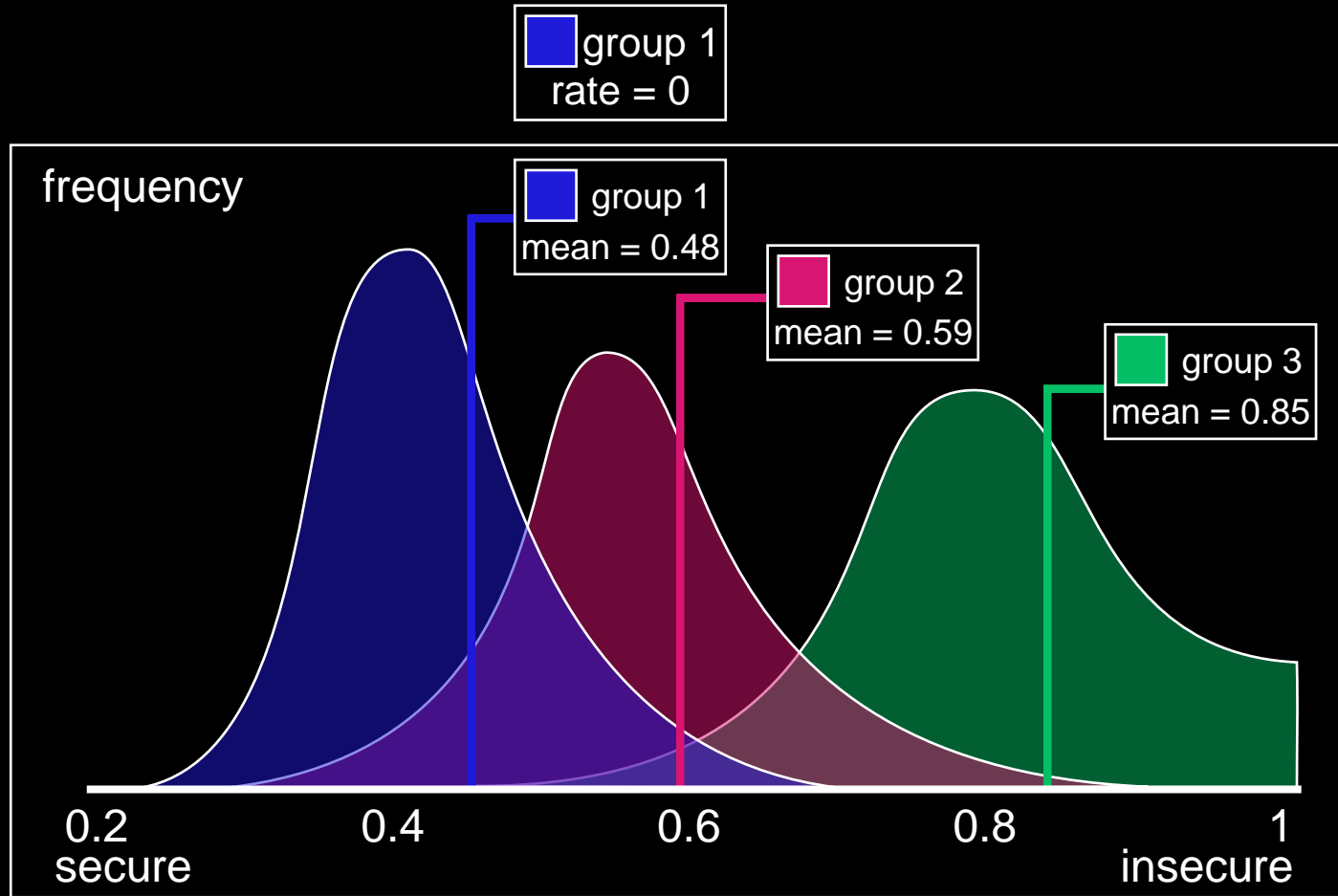


crimes “follow” a Poisson distribution
yearly rate = λ_k

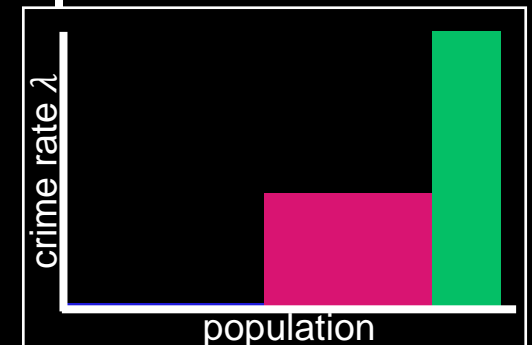
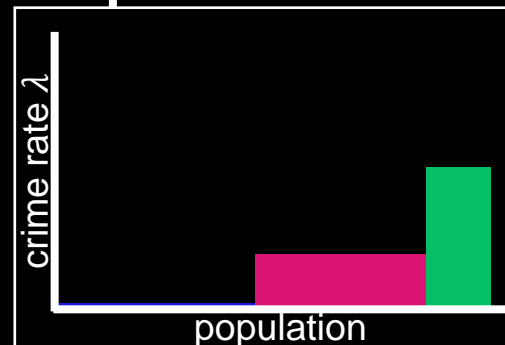
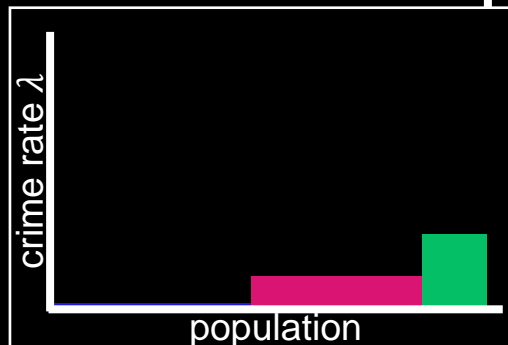
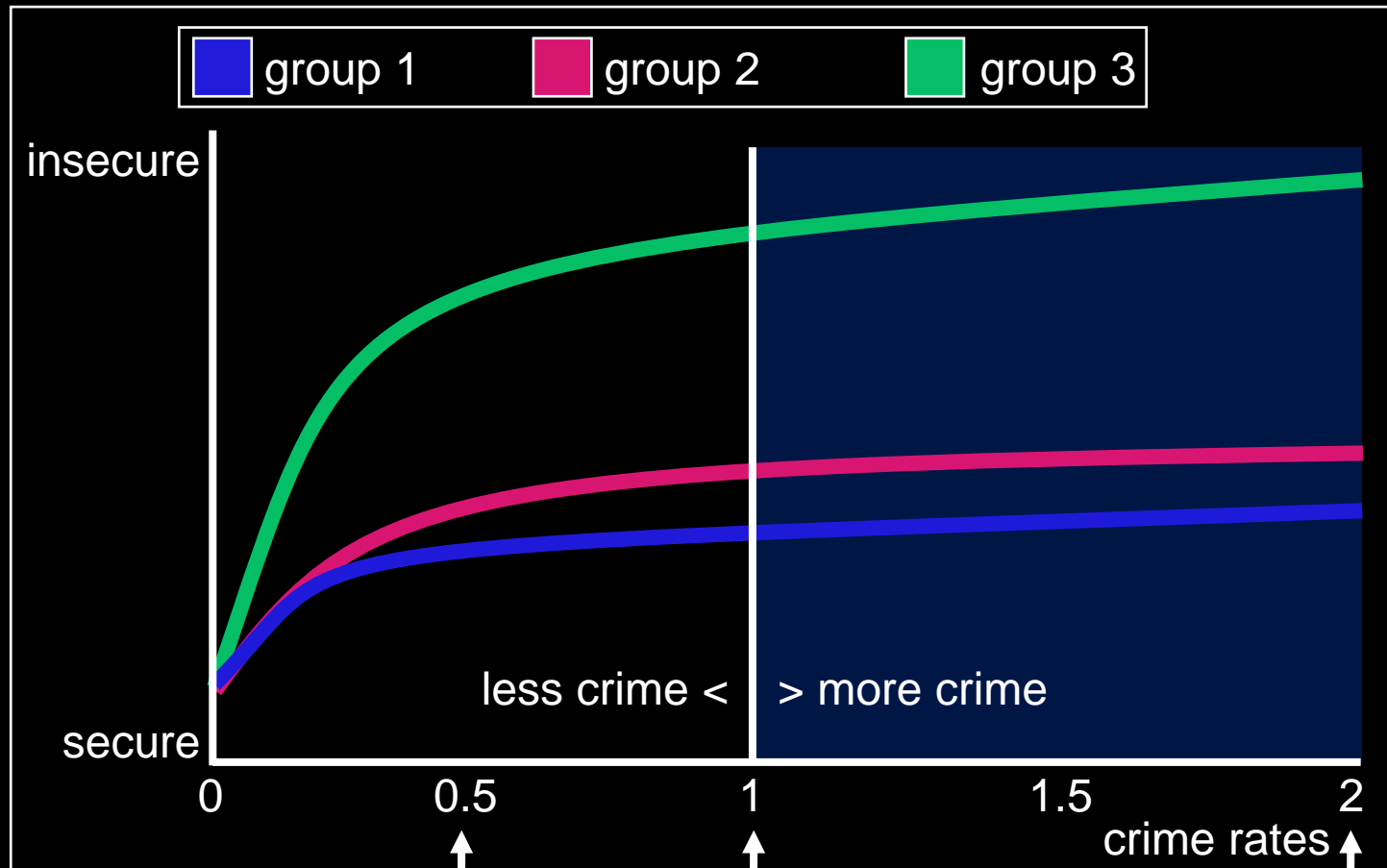




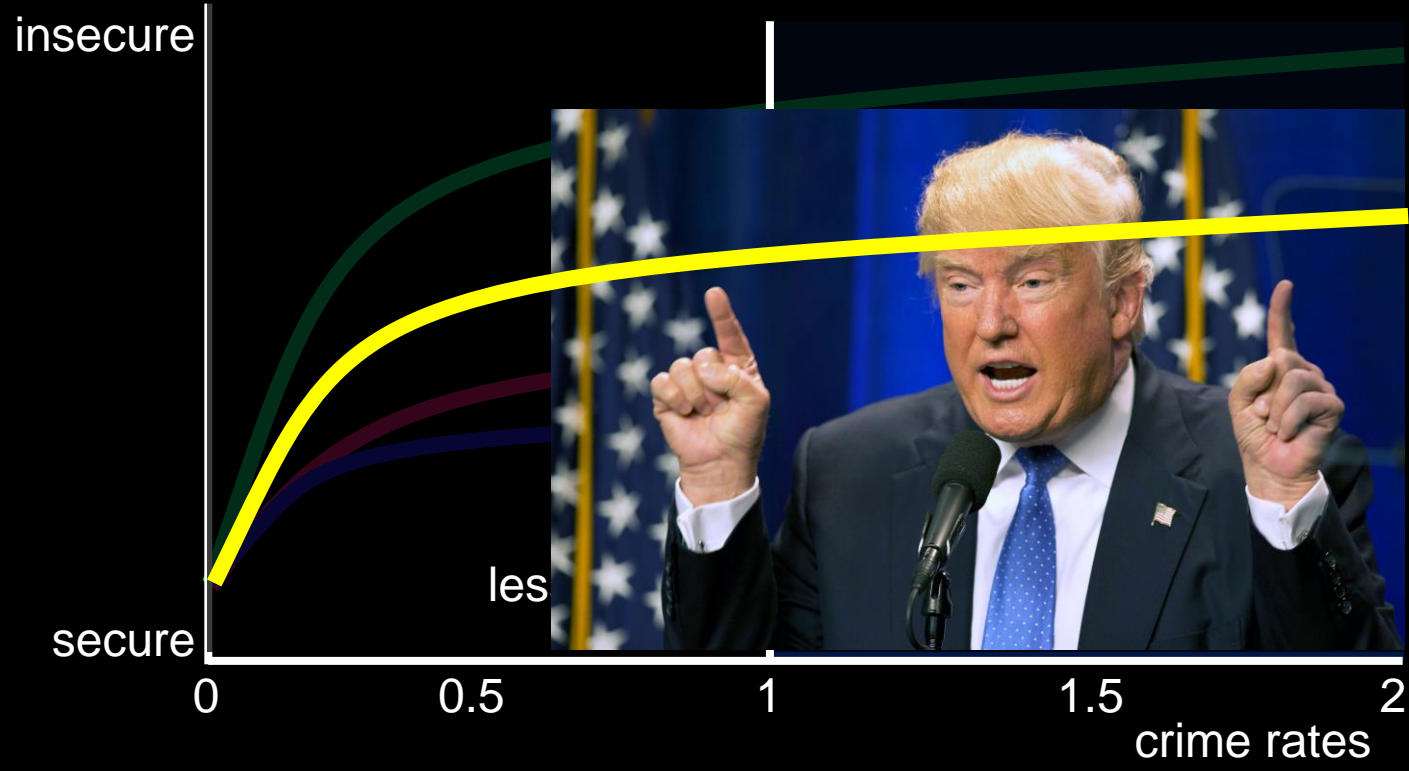


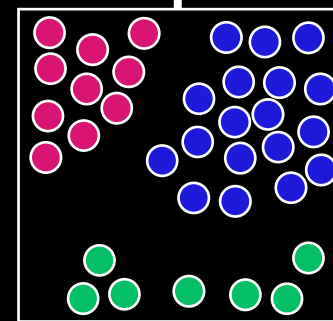
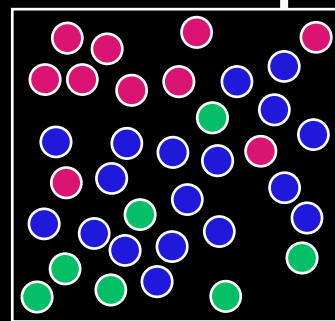
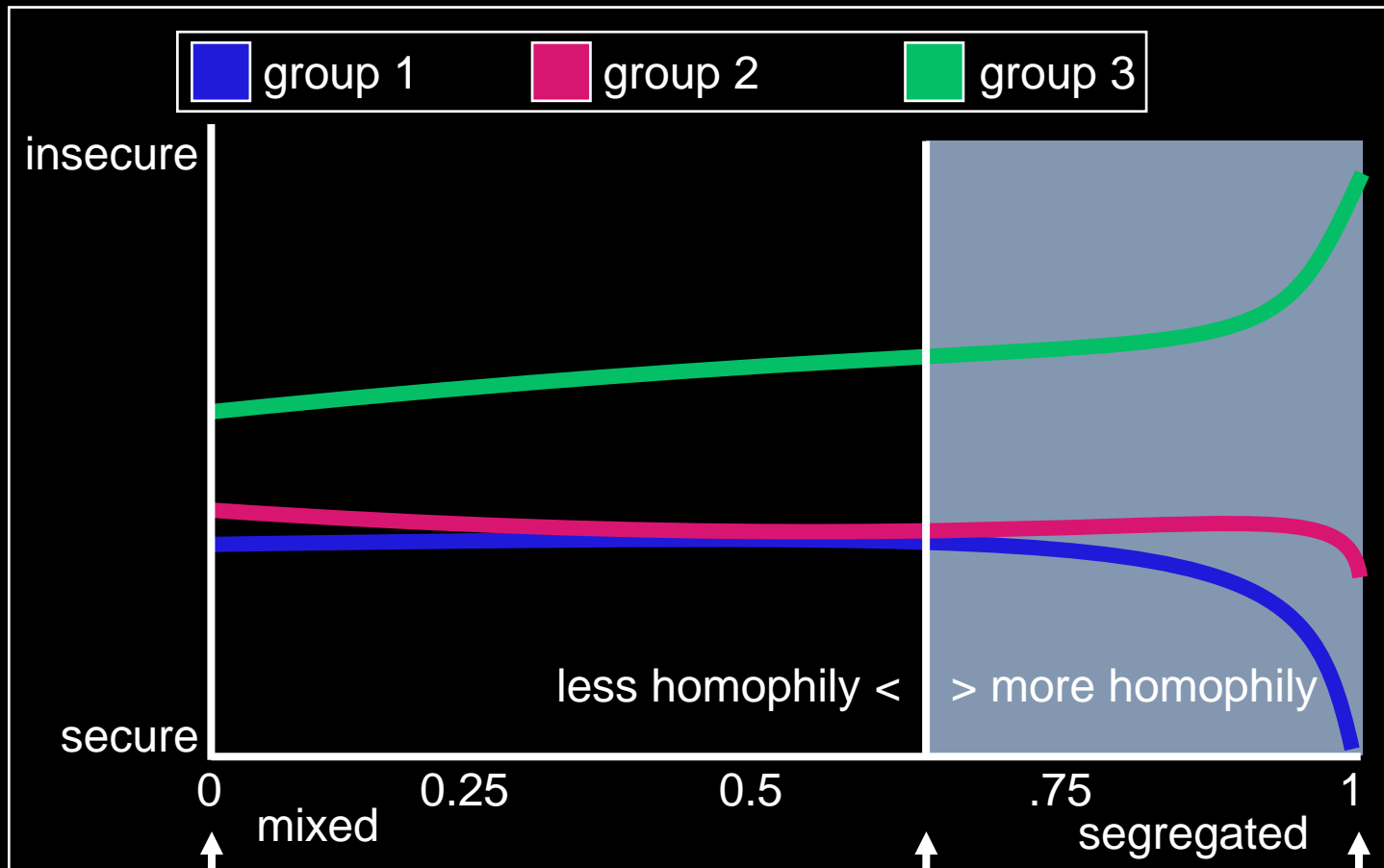


Results



group 1 group 2 group 3





PROCEEDINGS A

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Modelling the fear of crime

Rafael Prieto Curiel and Steven Bishop

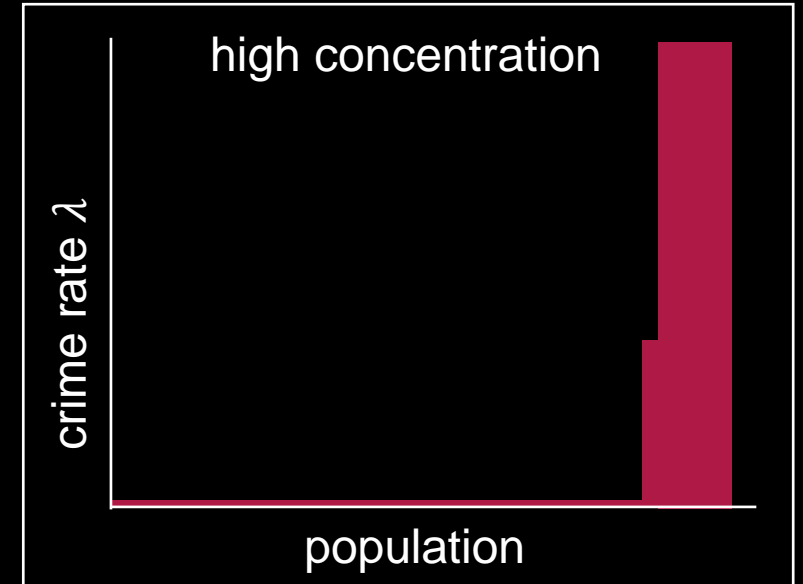
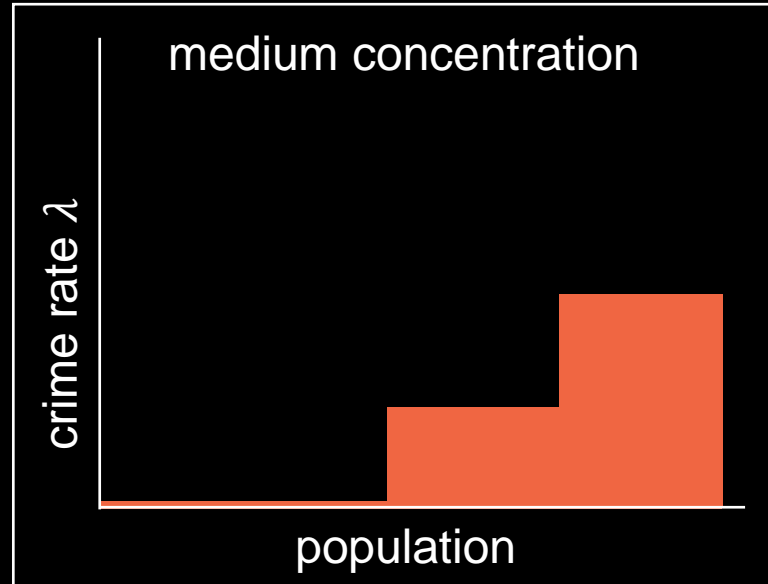
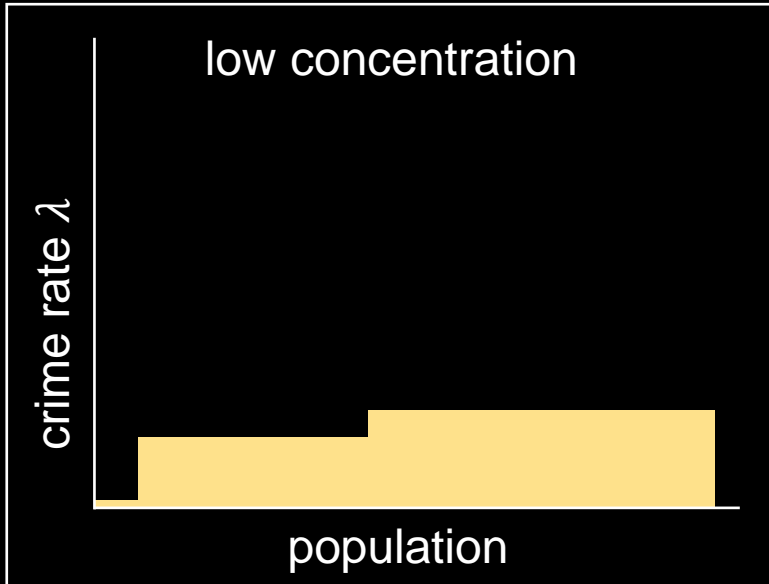
Department of Mathematics, University College London, Gower Street, London WC1E 6BT, UK

RPC, 0000-0002-0738-2633

Research

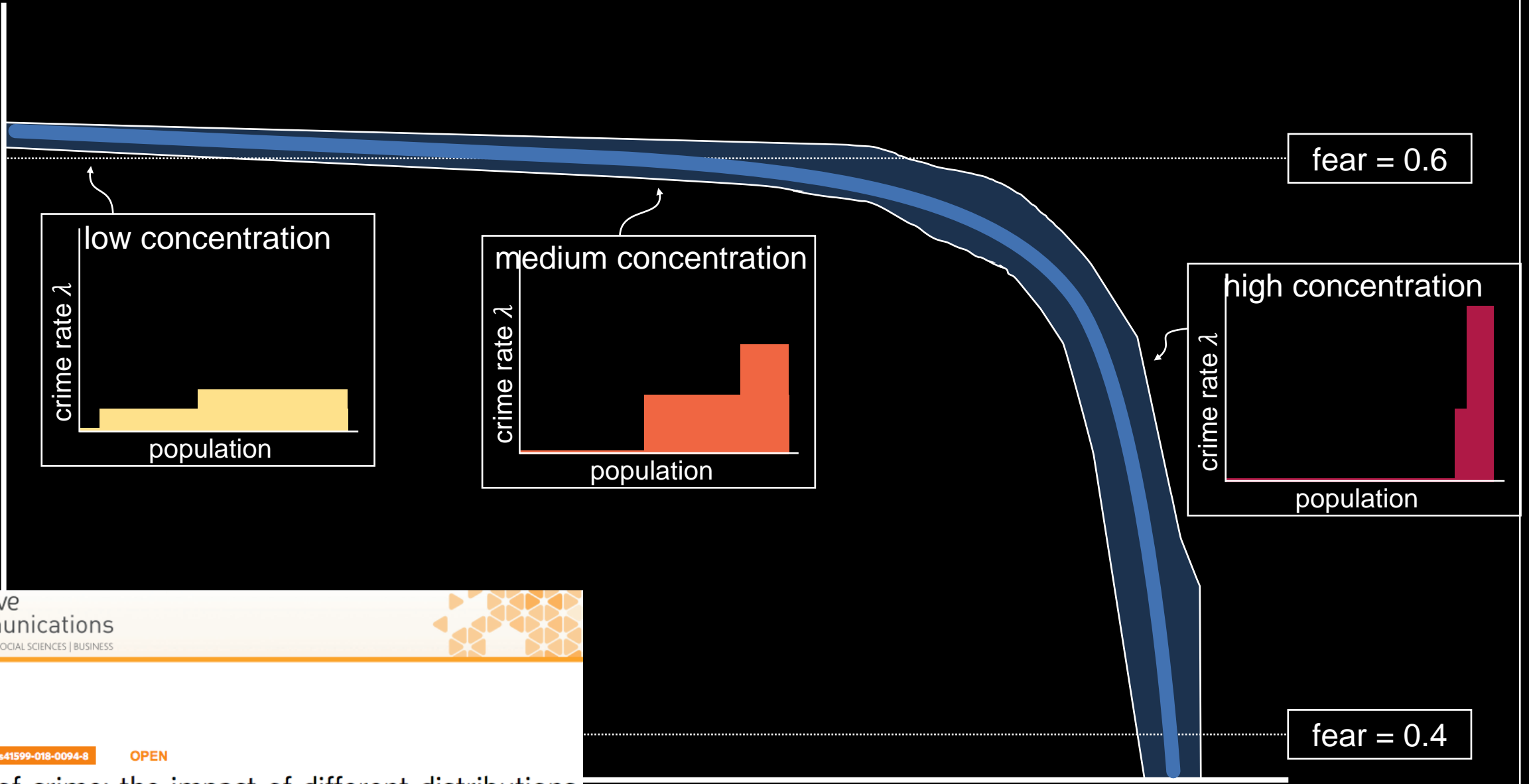


concentration of crime



lower concentration  higher concentration

fear of crime



palgrave
communications
HUMANITIES | SOCIAL SCIENCES | BUSINESS

ARTICLE

DOI: 10.1057/s41599-018-0094-8 OPEN

Fear of crime: the impact of different distributions of victimisation

Rafael Prieto Curiel¹ & Steven Richard Bishop¹

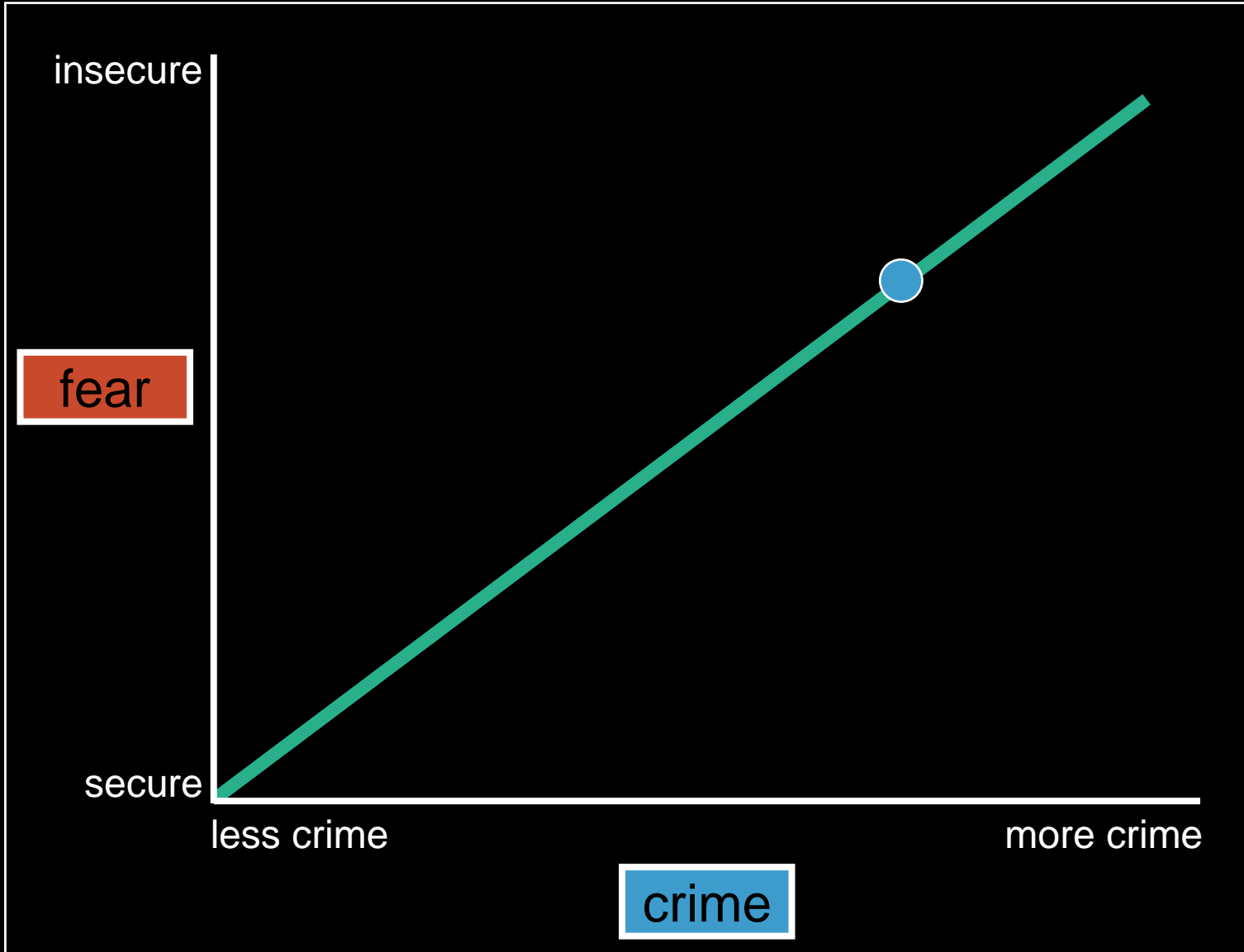
higher concentration

concentration of crime

**Should we aim for
fewer victims?**

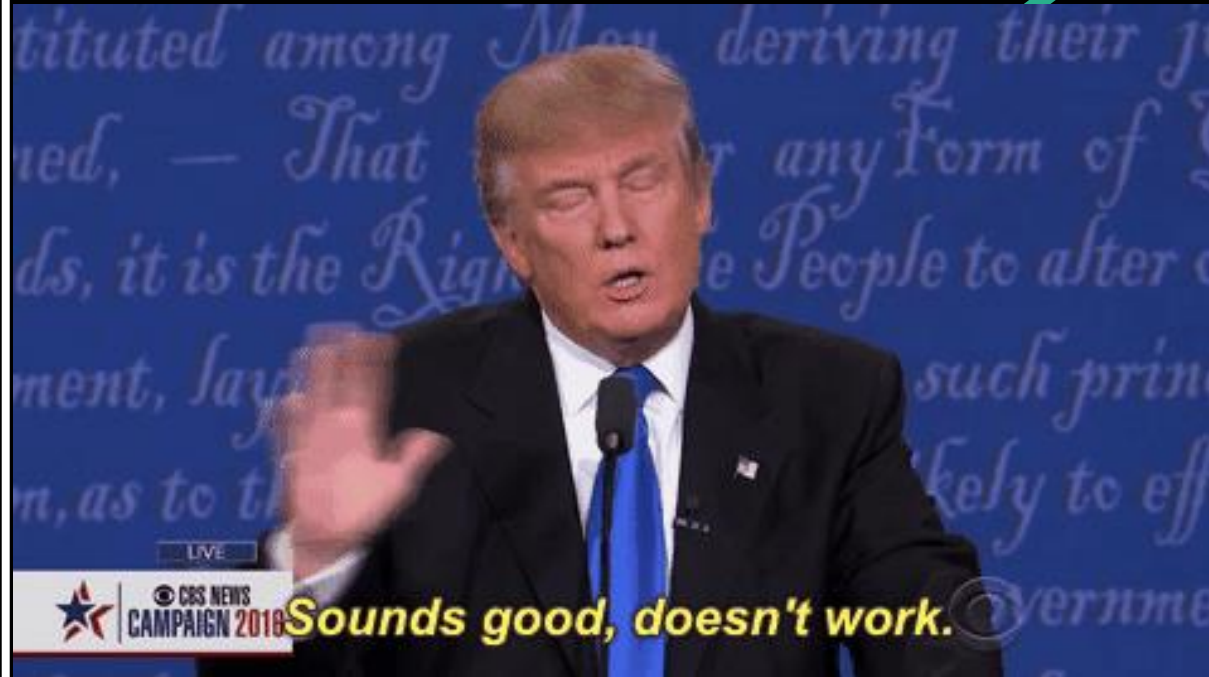
**Should we aim for
fewer victims?**





insecure

fear



secure

less crime

more crime

crime

Crime and social media

“Best photo ever”





18 countries in Latin America

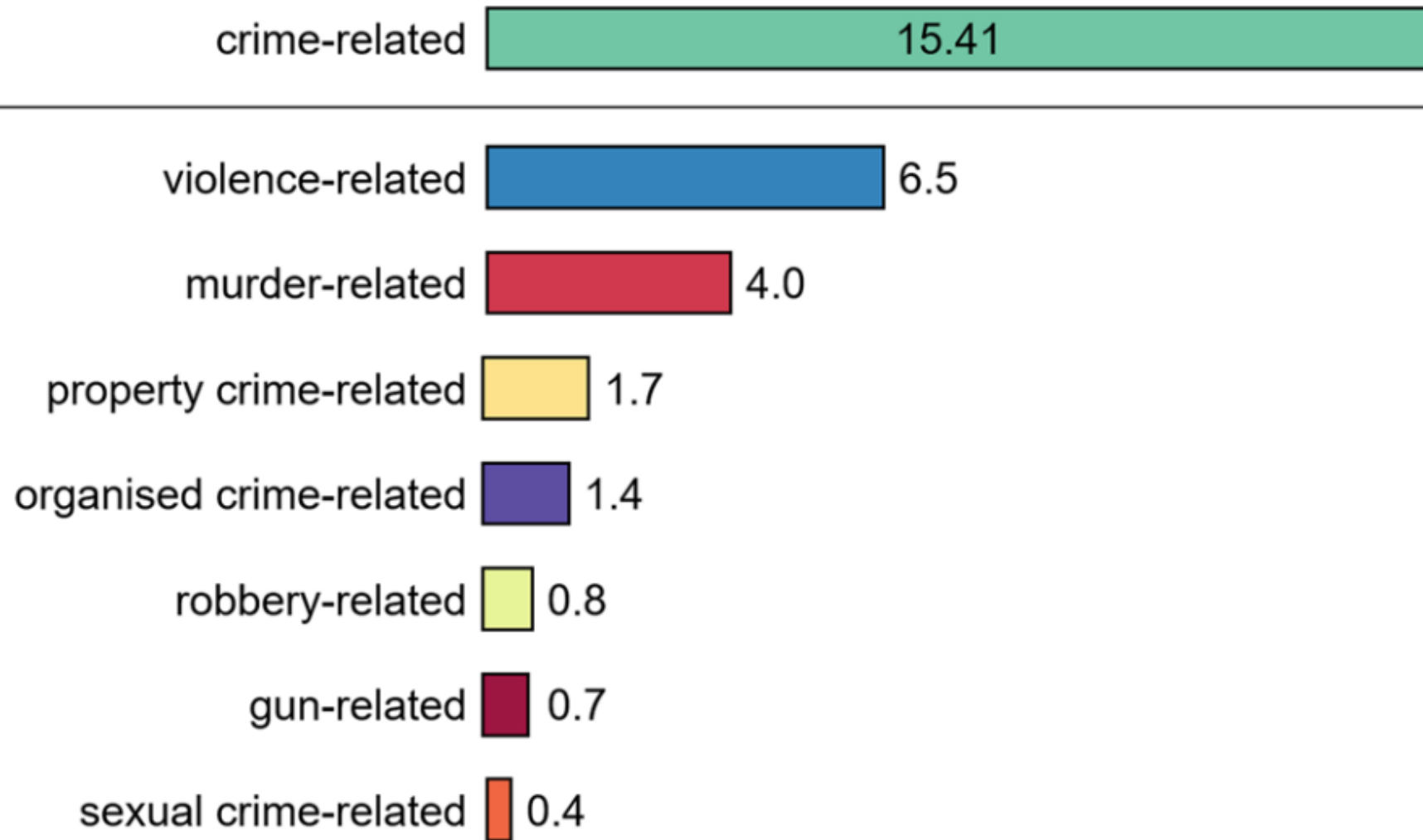
70 days

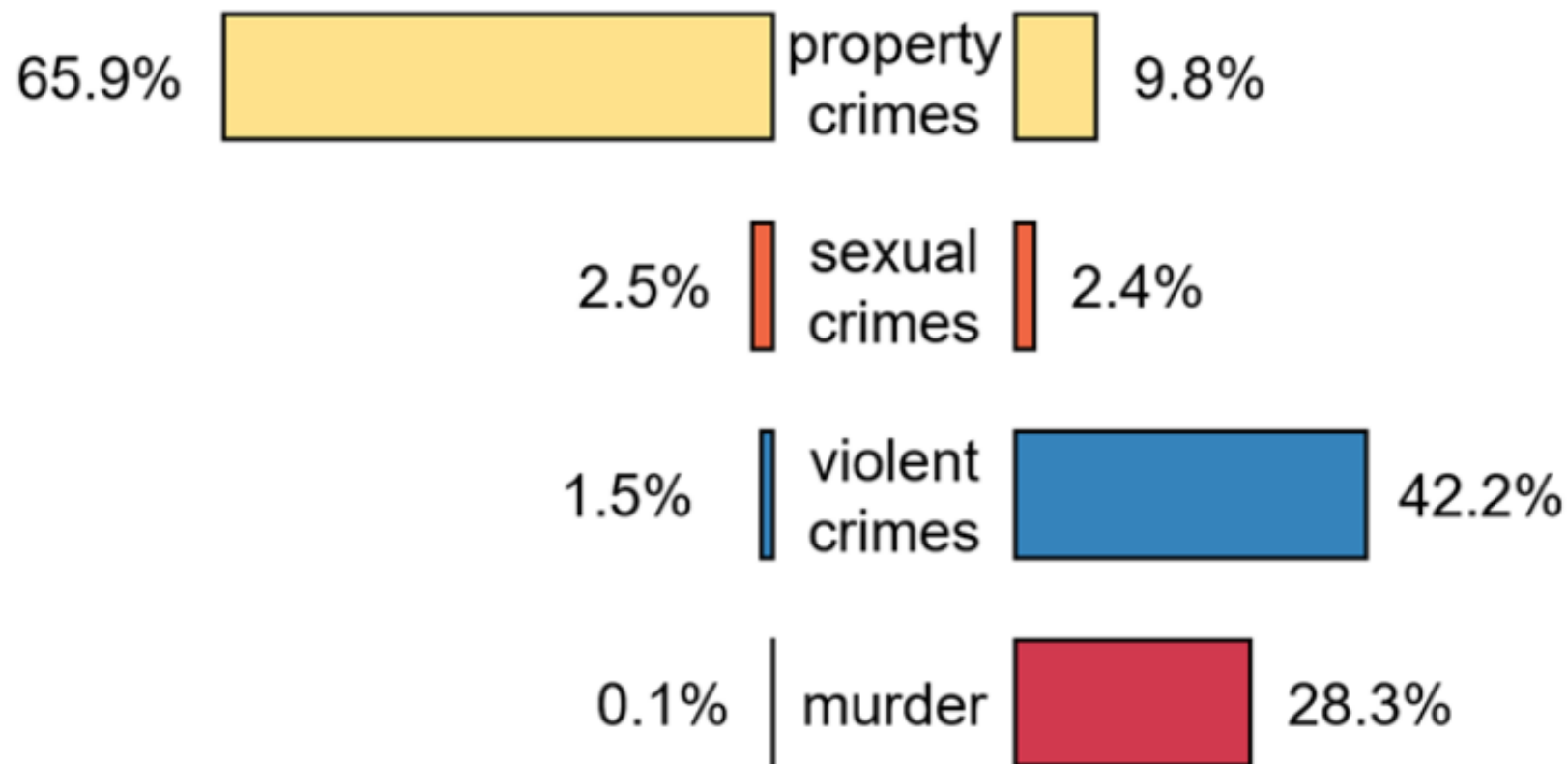
32 million tweets

“crime tweet” if it contains a crime word

0.5 million crime tweets

tweets per 1,000







ARTICLE



<https://doi.org/10.1057/s41599-020-0430-7>

OPEN

Crime and its fear in social media

Rafael Prieto Curiel ¹✉, Stefano Cresci ², Cristina Ioana Muntean³ & Steven Richard Bishop⁴

**Should we monitor
social media?**

**Should we monitor
social media?**





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Thank you!

Rafael Prieto Curiel
@rafaelprietoc

**How to identify a
criminal suspect?**

**Should we aim for
fewer victims?**

**Should we monitor
social media?**