Using innovative methods to quantify online Internet behaviors as risk factors for Internet-initiated victimization among sexually abused females

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Research with the child maltreatment population is HARD!

METHODOLOGICAL CONSIDERATIONS

- Access is challenging and time consuming
- Families can be skeptical
- Family structures are complex (custodial care, who can consent?)
- Families are transient
- Cancelations are common, retention is difficult
- Families have complex needs
- Specially trained staff
- Methods can be especially complex; eg semi-structured or observations

Research with the child maltreatment population is HARD!

ETHICAL CONSIDERATIONS

- Appropriately and respectfully engage maltreated children & families
- Understanding power relations
- Equipoise – ensuring standard of care for all arms
- Non coercive compensation
- Securing *truly* informed consent and assent
- Ascertaining harms and benefits
- Maintaining privacy and confidentiality
- Ensuring appropriate communication & translation of findings

Why persist?

" [Extreme] humanitarian contexts present extreme circumstances where ethical issues [for conducting human subjects research] are likely to present the greatest challenges and complexities. The implications for *not* reflecting on and mitigating against these difficulties could have far greater consequences for both the short and longer term safety and well-being of these children and their communities."

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Why persist?

THESE KIDS ARE AT HIGH RISK FOR A HOST OF MALADIES

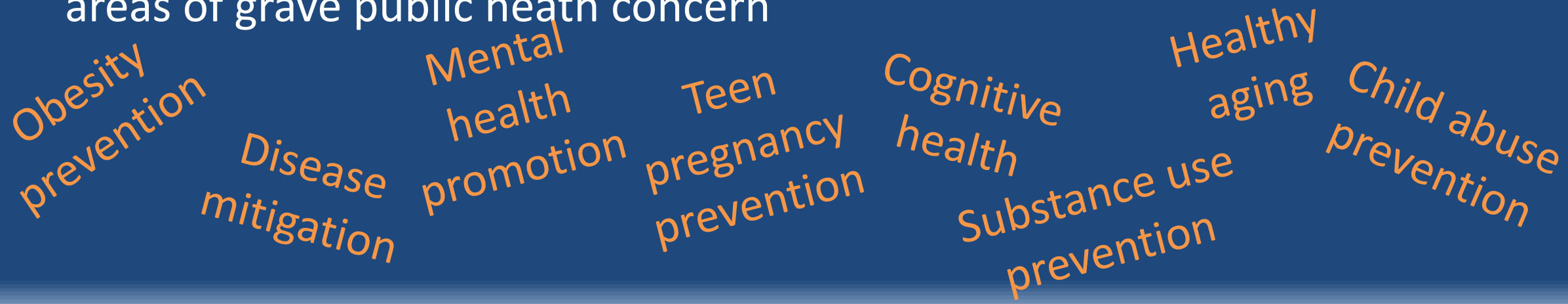
- Adverse mental health—eg, PTSD, mood disorders, anxiety disorders
- Adverse physical health—obesity, CVD, inflammation, accelerated aging
- Substance use disorders
- Cognitive performance issues, school dropout, premature cognitive decline
- Sexual risk-taking, teen pregnancy, STIs, sex trafficking
- Revictimization, domestic violence, incarceration
- Relational dysfunction
- Intergenerational transmission

Refs: Shalev, Heim & Noll, JAMA Psychiatry 2016; Noll, Ann Rev Cln Psy, 2020; Danese & Tan, Mol Psy 2014; Kendler et a,l Ar Gen Psy 2000; Binder et al , Ar Gen Psy 2018; Noll & Shenk, Pediatrics 2013; Noll et al, Pediatrics 2010; Danese & Baldwin, Ann Rev Psychbio 2017; O'Donnell & Meaney, Ann Rev Cln Psy 2020; Shalev et al, Mol Psy 2013; Yang, Font, et al, Cld Yth Srv Rev 2018

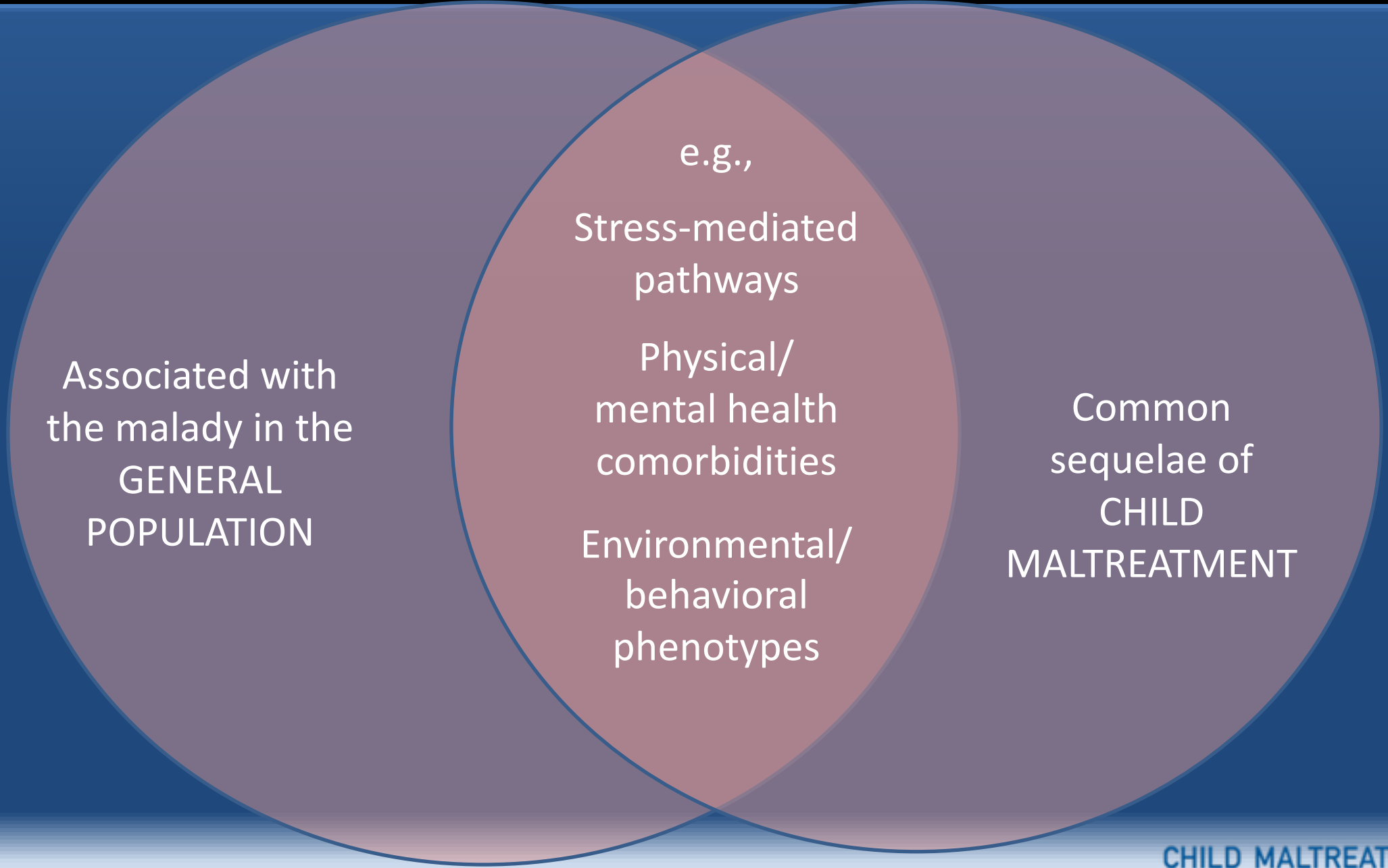
Why persist?

INCLUDING MALTREATE CHILDREN IN RESEARCH ON THESE MALADIES

- Provide insight into how to mitigate deleterious outcomes for these kids
- Help elucidate mechanisms of action that will benefit ALL kids
- Generalize beyond the child maltreatment population
- Studying maltreated kids provides the opportunity to *grow new science* in areas of grave public heath concern



Refs: Shalev, Heim & Noll, JAMA Psychiatry 2016; Noll, Ann Rev Cln Psy, 2020; Danese & Tan, Mol Psy 2014; Kendler et a,l Ar Gen Psy 2000; Binder et al , Ar Gen Psy 2018; Noll & Shenk, Pediatrics 2013; Noll et al, Pediatrics 2010; Danese & Baldwin, Ann Rev Psychbio 2017; O'Donnell & Meaney, Ann Rev Cln Psy 2020; Shalev et al, Mol Psy 2013; Yang, Font, et al, Cld Yth Srv Rev 2018


Associated with the malady in the GENERAL POPULATION
e.g.,
Stress-mediated pathways
Physical/ mental health comorbidities
Environmental/ behavioral phenotypes
Common sequelae of CHILD MALTREATMENT

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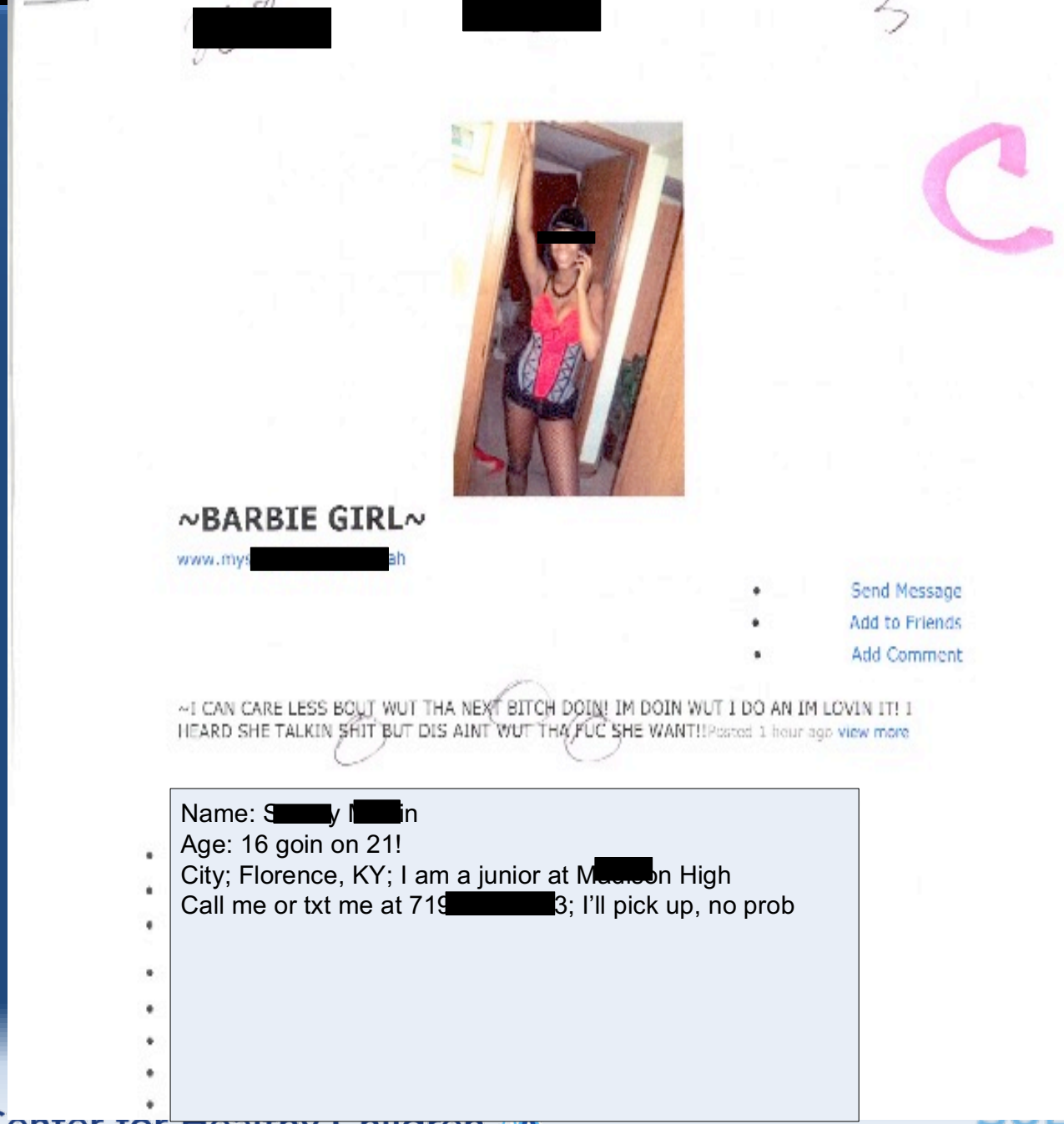
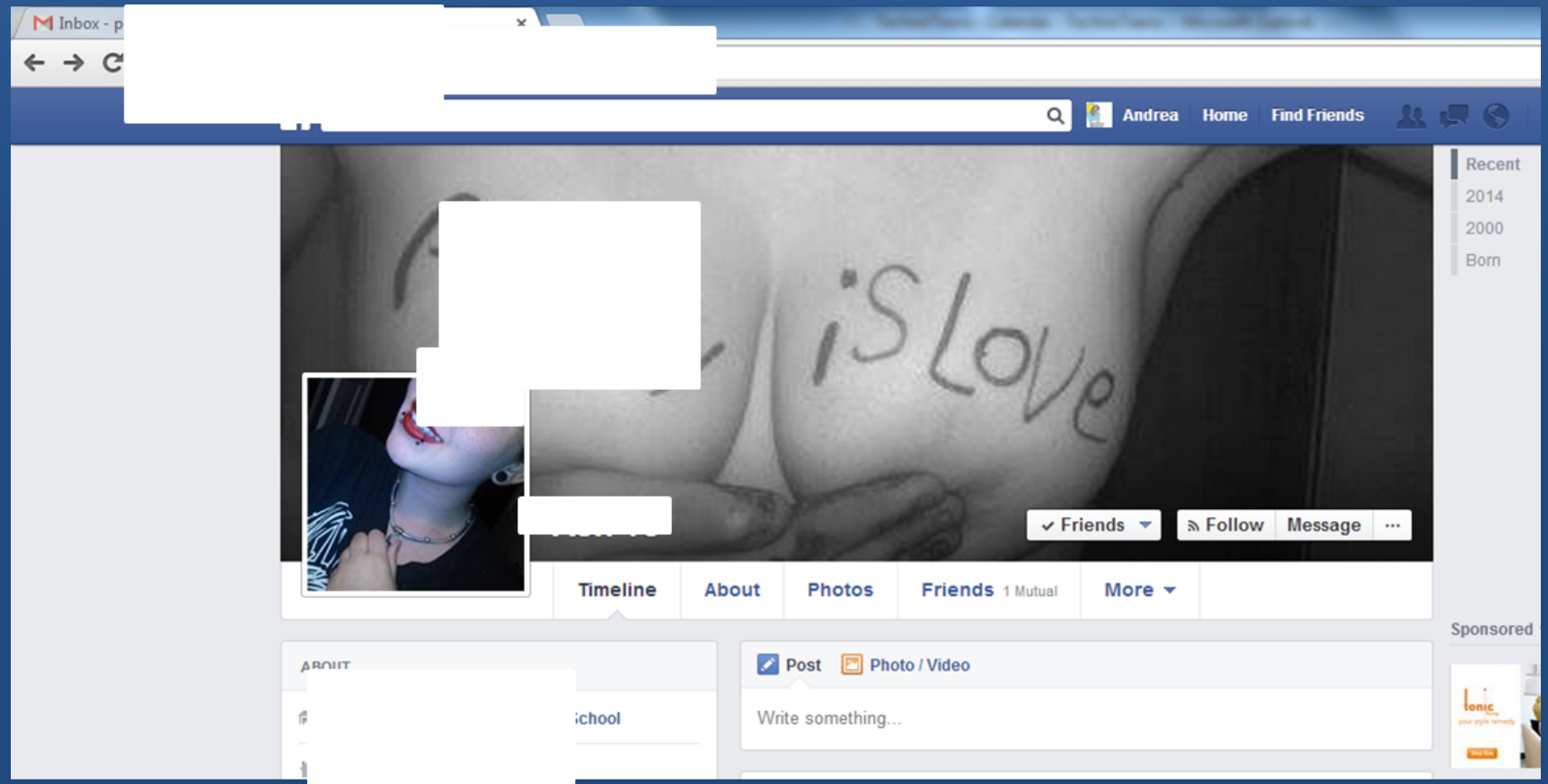
Publically available Social networking profiles



Publically available Social networking profiles



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Publically available Social networking profiles

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Cen

Internet-initiated victimization

Cyberbullying

23% of teens report being victims of cyberbullying

Most common among teens
who are high utilizers of
social media

Hamm, M. P. et al. (2015) JAMA Pediatrics; Garett, R., Lord, L. R. & Young, S. D. (2016) Mhealth 2.

Sexual Content, Solicitations & Strangers

- 40% report viewing “sexual content”
- 20% report “intentional seeking” of pornography
- 30% report “unwanted” online sexual solicitations
- 30% report “meeting strangers off-line”

Pew Trust Internet Use Survey, 2018; Noll et al., 2012

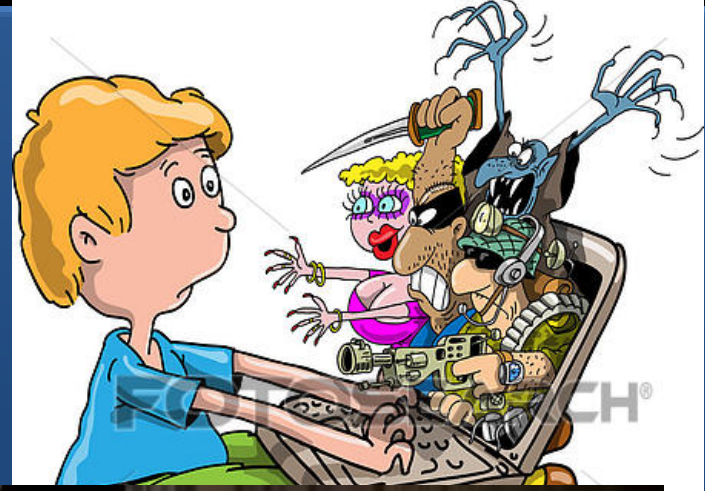
What we know….

Some surveys show negative impacts:

cyberbullying perpetration, depression, loneliness, internet addiction, poor academic engagement, shorter sleep duration

Just as many show positive impacts:

friendship development, self-esteem, identity exploration, social capital, social support, increases wellbeing among anxious and distressed teens



Summary in Noll, Haag, et al, In Press; NHB

Are concerns real? Or merely

"the latest wave of moral panic about how the current generation chooses to spend their time"?

Orben, A. Teenagers, screens and social media: a narrative review of reviews and key studies. Soc Psychiatry Psychiatr Epidemiol 55, 407-414, doi:10.1007/s00127-019-01825-4 (2020).

We don't know the impact on today's teens?

- Impact of pornography on sexual development??
- Victimization potential??
- Which teens are most vulnerable??
- How to protect vulnerable teens??

What we don't know…

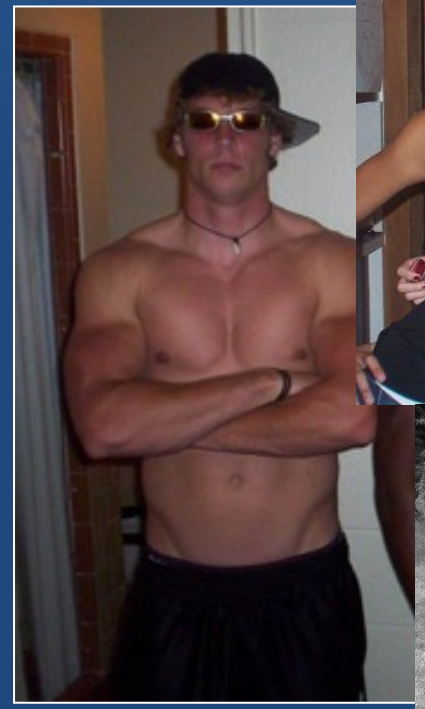
- The majority of research is on white middle-class teens
- All research is self-report
- Much comes from Yahoo, FaceBook, Google
- Almost no longitudinal research tracking teens over time

Pew Trust Internet Use Survey, 2018; Youth Internet Safety Survey, 2011; Summary in Noll et all, In Press

Sex Crime Perpetrators

Actively search for vulnerable teens:

- Online late at night
- Have some provocative features
- Divulge personal information
- Willing to chat about sex



Malesly, LM. J of Child Sex Abuse, 2007; Barnert et al., Child Abuse & Neglect , 2015

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Sex Crime Perpetrators

Lure kids into exploitative internet behaviors:

Become “friends” on social media
Get access to all content
Lure to pornography sites
Sharing sexual photos
Sexual advances
“Groom” through trust & flattery
Offline meetings

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Malesly, LM. J of Child Sex Abuse, 2007

Why worry about sexual abuse victims?

- vulnerable to aberrant sexual development
- 2 to 3 times more likely to be re-victimized
- engage in risky sexual behaviors
- more vulnerable to the effects of pornography
- low quality parenting / low parental monitoring

- more likely to visit online chat room / forums
- solicited sexually online
- receive aggressive sexual solicitations
- 70-90% of trafficking victims report having been sexually abused

Barnes, et al., 2009; Noll, et al., 2008; 2010; 2011; Wolak, et al, 2004; Ybarra & Mitchell, 2005; Mitchell, Finkelhor & Wolak, 2005; Williamson & Prior, 2009

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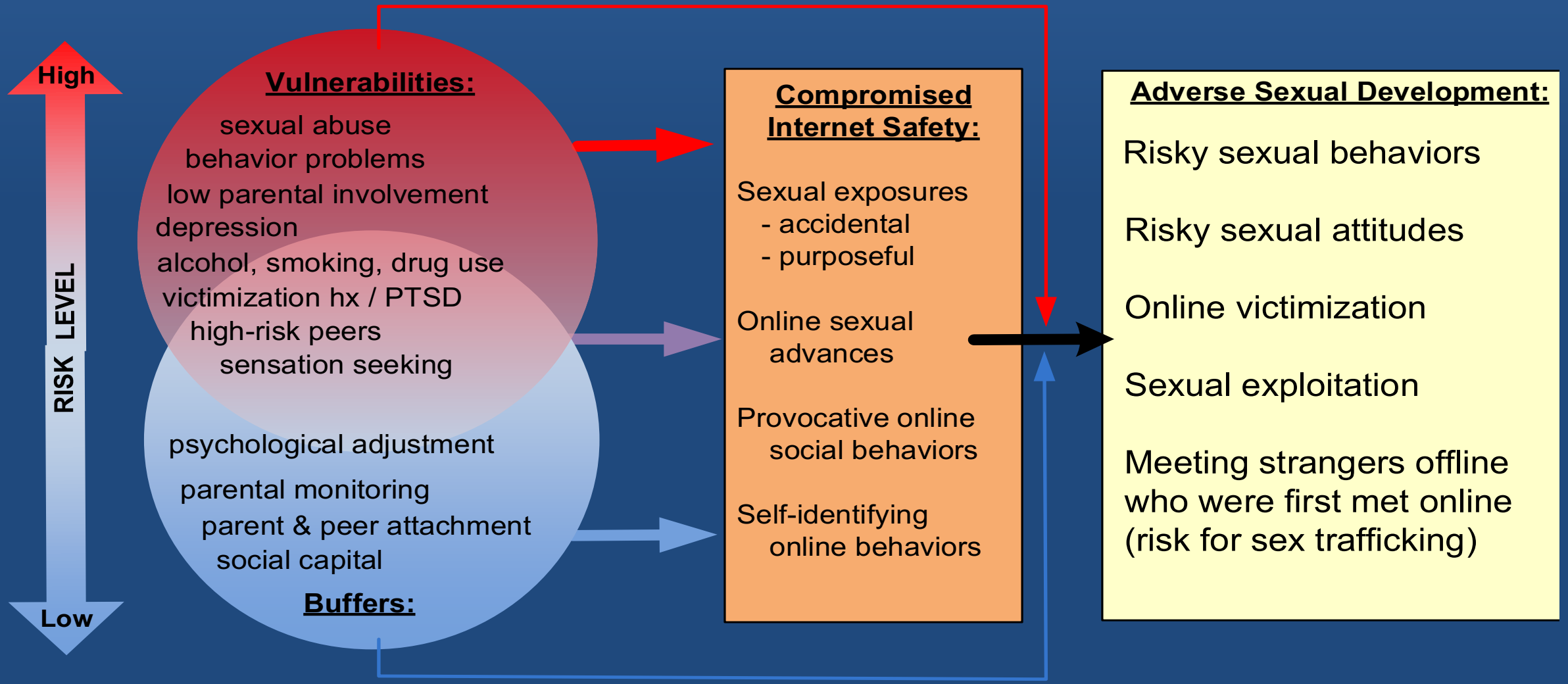
Teen Internet and Social Media Behaviors; "TechnoTeens"



R01 HD073130 PI: Noll 2013-2019

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TechnoTeens methods

First naturalistic, observational study of teen internet use

460 adolescent females and caregivers

Age at enrollment (Time 1) M=14 Range 12-16

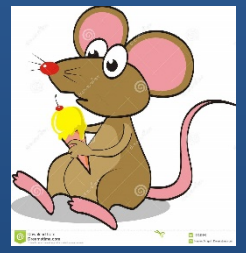
- 1/3 sexually abused referred from protective services (CSA)
- 1/3 demographically matched controls (DMC)
- 1/3 census matched controls (CMC)

R01 HD073130 PI: Noll 2013-2019

Moving beyond self reported Internet use

Michal Kouril
Bioinformatics
Engineer

Specially engineered MacBook Air computers w/modems



Psychosocial Interview Adolescent and Caregiver

One Month Later
Psychosocial Interview Adolescent and Caregiver

Self-report & Structured Assessments:

- Psychopathology
- Social and personal adjustment
- Prosocial activities
- Parental quality & involvement
- Risky sexual behaviors
- Illicit drug and alcohol use
- Impulse control
- Sensation seeking behaviors
- Cognitive abilities & exec function

2012 to 2015

Self-report & Structured Assessments:

- Comprehensive Trauma Interview
- "Upset Ratings" anchored to 'worst'
  - Trauma histories
  - Cyberbullying
  - Online sexual solicitations
  - Meeting strangers offline
- PTSD
- Media & Internet consumption
- Access to child welfare records

Central Server

SquidBlacklist.org
Objective classification
social media
pornography
entertainment
education
gaming

Human Verification
UG Noll Lab

Per session Qs
Mood?
Parents present?
Friends present?
Filler questions

YouTube & Netflix Keywords Quantified for sex, drugs, & violence

Session Details
# of minutes on each URL
time of day
weekday vs weekend
school holidays
snow days

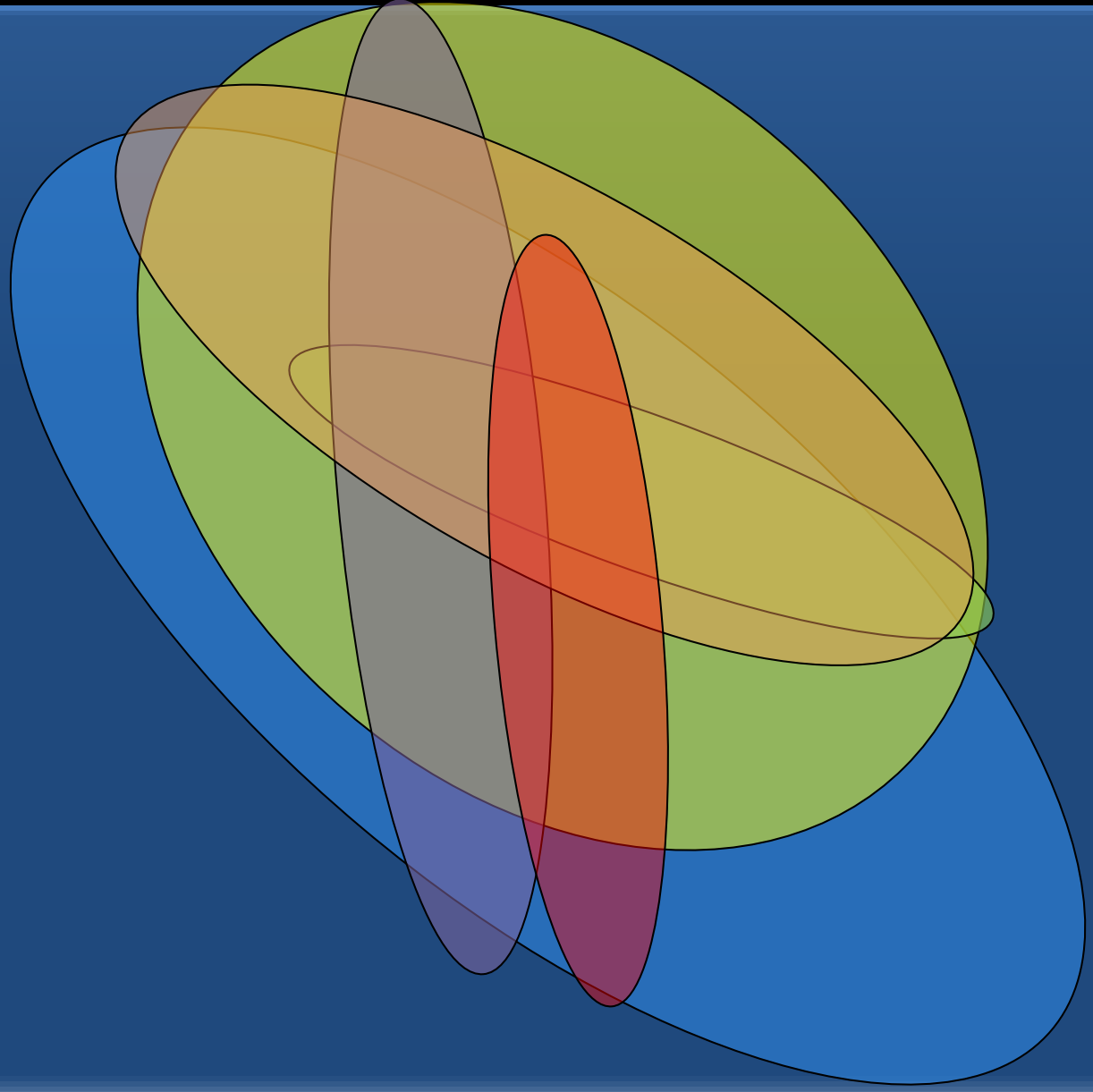
One month later
Psychosocial
Interview
Adolescent and
Caregiver

Social Media
Facebook, Twitter
Instagram
Newsfeed & Profile Page

Psychosocial Interview Adolescent and Caregiver

One month later
Psychosocial Interview Adolescent and Caregiver

Repeated Annually T2 (94%) & T3 (91%)



Social media
Total sessions = 16,450

Entertainment
Total sessions = 15,424

Gaming
Total sessions = 4,917

Education
Total sessions = 2,857

Adult-content videos
Total sessions = 7,662

Pornography
Total sessions = 3,159

Teen Internet Use Patterns: 23,839 2hr Sessions (authenticated)

Main Effect Findings

35% consumed pornography (via URL observation)

46% abused vs. 28% control ($p<.01$)

51% cyberbullied (structured interview)

62% abused vs. 43% control ($p<.05$)

22% received online sexual solicitations (structured interview)

6% sexual advances "went too far" (upset rating 'significant')

11% abused vs. 3% control ($p<.01$)

45% met stranger offline (structured interview)

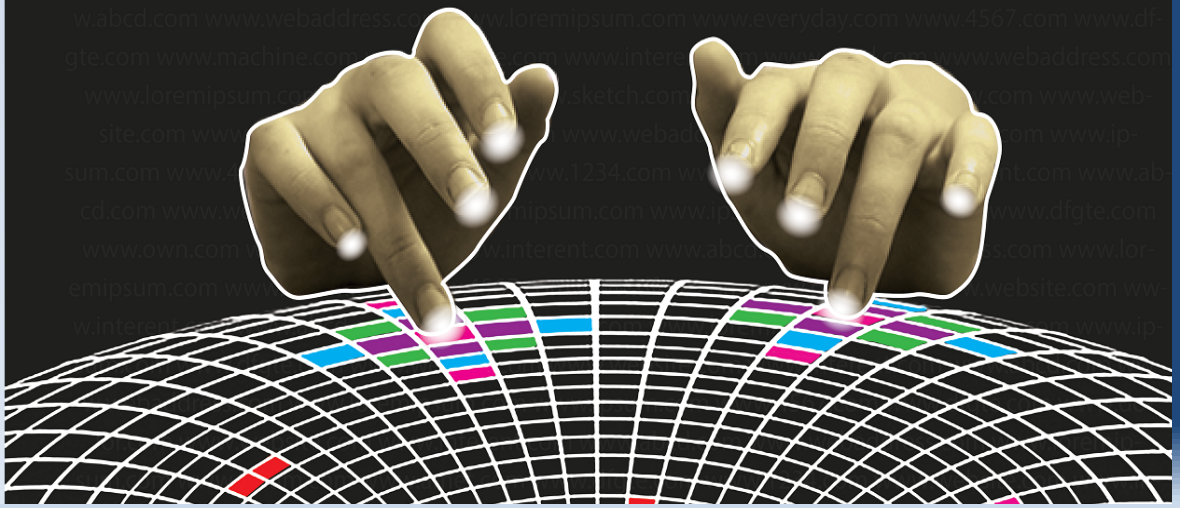
5% met stranger offline ending in assault or attempted assault

10% abused vs. 2% control ($p<.01$)

www.nature.com/nathumbehav/ August 25th 2021 Volume 56

nature human behavior

teens and the interent



DispatchDate: 05.08.2021 · ProofNo: 1187, p.1

nature human behaviour

ARTICLES

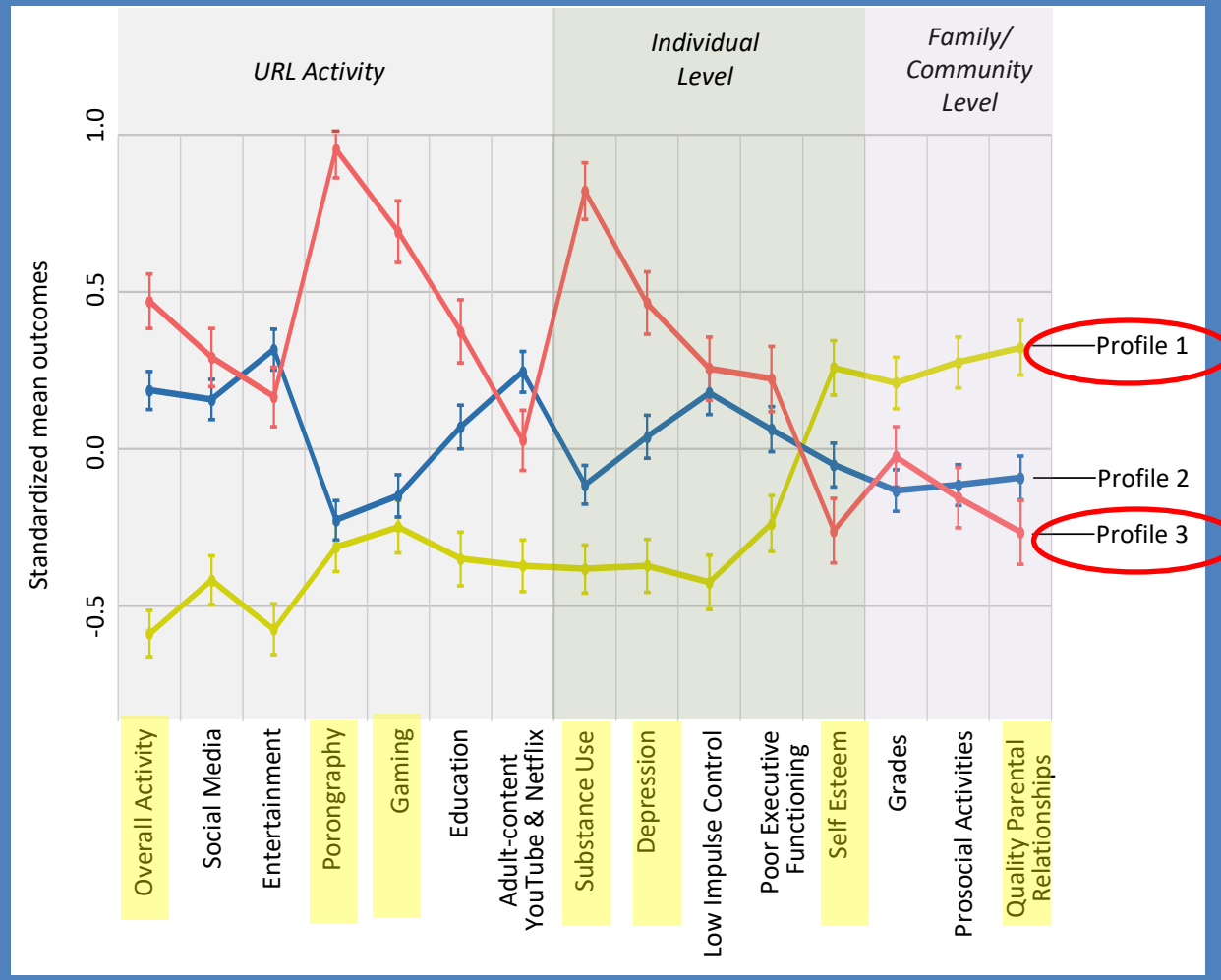
https://doi.org/10.1038/s41562-021-01187-5

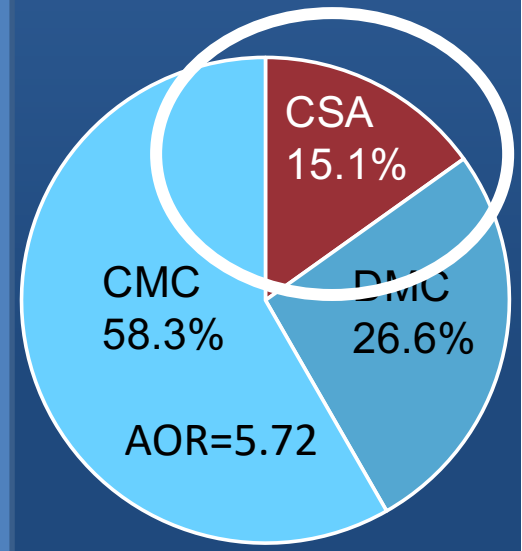
Check for updates

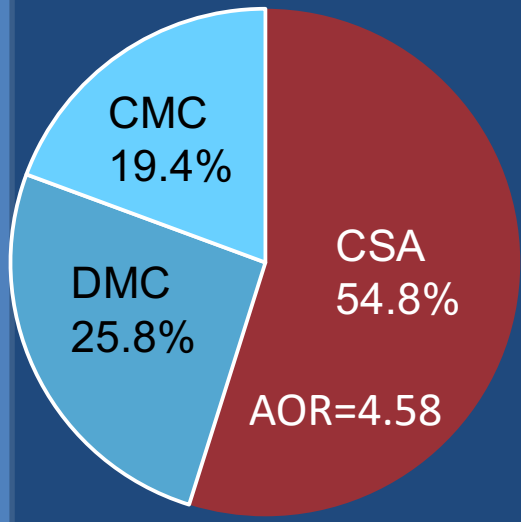
An observational study of Internet behaviours for adolescent females following sexual abuse

Jennie G. Noll[1,2,8]✉, Ann-Christin Haag[3,8]✉, Chad E. Shenk[1,4], Michelle F. Wright[5], Jaclyn E. Barnes[2], Mojtaba Kohram[2], Matteo Malgaroli[6], David J. Foley[7], Michal Kouril[2,9] and George A. Bonanno[3,9]

Latent Profile Analysis

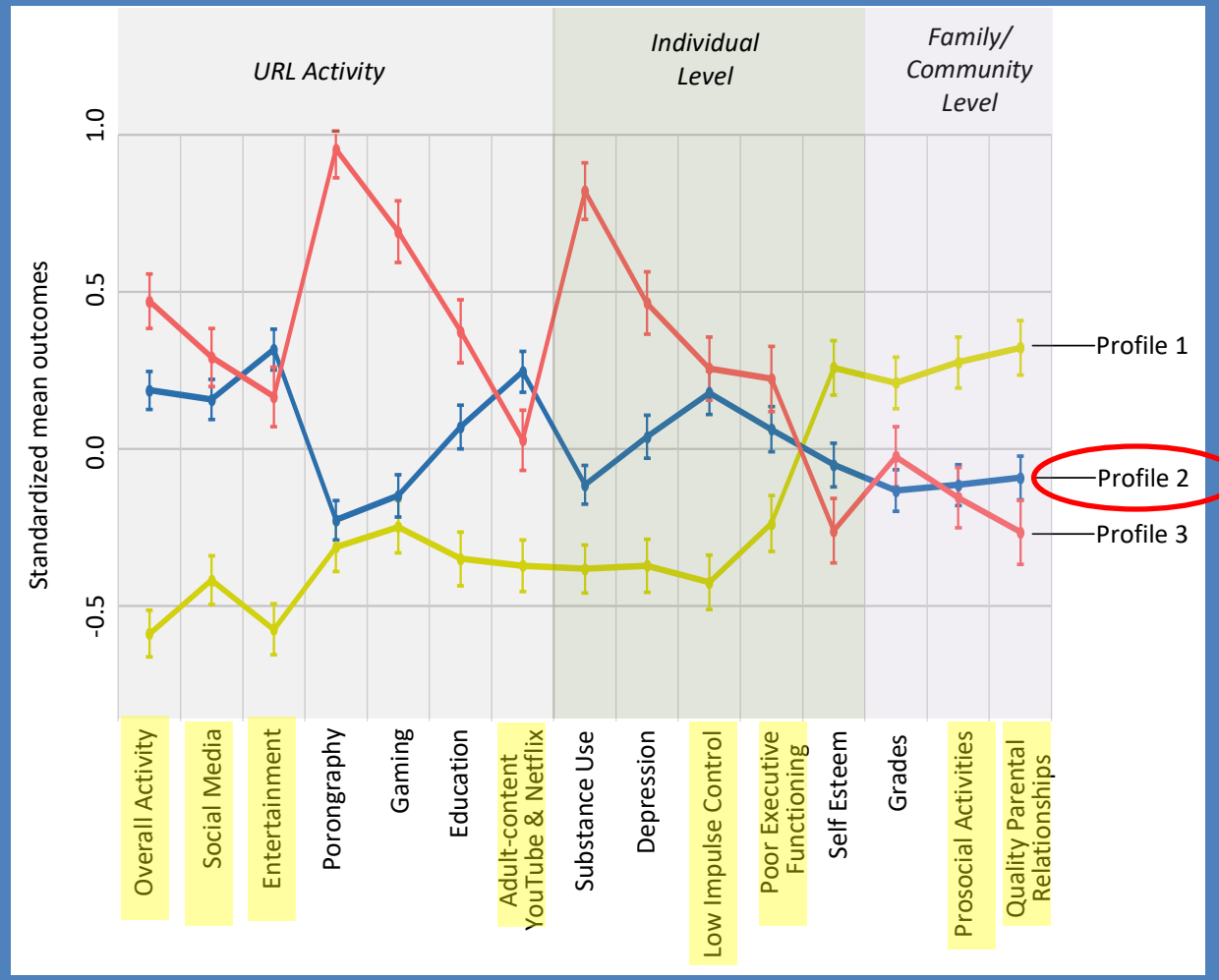


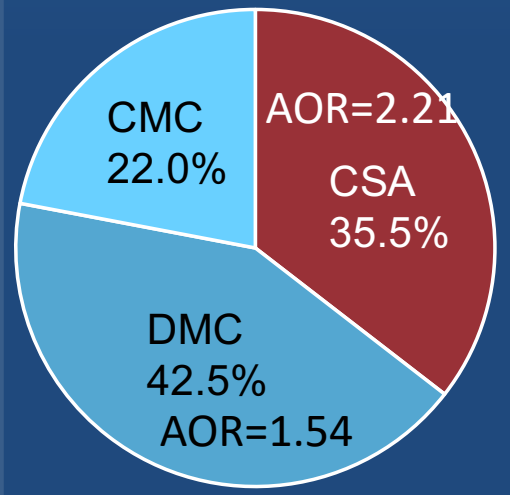




AORs adjusted for: Time 1 age, income, minority ethnicity, contamination, other forms of child maltreatment, and authentication mode

Latent Profile Analysis





AORs adjusted for: Time 1 age, income, minority ethnicity, contamination, other forms of child maltreatment, and authentication mode

Longitudinal findings 2 year followup

Cyberbullied (upset rating 'significant'):

CSA AOR=2.84

Profile 3 AOR=3.14

Online sexual solicitations (upset rating 'significant'):

Profile 3 AOR=2.63

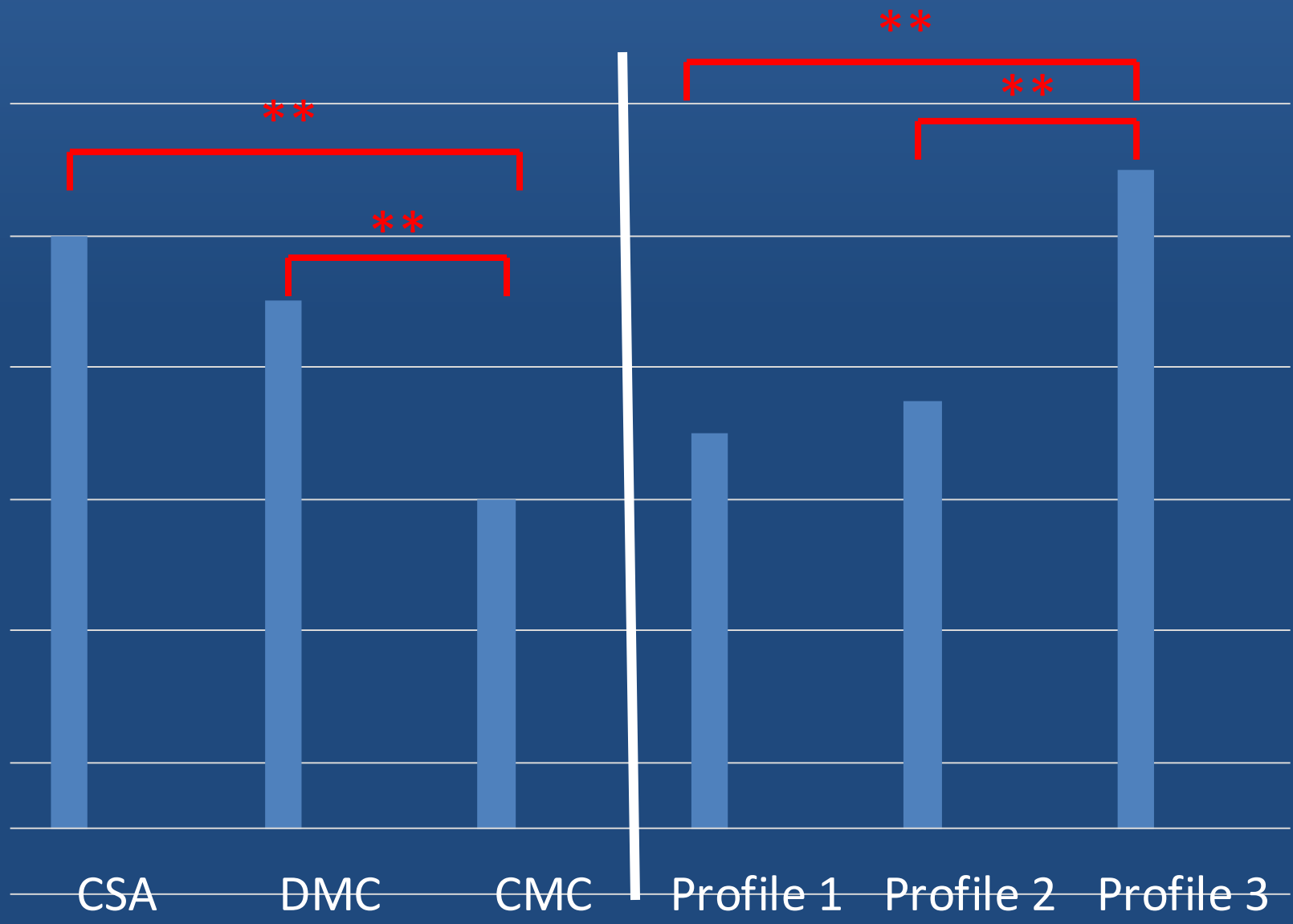
Met strangers off line resulting in assault or attempted assault:

CSA AOR=4.97

AORs adjusted for covariates: Time 1 age, income, minority ethnicity, contamination, other forms of child maltreatment, and authentication mode

Longitudinal findings:

Risky sexual activities 2 yr followoup



Covariates: Time 1 age, Time 1 sexual activities, income, minority ethnicity, contamination, other forms of child maltreatment, and authentication mode

What is driving the LPA findings?

Lasso Regression

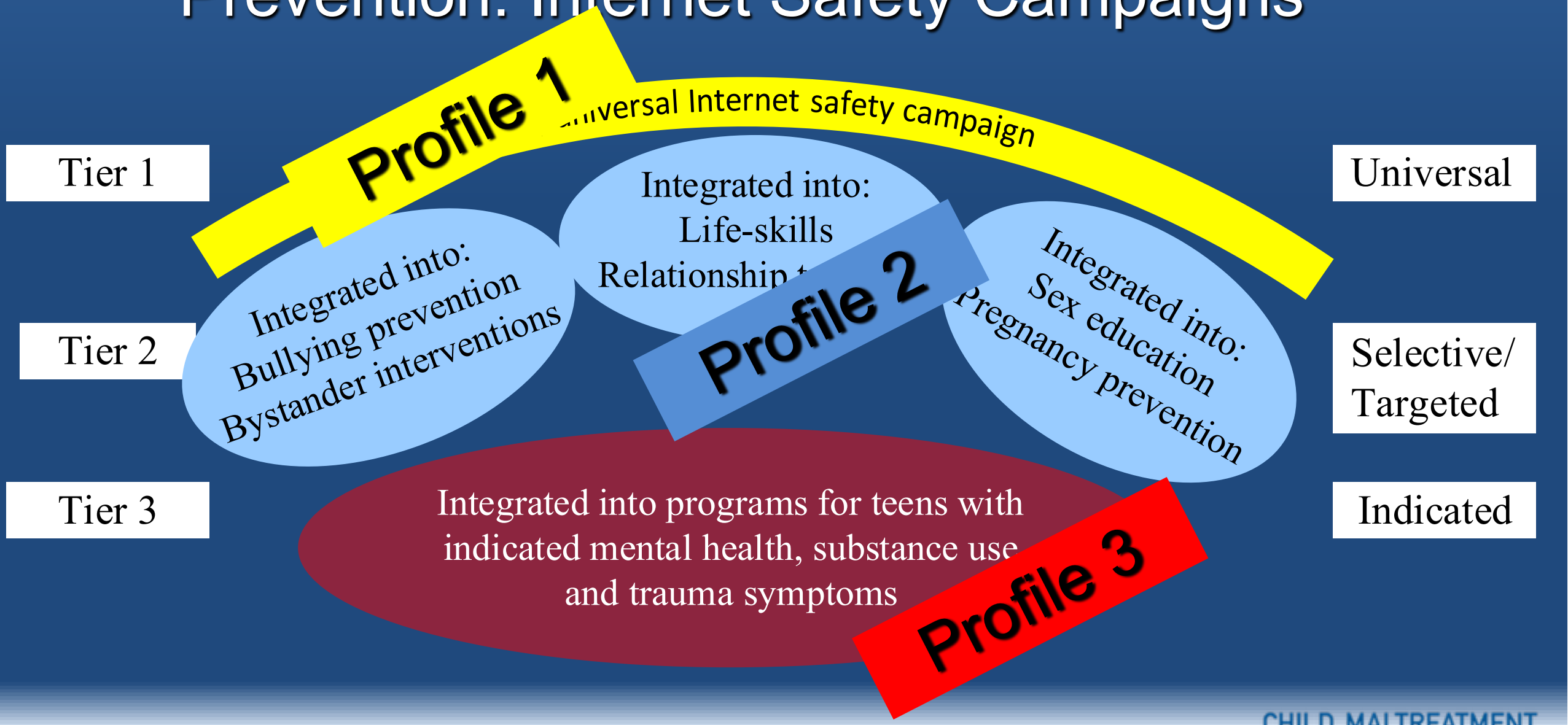
Machine-learning approach to reveal non-redundant features

Supplementary Table 10. Results of Least Absolute Shrinkage and Selection Operator (LASSO) regularized logistic and linear regressions

	Cyberbullied	Online sexual solicitations	Sexual activity
Predictor			
Overall activity	-	-	.001
Social Media	.001	.001	.002
Entertainment	-	-	-
Pornography	-	-	.002
Gaming	-	.003	.009
Education	-	-	-.067
Adult-content videos	-	-	-
Substance Use	.048	.068	.789
Depression	.018	.020	-
Low Impulse Control	.002	-	.068
Poor Executive Functioning	-	.001	.000
Self-Esteem	-.056	-.013	-.132
Grades	-.053	-.117	-
Prosocial Activities	-	.027	-.031
Parental Quality	-	.009	-.018
Model performance			
AUC	.66	.70	-
Lambda	.027	.010	.201
Accuracy	.78	.89	-
RMSE	-	-	6.38
R^2	-	-	.25

Tibshirani, R. Regression shrinkage and selection via the lasso. *J. R. Stat. Soc. B* **58**, 267–288 (1996)

Prevention: Internet Safety Campaigns



The Journal of Child Psychology and Psychiatry

The Association for Child and Adolescent Mental Health

Journal of Child Psychology and Psychiatry 61:3 (2020), pp 255–267 doi:10.1111/jcpp.131

Annual Research Review: Universal and targeted strategies for assigning interventions to achieve population impact

Kenneth A. Dodge

Sanford School of Public Policy, Duke University, Durham, NC, USA

Targeting maltreated kids can be thought of as targeted prevention

- Given that over 680K kids are victims of substantiated each year in the US
- 13% will be victims of child maltreatment by the time they turn 18
- 3.5M kids were subject to an investigation in 2018
- Even unsubstantiated allegations pose significant risk
- Greater access to treatment & targeted interventions will likely have an impact on overall rates

Policy and practice-relevant translation

1. Treatment of sexual abuse should include Internet safety education

2. Internet safety campaigns should be trauma-informed

3. If we can use the Internet for targeted marketing, why not partner with policy makers, Internet providers, and app developers for targeted prevention messaging based on Internet use patterns

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