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Understanding child abuse: From neurobiology to social policy

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Understanding Child Abuse: From Neurobiology to Social Policy

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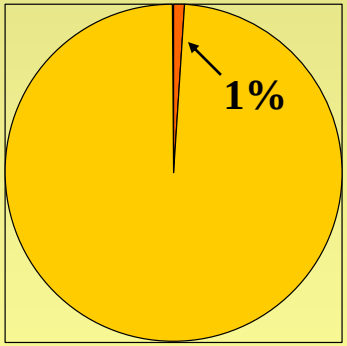
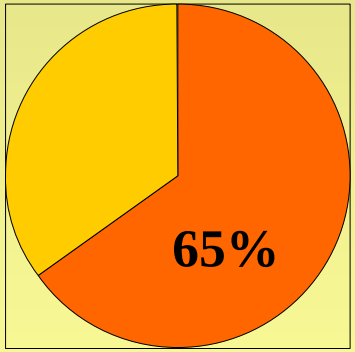
Rates of Child Maltreatment

- **2,974,000 annual reports of child abuse and neglect.**
- **826,000 confirmed cases per year.**
- **Many more cases which never come to the attention of authorities.**

Rates of Child Abuse among Child and Adolescent Psychiatric Patients

- **55% of child and adolescent inpatients have h/o abuse.**
- **35% of child and adolescent outpatients have h/o abuse.**





In Connecticut, children in State custody comprise 1% of the child population, and 65% of child psychiatric inpatients

Childhood Abuse and Psychiatric and Substance Use Disorders

Table 2. Childhood Sexual Abuse (CSA) by Self-report and the Odds Ratios for Psychiatric and Substance Use Disorders*

	Odds Ratio (95% CI)			
Diagnosis	Any CSA (n = 1403-1410)	Nongenital CSA (n = 1089-1094)	Genital CSA (n = 1179-1183)	Intercourse (n = 1097-1101)
Major depression	1.93† (1.52-2.44)	1.37 (0.93-2.03)	1.73† (1.27-2.36)	3.14† (2.08-4.75)
GAD	1.89† (1.41-2.53)	1.48 (0.92-2.40)	1.59‡ (1.08-2.35)	2.94† (1.90-4.55)
Panic disorder	1.89§ (1.19-3.00)	1.45 (0.63-3.32)	1.78 (0.97-3.27)	2.55§ (1.29-5.02)
Bulimia nervosa	1.61 (0.78-3.34)	1.80 (0.52-6.22)	0.53 (0.13-2.13)	3.30§ (1.37-7.96)
Alcohol dependence	2.80† (1.88-4.16)	2.42§ (1.27-4.61)	2.39† (1.42-4.01)	4.01† (2.33-6.91)
Drug dependence	3.09† (1.89-5.03)	2.93§ (1.39-6.16)	1.97‡ (1.01-3.85)	5.70† (3.04-10.69)
≥2 Disorders	2.58† (1.96-3.40)	1.61‡ (1.02-2.56)	2.04† (1.43-2.92)	5.47† (3.56-8.40)

*CI indicates confidence interval; GAD, generalized anxiety disorder.
†P<.001.
‡P<.05.
§P<.01.

Kendler et al., 2000

CARE Program: Mission

Child and Adolescent Research and Education Program

The CARE program is dedicated to work with maltreated children and their families. The focus of the CARE program is broad and spans from neurobiology to social policy. Our ultimate goal is to better understand risk and resiliency in abused children, and to utilize what we learn to develop effective interventions and social policies to help each maltreated child reach his or her potential.

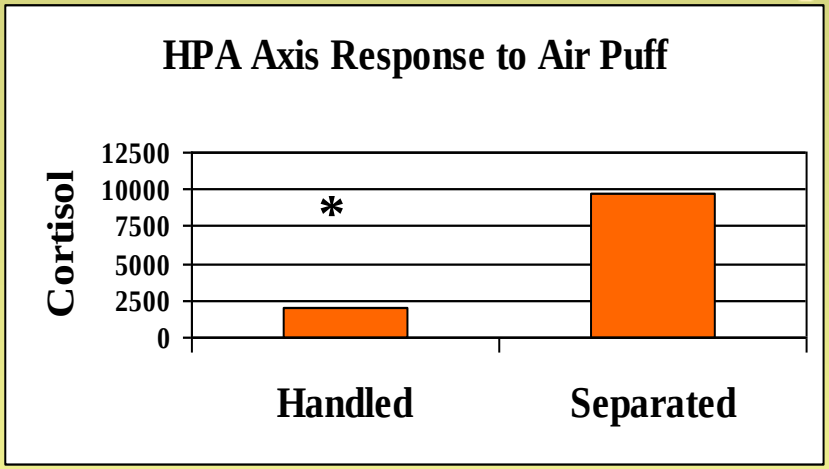
Rationale for Broad Program Focus

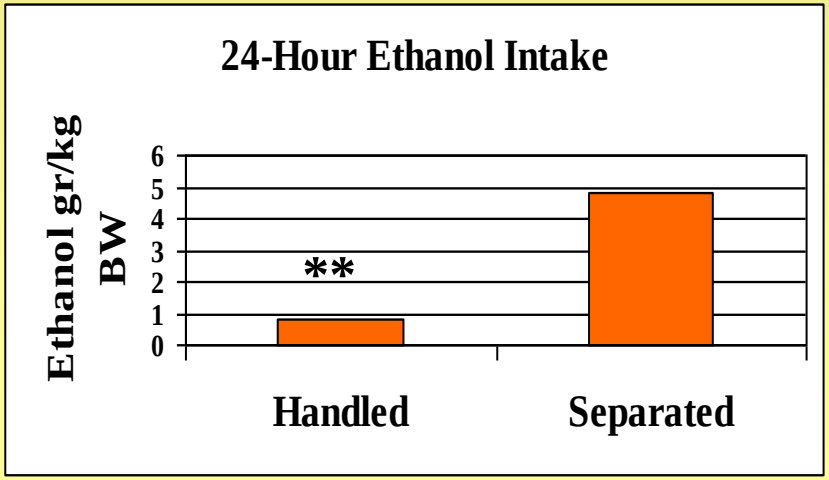
- **The focus on *neurobiology* derives from preclinical (e.g. animal) and clinical studies that suggest that stress early in life can promote long-term changes in stress reactivity and brain development.**
- **The focus on *social policy* comes from knowledge of the problems that can occur once maltreated children enter the system which increase the likelihood of the development of long-term mental health and other problems (e.g. separation from siblings, multiple changes in placements, congregate care, re-abuse).**

Translational Research Approach

Central Tenet: Preclinical (e.g., animal) studies – especially studies on the effects of early stress – can help to guide hypotheses about the causes, prevention, and treatment of stress related psychiatric illnesses.

Effects of Maternal Separation on Adult Stress Reactivity and Alcohol Consumption





Huot, Meaney, Thrivikramen, Plotsky, 2001

- Maternal separation associated with long term changes in stress reactivity and alcohol consumption
- Stress-induced cortisol correlates 0.9 with ethanol intake
- Effects reversed with SSRI intake

Social Policy Work:
Adoption and Safe Families Act (P.L. 105-89)

GOAL: Promote Permanency for maltreated children in out-of-home care.

Permanency can be attained via:

1 – Reunification with birth families.

2 - Adoption.

3 - Guardianship granted to kin.

Data Promoting the Passing of P.L. 105-89

- **Average length of stay in foster care estimated at 2 years.**
- **One-third of children in care spend the majority of their lives in "foster-care drift".**
- **Time to permanency/adoption drawn out:**

  3-4 years from placement to filing for TPR.

  1-2 years from filing to TPR ruling.

  2-5 years to finalize appeals process.

Components of the Adoption and Safe Families Act (P.L. 105-89)

- **A child's *health and safety are paramount* concerns in making decisions about the removal of a child from, and the return of a child to the birth family.**
- **It was not necessary to demonstrate *reasonable efforts* if a parent subjected the child to aggravated circumstances, committed a felony assault to the child or another child of the parent, had their rights to a sibling have terminated involuntarily, or committed murder of another child of the parent.**
- **If a child has been in foster care under the responsibility of the State for 15 of the most recent 22 months, the State shall file a petition to *terminate the parental rights* of the child's parents.**

Promoting Permanence for Maltreated Children: The Connecticut Model

SAFE Homes Programs

- **Short-term group homes**
- **Community based**
- **Evaluation**
- **Treatment planning**

SAFE Homes: Record Review Study

Subjects: 342 SAFE Home Cases
342 Traditional Foster Care Cases

First-time placements, 3-12 years of age at initial placement, propensity score matched cases from a larger cohort of 909 children.

Design: Longitudinal Record Review

Duration: 12-Month Follow-up

Child Abuse and Neglect, 2005

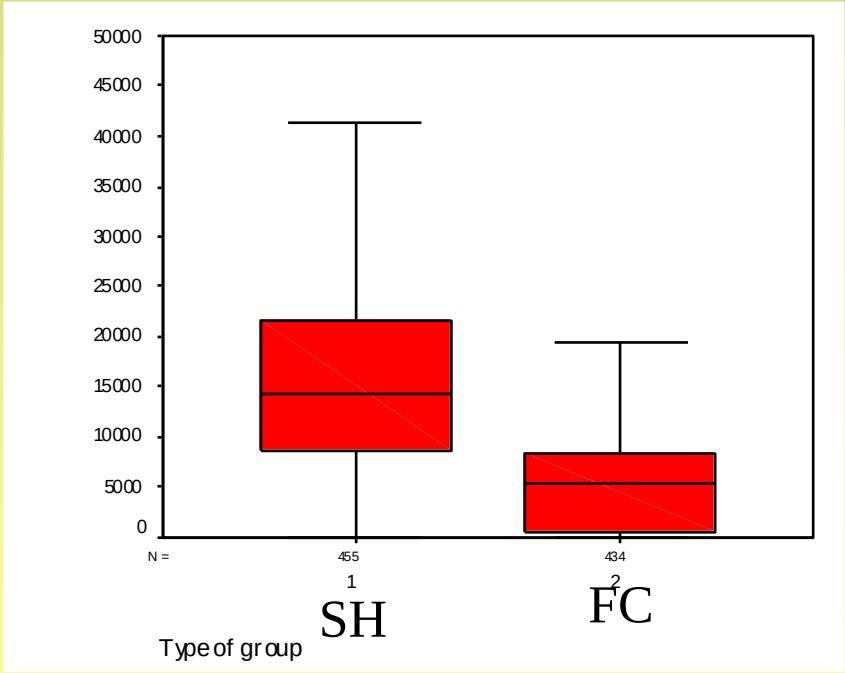
SAFE Homes: Record Review Study

Primary Outcomes:

- **Number of out-of-home placements**
- **Duration in out-of-home care**
- **Location at one-year follow-up**
- **Placement with siblings/town of origin**
- **Rates of Re-abuse**
- **Cost of out-of-home placements**

Cost for Out-of-Home Care

While the SH and FC children spent a comparable time in placement, the total cost for the out-of-home care of the children who were originally placed in the SAFE Homes was twice the total out-of-home care expenditures of the children who went to traditional foster care



Conclusions: Record Review Study

- **Children are experiencing fewer placements in out-of-home care.**
- **Improvement in outcome observed in SAFE Homes and Foster Care cases.**
- **Changes appear due to a paradigmatic shift in practice.**

Unanswered Questions:

SAFE Homes: Is it Worth the Cost?

Are children and families doing better since the initiation of SAFE Homes?

SAFE Homes: Prospective Study

- **Two-Year Prospective Longitudinal Study**
- **Service Use and Child Well Being**

Study of the Effects of Trauma on Children

State of Connecticut
Department of
Children and Families

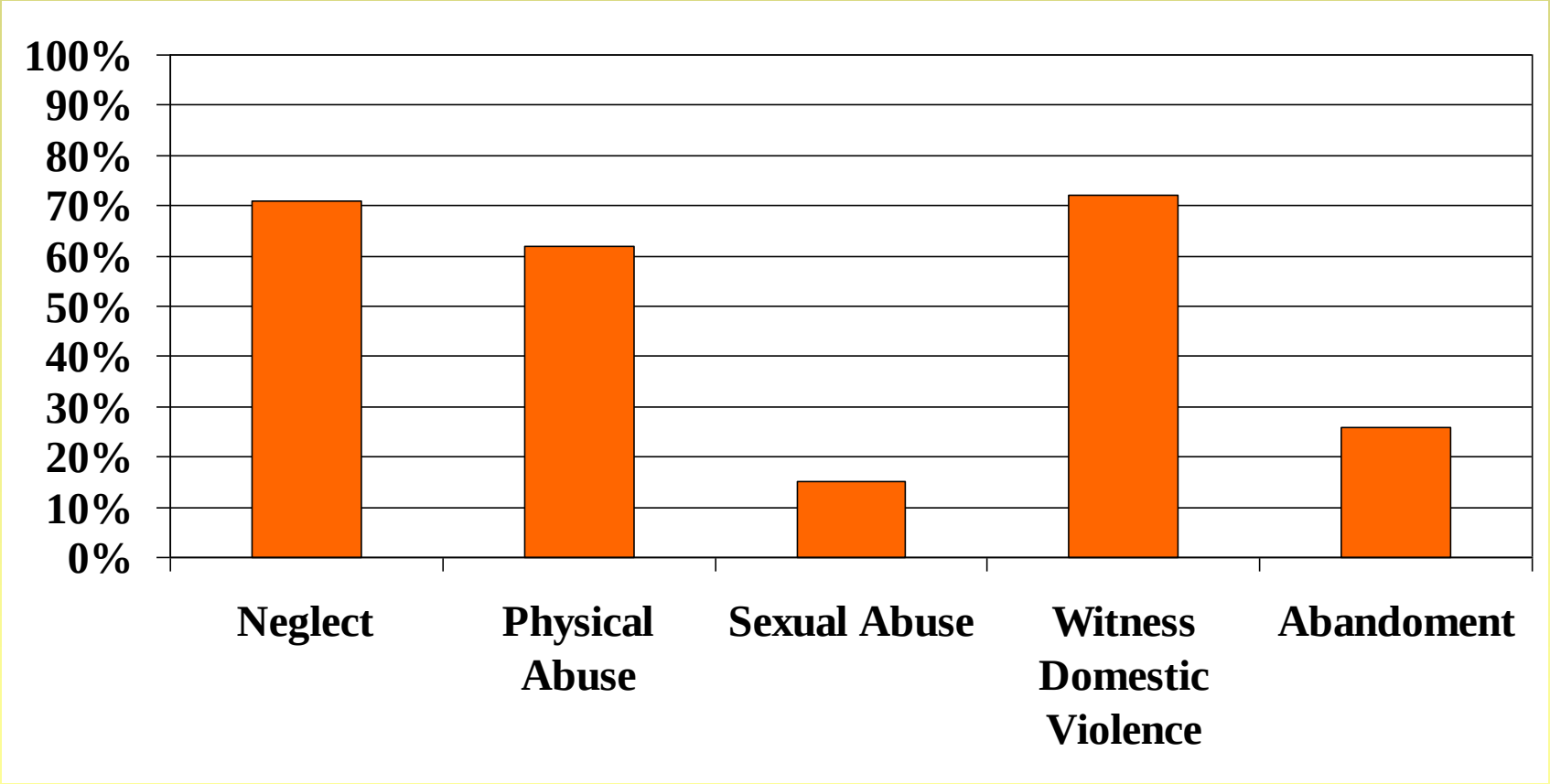
together with

Yale University's
C.A.R.E. Program

requests a moment of
your time…

- **A study within the SAFE Homes program evaluation study.**
- **Examination of genetic and environmental risk and protective factors.**
- **Assessments in Day Camp set up specifically for research purposes.**

Trauma Histories of Children (N=116)



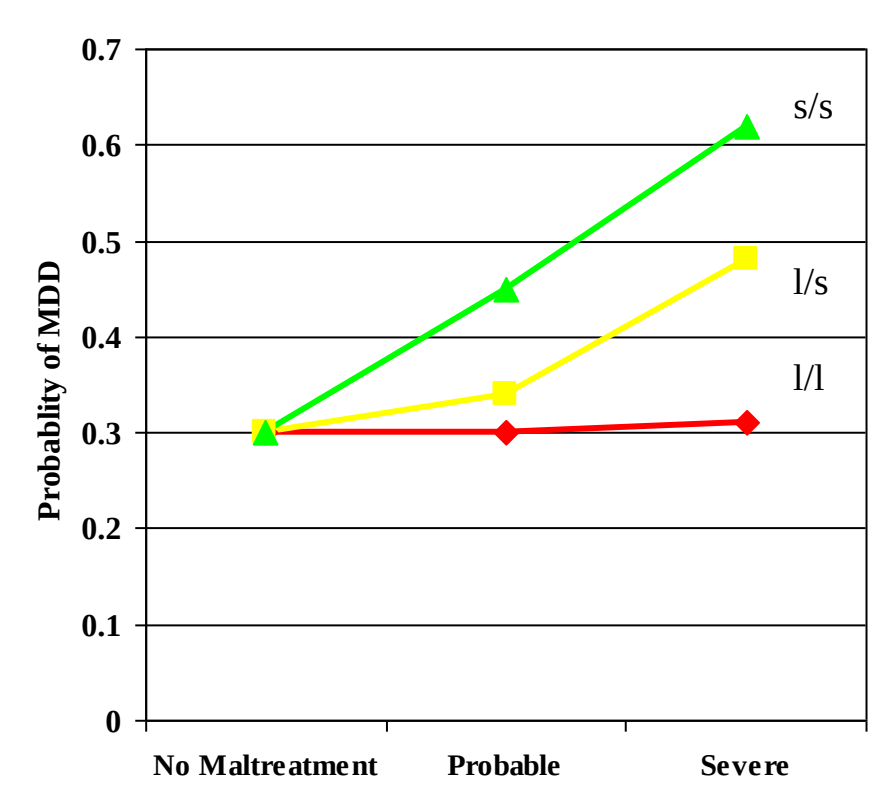
Genetic and Environmental Modifiers of Depression in Children

Joan Kaufman*†, Bao-Zhu Yang*‡, Heather Douglas-Palumberi*, Shadi Houshyar , Deborah Lipschitz*, John H. Krystal*‡, Joel Gelernter*‡

*Department of Psychiatry, Yale University School of Medicine, New Haven, CT 06511; ‡Clinical Neuroscience Division, National Center for Post-Traumatic Stress Disorder, Veterans Affairs Healthcare Center, West Haven, CT 06516; and Department of Psychology, Yale University, New Haven, CT 06511

Proceedings of the National Academy of Sciences;2004;101:17317-17321

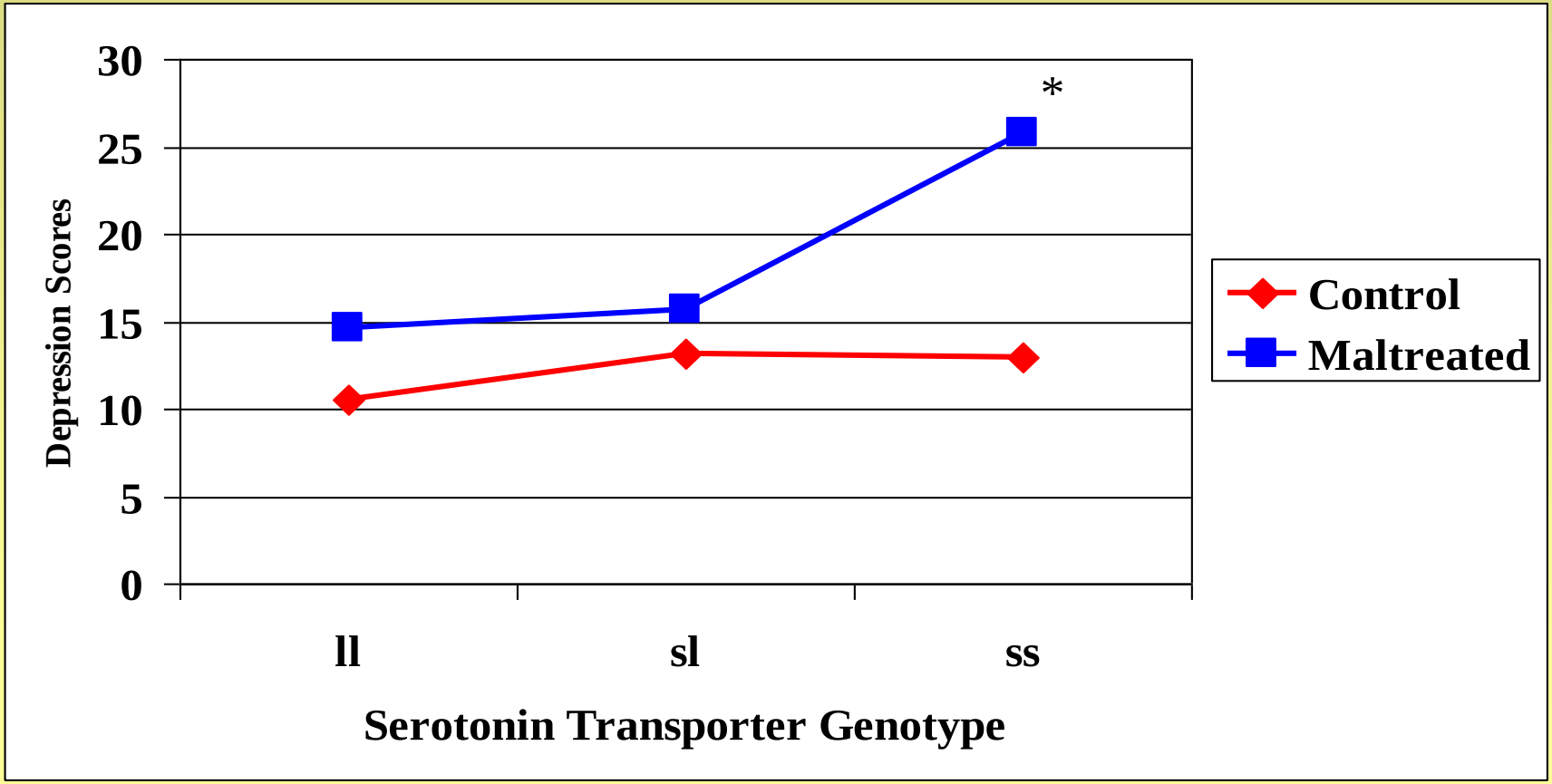
Serotonin Transporter (5-HTT) Gene Found to Moderate Influence of Stress on Depression



Caspi et al, 2003

- Short version of 5-HTT gene only associated with depression in the context of recent life stress or early child maltreatment
- Low rates of depression observed in individuals with history of severe maltreatment with l/l genotype

5-HTTLPR x Maltreatment Interaction in Predicting Depression Scores in Children (N=101)



BDNF - 5-HTTLPR Gene Interactions and Environmental Modifiers of Depression in Children

Joan Kaufman*†, Bao-Zhu Yang*‡, Heather Douglas-Palumberi*, Damion Grasso*, Deborah Lipschitz*, Shadi Houshyar§, John H. Krystal*‡, Joel Gelernter*‡

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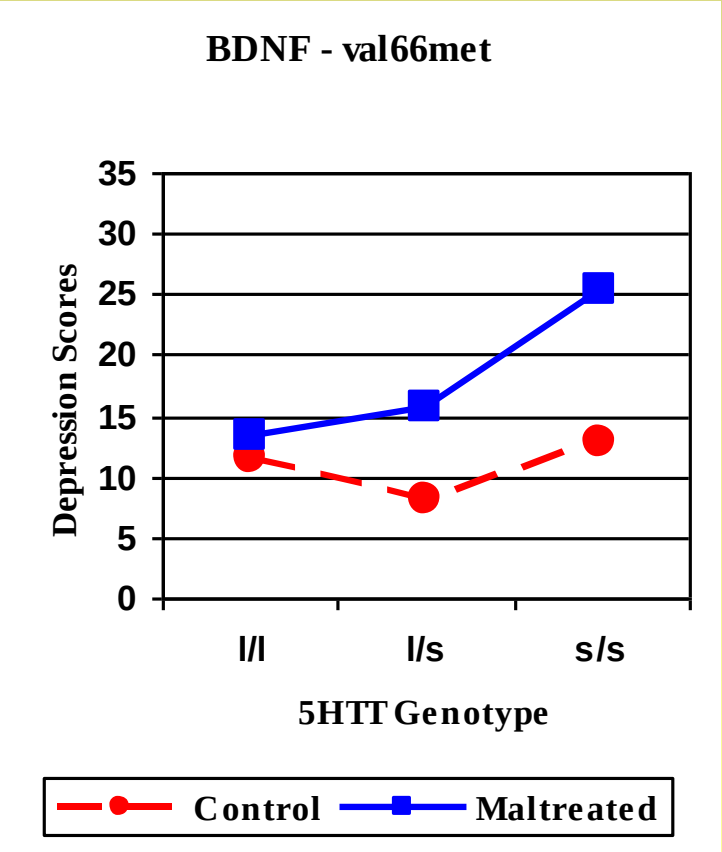
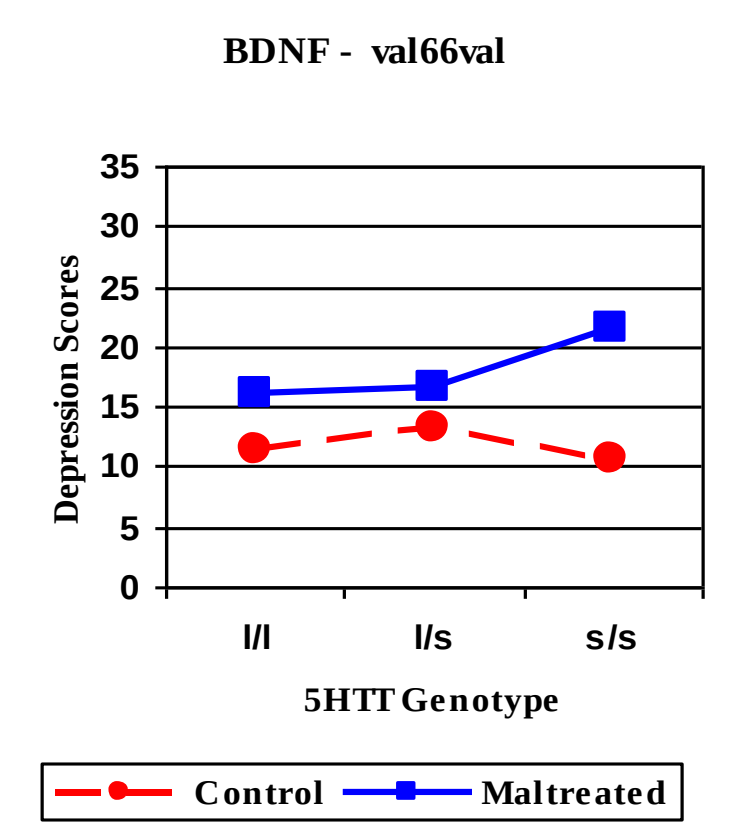
Biological Psychiatry, 2006

Rational for Examining BDNF Polymorphism

- **Gene-Gene interactions hypothesized in the etiology of depression.**
- **BDNF genetic variation recently associated with child onset depression in two independent samples**
- **Both BDNF (i.e., the protein product of the BDNF gene) and serotonin (5-HT) have been implicated in the etiology of depression, and both are also known to interact at multiple intra- and intercellular levels**

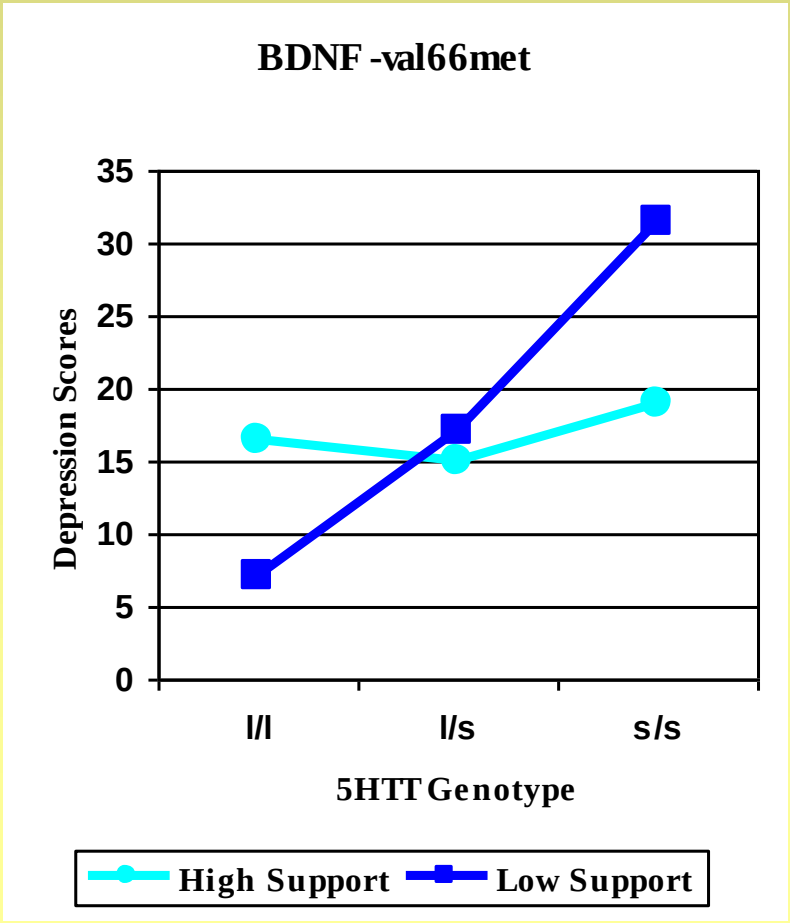
5-HTTLPR x BDNF x Maltreatment Interaction in Predicting Depression Scores in Children (N=196)

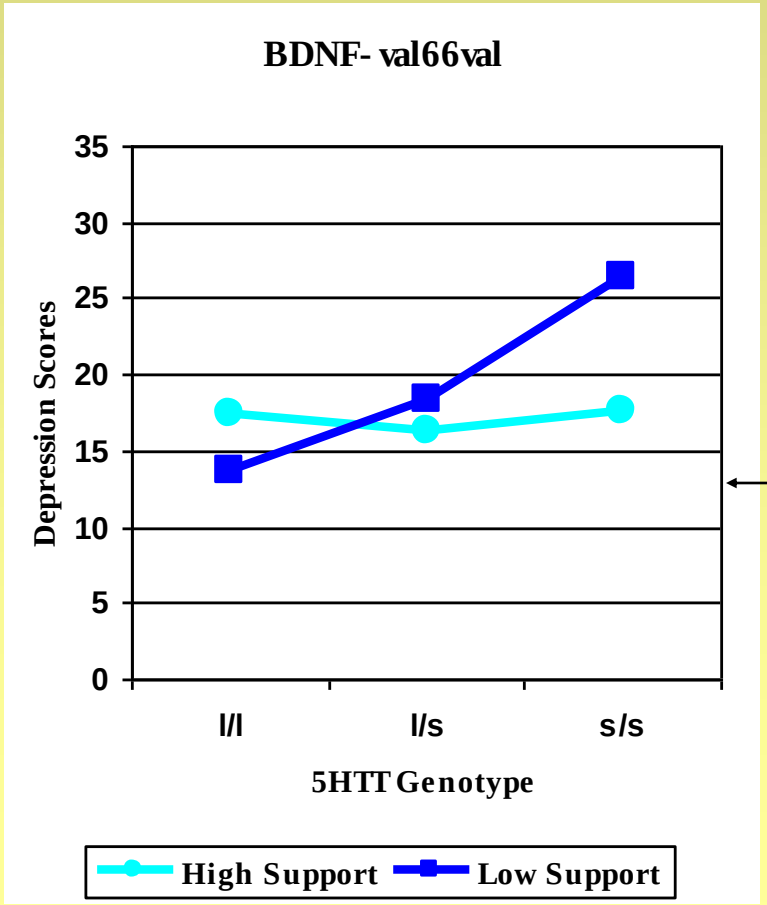




Four-Way Interaction Between 5-HTTLPR, BDNF, Maltreatment, and Social Supports (N=196)

Maltreated Children's Data





Mean Depression Score of Controls

Genetic and Environmental Predictors of Early Alcohol Use

Joan Kaufman*†, Bao-Zhu Yang*‡, Heather Douglas-Palumberi*, Mindy Crouse Artus*, Deborah Lipschitz*, John H. Krystal*‡, Joel Gelernter*‡

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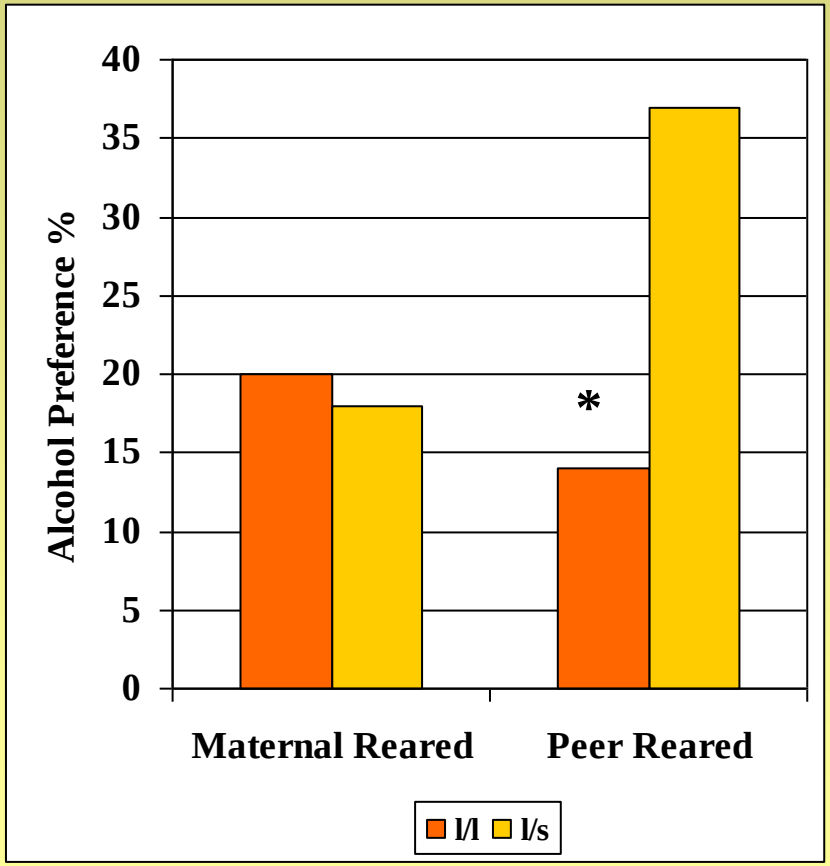
Biological Psychiatry, 2007

Rational for Examining 5-HTTLPR in Predciting Early Alcohol Use

- Serotonin critical modulator of the stress response
- Serotonin key neurotransmitter in brain reward circuitry
- Serotonin released in response to alcohol
- Alcohol dependence associated with serotonergic system dysregulation

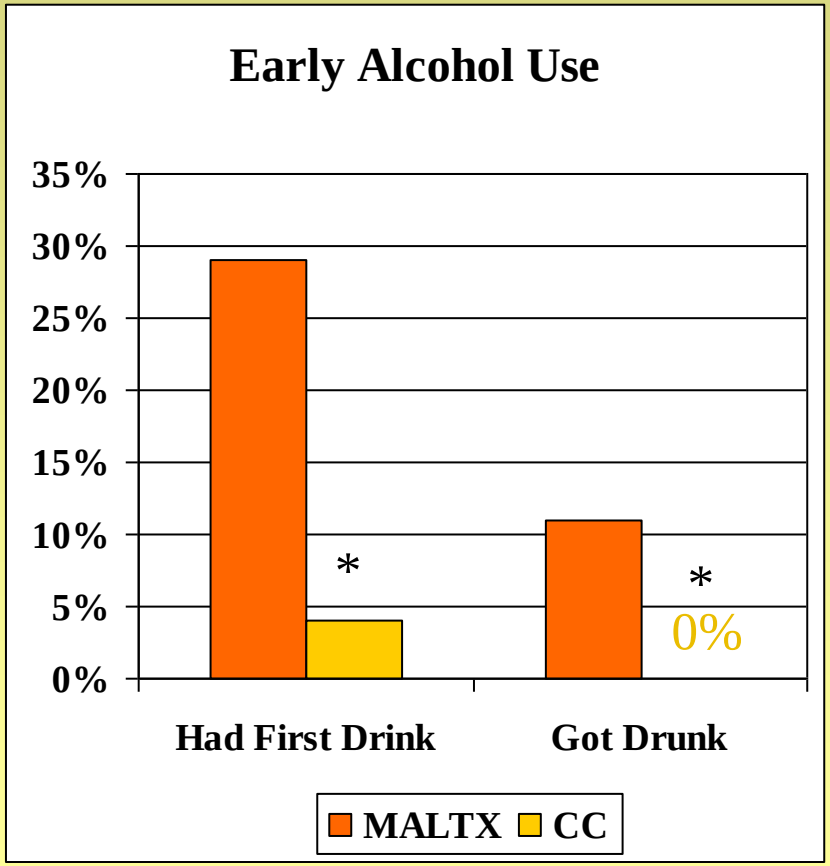
Interaction Between 5-HTTLPR and Rearing Condition in Non-Human Primates



Barr et al., 2004

- Serotonin Transporter gene polymorphism (5-HTTLPR) found to moderate effects of early rearing
- Peer rearing associated with increased alcohol consumption, but only in primates with short allele (s) of 5-HTTLPR
- Short allele not associated with increased alcohol consumption in mother-reared condition

Proportion of Maltreated and Control Children who Experimented with Alcohol



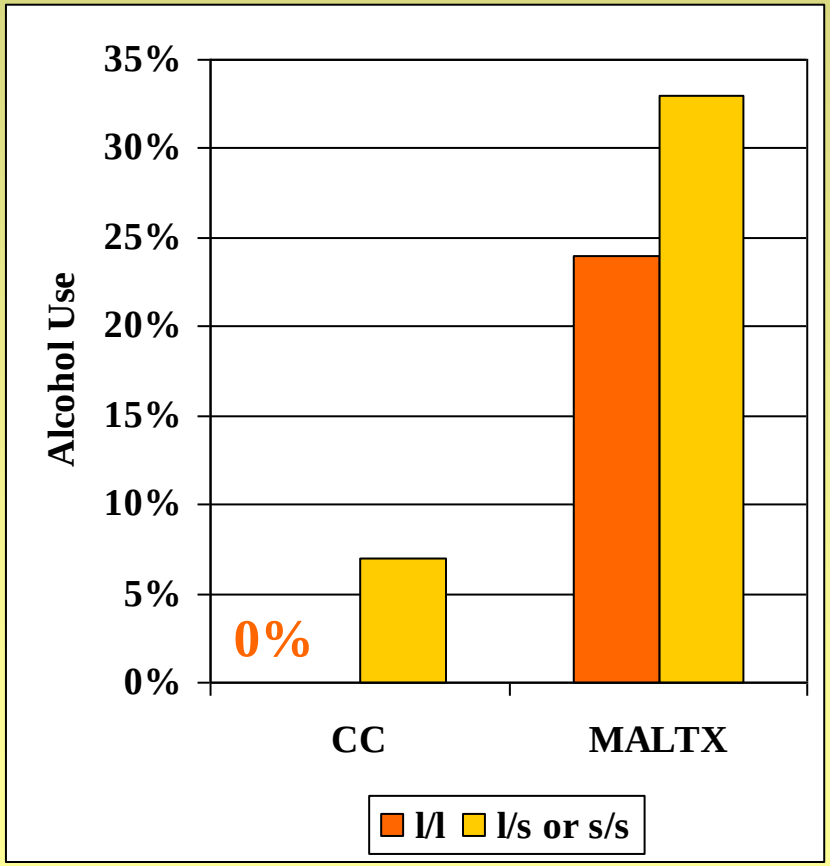
- At the two-year follow-up, maltreated children were statistically more likely to have experimented with alcohol than controls.
- Of the children who had experimented with alcohol, the children in the maltreated group did so on average more than 2 years earlier than controls (11.2 versus 13.5).
- Maltreated children were also statistically more likely to have had an experience of getting drunk.

Effect of Maltreatment and 5-HTTLPR in Predicting Early Alcohol Use (N=127)

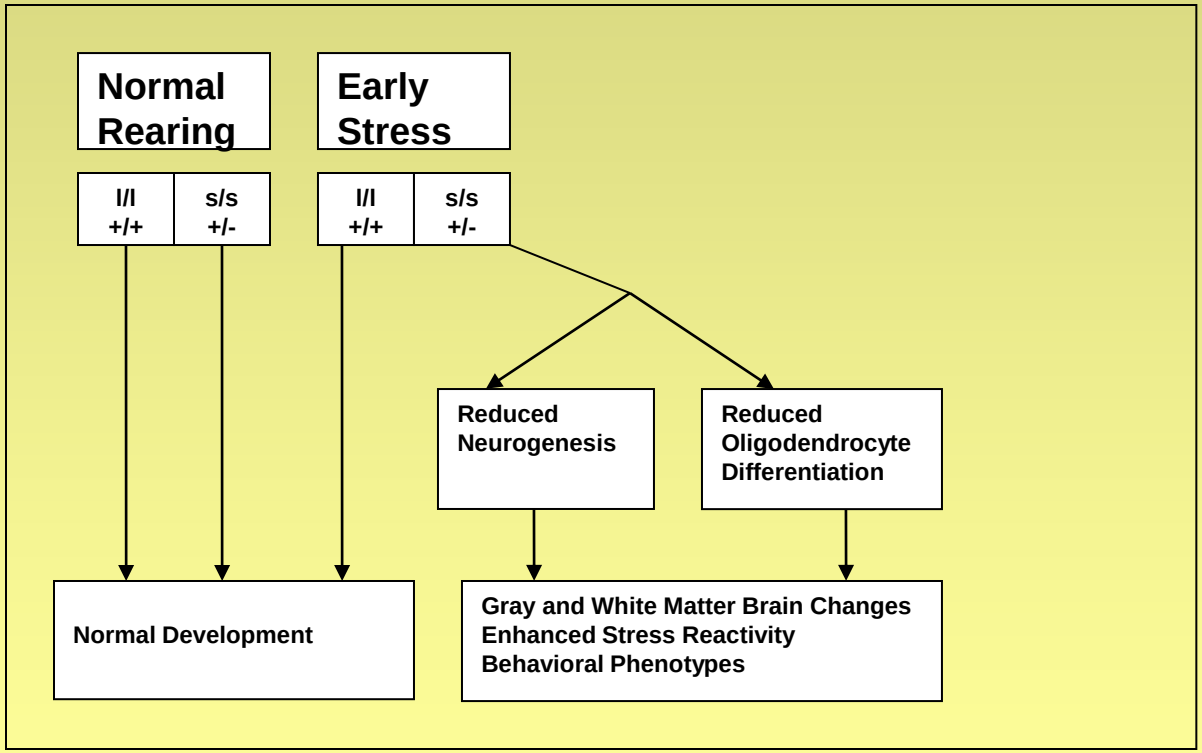
Source	Df	χ^2-Square	Significance
Age	1	3.14	.08
Sex	1	0.01	ns
Ancestral Proportion Score	1	2.24	ns
Family History Alcohol/Substance Use Disorders	1	3.04	.08
Maltreatment	**1**	**4.84**	**.03**
5-HTTLPR	**2**	**22.30**	**.0001**
5-HTTLPR x Maltreatment	**2**	**35.75**	**.0001**

5-HTTLPR x Maltreatment Effects on Early Alcohol Use

- **After controlling for family history of alcohol and substance use disorder, GxE significant**
- **Rate of early alcohol use greatest in maltreated children with one or more ‘s’ allele of 5-HTTLPR**



Hypothesized Mechanism by Which Early Stress Leads to Psychopathology

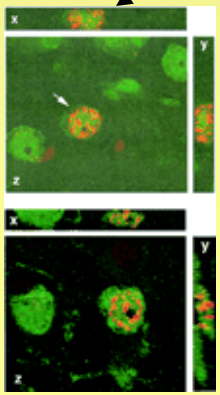


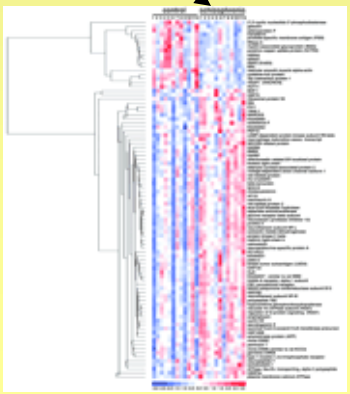
Translational Approaches to the Study of Early Stress, Psychopathology, and Resilience in Children

- **Rodent and primate models will be utilized to study the effects of genotype and early stress on brain development in prepubescent animals and across the lifecycle.**
- **Key Brain Regions: Corpus Callosum; Hippocampus**
- **Histological Studies of neural stem cell proliferation and differentiation of: 1) Neurons; 2) Oligodendrocytes**
- **Microarray Analyses: 1) Neurotrophic Factors and Signaling Factors; 2) Myelin-Related Genes**
- **Imaging genomics studies examining emotion processing and reward circuitry**

s/l vs. l/l

5-HTT (+/+) vs. 5-HTT (+/-)





SAFE Homes Program Prospective Evaluation

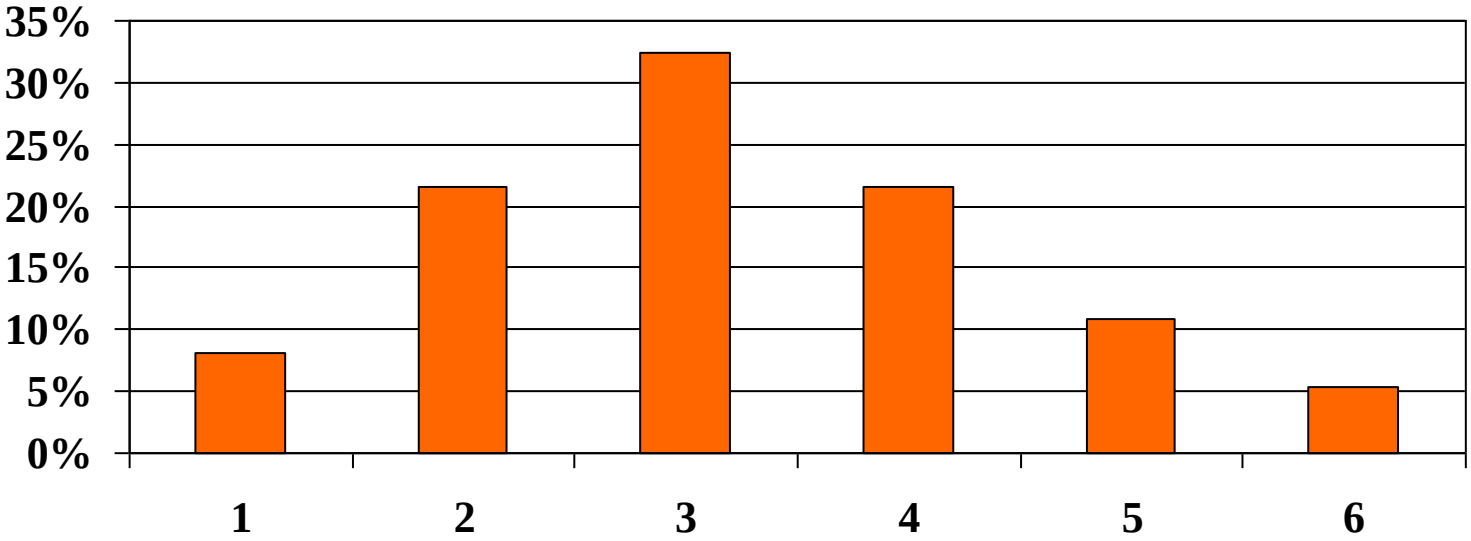
Sample: 116 children

82% (N=95) first time placement children

18% (N=21) with prior placements

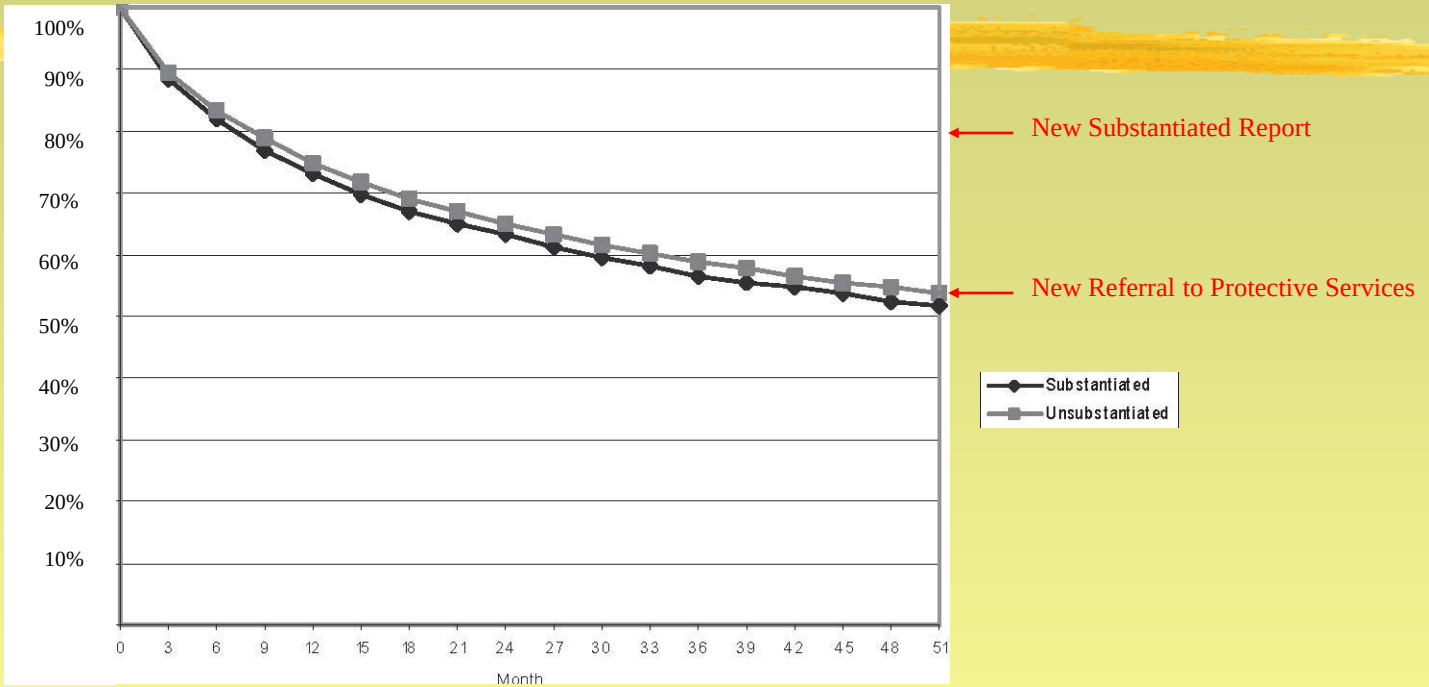
86% (N=100) children placed in SAFE home at Baseline

Years of DCF Contact Prior to Index Removal



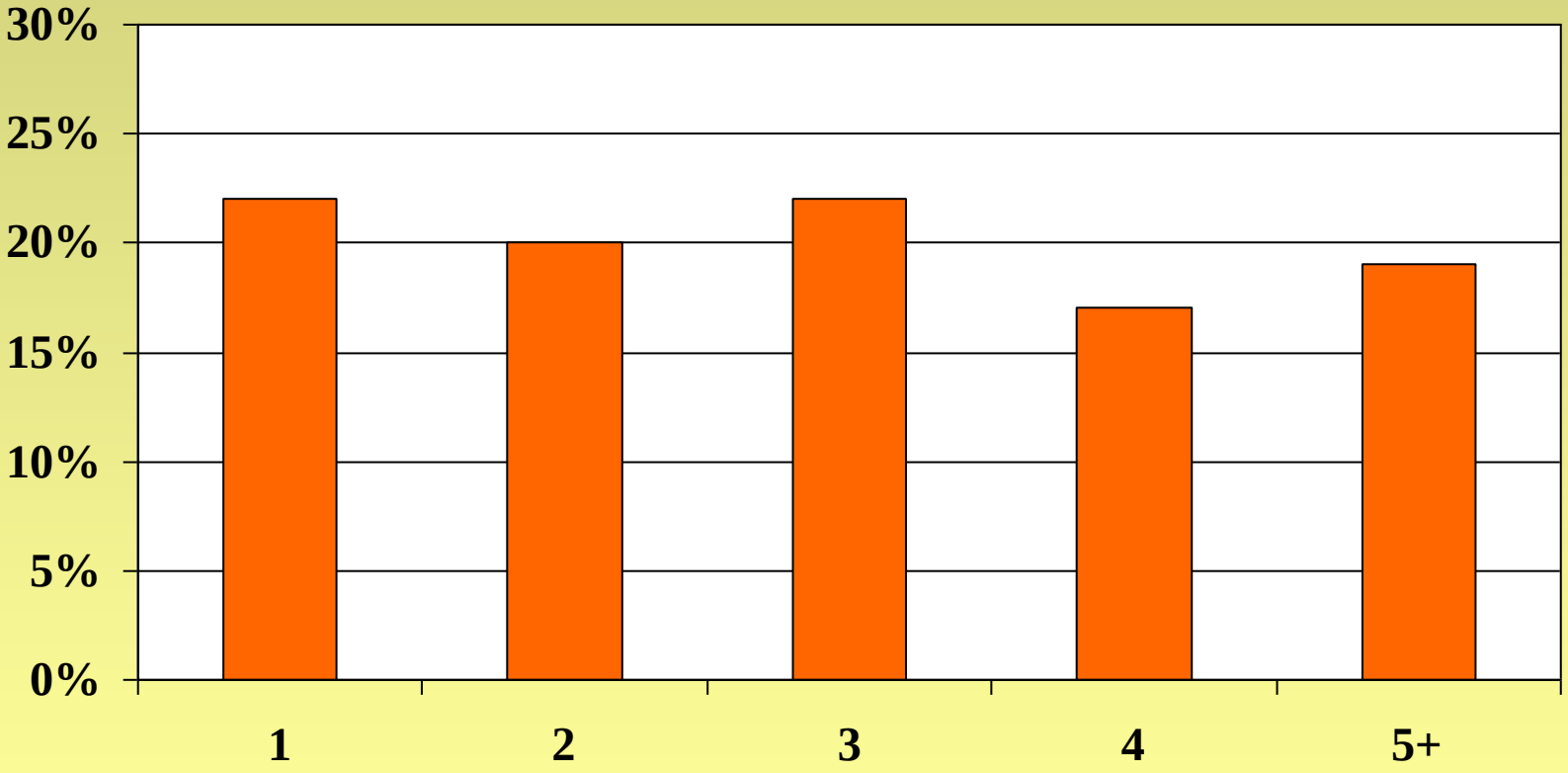
Approximately 70% of the sample first came into contact with DCF 3 or more years prior to the child's target removal, and 75% of the children had 2 or more prior substantiated reports of abuse or neglect before the event that precipitated removal.

RECIDIVISM – Drake et al., 2003



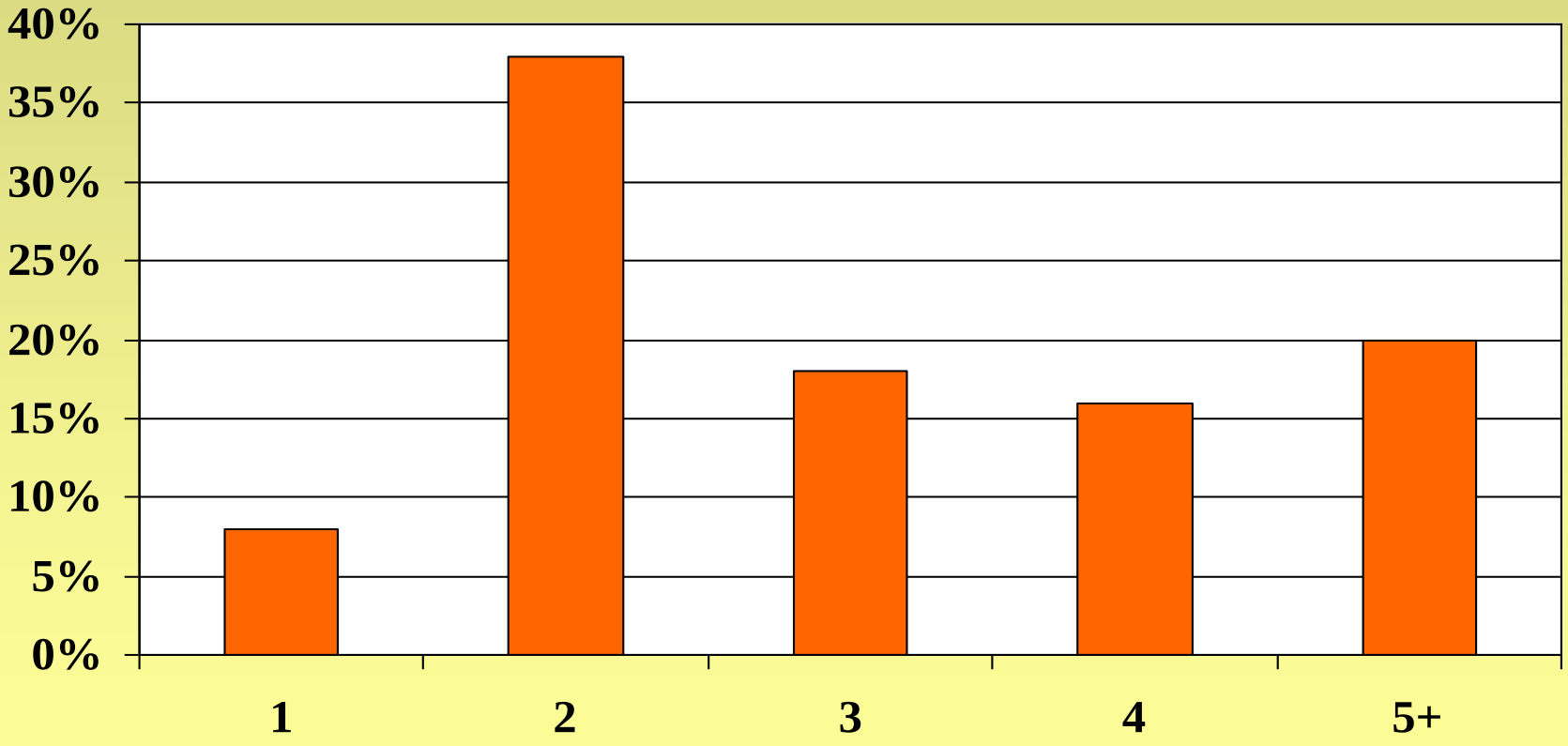
- **Outcomes of 52,943 first-time referrals to Missouri CPS.**
- **Within 4.5 years, 50% of the cases will be re-referred to CPS, 20% of the cases will have a new substantiated report.**
- **Substantiated *and* unsubstantiated cases at high-risk of recidivism.**

Total Number of Substantiated Reports of Maltreatment by Two-Year Follow-Up

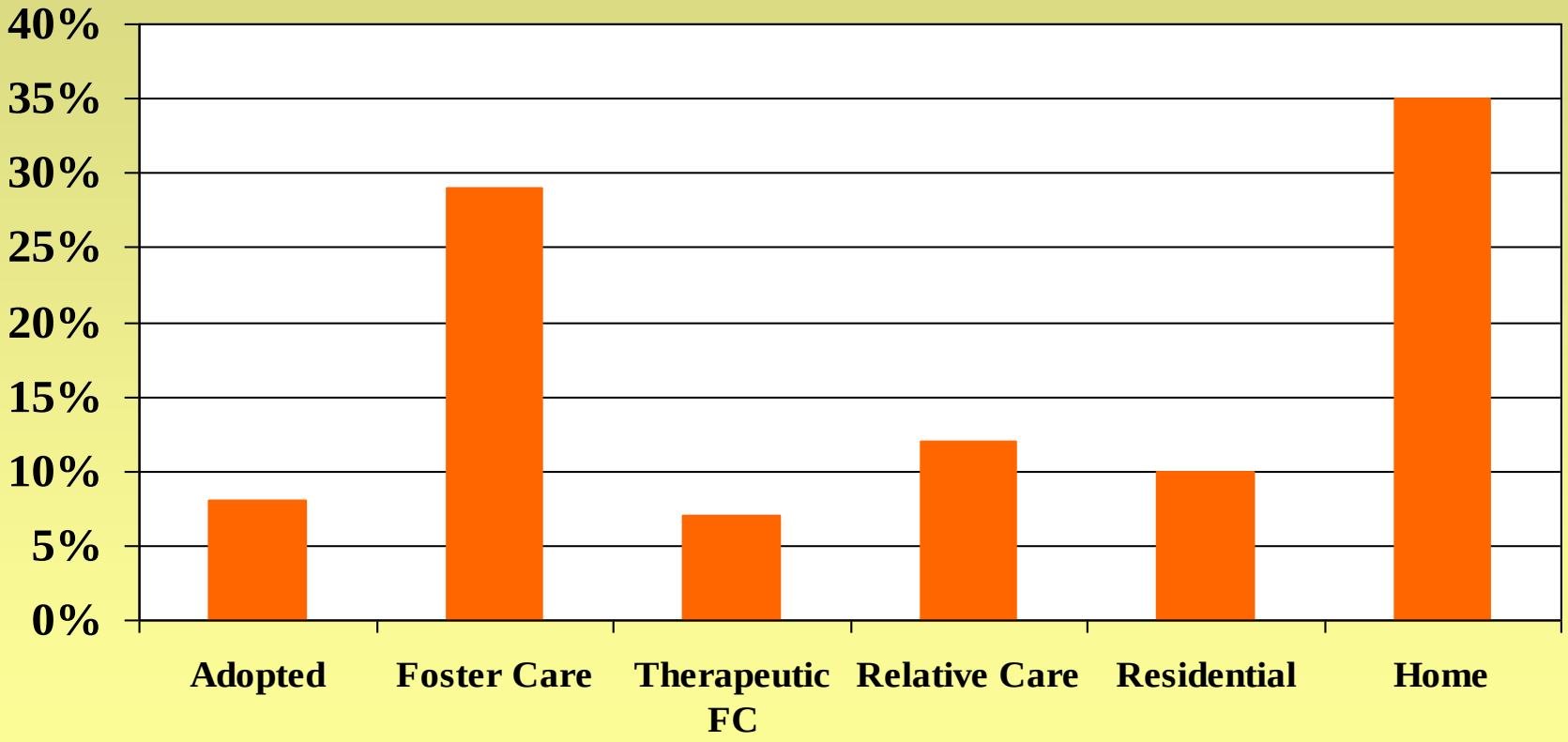


By the end of the one-year follow-up approximately 20% of the Children had a new substantiated report, by the two-year follow-up, 42% of the children had a new substantiated report.

Number of Out-of-Home Placements by Two-Year Follow-up

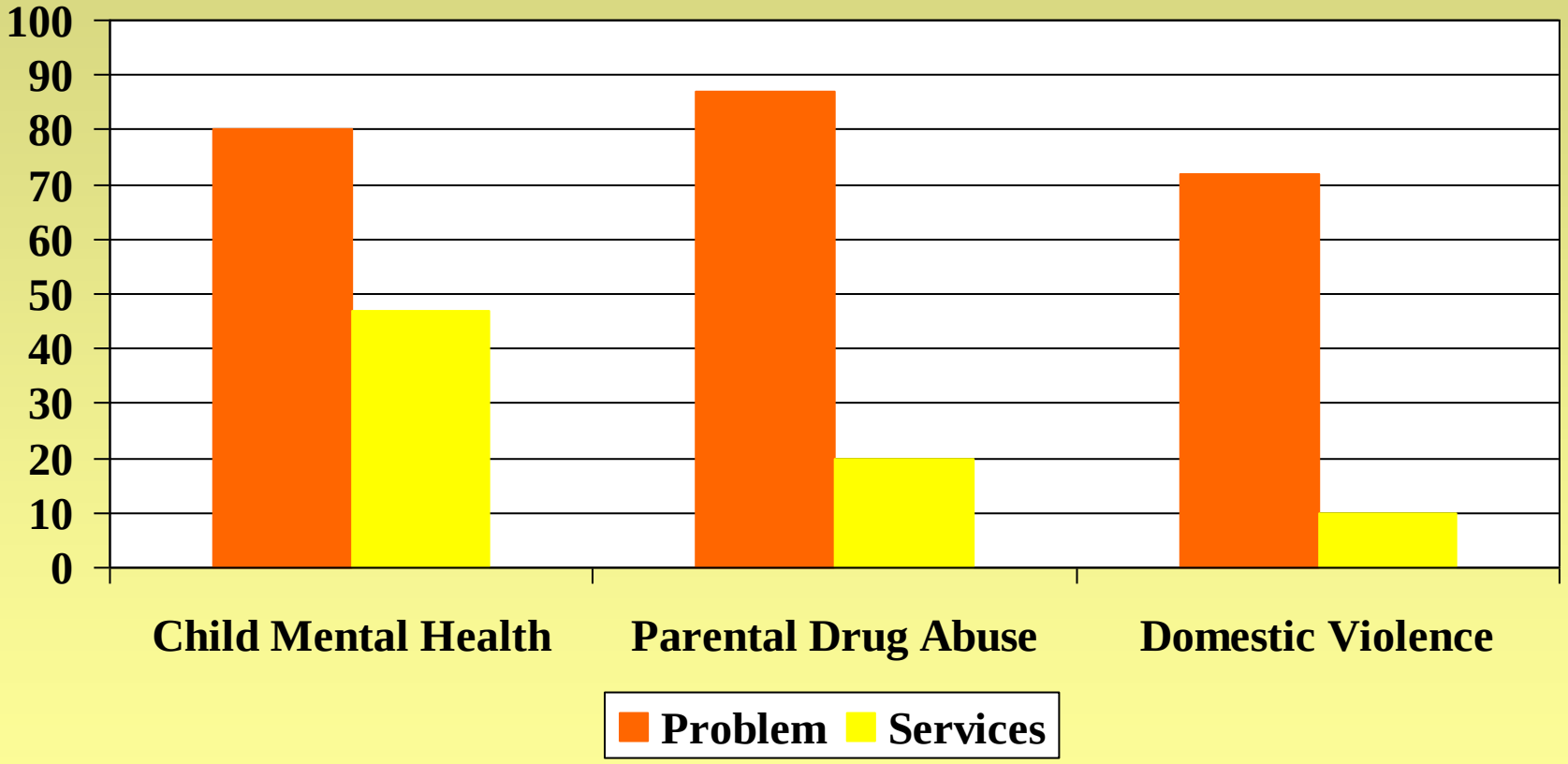


Location at Two-Year Follow-Up



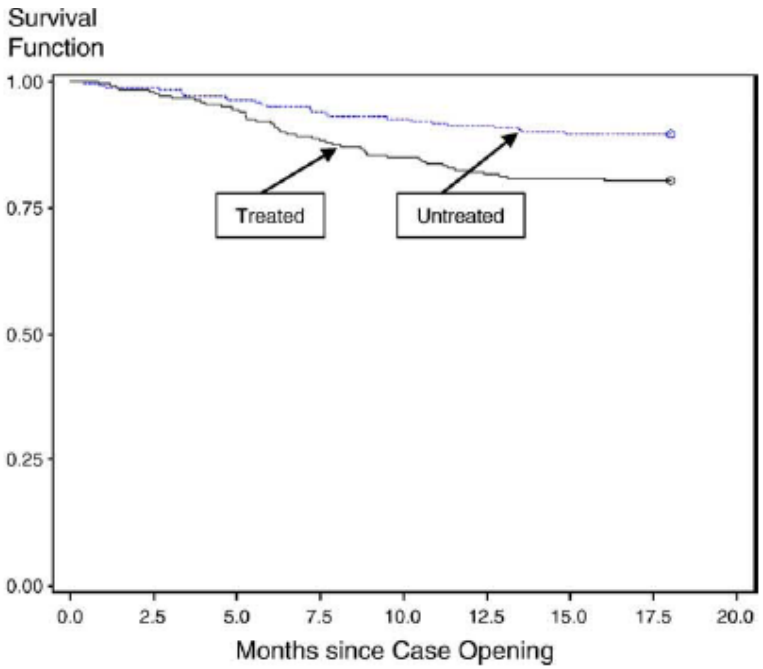
Permanence achieved for approximately 50% of the children

Service Use


100
90
80
70
60
50
40
30
20
10
0
Child Mental Health
Parental Drug Abuse
Domestic Violence
Problem
Services

Child Welfare and Substance Abuse

Substance abuse treatment and the recurrence of maltreatment among caregivers with children living at home: a propensity score analysis.



Barth et al., 2006

- **Drug Dependency Courts**
- **No best practice for providing substance abuse treatment in child welfare**
- **Little integration of substance abuse treatment research (e.g., MI)**
- **Co-occurring problems**

  domestic violence, mental health/trauma treatment needs, poverty

Summary

Better understanding of the neurobiological and psychosocial correlates associated with risk and resiliency in maltreated children will help to inform the development of more effective multi-modal interventions for children with histories of early trauma. It is our firm belief that the focus of clinical and research efforts for maltreated children and their families must span from neurobiology to social policy.

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