TEACH YOUR STUDENTS WILLPOWER

CAROL JONAS-MORRISON
AGENDA

• WHY IS WILLPOWER SUCH A STRUGGLE?
• A REVIEW OF THE SCIENCE
• STRATEGIES TO TEACH YOUR STUDENTS WILLPOWER
• STRATEGIES AGAINST PROCRASTINATION
STUDENTS WANT TO PASS, BUT MANY DON’T

• 50% NATIONAL PASS RATE IN COLLEGE ALGEBRA
• MOST STUDENTS BELIEVE “MATH IS A COLLECTION OF RECIPES THEY HAVE TO LEARN” (DEBORAH HUGHS-HALLETT)
• HLC STUDY ABOUT WHY STUDENTS FAIL MATH:
  • STUDENTS SAY LACK OF MOTIVATION AND POOR STUDY HABITS
  • FACULTY SAY ‘NOT READY FOR COLLEGE’, ‘POOR STUDY SKILLS’, ‘LACK OF EFFORT’
THE STRUGGLE OF WILLPOWER

- Studies show ‘self control’ is the most predictive of successful life
  - Marshmallow test
  - NZ study 2010 & follow up (siblings)

- Self control is the vital strength and key to success in life

- Self control is only trait that predicts college student’s GPA better than chance
  - More predictive than IQ or SAT scores
WHY IS WILLPOWER A CHALLENGE?

• “WE HAVE ONE BRAIN BUT TWO MINDS”
  • ONE VERSION OF OURSELVES ACTS ON IMPULSE & SEEKS IMMEDIATE GRATIFICATION
  • ANOTHER CONTROLS OUR IMPULSES & DELAYS GRATIFICATION FOR OUR LONG TERM GOALS
  • WE IDENTIFY AS BOTH

• EXPERIMENT: 200 PEOPLE IN GERMANY REPORTED SEVEN TIMES A DAY ON WHETHER THEY WERE EXPERIENCING A DESIRE AT THE TIME

Oscar Wilde “I can resist everything except temptation.”
WHY SHOULD STUDENTS CARE?

SELF ESTEEM MOVEMENT VERSUS WILLPOWER

• WIDESPREAD ACCEPTANCE OF THE IDEA OF THE ‘MATH GENE’

• RESEARCHERS POLLED SCHOLARS IN STEM FIELDS
  
  • HOW MUCH DOES SUCCESS IN YOUR FIELD DEPEND ON FIXED, INNATE ABILITY AS OPPOSED TO HARD WORK, DEDICATION AND LEARNING?
  
  • MATH SCHOLARS WERE THE MOST EXTREME IN EMPHASIZING FIXED, INNATE ABILITY

• SELF ESTEEM MOVEMENT IS STILL EVIDENT IN OUR SCHOOLS
BELIEFS ABOUT YOURSELF MATTER

**FIXED MINDSET**
- BELIEVES THEY DON’T HAVE THE MATH GENE OR THEY ARE REALLY SMART AND DON’T HAVE TO WORK HARD
  - AVOIDS CHALLENGES
  - GIVES UP EASILY
  - SEES EFFORT AS USELESS OR INDICATING THEY ARE NOT SMART
  - IGNORES FEEDBACK

**GROWTH MINDSET**
- BELIEVES THEY DON’T HAVE THE MATH GENE OR THEY ARE REALLY SMART AND DON’T HAVE TO WORK HARD
  - AVOIDS CHALLENGES
  - GIVES UP EASILY
  - SEES EFFORT AS USELESS OR INDICATING THEY ARE NOT SMART
  - IGNORES FEEDBACK
MINDSET EXAMPLE

• YOU GO TO A CLASS YOU LIKE AND IS IMPORTANT TO YOU

• PROFESSOR RETURNS THE MIDTERMS, YOU GOT C+

• YOU ARE VERY DISAPPOINTED

• THAT EVENING, ON YOUR WAY HOME, YOU FIND YOU GOT A PARKING TICKET

• BEING REALLY FRUSTRATED YOU CALL YOUR BEST FRIEND TO SHARE YOU EXPERIENCE BUT ARE SORT OF BRUSHED OFF

CAROL DWECK, MINDSET, PAGE 8-10
RESPONSES

FIXED MINDSET

- **REACTION:** “I’M A LOSER”, “I’M AN IDIOT”, “I’D FEEL USELESS AND DUMB”

- **COPING:** EAT”, “DO NOTHING”, “GET DRUNK”, “CRY”, “PICK A FIGHT”, “WHAT IS THERE TO DO?”

- **CREATED A FEELING OF UTTER FAILURE AND PARALYSIS**

GROWTH MINDSET

- **REACTION:** “…I’D HAVE TO WORK A LOT HARDER IN CLASS, BUT I HAVE THE REST OF THE SEMESTER TO PULL UP MY GRADE”

- **COPING:** “I’D START THINKING ABOUT STUDYING IN A DIFFERENT WAY, I’D PAY THE TICKET AND WORK IT OUT WITH MY FRIEND”

- **EVEN THOUGH DISTRESSED, READY TO CONFRONT CHALLENGES WITH ACTION**

Seriously?

- **C+ (not an F)**
- **ticket (not a car wreck)**
- **“sort of brushed off” (not rejected outright)**
MISTAKES AND STRUGGLE

• BRAINS REACT WITH GREATER ELECTRICAL ACTIVITY TO A MISTAKE
• MISTAKES ARE VERY, VERY IMPORTANT TO LEARNING MATH AND IN LIFE
• PETER SIMS, NYT, HAS STUDIED HABITS OF SUCCESSFUL PEOPLE
  • COMFORTABLE BEING WRONG
  • OPEN TO DIFFERENT EXPERIENCES
  • CAN GO AGAINST TRADITION
  • KEEP GOING THROUGH DIFFICULTIES
RESPONSE TO MAKING A MISTAKE

- ALL PARTICIPANTS RESPONDED WITH BRAIN SPARK
- VOLTAGE MAP SHOWS REACTION
- ORANGE = GREATER ACTIVITY, MORE INTENSITY & ATTENTION TO ERROR
- GROWTH MINDSET MEANS THE BRAIN IS MORE LIKELY TO SPARK AGAIN SHOWING AWARENESS MISTAKE WAS MADE
- FIXED MINDSET GIVE UP MORE EASILY
- GROWTH MINDSET PERSIST, EVEN WHEN ITS HARD
MINDSETS CHANGE THE MEANING OF EFFORT

• CAROL DWECK HAS SHOWN THAN TEACHING STUDENTS HOW THE BRAIN GROWS WITH EFFECTIVE EFFORT MAKES A BIG DIFFERENCE

• PROFESSORS CAN HELP: PROCESS VS PERSON PRAISE
  • “YOU ARE VERY SMART” VERSUS “YOU WORKED VERY HARD ON THIS, I AM IMPRESSED”

• WE CAN GROW OUR INTELLIGENCE LIKE A MUSCLE

• DOING CHALLENGING WORK OVER TIME IS THE BEST WAY TO GROW YOUR BRAIN

• THE KEY TO THIS GROWTH IS PRACTICE OVER TIME

Many students need to learn enough willpower in order to put forth the needed effort
WHERE DOES WILLPOWER COME FROM?

• Adult brain makes up 2% of body, consumes 20% energy
• Budget model of self control sees willpower finite resource
• Brain treats energy like money
• Brain is always asking “Is energy increasing or decreasing?"
  • Then makes strategic decision to spend or save energy
• Every tiny decision depletes our days store of willpower
HOW TO INCREASE YOUR WILLPOWER

“THE BEST WAY TO REDUCE STRESS IN YOUR LIFE IS TO STOP SCREWING UP”

• PEOPLE WITH STRONG SELF CONTROL SPEND LESS TIME RESISTING TEMPTATION
  • THEY USE IT TO DEVELOP EFFECTIVE HABITS AND ROUTINES
  • THEY ARE USING SELF CONTROL TO AVOID CRISIS

• MOST EFFECTIVE IF YOU TAKE GOOD BASIC CARE OF YOUR BODY
  • HEALTHY FOOD, REGULARLY
  • 7-8 SLEEP EVERY NIGHT
  • EXERCISE
  • MINDFULNESS MEDITATION
MATH STUDENTS

• MAKE A PLAN (FUZZY VERSUS FUSSY)

• EXPERIMENT: COLLEGE STUDENTS IN PROGRAM TO IMPROVE STUDY SKILLS
  • THREE PLANNING CONDITIONS: DAILY, MONTHLY, NONE
  • PREDICTION WAS DAILY PLANNING IS BEST BUT MONTHLY IS BEST, ESPECIALLY FOR WEAK STUDENTS
  • MONTHLY PLANNERS MORE LIKELY TO KEEP PLANNING
  • A YEAR AFTER THE PROGRAM ENDED, MONTHLY PLANNERS STILL GETTING BETTER GRADES
LIMITS OF SELF CONTROL

- EXERCISE PHYSIOLOGIST USED TO THINK OUR BODIES GIVE UP DUE TO MUSCLE FAILURE
- THERE IS A MONITOR IN THE BRAIN WORKS TO PREVENT EXHAUSTION
- NOAKES STUDIES SHOW NO EVIDENCE OF PHYSICAL FAILURE IN THE MUSCLES
  - INSTEAD BRAIN TELLING THE MUSCLES TO STOP AND GIVE UP
  - “FATIGUE SHOULD…BE CONSIDERED A SENSATION OR EMOTION”
  - EXTREME ATHLETES ROUTINELY PUSH PAST THIS
- OUR BELIEFS ABOUT OUR CAPABILITIES DETERMINE WHETHER WE GIVE UP OR SOLDIER ON
- STUDENTS PUSH PAST WILLPOWER CHALLENGE WHEN THEY BELIEVE PRACTICE WORKS

Self control is like a muscle, it get tired from use but regular exercise makes it stronger
LICENSE TO SIN

• WHEN EXERCISE LICENSES EATING, MARATHON TRAINEES PUT ON WEIGHT
• MARKETERS KNOW THAT 1% VIRTUE TO 99% VICE MAKE US FEEL GOOD ABOUT BAD CHOICES
  • YOU SAVED 50% OF YOUR PURCHASE
  • SNACKWELL COOKIES CRAZE OF 1992 IS MORAL LICENSING
  • NOW “ORGANIC” DOES THE TRICK
• WHEN THE ‘REAL’ YOU IS THE PART THAT WANTS TO SUCCEED AT MATH, YOU ARE MORE LIKELY TO SUCCEED THAN IF YOU SEE YOURSELF AS FORCED TO DO IT”
NOW VERSUS FUTURE SELF

- We all care more about ourselves than a stranger.
- People living longer yet retiring at the same age (not having saved enough):
  - 66% of Baby Boomers haven’t saved enough to maintain standard living.
  - 34% Americans have zero savings for retirement.
  - 53% under 33.
  - 22% of those 65 or older.
- Future self felt like a stranger.
- Stanford avatar of old age.
- Have students write a ‘future memory’ imaging failure and what caused it.
PROCRASTINATION PREVENTION

• PROCRASTINATION ASSOCIATED WITH IMPULSIVENESS

• 99% OF STUDENTS ADMIT TO CRAMMING FOR TESTS
  • SPACED OUT LEARNING IS MUCH MORE BENEFICIAL THAN CRAMMING
  • WE RELY ON FAMILIARITY, BUT RECOGNIZING IS NOT THE SAME AS KNOWING
  • CRAMMING MOST LIKELY TO STORE INFORMATION IN WORKING MEMORY
  • WE ARE FAMILIAR SO FEEL WE HAVE LEARNED, BUT WE HAVEN’T
  • DATA SHOWS ONLY 20% OF THE INFORMATION IS RETAINED IN CRAMMING

• PLAN FOR 10 MINUTES OF MATH MONDAY, WEDNESDAY, THURSDAY
SUMMARY

- ENCOURAGE A GROWTH MINDSET WHERE EFFORT IS THE KEY TO SUCCESS
- TELL THEM THEY HAVE TO EAT WELL AND SLEEP ENOUGH TO FEEL RESTED
- MAKE A FUZZY PLAN TO STUDY
- THEY HAVE TO BE TRULY BELIEVE THAT PRACTICE WORKS
- IMAGINE YOUR FUTURE SELF AT THE END OF THE SEMESTER, BUT THEY FAILED (NO LICENSE TO SIN HERE)
REFERENCES

BOOKS

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• MATHEMATICAL MINDSETS BY JO BOALER
• WILLPOWER BY ROY BAUMEISTER & JOHN TIERNEY
• THE WILLPOWER INSTINCT BY KELLY MCGONIGAL, PHD
• THE MARSHMELLOW PROJECT BY WALTER MISCHEL
• THE LONGEVITY PROJECT BY HOWARD FREEMAN & LESLIE MARTIN
WEB ARTICLES

• ARTICLE SHOWING “YOU CAN GROW YOUR INTELLIGENCE LIKE A MUSCLE”
  HTTPS://WWW.MINDSETWORKS.COM/WEBSITEMEDIA/YOUCANGROWYOURINTELLIGENCE.PDF

• KHAN ACADEMY “GROWTH MINDSET LESSON PLAN”
  HTTPS://WWW.KHANACADEMY.ORG/EDUCATOR/REFERENCE-FOR-COACHES/HOW-TO/A/GROWTH-MINDSET-LESSON-PLAN

• HTTP://WWW.MAA.ORG/SITES/DEFAULT/FILES/PDF/COMMONVISIONFINAL.PDF

• HTTP://COP.HLCOMMISSION.ORG/LEARNING-ENVIRONMENTS/CHERIF.HTML
STUDENTS WANT TO SUCCEED BUT STRUGGLE

• EACH YEAR ONLY 50% OF STUDENT PASS COLLEGE ALGEBRA WITH A, B, OR C
• WOMAN ARE TWICE AS LIKELY AS MEN TO STALL AT CALC I (EVEN WHEN THEIR GOALS REQUIRE CALC II OR HIGHER)
• FAILURE RATES UNDER TRADITIONAL LECTURE ARE 55% HIGHER THAN UNDER MORE ACTIVE APPROACHES
• IN 2012 ~20% OF BACHELORS DEGREES AWARDED TO UNDERREPRESENTED MINORITIES
• IN MATH ~12% OF BACHELORS DEGREES AWARDED TO UNDERREPRESENTED MINORITIES
• “THE STATUS QUO IS UNACCEPTABLE”