Tri-County Meeting Batterer Intervention Provider Network Meeting Minutes-11/09/2009

Present: Chris Huffine (Allies in Change Counseling Center), Samantha Naliboff (VOA Home Free), Sara Windsheimer (Choices DVIP), Stacey Womack (ARMS), Johnnie Burt (ARMS), Ryan Alonzo (Bridges to Safety), Amanda Briley (Bridges to Safety), Chad McGhee (Allies), Roberto Olivero (Men's Resource Center), Regina Rosann (ARMS), Paula Manley (Manley Interventions), Jennifer Warren (Women's Counseling Center/Men's Resource Center), Jacquie Pancoast (ChangePoint), Kathleen Gillis (private practice), Paul Lee (MRC), Dean Camarda (MRC, Allies), Emily Szeliga (Allies), Ashley Boal (Portland State University)

Minutes by Ashley Boal, edited by Chris Huffine

- Neurobiology of Aggression and Violence by Dr. Rich Kolbell (provided handout)
    - Local psychologist, PhD from the University of Oregon in neuropsychology with a subspecialty in forensics. He has done lots of work in violence risk assessment and evaluation.
    - Today will be just an overview. He will be doing more detailed, science-based presentation at the Oregon Psychological Association conference in the spring, 2010.

I. Introduction
    a. Aggression v. Violence
        i. From an evolution perspective, there is value to aggression and violence.
        ii. We are "hardwired" in a way that allows aggression and physical actions to occur. We also have ways to mediate this. The relationships in the brain change over time.
        iii. Aggression- An urge to move out and actively accomplish a task. You can be aggressive in attempt to complete a goal. Aggression is the impulse that forms the context for violence.
        iv. Violence- The overt physical act by one person doing something physical that brings physical harm to another. It is a narrow definition but allows us to understand it better at this specific level.

II. Violence
    a. Physical vs. verbal
        i. Both are violence but today we will focus on physical violence.
        ii. Person vs. object violence. Today we will focus on person violence but object violence makes person violence more likely.
    b. Ancient
        i. The combination between bottom up= drive and top down= breaks. More fundamental operations that are much more primitive, biochemical, bioelectrical that produce impulses to act that are intervened and modulated by more complex parts of the brain.
    c. Predatory vs Emotional
        i. Broadly two types of violence- predatory= deliberate, planful, instrumental and impulsive= not planned, explosive. Different brain activity and structures in use for each type. Today we will be talking about impulsive violence- brain is hyperactive.

1. Deliberate is much more premeditative (e.g.,"I am going to take this weapon and use this weapon to get money from the register"), less emotion, become less aroused when in an argument. Impulsive still involves choice but not so planned, become more aroused when in an argument- not a clear distinction
2. Research has shown intent to commit an act occurs as much as 10 seconds before it comes to conscious awareness- things get messy

ii. Nothing is meant to be used as an excuse, instead this should be used to inform prevention- excuse is a moral/ethical question

d. Complexity
   i. Violent behavior is incredibly complex- critical factors- genetic, anatomic (brain structures), biochemical (chemistry in the brain), psychological (cognitive and emotional), environment. They all interact with one another.

III. Genetic
   a. Impulsive aggression has significant hereditability (44-72%), demonstrated through twin studies- family histories going back at least 2 generations is a fairly robust predictor of violence in offspring.
   b. Genes are not fixed, some are more or less resistant to change. Much of genetics is impacted by a number of things starting in the womb- genetic expression also takes shape after birth. Just because you have predisposition doesn't mean it will happen.
   c. Genetics best understood as a risk factor not a determinant- important because knowing family information might give you information- could be genetic could be environment, either way need to understand the persons history

IV. Anatomic
   a. Virtually any behavior is broadly distributed throughout brain- all of your brain is contributing to your behavior all of the time (areas vary in the degree to which they contribute)
   b. Subcortical structures- critical in impulse and aggressive behaviors (bottom up)
      i. Limbic system (emotions): amygdala, hippocampus, hypothalamus, insula, cortico-limbic pathway
      ii. Entry point for appraising stimuli or provocation- is there anything going on in appraisal/perceiving? Are they perceiving the world "correctly"
   c. Can be affected by drugs, alcohol, mental illness, lesions, hyperactivity of structures, sensitizing effects, context
   d. Are there biological gender differences?
      i. Structurally male and female brains are slightly different (temporal area) and some hormonal and endocrine differences that can affect these structures. BUT the cultural factors are huge, the environment is effecting the brain from the get go (natal, even prenatal).
      ii. There are similarities to structure and function, there are differences to structure and functioning
   e. Cortical regions- top-down

i. Widely distributed but chief area of interest is the prefrontal cortex
    1. 3 different areas- dorsolateral, orbiotfrontal, and ventromedial (emotional regulation, moral)
    2. Again effected by a huge number of things
    3. Abnormalities can show up in different types of brain scans
    4. Late developing- not done until 20-30 years of age (mixed findings regarding age of full development)- reason why adolescents are more impulsive- not able to regulate in the same way as adults
    5. Practically you need to get a good history- start with medical history and then build up
ii. Question- Is there a connection between depression and violence?
    1. Depressed people may be more irritable and have less resources to manage behaviors.
    2. Suicidality- defined differently by different people. Literature that looks at suicide in the biochemical and anatomic dimensions find some concordance in other directed aggression and self directed aggression.
iii. Best way to understand these things is that they are correlational and bidirectional. They are just related, doesn't mean anything will actually happen, just means you are at risk.
iv. Call a neuropsychologist for a consult if someone has a history that leads you to believe that something is going on at the level of the brain.
v. Subcortical and cortical interactions are reciprocal and interact with one another, all are regulated by biochemical elements.

f. Some men may have unusual brains- what do we do with them? If the brains of people that are abusive and violent have certain ways of functioning, how can we work with them?
    i. First determine what is this person's ability to comprehend, store, retrieve, and apply information?

V. Neurotransimtters and peptides (serotonin, dopamine, norepinephrine, acetylcholine) all relevant to violence

a. For some people can medication decrease violence?
    i. Yes! Which men can we identify as being potentially well suited for this? Psychiatric history of disorders (mood disorders particularly), family history of that, men who have a history of seizures, general instability in mood and management, instability in behavior and lifestyle, people presenting with anxiety disorders or symptoms, history of adhd, people who appear restless, unusually reactive in benign situations- anticonvulsants (seizure meds), antipsychotics, antidepressants, etc. Psychoeducational intervention may be an important part of intervention but maybe meds/ other things are necessary (talk therapy, behavior therapy, somatic therapys, pharmacotherapys).

b. Multiple influences to violence so we need multimodal response. The extent to which we can employ multiple methods will likely have a positive effect because not one size fits all.

c. Comment- much of the work we do is cognitive behavioral which is good for some men but not others. Highlights importance of other methods such as role play, and other experiential activities
d. Comment- therapy and neurotransmission- post synaptic depression- use psychoeducation to explain to men how not giving in to violent impulses works to change the brain and may reduce likelihood of violence in the future. "neurons that fire together wire together".

Presenter Contact Information:
Rich Kolbell
503-284-2372
rkolbell.pdxpsych@comacast.net

HANDOUT

Neurobiology of Aggression and Violence

Men's Resource Center, Nov. 10, 2009

Richard Kolbell, Ph.D., ABPP

1. **INTRODUCTION**
    a. Aggression v. Violence
        i. Violence as a form of aggression
1. **VIOLENCE**
    a. Physical v. verbal
        i. Person v. object
    b. Ancient
        i. Adaptive: survival value
        ii. Across animal kingdom
        iii. "Hard wired"
            1. originates in very early "primitive" brain structures
    c. Predatory v. Emotional
        i. Deliberate v. Impulsive
            1. Different pathways and processes in brain: hyper v. hypoactive
    d. Exceedingly complex interaction of multiple factors and influences
        i. Genetic
        ii. Anatomic
        iii. Biochemical
        iv. Psychological
        v. Social/Environmental
1. **GENETIC**
    a. Impulsive aggression has significant hereditability (44%-72%)
    b. Genetic expression varies, affected by intrauterine, perinatal, environmental factors
    c. Best understood as a risk factor for violence

1. **ANATOMIC**
    a. Very broadly distributed throughout the brain
        i. Multiple factors reflect multiple brain regions: senslry, motot, attention, memory, emotions, executive function
            1. Sub-cortical and cortical: “bottom-up and top-down” processing
                a. Sub-cortical, especially limbic system
                    i. Amygdala
                    ii. Hippocampus
                    iii. Hypothalamus
                    iv. Insula
                    v. Cortico-limbic pathways
                b. Early entry point for apprehending and appraising stimulus/provocation
                    i. Follow sensory processing
                        1. Eg. Visual, auditory, tactile, olfactory
                c. Can all be compromised by drugs, mental illness, other deficits
                d. Limbic system can be affected by multiple factors
                    i. Drugs
                    ii. Mental illness
                    iii. Lesions
                    iv. Hyperactivity of structures
                    v. Sensitizing effects
                    vi. Context
                        1. Abnormalities seen particularly in Borderline and Antisocial Personality
            1. Cortical regions: “top-down”
                a. Frontal lobes
                    i. Prefrontal cortex
                        1. Orbitofrontal, Ventromedial, Dorsolateral
                    ii. Primary is orbitofrontal (OFC)
                        1. Lesions, reduced volume, rCBF, glucose metabolism
                        2. Impulse control, judgment
                    iii. Ventromedial
                        1. Social awareness, emotional integration and regulation, moral reasoning
                b. May be observed with imaging: PET, SPECT, fMRI, DTMRI, EEG
                    i. Mixed findings
                c. May show up on Neuropsycholgical evaluation
                    i. Importance of detailed history and sensitive/specific tests
    a. Cortical-subcortical interaction is dynamic and reciprocal with multiple feedback and feedforward loops that regulate the ultimate output: Behavior
1. **BIOCHEMICAL**
    a. Regulates functions of neurons and neural circuits
    b. Two general classes: neurotransmitters and neuropeptides
    c. Extremely complex physiology: Chemical, receptor density, receptor subtypes, reciprocal effects, inhibitory and excitatory
        i. Neurotransmitters
            a. Serotonin (5HT)
                i. Densely distributed in OFC and cingulate gyrus
                ii. Generally, decreased serotonin associated with increased impulsivity/aggression

b. Dopamine (DA)
    i. Widely distributed, esp. OFC and Ventromedial
    ii. Generally, increased dopamine associated with increased aggression
        1. Again, variable, possibly due to receptor subtypes and location
c. Norepinephrine (NE)
    i. More “upstream” distribution
    ii. Similar to DA; generally increased NE associated with increased aggression
d. Acetylcholine (Ach)
    i. Generally facilitates aggression
        1. Eg. Defensive rage in cats
e. Gamma-aminobutyric acid (GABA)
    i. Generally, decreased GABA associated with increased aggression

ii. Neuropeptides
1. Opioids
a. Endorphins, Enkephalins
i. Generally, increased opioids associated with decreased aggression
b. Oxytocin
i. Generally, increased oxytocin associated with decreased aggression
c. Vasopressin
i. Generally, increased vasopression associated with increased aggression
d. Others (Substance P, cholecystokinin) less well-studied

iii. Steroids
1. Testosterone
a. Generally, increased testosterone associated with increased aggression
2. Cortisol
a. Generally, decreased cortisol associated with increased aggression

1. **PSYCHOLOGICAL INFLUENCES**
a. Driven by anatomic and biochemical processes described above
b. Cognitive operations interact reciprocally with emotions to produce behavior
c. Broadly, cognition, especially “higher order” thought modulates emotional impulses
i. Cognitive function widely distributed across cortex, though somewhat more localized to the PFC

1. **TREATMENT**
a. Multifactorial nature of aggression suggests multimodal approach to treatment
i. Biological
1. Antipsychotics
a. Clozaril
b. Risperidal
c. Zyprexa
d. Seroquel
e. Abilify
2. Anticonvulsants
a. Dilantin
b. Depakote
c. Tegretol
d. Trileptal
e. Lamictal
3. SSRI

        a. Prozac
        b. Zoloft
        c. Paxil
    4. Benzodiazepines, Beta- blockers
ii. Somatic
    1. Biofeedback
    2. Relaxation therapies
    3. Yoga, meditation, movement therapies
iii. Talk therapies
    1. Cognitive-Behavioral
    2. Dialectical Behavior Therapy
    3. Contingency management/behavioral

1. **Aggression and violence is an extremely complex set of behaviors that is not unitary, multifactorial, significant inter- and intra-individual variability**
    a. **One size does not fit all!**

Further reading:

Ledoux, J. (1996). The Emotional Brain. Touchstone: NY

Siegel, A. (2005). Neurobiology of Aggression and Rage. CRC Press: NY

Siever, L. (2009). Neurobiology of Aggression and Violence. American Journal of Psychiatry, 165:4

Stoff, D., and Cairns, R. (1996). Aggression and Violence. Erlbaum: New Jersey