# Today

- Health interventions
- Technology-mediated interventions
  - JITAIs
- The process of illness and illness cognitions
  - Illiness cognitions
  - Stress, Pain (May 10)

Assignments

- Assignment 3 – mismatch between theory and methods and strategies
- APA formatting
- Adhere to page limit
- Academic writing tips
  - Formal vs. informal
    - Not necessarily passive voice
    - Watch out for word choices (pretty, well, …)
  - Do not abbreviate – it's ….it is
  - Effective transition sentences versus "filler" sentences
    - Consider the difference
      - In the next section, I will write about a theory that I can apply towards achieving my goals.
      Vs.
      - Health behavior theories can be useful in guiding interventions towards achieving goals.

Focus on Theory-Based Interventions
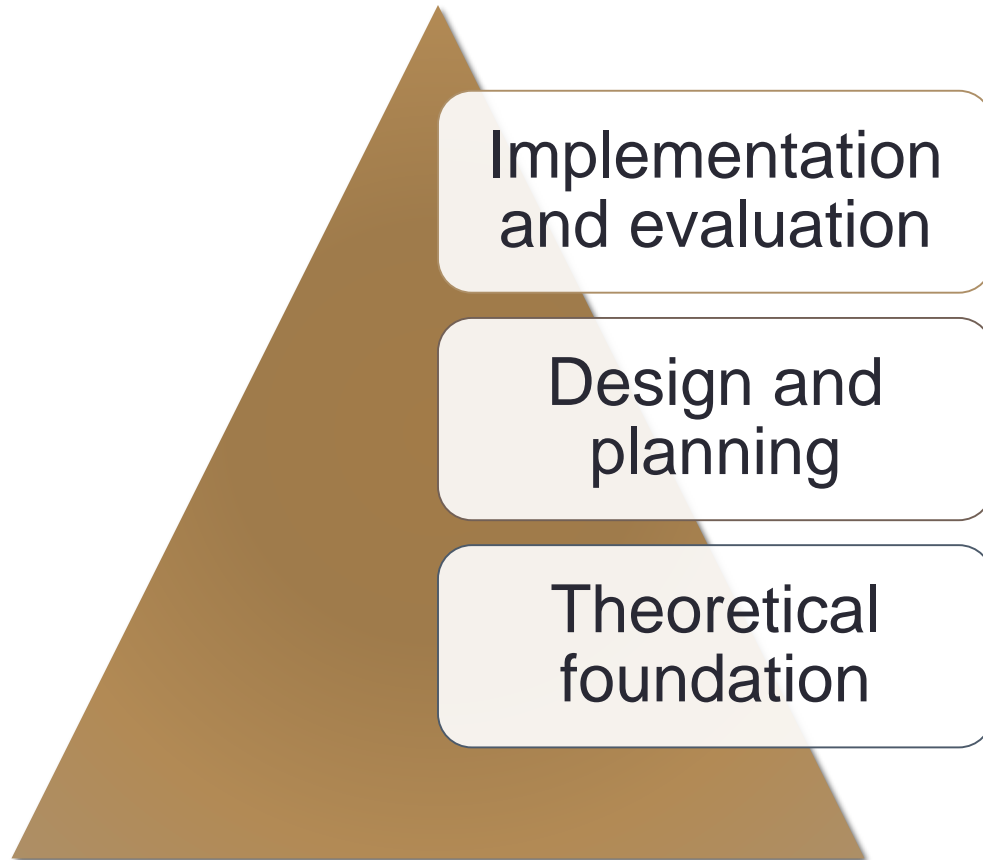
General Steps in Planning Models

- **Step 1**
  - Identify behavior and target population
- **Step 2**
  - Identify relevant influences on behavior
- **Step 3**
  - Select intervention methods
- **Step 4**
  - Develop intervention strategies

Steps 1 & 2

- Should involve needs assessment
- Should result in the identification of appropriate intervention goals and objectives

Need Assessment

- Key is to identify needs based on evaluation of current conditions and desired conditions
- Involves gathering of new data as well as use of existing secondary data sources
- Ultimately should inform why intervention needs to take place and what may be the key intervention components.
- Various methods utilized to complete need assessment (surveys, focus groups, observation groups, interviews, community or expert forum, public health data and databases, etc.)

Steps 3 & 4

- Are informed by research in Step 1 & 2
- Involve selection of intervention methods and strategies
  - *What will be done in order to change behavior?*
- These steps represent the creative part of intervention planning – this is where planning becomes reality

Steps 3 & 4

- Brainstorming methods
  - How can we use the performance objective to alter the determinant?
- Delineating methods
  - Which methods have been successfully used in the past?
  - How were previous programs similar/different from this program?
- Translating methods into strategies
  - How can we deliver our program to our target population?
  - Is there a necessary sequence in the methods we will use?
- Operationalize strategies
  - Organize strategies into a deliverable program
  - Specify channels of delivery/communication
- Design program materials
  - Planning documents, schedules
  - *How do you hold yourself accountable?*
- Pretest instruction materials
- Produce program materials

Intervention Mapping

Helps answer your questions:

1. How do I set appropriate intervention goals?
2. When in the planning process do I use theory to guide decisions?
3. How do I know what theory, methods to use?
4. How do I develop concrete strategies?
5. How do I implement them?
6. …

Let's Create an Intervention Map

NEEDS ASSESSMENT

Identify the at-risk population, quality of life and health problem

Distinguish environmental and behavioral causes

Review key determinants

EVALUATION

INTERVENTION MAP

Outcomes
Proximal Program Objective Matrices

Tasks
- Specify the performance objectives
- Specify important, changeable determinants
- Differentiate the target population
- Create matrices of proximal program objectives

Theoretical Methods and Practical Strategies
- Brainstorm methods to achieve proximal program objectives
- Use the theoretical and empirical literature to further delineate methods
- Translate methods into strategies

Program Design
- Operationalize the strategies into plans considering implementors and sites
- Design instruction materials
- Pretest instruction materials with the target group
- Produce the materials

Adoption & Implementation Plan
- Develop a linkage system
- Specify adoption and implementation performance objectives
- Specify determinants of adoption and implementation
- Write the implementation plan

Monitoring & Evaluation Plan
- Develop an evaluation model using information from previous steps of intervention mapping and information from the needs assessment
- Develop *effect* evaluation questions, referring to the matrices of proximal program objective as blueprints for instrument development
- Develop *process* evaluation questions from the needs assessment and intervention map

IMPLEMENTATION

Intervention Mapping

Population: African American Urban Youth

Intervention Goal	Determinant	Determinant
	Lack of Knowledge	Lack of Resources
Accumulate 30 minutes of VIGOROUS PA outside of school	???	
Limit time TV/computer screen time to 1 hour per day		

- **Proximal program objective**: Action statement indicating what individuals must learn or what must change in the social context as a result of the program.

Question

What is an appropriate proximal program objective for ???

Intervention Goal	Determinant	Determinant
	Lack of Knowledge	Lack of Resources
Accumulate 30 minutes of VIGOROUS PA outside of school	???	

A. Lack knowledge about the benefits of vigorous PA and amount needed.

B. Understands the health benefits of vigorous PA and amount recommended.

C. Has barriers to performing 30 minutes of vigorous PA outside of school.

Question

- What is an intervention method?
  - A.   Use of exercise logs
  - B.   Self-monitoring
  - C.   Face-to-face instruction
  - D.   Pedometers

Question

- What is an intervention strategy?
  A. Self-talk
  B. Goal-setting
  C. Weekly feedback forms
  D. Reinforcement

Methods versus Strategies

- Theoretical methods: A generalized technique used to influence a determinant

- Practical strategies: A plan for organizing and delivering methods

Methods versus Strategies

self-talk, goal-setting
rewards, benefits
monitoring, feedback, reinforcement, relapse

face, phone and mail contacts
contacts plus logs and incentives
attendance records, pedometers, facility
scan system

supportive learning
enhanced communication
increase reinforcing social interactions

assigned peer mentor
assigned caring provider
compare interactions with peer versus
provider

Methods versus Strategies

METHODS	STRATEGIES
self-talk, goal-setting	face, phone and mail contacts
rewards, benefits	contacts plus logs and incentives
monitoring, feedback, reinforcement, relapse	attendance records, pedometers, facility scan system
supportive learning	assigned peer mentor
enhanced communication	assigned caring provider
increase reinforcing social interactions	compare interactions with peer versus provider

Applying Intervention Mapping

- Treatment Resistant Depression Exercise Trial – Planning Phase

Intervention objectives	Determinant 1 Lack of energy/fatigue	Determinant 2 Lack of enjoyment	Determinant 3 Time constraints
Reach level of PA guidelines	*Understands importance of gradual progression and allowing time for adaptation*	*Understands importance of moderate intensity and explores enjoyable types of exercise*	*Learns how to schedule 150 min of physical activity into a week in a flexible manner*
Improve symptoms of depression			

Steps 3 & 4

- Brainstorming methods
  - How can we use the performance objective to alter the determinant?
- Delineating methods
  - Which methods have been successfully used in the past?
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TRD Example

Methods	Strategies
Information provision	Provide information in a booklet (importance of PA, recommended levels, relevance for depression and other health risks/benefits)
Teaching behavioral skills	In-person instruction and provide information in booklet, handouts, newsletters (self-monitoring, selecting appropriate activities across different settings)
Increasing motivation	Provision of feedback and encouragement through feedback reports and instructor consultation
Teaching self-regulation skills	In-person instruction and provide information in booklet (time management strategies, use of implementation plans, how to overcome common barriers and recover from setbacks)
Self-efficacy	Self-monitoring through exercise logs, feedback reports, in-person consultation about progress and success, vicarious learning through interaction with other participants

TRD Example

Program Description	
Mode	Face-to-face
Location	University fitness center
Schedule	Flexible hours (morning, mid-day, evening classes) plus general membership
Treatment Duration	12 weeks
Treatment Progression	Weeks 1-4 – 3 supervised + 2 home-based per week Weeks 5-8 – 2 supervised + 3 home-based per week Weeks 9-12 – 1 supervised + 4 home-based per week Weeks 1-6 – gradually increase duration per session (start at 15 min up to 45 min) at low-to-moderate intensity (RPE = 10-12; HR = 50-60% MaxHR) Weeks 7-12 – maintain duration and increase intensity to moderate range (RPE = 12-15; HR = 60-70% Max HR)

Group Activity

- Create intervention objectives

Intervention Goal	Determinant	Determinant

- Brainstorm methods using CALO-RE taxonomy
  - *Which methods can we use to achieve proximal objectives and change intervention determinants?*
- Translate methods into practical strategies
  - *How can we deliver the methods to participants?*
- Determine the overall parameters of your intervention
  - *Design, channel/platform, duration, frequency of contact, etc.*

Logic Models

- Logic models help identify the factors that will impact your program and enable you to anticipate the data and resources you will need to achieve success.
  - Cataloguing of the resources and actions you believe you will need to reach intended results.
  - Documentation of connections among your available resources, planned activities and the results you expect to achieve.
  - Description of the results you are aiming for in terms of specific, measurable, action-oriented, realistic and timed outcomes.

Logic Models

Inputs	Activities	Outputs
What will it take to meet out goals?	What will we do? What are our activities?	Who did we reach? How many? How many times? Where they satisfied?
•Time •People (staff & volunteers) •Money •Materials •Equipment •Partnerships •Technology	•Conduct workshops, meetings •Deliver Services •Develop products, curricula, resources •Train, Counsel, Educate, Assess, Facilitate, Partner, Advocate	•Participants •Clients/Customers •Agencies •Communities •Students •Parents

Logic Models

RESOURCES	ACTIVITIES	OUTPUTS	SHORT & LONG-TERM OUTCOMES	IMPACT
In order to accomplish our set of activities we will need the following:	*In order to address our problem or asset we will conduct the following activities:*	*We expect that once completed or underway these activities will produce the following evidence of service delivery:*	*We expect that if completed or on-going these activities will lead to the following changes in 1-3 then 4-6 years:*	*We expect that if completed these activities will lead to the following changes in 7-10 years:*

Logic Models

Resources	Activities	Outputs	Short & long-term outcomes	Impact
In order to accomplish our set of activities we will need the following:	In order to address our problem or asset we will conduct the following activities	We expect that once completed, these activities will produce the following evidence of service delivery:	We expect that the activities will lead to the following changes in the next 6 months – 1 year…	We expect that the activities will lead to the following changes in the next 5 years…
• Qualified & dedicated staff • Endorsement from Psychiatric clinic • Donated hospital fitness center time • Job descriptions for staff • First year's funding ($50,000) • Equipment • . . .	• Launch staff search • Secure clinic endorsement and fitness center time • Create job descriptions and staff manual • Design and implement funding strategy • Secure equipment .	• # of patients recruited/referred • # of staff members trained • Level of funding secured .	Or: Proximal Outcomes	Or: Distal Outcomes

Mediated Interventions

- Use of non-face-to-face approaches (especially technology)
- Goals
  - Providing interventions to large numbers of people at low cost (SCALABILITY)
  - Provide health messages to the population
- What are the platforms?
  - mass-reach broadcast media
  - print-based materials (by mail)
  - audiovisual materials (videos, tapes)
  - newer multimedia (internet, cell phones, smartphones, ipads/tablets, exergaming, etc.)

Communication Theory

S-M-C-R model

- Computer-mediated communication

S-M-C-R-F model

- Human computer interaction

Source (interventionist/intervention system)

Message (content of intervention)

Channel (platform)

Receiver (users/participants)

Feedback (sensor device)

Mass Media Campaigns

- **Participaction**
- Since 1971
- Social marketing approach to physical activity promotion
- a national not-for-profit organization solely dedicated to inspiring and supporting active living and sport participation for Canadians
- sectors represented include business, education, entertainment, media, social service, government, healthcare, physical activity, sport and recreation and research
- http://www.youtube.com/watch?v=a6j9VdMcN9k

Other Media

- Interactive Voice Recordings (IVR)
  - Avatars
- Social Media
  - Populations?
  - Your experiences?
- Text messaging
  - Content, frequency versus message exposure
- Smartphones
  - Integration of technology – built-in accelerometers
- Other?

Apps

- Apps generally observed to be lacking in theoretical content
- The health belief model was the most prevalent theory
- Higher priced apps and apps that addressed a broader activity spectrum associated with higher theoretical fidelity and credibility
- More likely to be used personally or recommended to a health care client
- Many cater to already active populations
- What is their longevity????
- **What was your experience?**

Apps – cont.

Cowan et al. (2012):

- Content analysis of 127 apps from Apple's (App Store) Health & Fitness category
- Inclusion of theoretical constructs from prominent behavior change theories (20 theoretical constructs)
- Apps were generally observed to be lacking in theoretical content (89%)
- Theory scores ranged from 1 to 28 on a 100-point scale.
- The health belief model was the most prevalent theory, accounting for 32% of all constructs
- Higher priced apps and apps that addressed a broader activity spectrum were associated with higher total theory scores.

Apps – cont.

West et al. (2012)

- Content analysis of health and fitness app descriptions available on iTunes during February 2011 (3336 paid apps)

- Only 1.86% (62/3336) included predisposing, enabling, and reinforcing factors

- Compared to apps with a cost less than US $0.99, apps exceeding US $0.99 were more likely to be scored as intending to promote health or prevent disease to be credible or trustworthy

- More likely to be used personally or recommended to a health care client

SMART

- **S**equential, **M**ultiple **A**ssignment, **R**andomized **T**rial
- Adaptive interventions, individually tailored treatments

Lei H, Nahum-Shani I, Lynch K, Oslin D, Murphy SA. Annu Rev Clin Psychol. 2012;8:21-48
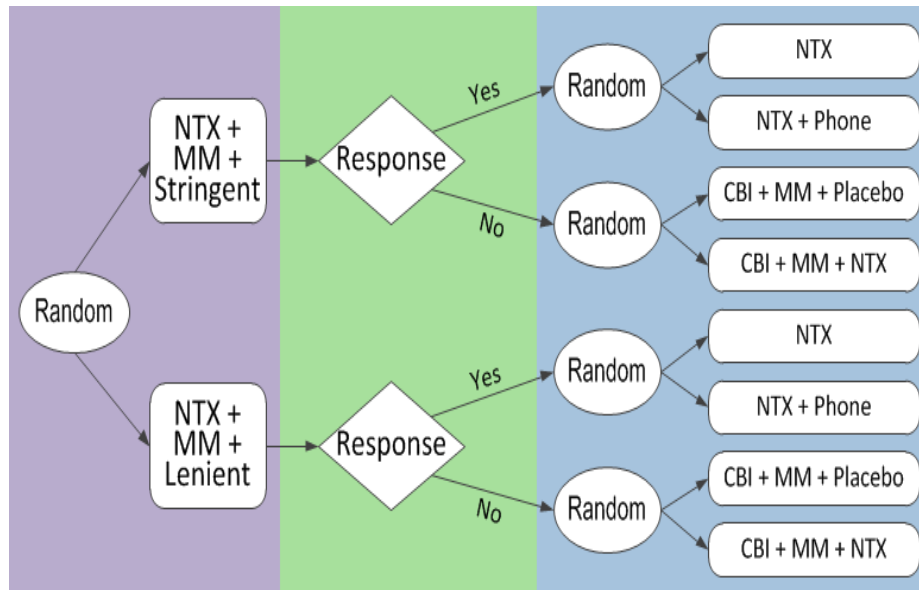
SMART

- **J**ust-**i**n-**T**ime **A**daptive **I**nterventions (JITAIs)
- Adaptation guided by
  - Distal and proximal reponse
- Adaptation made up of
  - Tailoring variables
  - Decision rules
  - Treatments
- Adaptation triggered at
  - Decision points

Nahum-Shani I, Smith SN, Spring BJ, Collins LM, Witkiewitz K, Tewari A, Murphy SA (2016) Ann Behav Med.

JITAI

- Hypothetical example

- **Treatment**
  - Self-monitoring (daily step count)
  - Feedback provision (automated)
  - Goal setting (medium)
  - Daily prompts (tailored)

- **Distal response** – overal physical activity
- **Proximal response** – step count over next hour
- **Tailoring variable** (e.g., what could moderate response?)
  - Availability
  - Location
  - Step count
- **Decision rule**
  - IF available, THEN
    - If at home = Yes,
      - THEN Text=prompt tip for home exercise
    - Else if at home = No
      - THEN Text=prompt tip for
      - …..
  - Else if not available, THEN Text= do nothing
- **Decision point** (guided by dynamics of tailoring variable and effects of treatment)
  - Every 2 hours

JITAI

- *In what context are pushed messages most effective? (home versus work or morning versus afternoon)*
- *What is the appropriate frequency of pushed messages?*
- **Micro-randomized trial**
  - Randomize each participant between treatments at each decision point

    (100-1000 or more randomizations)
  - Sequential, factorial designs
    - Time-varying main effects, interactions/moderation (are then used to inform decision rules…)
  - This approach becoming a standard in developing ***mobile health*** interventions

Nahum-Shani I, Hekler EB, Spruijt-Metz D. (2015) Health Psychology.
www.methodology.psu.edu

The Process of Illness

- Think of the last time you were ill (e.g., headache, flu, broken limb, etc.).
- Consider the ways in which you made sense of your illness, how they related to your coping strategies and how you recovered.
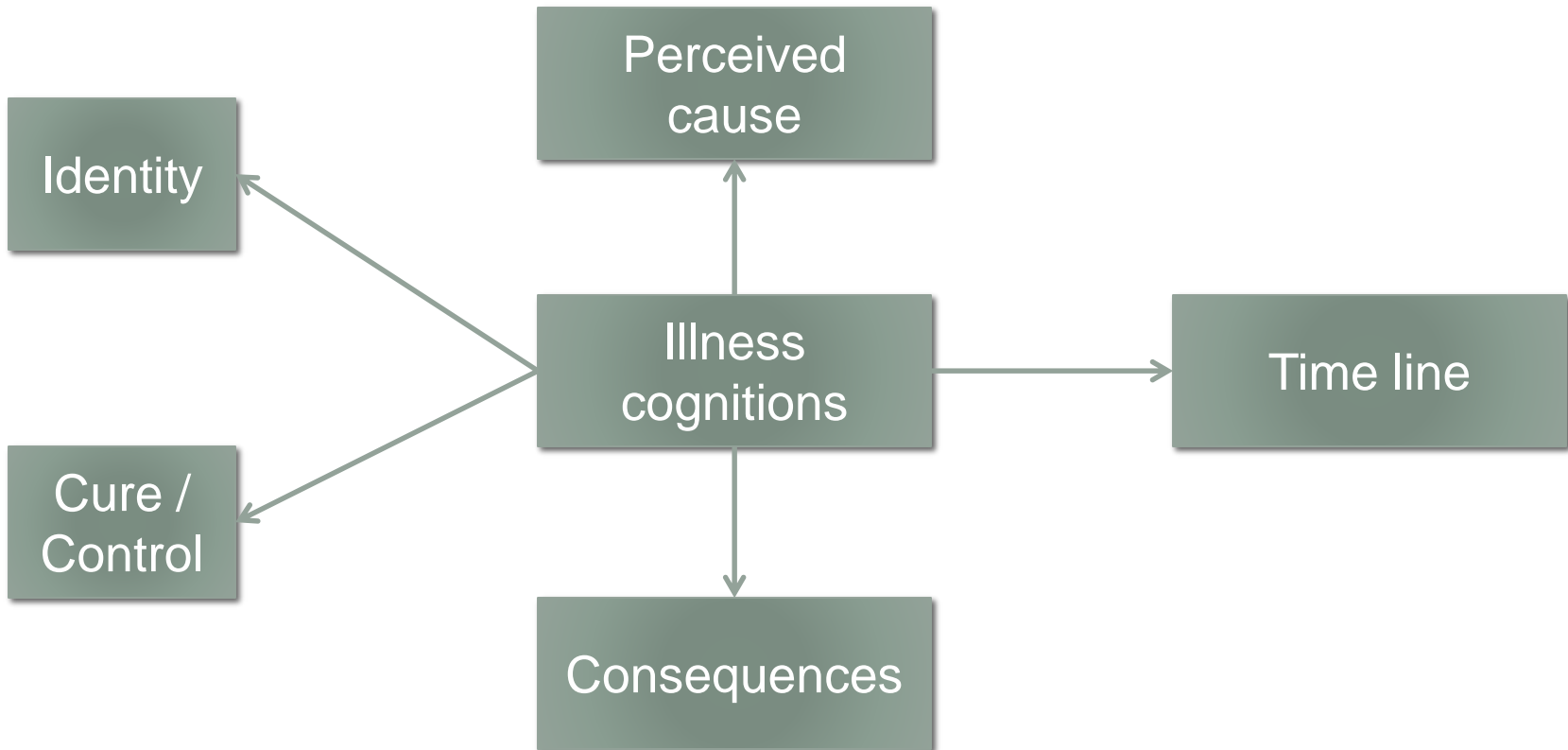
What does it mean to be ill?

- Not feeling normal
- Specific symptoms
- Specific illnesses
- Consequences of illness
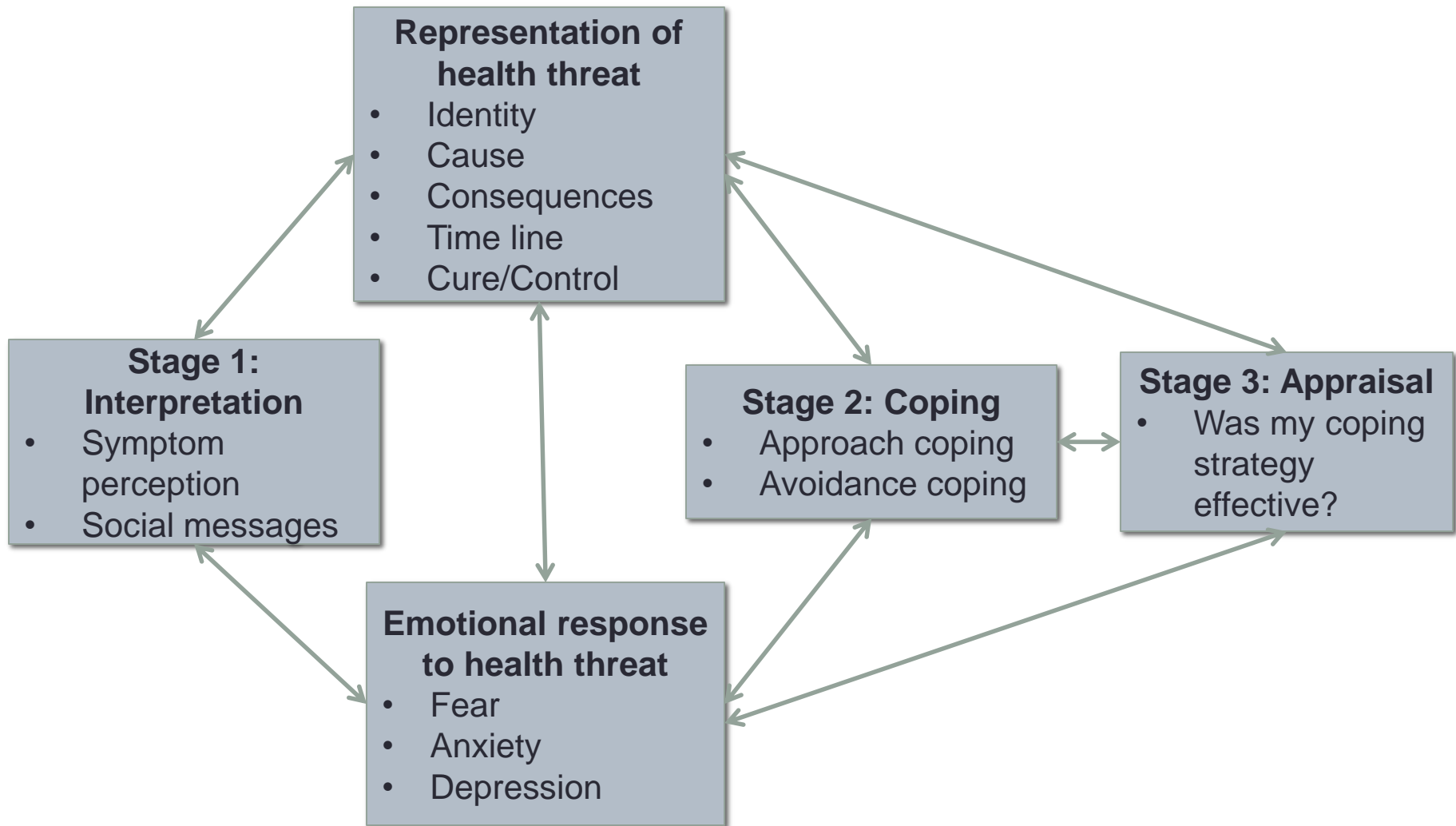- Time line
- Absence of health

Illness Cognitions

- Leventhal et al. (1980)

- A patient's own implicit common sense beliefs about their illness
- Provide schema for coping with illness, understanding their illness, warning signs

Self-Regulatory Model of Illness Behavior

Representation of health threat
- Identity
- Cause
- Consequences
- Time line
- Cure/Control

Stage 1: Interpretation
- Symptom perception
- Social messages

Stage 2: Coping
- Approach coping
- Avoidance coping

Stage 3: Appraisal
- Was my coping strategy effective?

Emotional response to health threat
- Fear
- Anxiety
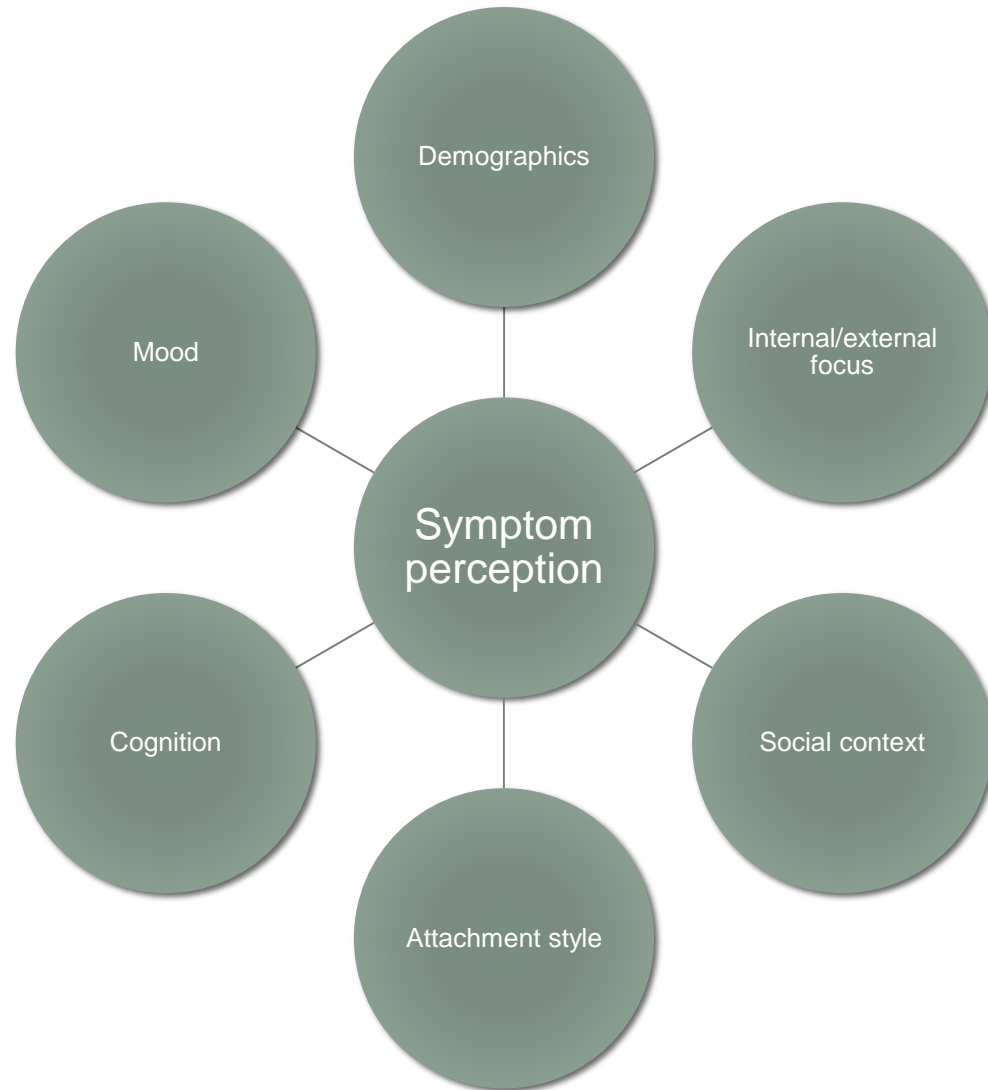- Depression

Symptom Perception

- Discuss
  - Symptoms are more than just a sensation.
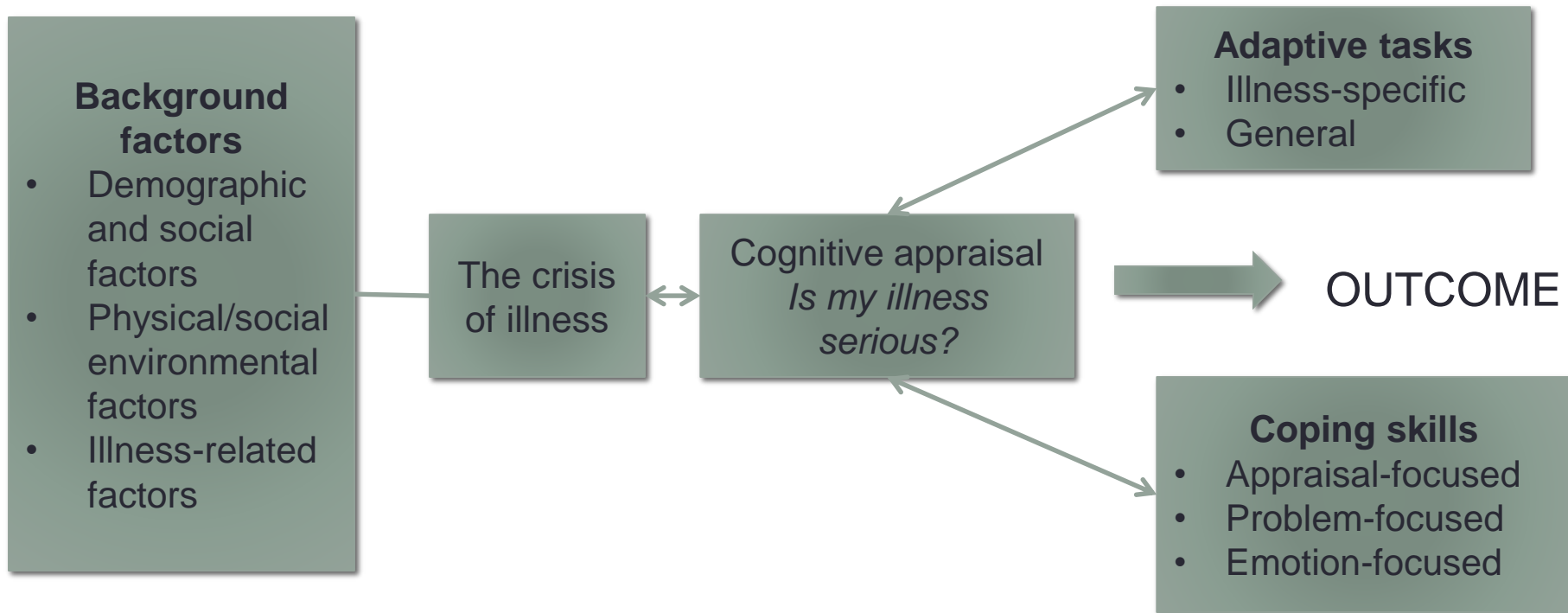- What influences symptom perception?
  - Draw a model

Symptom Perception

Coping

- Illness as a crisis (Moos & Schaefer, 1984)
  - Changes in identity
  - Changes in location
  - Changes in role
  - Changes in social support
  - Unpredicted event
  - Insufficient or unclear information about illness
  - Decision needed quickly
  - Ambiguous meaning
  - Limited prior experience
- Coping as a process (Moos & Schaefer, 1984)
  - (1) Cognitive appraisal   (2) Adaptive tasks   (3) Coping skills

Coping with the crisis of illness

Background factors
- Demographic and social factors
- Physical/social environmental factors
- Illness-related factors

The crisis of illness

Cognitive appraisal
Is my illness serious?

Adaptive tasks
- Illness-specific
- General

Coping skills
- Appraisal-focused
- Problem-focused
- Emotion-focused

OUTCOME

Videos

- https://www.youtube.com/watch?v=YY3d4dyFRog

- Harvard Innovation Lab talk
- https://www.youtube.com/watch?v=oPrIBJZah5Y

- https://www.youtube.com/watch?v=kVZLR_rxjfE