



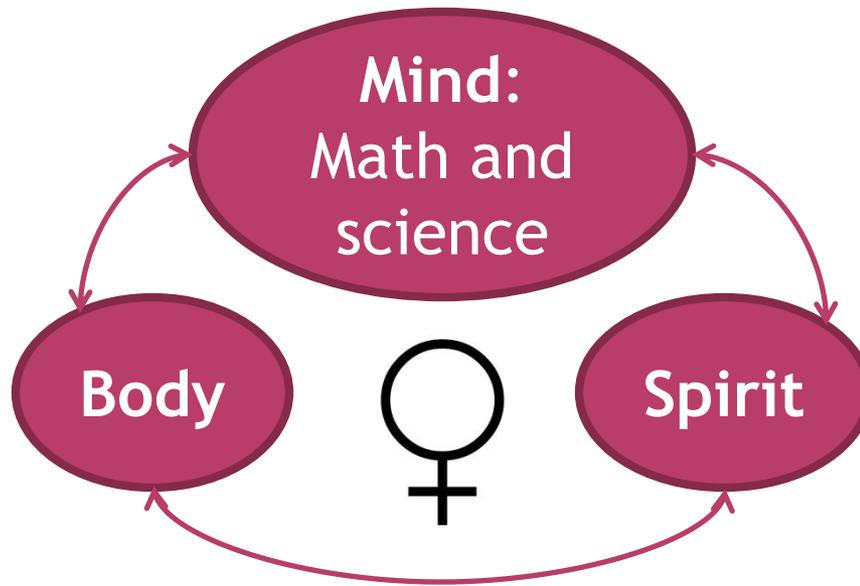
THE WOMAN SCHOLAR AND WARRIOR: EMPOWERING MIND, BODY, AND SPIRIT

FELICIA WU, PHD

JOHN A. HANNAH DISTINGUISHED PROFESSOR
DEPT. OF FOOD SCIENCE & HUMAN NUTRITION
DEPT. OF AGRICULTURAL, FOOD & RESOURCE ECONOMICS
MICHIGAN STATE UNIVERSITY

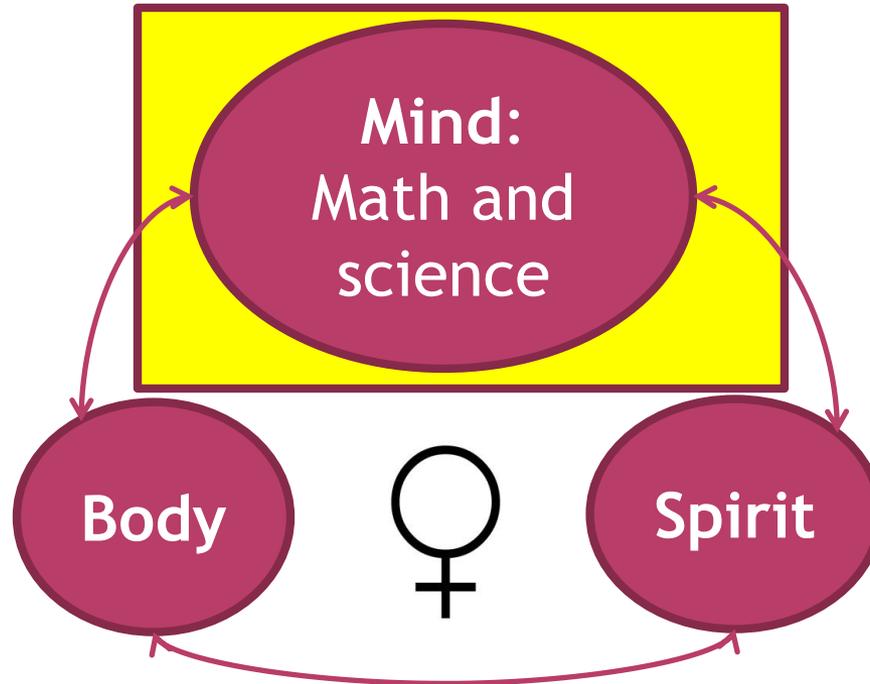
MIDDLE SCHOOL GIRLS' MATH & SCIENCE DAY, 1 MAR 2014

IN THIS LECTURE, WE FOCUS ON:



- ◉ What brings power and health to each
- ◉ Why it's important to start young (like you)

MATH AND SCIENCE: AN ADVENTURE FOR THE MIND



- ◉ You never have to study just one thing. You can jump from topic to topic.
- ◉ You can work all over the world. (my work: 24 nations)
- ◉ It doesn't matter where you start. Just start early to build your confidence!

SINCE GRADUATING FROM COLLEGE WITH A MATH DEGREE, I HAVE WORKED IN...

- Safe drinking water for people with AIDS
 - The cyanide spill in Hungary's Tisza River
 - Safety of genetically modified foods
 - Why pesticides stop working
 - Hospitals on Navy ships
 - Fungi in food, & the poisons they produce
 - Indoor mold and children's asthma
 - Global food security
 - Food safety in Africa
-
- Serving on panels of US National Academy of Sciences & World Health Organization (WHO of the United Nations)

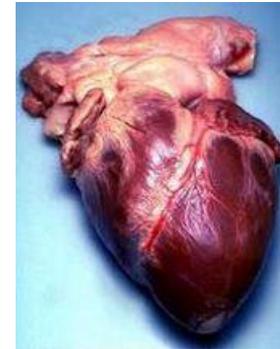




World Health
Organization

HOW DOES UNITED NATIONS DECIDE WHICH DISEASES MATTER MOST?

- Where should WHO put its money? It doesn't have all the money in the world.
 - AIDS?
 - Cancer?
 - Heart disease?
 - Malaria?
- You can measure “Global Burden of Disease” using *Disability-Adjusted Life Years (DALYs)*
 - In 1990, WHO ranked 108 diseases & injuries
- $DALYs = YLL + YLD$
 - YLL = Years of Life Lost
 - YLD = Years Lived with Disability, multiplied by weight [0, 1]



HOW MUCH DOES A DISEASE COST THE WORLD?

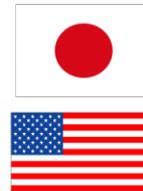


World Health Organization

- **DALYs = YLL + YLD**

- Years of Life Lost (YLL): # years between age when disease takes life, and highest possible life expectancy (**Japan**): *Every human in the world should be able to live as long as the Japanese.*

- Japan (#1): 79.0 male, 86.1 female
- US (#38): 75.6 male, 80.8 female



- Years Lived with Disability (YLD)

- Every disease has disability weight [0, 1] based on how bad it is
 - “How would you rank these diseases?”
 - **Blindness** vs. **foot amputation** vs. **breast cancer** vs. **appendicitis**

WHICH CONDITIONS CAUSE GREATEST GLOBAL HEALTH BURDEN (DALYS)?

Disease / Condition
Diarrheal diseases
Lower respiratory infections
Unintentional injuries (not traffic)
Malaria
Road traffic injuries
Chronic obstructive pulmonary disease
Perinatal conditions (22 wks - 7 days)

Source: <http://www.who.int/mediacentre/news/releases/2006/pr32/en/index.html>

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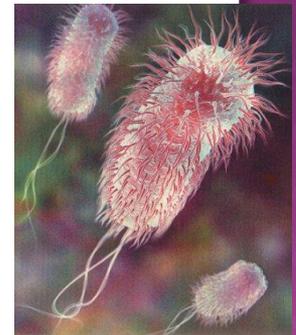
World Health
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MY WORK: HOW MUCH DISEASE IS CAUSED BY IMPURE FOOD?



◉ WHO Foodborne Disease Burden Epidemiology Reference Group (FERG)

- Chemicals (fungal toxins, seafood toxins, mushroom poisons, pesticides, metals, cyanide, allergens)
- Bacteria, viruses, worms (*E.coli*, *Salmonella*, *Campylobacter*, *Listeria*, tapeworms)
- My research team focused on **aflatoxin**: fungal toxin in corn, peanuts, & other nuts; causes liver cancer & child stunting

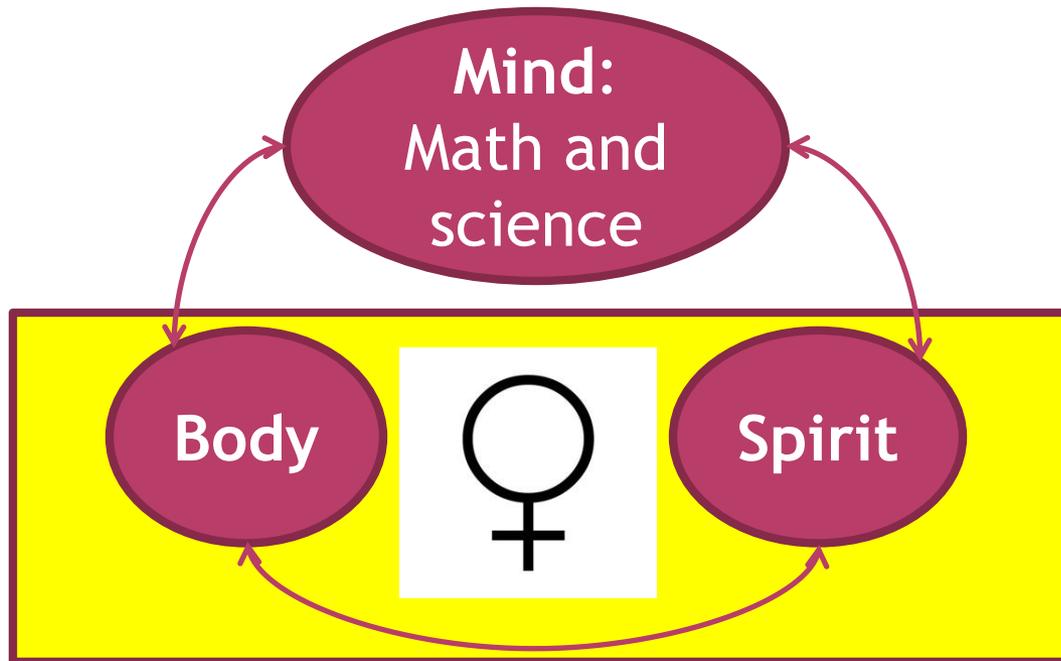


HOW DOES BECOMING GOOD IN MATH & SCIENCE MAKE YOU POWERFUL?

- Trains your mind
 - You learn to think critically about things.
 - You question things more.
- Gives you options
 - Jobs in future: Many are ONLY open to those who can do science & math.
 - Why not give yourself the most chances possible?
- Becoming confident in one area gives you courage in other areas.



WHY TALK ABOUT **BODY & SPIRIT** IN A GIRLS' MATH-SCIENCE TALK?



- ⦿ This is where I have seen girls lose their focus, confidence, and joy in middle school and high school.
- ⦿ Your body and spirit affect your mind.

DON'T THINK "THIN" OR "FAT".
THINK HEALTHY & FIT.



“Why do we spend all of our money and energy to be skinny? Why do we care more about what we *look like* than what we *look at*? Why do we think it’s more important to make ourselves beautiful for others to look at, than it is to **make the world more beautiful** for us to look at?”

- Glennon Melton, [Momastery](#) blog (reprinted with permission)

- ◉ Science makes the world more beautiful. What is more beautiful than saving lives & uncovering world’s mysteries?
- ◉ To get there, you have to be HEALTHY. Treat your body well.
 - Eat well.
 - Sleep well.
 - Become FIT...

WHY IS FITNESS IMPORTANT? IT'S NOT JUST ABOUT MUSCLES.



- ◉ “Strength and fitness make you hold yourself differently. You have a different posture, and you give off a different aura - **you’re not helpless or weak**. It’s so important for women to develop their physical strength so **they’re not afraid**. I would get them to weight train, develop cardiovascular fitness, and then **I would urge every woman to learn some sort of martial arts.**”

-- Bev Francis (powerlifter) in Gloria Steinem’s *Moving Beyond Words*

- *Aim to be STRONG, so that you look strong.*
- *Learn to defend yourself (martial arts). There may not be someone else there to defend you.*

SELF-DEFENSE FOR WOMEN & GIRLS* (GET UP!)

- ⦿ The parking lot scenario: “kihap”
- ⦿ The index finger
- ⦿ The wrist grab
- ⦿ Blocks & more: use attacker’s weakness to your advantage



- ⦿ It is not **size** that matters. It is **strategy**.
Keep a **cool head** at all times.

*Courtesy of Master Shinn, Master Deatruck, & Dr. Rubin,
Shinn's Tae Kwon Do

IN SUMMARY: STRENGTHEN YOURSELF & DON'T BE SHY ABOUT IT, WARRIORS!

- Science & math expand your mind, confidence, & future opportunities.
- Physical training strengthens your body & spirit.
- Don't be shy. When you become strong, the girls & women around you will be **INSPIRED** by you.
 - I'm inspired by: a 75-year-old trapeze-swinging professor, a 27-year-old postdoctoral researcher, taekwondo instructors ½ my age, & a 7-year-old daughter.
 - **It's never too early - or too late - to make the world a better place!**