

Inside the Biology and Culture of
Sex and Gender:
Science and Theory for
Improving Services

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- **Human Development:** (What Makes us who we are?)

Biology + Environment = Individual

- % Environment?
- % Biology?

Overarching Understanding

- Each person is a unique individual
- Biology: Sex (develops on a wide spectrum)
- Environment - Gender roles - culture

**Brain, Sex and Gender
Overarching Principles**

- Does not imply:
 - A single factor, simplistic or rigid thinking
 - Superiority
 - Looking or benefiting one sex over other

Brain, Sex and Gender Overarching Principles

- Does imply:
 - Open-mindedness and creative thinking
 - What good science research is telling us to:
 - Enhance existing services
 - Create more target specific services to our audiences

- Science has come a long way
 - Past:
 - no thought about "male" or "female" brain
 - Today:
 - **good** scientific research would never pool data without consideration of differences

- Consider: Alcohol and Other Drug Research

- Old research: No females in studies
- Modern research: Extremely important differences between sexes which has impacted service delivery

Gender Sensitivity

- Gender Sensitivity means:
 - Being aware of
 - Understanding
 - Appreciating

Both Male and Female biology and cultures

Brain Development and Gender

- Males and Females differ, not only physically...
- But also in the way we approach and solve problems and view our worlds.

Brain and Gender

- Are differences only because of variations we experience in the environment?
- Scientists say No!
 - It's also the effects of sex hormones on brain organization and processing.
 - From the start, environment is acting on differently wired brains in males and females.

The Science of Neuroscience

- Why now?
 - New technology –
 - Volumetric measurements of brain parts (computers)
 - Functional: PET, MRI
 - Modern image analysis of post-mortem examinations

Gender Confusion

- *Cultural* confusion (and tension):
 - Feminist Movement: Equal Rights
 - Equality –over time-----→Sameness
 - Rather than acknowledge (and honor) differences - act as if there are none

Brain Development and Sex Differences

Science is clear about -

Male and females being different:

1. Biologically
2. Structurally
3. Functionally

- Science has come a long way

- Past:

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- Today:

- **good** scientific research would never pool data without consideration of differences

Applies to male and female brains:

1. Structural differences
2. Processing differences
3. Developmental timeline differences

Brain and Gender

- Impossible to successfully evaluate effects of environment independent of considering sex of individual.

Brain Development and Sex Differences

- Estrogen (Female hormones).
- Testosterone (Male hormones).
- Starts in utero. Continues after birth.
- Will alter sex and brain function permanently only during critical periods (organizational exposure).

New Research

- Not just hormones affect expression of male vs. female brain
 - 2004 study looked at *protein* expression from X and Y chromosomes
 - Diff. so dramatic were able to correctly identify sex of brain tissue 100% of time by two gene expressions
(Neuropsychopharmacology, 2004)

What does research tell us?

- Structurally: distinct areas of differences between male and female brains.
- These differences affect the way the brain processes and develops in certain task areas.

What Does Research Tell Us

- Physical differences
- Processing differences
- May create some “hard wiring” and processing of emotive responses to environment affecting behavior

Gender and Childbirth

- Example:
- Oxytocin
 - “Bonding hormone” “Tend and Befriend”
 - Greater in females
 - Spikes during/after childbirth

Gender and Stress

- UCLA research showed sex differences
- During stressful times:



In Females



In Males

Regulates Bonding, Mood and Behavior

Gender and Stress

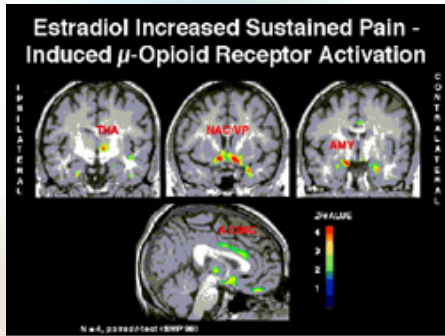
- Females tend to seek connection.
 - Males tend to, isolate, shutdown, or become angry.
- Also:
- Male brain less quick to integrate “feeling” and verbal parts of brain quickly

Male and Female Brains

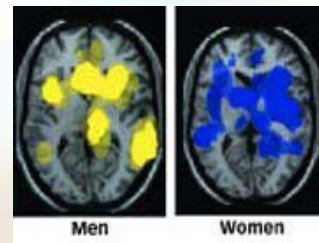
- Physical pain –
 - Stimulates different areas in men and women:
 - Female: greater activity in limbic area (emotional centers)
 - Male: greater activity in cognitive area (analytical centers)

(Mayer, 2003)

Estrogen and Female Pain Response



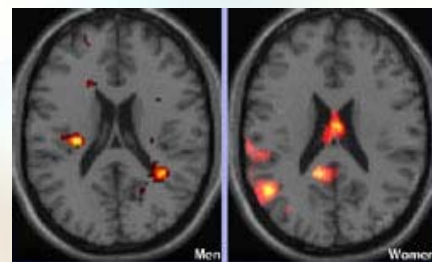
Gender/Hunger & Satiety



Brain and Gender

- Visual Sexual Stimuli
 - Both affected amygdala
 - Males significantly higher levels of activation
 - Despite similar reports of levels of arousal (Hamann, 2004)

Gender and Love



Male and Female Brains

- Areas in the frontal and temporal lobes related to language appear larger in females.

(Schlaepfer, 1995)

Female babies have approx. 80% greater acoustic brain response

(Sax, 2005)

- Region in the cortex related to spatial and visual larger in males.

(Frederikse, 1999)

Newborn males >twice as likely to prefer mobile

(Infant Behavior and Dev. 2000)

Male and Female Brain Regulation

- Female brain: organized toward integration of verbal/ emotive processing
- Male brain: organized toward spatial/mechanical, factual processing, physicality

Risk Taking and Gender

- ▣ U.S. and worldwide studies show boys more likely to engage in physically risky activities.

(Archives of Pediatrics and Adolescent Medicine, 2002)

Risky/dangerous activity triggers "flight or fight" that boys find enjoyable.

Risk/danger seen as fun "for its own sake" rather than to achieve goal.

Gender and Aggression

- Elementary school boys fight 20 times as often as girls do.
 - *However:* usually end up being better friends!
- Elementary girls fight less often, usually with words.
 - Usually *ends* friendship
 - (Lever, 1976 &'78; Simmons, 2002)
- The *same* holds true for primates!
 - (Blume, 1998)

Spatial Tasks

- Male brains right hemisphere highly activated – almost all in right half.
- Female brain has activity in both but much lower rate than males.

Verbal Accuracy Tests

- Boys = High activity in only the left hemisphere
- Girls = High activity in both hemispheres during verbal activities
(Gurian, 2001)

Even in groups where both communicate well:

- Difference in regulation of speech sounds (sounds corresponding to written letters).
 - Male - mostly left brain activities boosted.
 - Female - both sides equally boosted.
- Females, however, less likely to filter out peripheral data than males.

- Self selecting of activities/careers
Activity
 - Development of the computer and computer games – “speaks” to male brain
- Field of medicine – specialties of psychiatry and obstetrics draw higher numbers of women

Development Gender Differences

Carol Gilligan's Work:

- Self In Relation Model
- Women are more relational than men.
- Growth/development through connections – sense of self organized around maintaining affiliations.
- Sense of self is grounded in the making and/or enhancing relationships to others.

• Self in Relation Model (continued)

- Find pleasure, self-worth from life activities that arise from and lead back into a sense of connection with others.
- Also places oneself within context to understand it or “feel” connected to it (leads to empathy).
- Looks at issues within a relational context vs.. “right/wrong” approach.

Traditional Developmental Model Healthy Male Development

- Strive for Autonomy
- Separation
- Development of the “independent” individual
 - Healthy male development but portrayed as healthy human development.
 - Emphasis on self/individual achievement; disconnecting from nuclear relationships.
 - Stress on individualism related to Western cultural ideals.

- Since the industrial revolution and other movements, women expected to adapt more “male like” behaviors:
 - Sexually
 - Career wise
 - Smoking and drinking
 - Independence rather than interdependence

- **Media and culture has brought confusion and conflicting messages for females.**
 - **Be sexual BUT don't be a Bad Girl**
 - **Be independent but not TOO independent**
 - **Compete with men but also PLEASE men**

Traditional Developmental Model

- Puts females in a double bind
- Female's sense of self through connectedness seen as:
 - Negative
 - Co-Dependent
 - Deficient

Female Culture

- **Teen girls today:**
 - 4 times more likely to drink than their mothers were
 - 15 times more likely to use drugs than their mothers were.
- **Good News:**
 - Rise in rates of females completing high school
 - Rise in rates of females entering and completing college

Male/Female Brain Development

- **Maturity gap in second decade of life most pronounced brain based gap.**
 - Female brain; 1.5 yrs ahead of male brain.
 - Male brain and hormones tend to guide boys towards short-term experimental attachments, impulsivity, high level risk taking.

Science to Practice

- May want to rethink service models:
 - Example: Prevention
 - Extracurricular activities:
 - Protective factor for girls
 - No influence on boys
- Sports:
- Competitive sports a protective factor for girls
 - Competitive sports a risk factor for boys

Male Culture

- Aggression -----→ Violence
 - (physicality -----→ destructiveness)
- Last 25 years:
 - Natural male behaviors are discouraged
 - Focus in schools and general culture
 - All aggression and physicality – bad
 - Competitive games at recess discouraged

Male Culture

- During this time:
 - Rise in violence
 - Rise in extremes of masculine definition
 - Rise in drop out rates in education
 - Fall in enrollment and completion rates of higher education
 - Dramatic rise in ADD and ADHD diagnoses
 - Rise in other ED special education enrollments

Male Role Confusion

- Respect for female body (sexual harassment)
- When equality becomes “sameness”
 - Co-ed High School Wrestling

Male Role Confusion

- **Media Culture**
 - Portrays males as super “macho”
 - Any emotion except Anger is “ weak”
 - Tough, dominant and unfeeling
 - **World Wrestling Federation**
 - **Movies: Terminator**

Males and Trauma Confusion

- **Sexual Assault:**
 - **Contradicts “definition of masculinity”**
Can’t see themselves as victims
 - **Rather as failures for not being able to do something to stop it.**

What we know about boys...

- **Boys are twice as likely to be the victims of physical abuse and are three times as likely to be victims of violence as girls.**
- **Twice as many boys as girls are injured or die from physical abuse at the hands of parents and caregivers.**
- **Emotionally disturbed boys outnumber girls four to one.**

Males Dealing With Emotions

Related to Testosterone and Brain Development (M. Gurian)

- Action-release method
 - Quick bursts of displayed energy.
- Suppression-delayed reaction
 - Wired for a certain amount of delayed reaction to problem solve.
- Displacement-objectification
 - Putting emotional experience into a story, involving objects around him.
- Physical expression of Anger
 - Can help put boundaries and safe places to express feelings.

Males Dealing With Emotions

- **Problem solving**
 - **Solving problem releases emotive energy of the experience**
- **Crying**
 - **Happens less as boys reach school age. Not only culture but brain development involved. Involves processing hard emotive data quickly (male brains not wired to do this.)**

Brain and Gender

- **Significance for providing services:**
 - **Different paradigms for different sexes:**
 - **Genetics +Brain biology + Environment =**
 - Male culture**
 - Female culture**