

# FORMS OF UNDERSTANDING

## KIERAN EGAN KINDS OF UNDERSTANDING / COGNITIVE TOOLKITS

### SOMATIC

(PRE-LINGUISTIC) UNDERSTANDING THROUGH THE BODY — SIGHT, HEARING, TOUCH — EMOTIONS — BALANCE, MOVEMENT, TENSION, PAIN, PLEASURE.

### MYTHIC

(WITH ORAL LANGUAGE) STORIES, METAPHORS, BINARY OPPOSITIONS.

### ROMANTIC

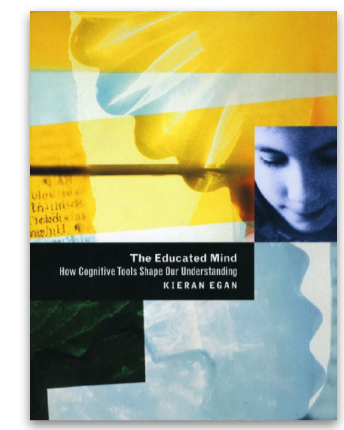
(WITH WRITTEN LANGUAGE) HEROES, WONDER AND AWE, EXTREMES AND LIMITS OF REALITY, COLLECTIONS AND DETAILS.

### PHILOSOPHIC

(WITH THEORETIC USE OF LANGUAGE) CRAVING FOR GENERALITY, SYNTHESIZING SYSTEMATIC THEORIES AND MODELS, PROCESSES RATHER THAN HIGHLIGHTS, HYPOTHESIS AND EXPERIMENT.

### IRONIC

(WITH REFLEXIVE USE OF LANGUAGE) LIMITATIONS OF LANGUAGE AND SYSTEMATIC THEORIES, APPRECIATION OF AMBIGUITY AND MULTIPLE PERSPECTIVES, THE MAP IS NOT THE TERRITORY.



THE EDUCATED MIND (1997)

## JEROME BRUNER MODES OF INTERNAL REPRESENTATION

### ENACTIVE

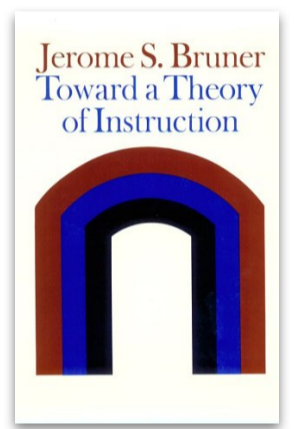
(ACTION-BASED) A SET OF ACTIONS APPROPRIATE FOR ACHIEVING A CERTAIN RESULT. CONFIDENTLY MANIPULABLE.

### ICONIC

(IMAGE-BASED) A SET OF SUMMARY IMAGES OR GRAPHICS THAT STAND FOR A CONCEPT WITHOUT DEFINING IT FULLY. HAVING A SENSE OF IMAGE OF.

### SYMBOLIC

(LANGUAGE-BASED) A SET OF SYMBOLIC OR LOGICAL PROPOSITIONS DRAWN FROM A SYMBOLIC SYSTEM THAT IS GOVERNED BY RULES OR LAWS FOR FORMING AND TRANSFORMING PROPOSITIONS. HAVING AN ARTICULATION OF.



TOWARD A THEORY OF INSTRUCTION (1966)

## HOWARD GARDNER INTELLIGENCE MODALITIES

### MUSICAL

(RHYTHMIC) SENSITIVITY TO RHYTHM, PITCH, METER, TONE, MELODY OR TIMBRE.

### VISUAL

(SPATIAL) SPATIAL JUDGMENT AND THE ABILITY TO VISUALIZE WITH THE MIND'S EYE.

### VERBAL

(LINGUISTIC) FACILITY WITH WORDS AND LANGUAGES, READING, WRITING, TELLING STORIES.

### LOGICAL

(MATHEMATICAL) LOGIC, ABSTRACTIONS, REASONING, NUMBERS AND CRITICAL THINKING. UNDERSTANDING THE UNDERLYING PRINCIPLES OF A CAUSAL SYSTEM.

### BODILY

(KINESTHETIC) CONTROL OF ONE'S BODILY MOTIONS AND THE CAPACITY TO HANDLE OBJECTS SKILLFULLY. A SENSE OF TIMING, A CLEAR SENSE OF THE GOAL OF A PHYSICAL ACTION, ALONG WITH THE ABILITY TO TRAIN RESPONSES.

### INTERPERSONAL

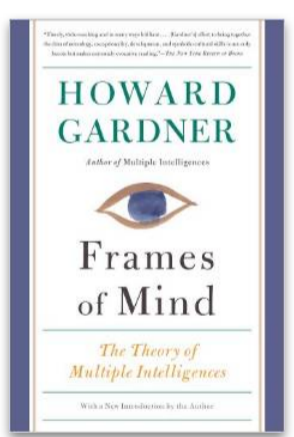
(SOCIAL) SENSITIVITY TO OTHERS' MOODS, FEELINGS, TEMPERAMENTS AND MOTIVATIONS. ABILITY TO COOPERATE IN ORDER TO WORK AS PART OF A GROUP.

### INTRAPERSONAL

(REFLECTIVE) INTROSPECTIVE AND SELF-REFLECTIVE CAPACITIES. A DEEP UNDERSTANDING OF THE SELF, ONE'S STRENGTHS AND WEAKNESSES, ABILITY TO PREDICT ONE'S OWN REACTIONS/EMOTIONS.

### NATURALISTIC

NURTURING AND RELATING INFORMATION TO ONE'S NATURAL SURROUNDINGS. A SENSITIVE, ETHICAL, AND HOLISTIC UNDERSTANDING OF THE WORLD AND ITS COMPLEXITIES, INCLUDING THE ROLE OF HUMANITY WITHIN THE GREATER ECOSPHERE.



FRAMES OF MIND: THE THEORY OF MULTIPLE INTELLIGENCES (1983)

# MODELS OF LEARNING

## DAVID KOLB EXPERIENTIAL LEARNING MODEL

### CONCRETE EXPERIENCE

(FEELING) HAVING AN EXPERIENCE.

### REFLECTIVE OBSERVATION

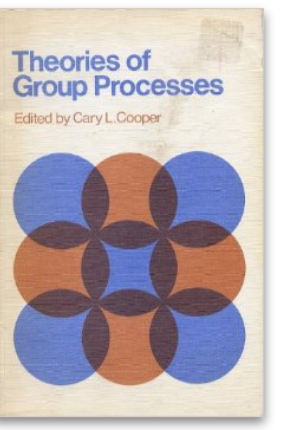
(WATCHING) REVIEWING, REFLECTING ON THE EXPERIENCE.

### ABSTRACT CONCEPTUALIZATION

(THINKING) CONCLUDING, LEARNING FROM THE EXPERIENCE, FORMATION OF ABSTRACT CONCEPTS AND GENERALIZATIONS.

### ACTIVE EXPERIMENTATION

(DOING) TRYING OUT WHAT HAS BEEN LEARNED. TESTING IMPLICATIONS OF CONCEPTS IN NEW SITUATIONS.



TOWARD AN APPLIED THEORY OF EXPERIENTIAL LEARNING (1975)

## ALLAN COLLINS, ET AL COGNITIVE APPRENTICESHIP / METHODS OF TEACHING

### MODELING

AN EXPERT DEMONSTRATES A TASK EXPLICITLY SO THAT THE STUDENT CAN EXPERIENCE AND BUILD A CONCEPTUAL MODEL OF THE TASK.

### COACHING

AN EXPERT OBSERVES THE STUDENT'S TASK PERFORMANCE AND OFFERS FEEDBACK AND HINTS.

### SCAFFOLDING

PUTTING INTO PLACE STRATEGIES AND METHODS TO SUPPORT THE STUDENT'S LEARNING, POSSIBLY EXECUTING PARTS OF THE TASK THAT THE STUDENT IS NOT YET ABLE TO DO.

### ARTICULATION

GETTING THE STUDENT TO ARTICULATE THEIR KNOWLEDGE, REASONING, OR PROBLEM-SOLVING PROCESS. THREE METHODS ARE INQUIRY TEACHING, THINKING ALOUD, AND CRITICAL STUDENT ROLE.

### REFLECTION

STUDENTS COMPARE THEIR OWN PROBLEM-SOLVING PROCESSES WITH THOSE OF AN EXPERT, ANOTHER STUDENT, AND ULTIMATELY, AN INTERNAL COGNITIVE MODEL OF EXPERTISE.

### EXPLORATION

STUDENTS FRAME INTERESTING PROBLEMS WITHIN THE DOMAIN FOR THEMSELVES, AND THEN TAKE THE INITIATIVE TO SOLVE THESE PROBLEMS.

## BENJAMIN BLOOM TAXONOMY OF EDUCATIONAL OBJECTIVES

### REMEMBER

(KNOWLEDGE) EXHIBIT MEMORY OF LEARNED MATERIALS BY RECALLING FACTS, TERMS, BASIC CONCEPTS AND ANSWERS.

### UNDERSTAND

(COMPREHENSION) DEMONSTRATE UNDERSTANDING OF FACTS AND IDEAS BY ORGANIZING, COMPARING, TRANSLATING, INTERPRETING, GIVING DESCRIPTIONS, AND STATING THE MAIN IDEAS.

### APPLY

(APPLICATION) USE ACQUIRED KNOWLEDGE. SOLVE PROBLEMS IN NEW SITUATIONS BY APPLYING ACQUIRED KNOWLEDGE, FACTS, TECHNIQUES AND RULES IN A DIFFERENT WAY.

### ANALYZE

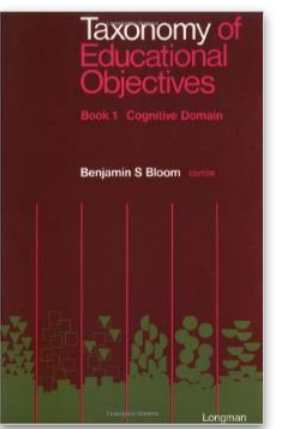
(ANALYSIS) EXAMINE AND BREAK INFORMATION INTO PARTS BY IDENTIFYING MOTIVES OR CAUSES, MAKE INFERENCES AND FIND EVIDENCE TO SUPPORT GENERALIZATIONS.

### EVALUATE

(EVALUATION) PRESENT AND DEFEND OPINIONS BY MAKING JUDGMENTS ABOUT INFORMATION, VALIDITY OF IDEAS OR QUALITY OF WORK BASED ON A SET OF CRITERIA.

### CREATE

(SYNTHESIS) COMPILE INFORMATION TOGETHER IN A DIFFERENT WAY BY COMBINING ELEMENTS IN A NEW PATTERN OR PROPOSING ALTERNATIVE SOLUTIONS.



TAXONOMY OF EDUCATIONAL OBJECTIVES, HANDBOOK 1: THE COGNITIVE DOMAIN (1956)

# THINKING TECHNIQUES

## GEORGE PÓLYA INDUCTIVE MOVES

### GENERALIZATION

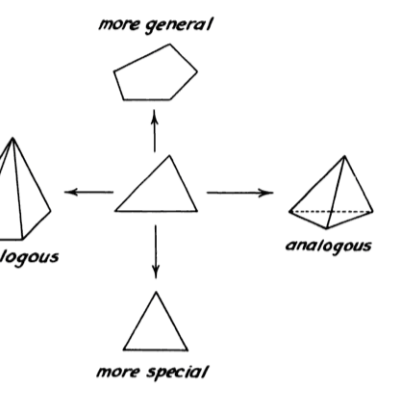
PASSING FROM THE CONSIDERATION OF A GIVEN SET OF OBJECTS TO THAT OF A LARGER SET, CONTAINING THE GIVEN ONE. OFTEN, PASSING FROM JUST ONE OBJECT TO A WHOLE CLASS CONTAINING THAT OBJECT.

### SPECIALIZATION

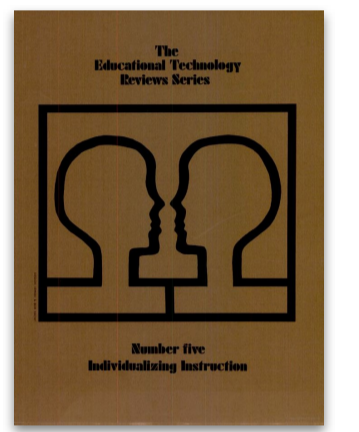
PASSING FROM THE CONSIDERATION OF A GIVEN SET OF OBJECTS TO THAT OF A SMALLER SET, CONTAINED IN THE GIVEN ONE. VERY OFTEN, PASSING FROM A WHOLE CLASS OF OBJECTS TO JUST ONE OBJECT CONTAINED IN THE CLASS.

### ANALOGY

TWO SYSTEMS ARE ANALOGOUS IF THEY AGREE IN CLEARLY DEFINABLE RELATIONS OF THEIR RESPECTIVE PARTS.



MATHEMATICS AND PLAUSIBLE REASONING, VOLUME 1: INDUCTION AND ANALOGY IN MATHEMATICS (1954)



MODELS FOR ENCOURAGING CREATIVITY IN THE CLASSROOM BY INTEGRATING COGNITIVE-AFFECTIVE BEHAVIORS (1984)

## FRANK WILLIAMS TAXONOMY OF CREATIVE THINKING

### COGNITIVE

GENERATING MANY IDEAS, ANSWERS, RESPONSES, POSSIBILITIES TO A GIVEN SITUATION/PROBLEM.

### FLEXIBILITY

(PERSONALITY) GENERATING ALTERNATIVES, VARIATIONS, ADAPTATIONS, DIFFERENT IDEAS/SOLUTIONS/OPTIONS.

### ORIGINALITY

GENERATING NEW, UNIQUE AND NOVEL RESPONSES/SOLUTIONS.

### ELABORATION

EXPANDING, ENLARGING, ENRICHING OR EMBELLISHING IDEAS TO MAKE IT EASIER FOR OTHERS TO UNDERSTAND OR MAKE IT MORE INTERESTING.

### AFFECTIVE

### RISK-TAKING

EXPERIMENTING, TRYING NEW CHALLENGES.

### COMPLEXITY

CREATING STRUCTURE OUT OF CHAOS, BRINGING LOGICAL ORDER TO A GIVEN SITUATION, SEEING THE MISSING PARTS.

### CURIOSITY

WONDERING, PONDERING, CONTEMPLATING, PUZZLING.

### IMAGINATION

BUILDING MENTAL PICTURES, VISUALIZING POSSIBILITIES AND NEW THINGS, REACHING BEYOND PRACTICAL LIMITS.

## EDWARD DEBONO THINKING HATS

### MANAGING

(BLUE) WHAT IS THE SUBJECT? WHAT ARE WE THINKING ABOUT? WHAT IS THE GOAL?

### INFORMATION

(WHITE) CONSIDERING PURELY WHAT INFORMATION IS AVAILABLE, WHAT ARE THE FACTS?

### EMOTIONS

(RED) INTUITIVE OR INSTINCTIVE GUT REACTIONS OR STATEMENTS OF EMOTIONAL FEELING (BUT NOT ANY JUSTIFICATION).

### DISCERNMENT

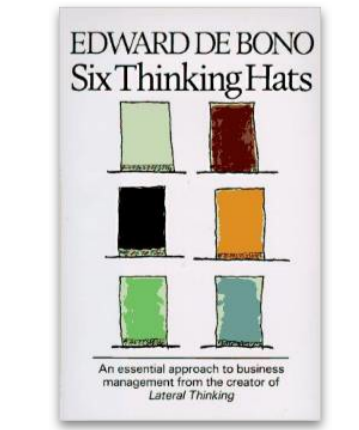
(BLACK) LOGIC APPLIED TO IDENTIFYING REASONS TO BE CAUTIOUS AND CONSERVATIVE.

### OPTIMISTIC RESPONSE

(YELLOW) LOGIC APPLIED TO IDENTIFYING BENEFITS, SEEKING HARMONY.

### CREATIVITY

(GREEN) PROVOCATION AND INVESTIGATION, SEEING WHERE A THOUGHT GOES.



SIX THINKING HATS (1985)

# STAGES OF DEVELOPMENT

## JEAN PIAGET STAGES OF COGNITIVE DEVELOPMENT

### SENSORIMOTOR

(BIRTH TO 2 YEARS OLD) THE INFANT BUILDS AN UNDERSTANDING OF ITSELF AND REALITY THROUGH INTERACTIONS WITH THE ENVIRONMENT. LEARNING TAKES PLACE VIA ASSIMILATION (THE ORGANIZATION OF INFORMATION AND ABSORBING IT INTO EXISTING SCHEMA) AND ACCOMMODATION (WHEN AN OBJECT CANNOT BE ASSIMILATED AND THE SCHEMATA HAVE TO BE MODIFIED TO INCLUDE THE OBJECT).

### PREOPERATIONAL

(AGES 2 TO 7) THE CHILD IS NOT YET ABLE TO CONCEPTUALIZE ABSTRACTLY AND NEEDS CONCRETE PHYSICAL SITUATIONS. OBJECTS ARE CLASSIFIED IN SIMPLE WAYS, ESPECIALLY BY IMPORTANT FEATURES.

### CONCRETE OPERATIONAL

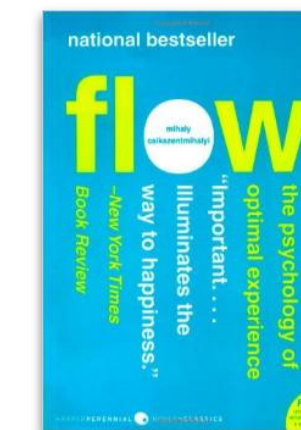
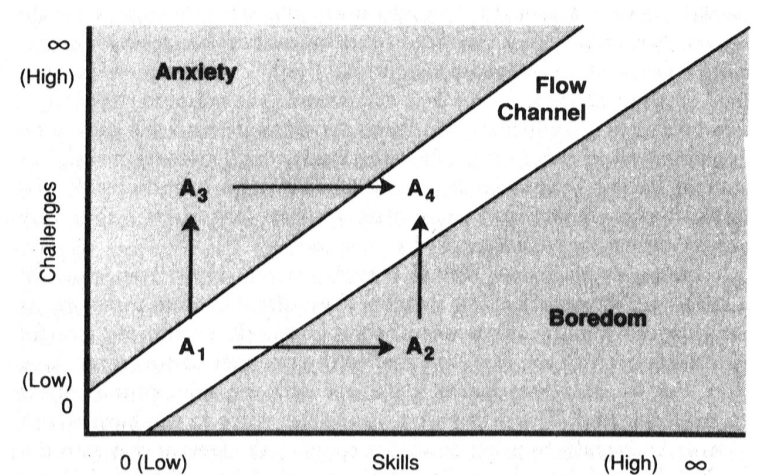
(AGES 7 TO 11) AS PHYSICAL EXPERIENCE ACCUMULATES, ACCOMMODATION IS INCREASED. THE CHILD BEGINS TO THINK ABSTRACTLY AND CONCEPTUALIZE, CREATING LOGICAL STRUCTURES THAT EXPLAIN HIS OR HER PHYSICAL EXPERIENCES.

### FORMAL OPERATIONAL

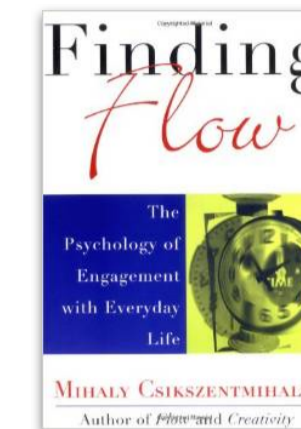
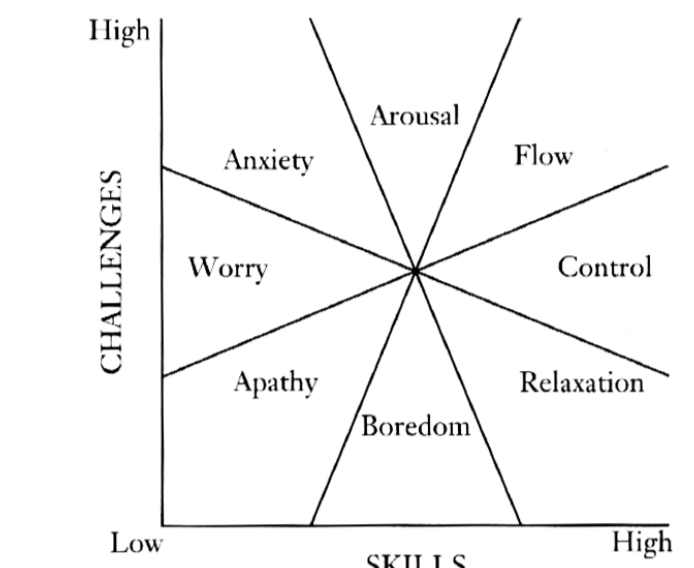
(BEGINNING AT AGES 11 TO 15). COGNITION REACHES ITS FINAL FORM. BY THIS STAGE, THE PERSON NO LONGER REQUIRES CONCRETE OBJECTS TO MAKE RATIONAL JUDGEMENTS, AND IS CAPABLE OF DEDUCTIVE AND HYPOTHETICAL REASONING.

# MODELS OF HUMAN BEHAVIOR

## MIHALY CSIKSZENTMIHALYI FLOW CHANNEL



FLOW (1990)



FINDING FLOW (1998)

## ERIK ERIKSON STAGES OF PSYCHOSOCIAL DEVELOPMENT

### TRUST VS MISTRUST

(BIRTH TO 18 MONTHS) CAN I TRUST THE WORLD? THE INFANT MUST FORM A FIRST LOVING, TRUSTING RELATIONSHIP WITH THE CAREGIVER, OR DEVELOP A SENSE OF MISTRUST.

### AUTONOMY VS SHAME AND DOUBT

(AGES 2 TO 4) IS IT OKAY TO BE ME? THE CHILD NEEDS TO DEVELOP A SENSE OF PERSONAL CONTROL OVER PHYSICAL SKILLS AND A SENSE OF INDEPENDENCE. SUCCESS LEADS TO FEELINGS OF AUTONOMY, FAILURE RESULTS IN FEELINGS OF SHAME AND DOUBT.

### INITIATIVE VS GUILT

(AGES 3 TO 6) IS IT OKAY FOR ME TO DO, MOVE AND ACT? CHILDREN NEED TO BEGIN ASSERTING CONTROL AND POWER OVER THE ENVIRONMENT, LEADING TO A SENSE OF PURPOSE. CHILDREN WHO TRY TO EXERT TOO MUCH POWER EXPERIENCE DISAPPROVAL, RESULTING IN A SENSE OF GUILT.

### INDUSTRY VS INFERIORITY

(AGES 6 TO 11) CAN I MAKE IT IN THE WORLD OF PEOPLE AND THINGS? CHILDREN NEED TO COPE WITH NEW SOCIAL AND ACADEMIC DEMANDS. SUCCESS LEADS TO A SENSE OF COMPETENCE, WHILE FAILURE RESULTS IN FEELINGS OF INFERIORITY.

### IDENTITY VS ROLE CONFUSION

(AGES 12 TO 18) WHO AM I? WHAT CAN I BE? TEENS NEED TO DEVELOP A SENSE OF SELF AND PERSONAL IDENTITY. SUCCESS LEADS TO AN ABILITY TO STAY TRUE TO YOURSELF, WHILE FAILURE LEADS TO ROLE CONFUSION AND A WEAK SENSE OF SELF.

### INTIMACY VS ISOLATION

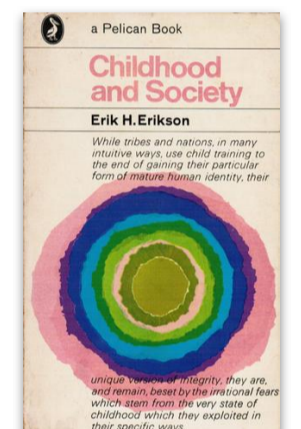
(AGES 19 TO 40) CAN I LOVE? YOUNG ADULTS NEED TO FORM INTIMATE, LOVING RELATIONSHIPS WITH OTHER PEOPLE. SUCCESS LEADS TO STRONG RELATIONSHIPS, WHILE FAILURE RESULTS IN LONELINESS AND ISOLATION.

### GENERATIVITY VS STAGNATION

(AGES 40 TO 65) CAN I MAKE MY LIFE COUNT? ADULTS NEED TO CREATE OR NURTURE THINGS THAT WILL OUTLAST THEM, OFTEN BY HAVING CHILDREN OR CREATING A POSITIVE CHANGE THAT BENEFITS OTHER PEOPLE. SUCCESS LEADS TO FEELINGS OF USEFULNESS AND ACCOMPLISHMENT, WHILE FAILURE RESULTS IN SHALLOW INVOLVEMENT IN THE WORLD.

### EGO INTEGRITY VS DESPAIR

(AGES 65 TO DEATH) IS IT OKAY TO HAVE BEEN ME? OLDER ADULTS NEED TO LOOK BACK ON LIFE AND FEEL A SENSE OF FULFILLMENT. SUCCESS AT THIS STAGE LEADS TO FEELINGS OF WISDOM, WHILE FAILURE RESULTS IN REGRET, BITTERNESS, AND DESPAIR.



CHILDHOOD AND SOCIETY (1950)

## ABRAHAM MASLOW HIERARCHY OF NEEDS

### PHYSIOLOGICAL

AIR, FOOD, DRINK, SHELTER, WARMTH, SEX, SLEEP

### SAFETY

PROTECTION FROM ELEMENTS, SECURITY, ORDER, LAW, STABILITY, FREEDOM FROM FEAR

### LOVE AND BELONGINGNESS

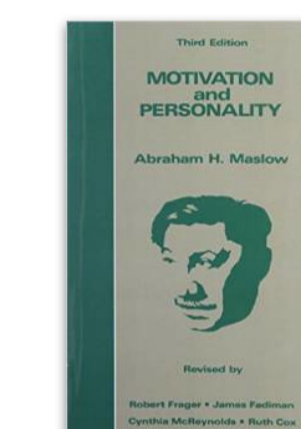
FRIENDSHIP, INTIMACY, AFFECTION AND LOVE, FROM WORK GROUP, FAMILY, FRIENDS, ROMANTIC RELATIONSHIPS

### ESTEEM

ACHIEVEMENT, MASTERY, INDEPENDENCE, STATUS, DOMINANCE, PRESTIGE, SELF-RESPECT, RESPECT FROM OTHERS

### SELF-ACTUALIZATION

REALIZING PERSONAL POTENTIAL, SELF-FULFILLMENT, SEEKING PERSONAL GROWTH AND PEAK EXPERIENCES



A THEORY OF HUMAN MOTIVATION (1954)

## ELISABETH KÜBLER-ROSS STAGES OF GRIEF

### DENIAL

THE PERSON IS TRYING TO SHUT OUT THE REALITY OR MAGNITUDE OF HIS/HER SITUATION, AND BEGINS TO DEVELOP A FALSE, PREFERABLE REALITY.

### ANGER

"WHY ME? IT'S NOT FAIR!" "HOW CAN THIS HAPPEN TO ME?" "WHO IS TO BLAME?" "WHY WOULD GOD LET THIS HAPPEN?"

### BARGAINING

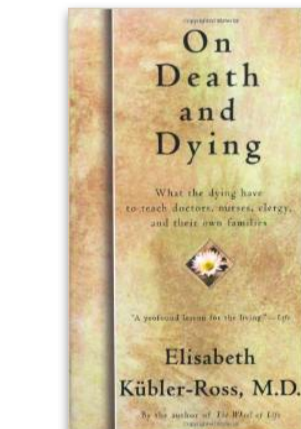
THE HOPE THAT THE INDIVIDUAL CAN SOMEHOW UNDO OR AVOID A CAUSE OF GRIEF. USUALLY, THE NEGOTIATION FOR AN EXTENDED LIFE IS MADE WITH A HIGHER POWER IN EXCHANGE FOR A REFORMED LIFESTYLE. OTHER TIMES, THEY WILL USE ANYTHING VALUABLE AS A BARGAINING CHIP AGAINST ANOTHER HUMAN AGENCY TO EXTEND OR PROLONG THE LIFE THEY LIVE.

### DEPRESSION

THE GRIEVING PERSON BEGINS TO UNDERSTAND THE CERTAINTY OF DEATH. MUCH LIKE THE EXISTENTIAL CONCEPT OF THE VOID, THE IDEA OF LIVING BECOMES POINTLESS. THINGS BEGIN TO LOSE MEANING TO THE GRIEVER.

### ACCEPTANCE

INDIVIDUALS BEGIN TO COME TO TERMS WITH THEIR MORTALITY OR INEVITABLE FUTURE, OR THAT OF A LOVED ONE, OR OTHER TRAGIC EVENT. THIS TYPICALLY COMES WITH A CALM, RETROSPECTIVE VIEW FOR THE INDIVIDUAL, AND A STABLE MINDSET.



ON DEATH AND DYING (1969)