The role of alcohol behavioral research in the design of HIV primary prevention interventions in the era of ART: Research Agenda for the next 5 years

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Overview

"In 2015, the estimated number of new HIV infections …was no fewer than in 2010. Unless the decline in new HIV infections is accelerated, a rebound of the epidemic is likely…"
"We neglect primary HIV prevention at our peril" (Isbell, Kilonzo, Mugurungi, & Bekker, 2016)

The capacity to prevent unsafe sex ultimately hinges on scientists' capacity to understand what transpires in those critical moments when sexual decisions are made or "just happen"

Thus, prevention science must remain linked to basic science aimed at evaluating theory-driven mechanisms explaining why people take these risks

Outline

Introduction
Findings from basic behavior research
Intervention implications
Future research agenda?

Introduction

Mission:

- Goal: Prevent alcohol-involved sexual risk behavior (SRB) – namely unprotected vaginal and anal intercourse – among HIV-negative persons
- Primary prevention hinges on understanding
    - What aspects of a person's background and prevailing social circumstances determine that he or she winds up in situation in which SRB is a possible outcome?
    - What aspects determine that he or she will experience acute alcohol intoxication in said situation?
    - Once in the situation, how is it that acute alcohol intoxication causally contributes to SRB occurring?

Introduction

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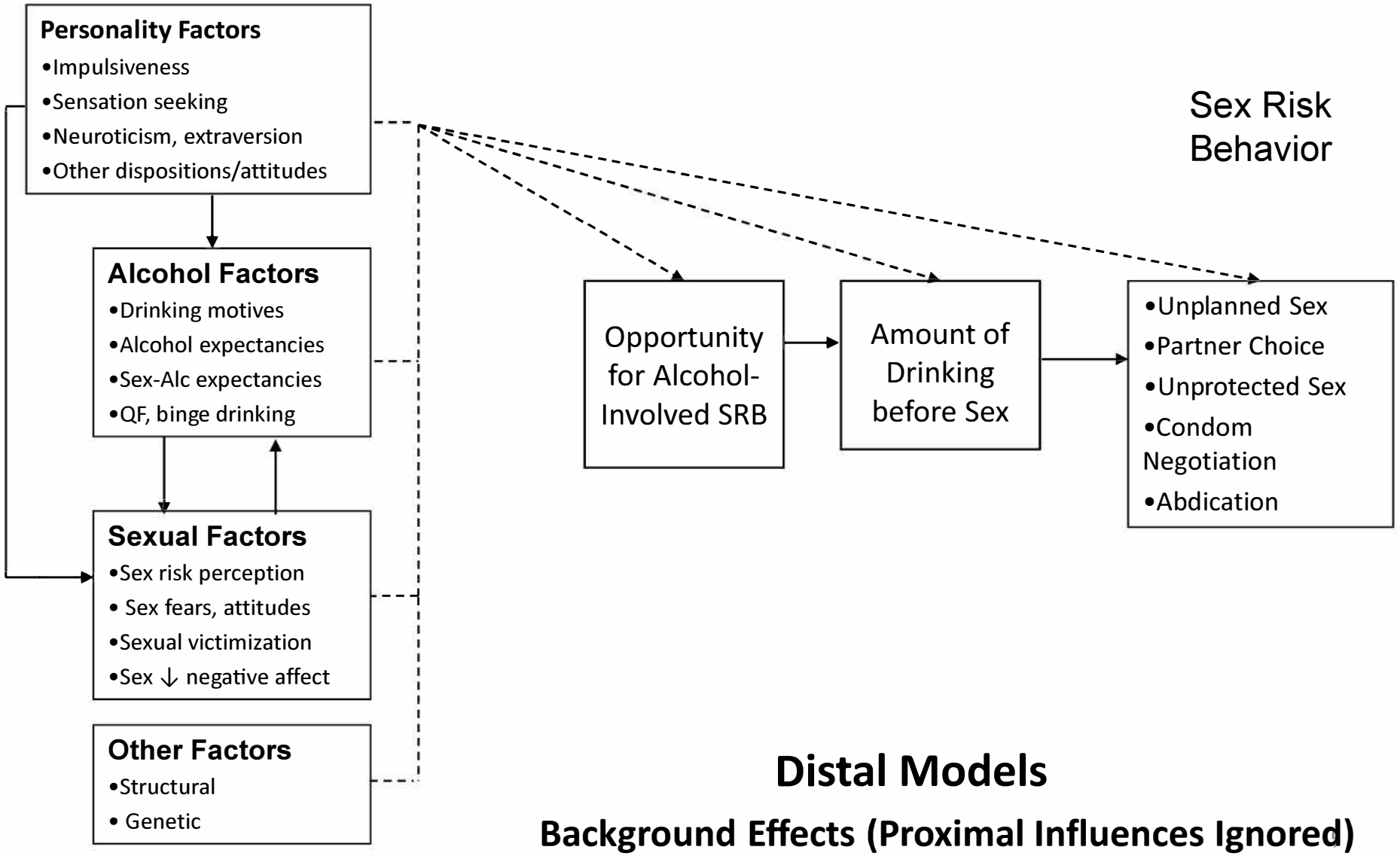
- Once in the situation, how is it that acute alcohol intoxication causally contributes to SRB occurring?
- Hypothetical model about these questions

Distal Factors

How Does One Wind Up in a "Heat-of-the-Moment" Situation



Distal Models

Background Effects (Proximal Influences Ignored)

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Introduction

An embedded assertion

- Alcohol's role in SRB is causal
- Yes; – "settled law" – no longer open for debate, particularly if stated with the following precision:
  - Acute intoxication is capable of exerting a causal impact on various component aspects of SRB, and SRB intention
  - This is an augmentation effect and it increases with dosage
  - Whether the effect materializes in any particular real-world instance depends on …many things
- How do we know this?

Alcohol → SRB

Reviews of longitudinal work, e.g.:

- Cooper et al., (2010)

Reviews of experiments, e.g.:

- Hendershot & George (2007)

Meta-analyses, e.g.:

- Rehm et al., (2012)
- Scott-Sheldon et al., (2016)
- Berry & Johnson (2017)

Heat of the Moment Experimental Methods

- Aim of HOTM experiments: Comprehensive account of states, motivations, perceptions, & processes that immediately precede responding indicative of SRB

- Why HOTM experiments?
  - Surveys cannot access HOTM variables in real time
  - Ethics prohibit investigating HOTM *in vivo*
  - Experiments allow investigating HOTM *in vitro*

- Experiments complement other approaches
  - Isolate mediating and moderating mechanisms
  - Ascertain intoxication variables (dose, B.A.C., limb)
  - Establish ordering of events (drink $\rightarrow$sexual response)

Typical Participant Characteristics

- Passively recruited by ads in alternative newspapers, posters, Craigslist, and social media websites
- Single, 21-35 y.o., moderate drinkers, interested in opposite sex partners, inconsistent condom use
- Students about 40%
- Race/Ethnicity
  - Caucasian 70-75%
  - Multiracial or other 13-17%
  - African American 6-8%
  - Latino/a 7%
  - Asian Pacific Island 5%

Beverage Administration

Drinking:

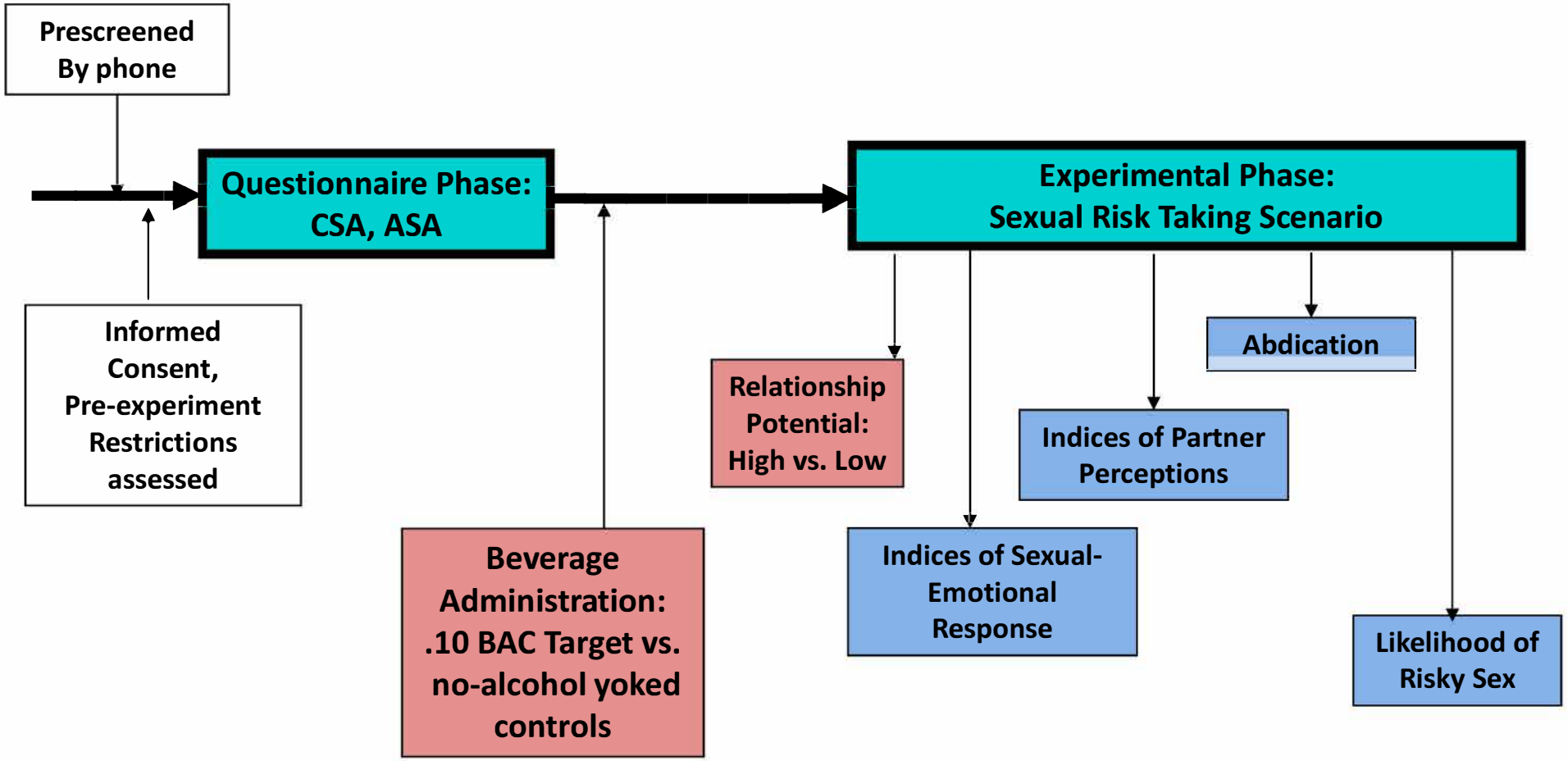
- Juice & Alcohol
- Weight-Adjusted Dose
- Gender-Adjusted Dose
- Bolus Dosing: 9-Min Total Drinking Time (3-Min/drink)

Idiographic BAC Tracking:

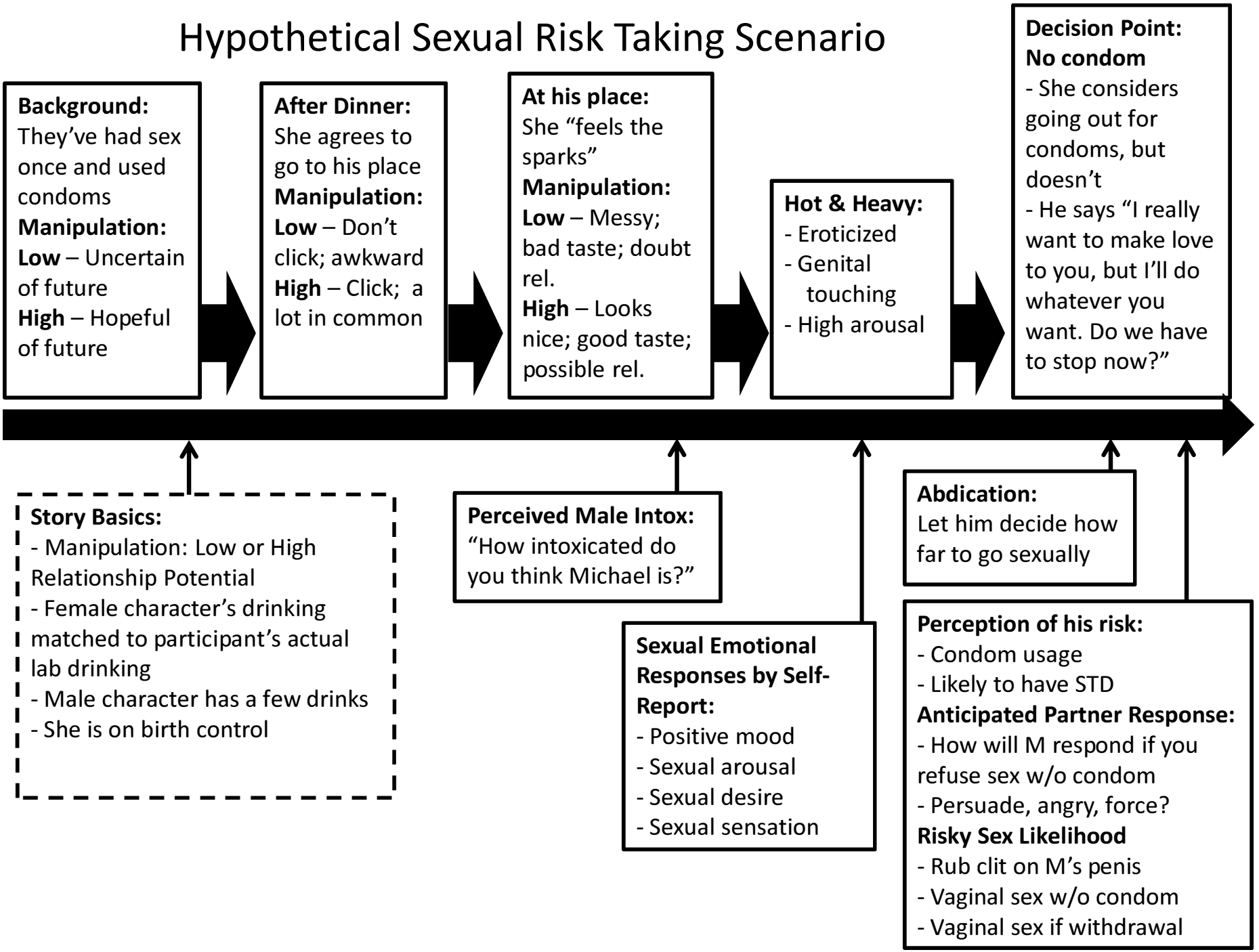
- Breathalyzed Every 3 Minutes
- Ascending BAC Limb Established
- Proximity to Peak BAC Established
- Yoked Control

Typical Method: Overview of Prototypic Procedures for HOTM Experiments

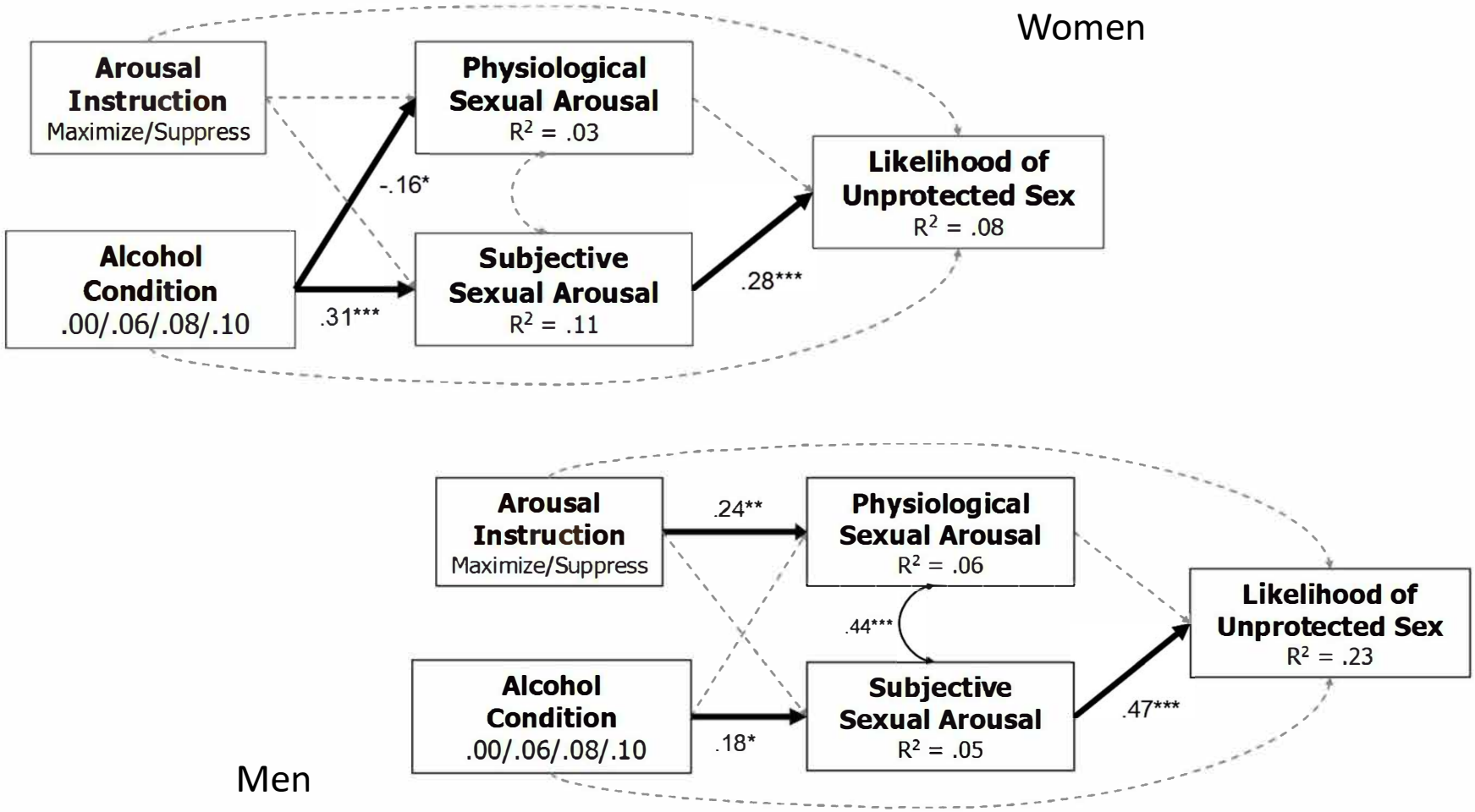
- Recruited via online venues, print ads, flyers
- Called the lab



Hypothetical Sexual Risk Taking Scenario



REASONS Results: Alcohol & Arousal Set Effects



George et al., 2009

CSA Prevalence

30% reported CSA experience

Type

- 38% contact only
- 62% penetration

Duration

- 40% one-time event
- 21% < 1 year
- 8% 1 to 2 years
- 32% 2 years or more

Perpetrator

- 12% stranger/ other
- 46% “friend”
- 32% family member
- 10% parent

ASA Prevalence

80% reported ASA experience

Type of outcome

- 7% contact only
- 17% attempted penetration
- 76% completed penetration

Tactic

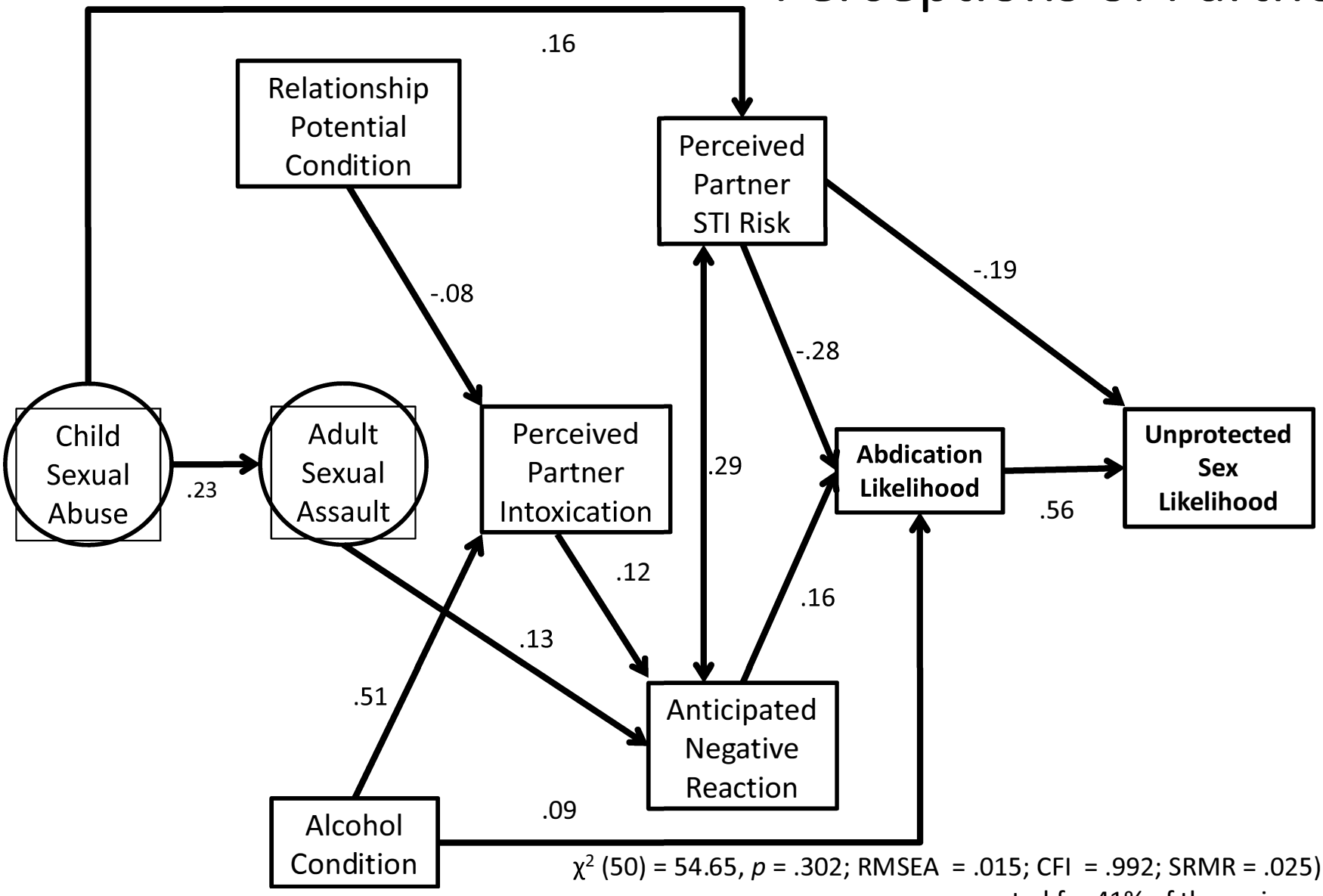
- 10% coercion
- 48% incapacitation
- 42% force

Completed Penetrative Assault Frequency

- 18% once
- 23% 2-3 times
- 33% 4 or more times

Only 16% of the sample reported no CSA or ASA

Perceptions of Partner



χ^2 (50) = 54.65, *p* = .302; RMSEA = .015; CFI = .992; SRMR = .025)

accounted for 41% of the variance

Note. All paths in the figure are significantly different from zero (p < .05).

Examples of Direct Effects on SRB Related Lab Outcomes

Study	Alcohol Intoxication …
Abbey et al., (2005)	Increased sex w/out condom likelihood
Cho & Span (2010)	Increased casual sex likelihood
Davis et al., (2016)	Increased intention to resist condom use
Fromme et al., (1999)	Decreased risk ratings for sex w. new partner
Gordon et al., (1997)	Decreased condom negotiation skills
Maisto et al., (2002, 2006)	increased risky sex intent and decreased skill at negotiating condom use
Schacht et al., (2010)	Decreased condom use intention

Examples of Indirect Effects via *Cognitive* Mediators

Study	Cognitive Mediators	SRB Dependent Measure
Davis et al., (2009)	Perceived intoxication	Unprotected Sex Intentions
Davis et al., (2014)	Condom negotiation intentions	Likelihood of Unprotected Sex
Masters et al., (2014)	Anticipated negative partner reaction to condom insistence	Unprotected Sex Likelihood
Norris e al., (2009)	Appraisals of inhibiting and impelling cognitions	Unprotected Sex Intentions
Stoner et al., (2008)	Perceived health consequences and condom insistence	Unprotected Sex Intentions

Examples of Indirect Effects via *Sexual-Emotional* Mediators

Study	Sexual-Emotional Mediators	SRB Dependent Measure
Davis et al., (2007)	Balance of arousal/risk cues	Unsafe Sex Intentions
George et al., (2009)	Subjective sexual arousal	Likelihood of Unprotected Sex
George et al., (2014)	Positive mood	Risky Sex Likelihood
Stappenbeck et al., (2016)	Emotional numbing	Unprotected Sex Intentions

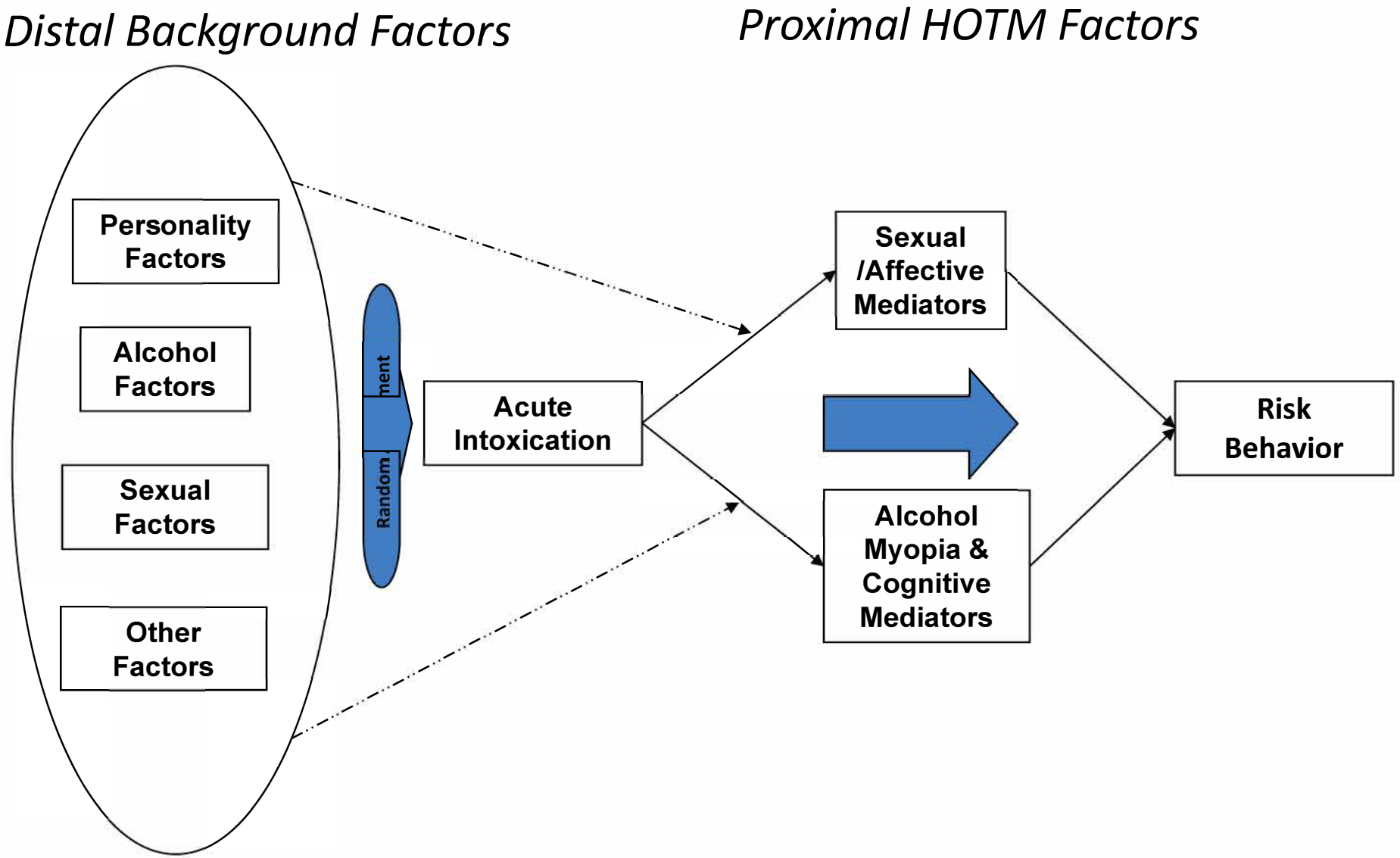
Distal Factors Moderating Alcohol's Direct & Indirect Effects on SRB

Experiments have identified a host of factors that moderate alcohol's direct or indirect effects (via mediators) on SRB

- Sexual sensation seeking (e.g., Heidinger, et al., 2015)
- Drinking motives (e.g., Kilwein & Looby, 2018)
- Alcohol expectancies (e.g., Stappenbeck et al., 2013)
- Sex related alcohol expectancies (e.g., Zawacki, 2011)
- Child sexual abuse (CSA) history (e.g., Staples, et al., 2015)
- Adult sexual assault (ASA) history (e.g., Bountress, et al., 2017)
- ASA perpetration history (e.g., Davis 2010)

Proximal Factors Moderating Alcohol's Direct & Indirect Effects on SRB

- Social familiarly & relationship motivation (Zawacki, et al., 2009)
- Sexual precedence & relationship motivation (Jacques-Tiura et al., 2015)
- Cognitive reserve (Abbey et al., 2006)
- Ascending vs. descending blood alcohol limb (e.g., Davis et al., 2009)
- Dosage level (e.g., George et al., 2009)
- Sexual fear (Stoner et al., 2007)



Conjoint Distal-Proximal Model of HOTM Processes in the Lab

Behavioral Alcohol Experiments Show

- HOTM processes are important and can be credibly analogized and modeled in the laboratory
- Alcohol's role is complex!
- Numerous influential factors have been identified
    - Distal factors leading to an alcohol-involved HOTM situation
    - Distal factors moderating how one behaves in the situation
    - Proximal factors mediating and moderating alcohol effects

Behavioral Alcohol Research Suggests:

- Intervention-related translational points robustly suggested
  - Arousal and mood
  - Alcohol myopia attentional processes
  - Alcohol expectancies
  - Condom self-efficacy and condom request/negotiation skills
  - For men
    - CSA victimization & ASA perpetration are distal factors
    - Condom Use Resistance (Davis) is an important construct
  - For women
    - CSA and ASA victimization are important distal factors
    - Abdication is an important construct

Primary Prevention Implications

Scale up and extend existing risk-reduction interventions

Modify existing interventions

Innovate new interventions

Meta-Analyses with Evidence of Risk Reduction Effectiveness	
Kalichman et al., 1996	Noar et al., 2010
Sheeran et al., 1999	Albarracin & Durantini, 2010
Prendgast et al., 2001	Scott-Sheldon et al., 2010
Mize et al., 2002	Chin et al., 2012
Albarracin et al., 2003	Henny e al., 2012
Johnson, W. et al., 2004	Lennon et al., 2012
Albarracin et al., 2005	Pearson et al 2012
Smoak et al., 2006	Tan et al., 2012
Copenhaver et al., 2006	Xiao et al., 2012
Noguchi et al., 2007	Meader et al 2013
Albarracin et al., 2008	Johnson, B. et al., 2014
Denison et al., 2008	Lan et al., 2014
Johnson, B. et al., 2009	Althoff et al., 2015
Crepaz et al., 2009	Chow et al., 2015
Noar et al., 2009	Sagherian et al., 2016

Primary Prevention Implications

Scale up and extend existing risk-reduction interventions:

- According to meta-analytic evidence, it would have to be concluded that psychosocial-psychoeducational interventions by large work!
- "nearly 70 interventions that have been scientifically demonstrated to be effective in reducing HIV risk-related behaviors (CDC, 2009)" (Klein & Card, 2011, p. 565)
  - Compendium of Evidence-Based Interventions and Best Practices for HIV Prevention
- Alcohol reduction = SRB reduction (Walsh, Weinahrdt, Kalichman, & Carey 2017)

Scale Up Existing Interventions

Continue to identify and reach at-risk subpopulations, based on:

- Sexuality: MSM, transsexual/transgender, sex workers, STI clinic attendees, CSA/ASA survivors ✓
- High prevalence/incidence locales: Sub-Saharan Africa, India, China, Russia, Southeast Asia ✓
- Race/ethnicity: African Americans, Latino/a Americans ✓
- Alcohol/substance use/abuse: heavy drinkers, IV drug users, substance abuse treatment attendees, drinking venues ✓
- Criminal justice populations and venues; post-release transition ✓

Bundle with other health care services

Exploit technology trends: Smart phone, social media, mHealth

Modify Existing Interventions

Intensify psychoeducation content about alcohol by providing evidence-based content about: **Alcohol Expectancies**

- Alcohol's sexual effects are not strictly a result of pharmacology
- Expectancies influence deciding to drink
- Expectancies influence how much you drink
- Expectancies influence how one initially behaves after drinking
  - Self-fulfilling prophecy
  - Deviance disavowal
- "Expectancy Challenge" demonstrations
- Expectancies are modifiable

Modify Existing Interventions

Intensify psychoeducation content about alcohol by providing evidence-based content about: **Alcohol Myopia**

- Alcohol narrows attention bandwidth; “tunnel vision”
- Over-attention to impelling “green light” signals, such as sexual craving, sexual arousal
- Under-attention to inhibiting “red light” signals, such as disease risk
- High conflict between impelling & inhibiting signals
- But, if inhibiting signals are salient, intoxication can lead to lowered SRB risk (MacDonald et al., 2000)

Modify Existing Interventions

Intensify psychoeducation content about alcohol by providing evidence-based content about: **Sexual Arousal**

- Debunk myths: Male physiology as an uncontrollable determinant of sexual outcomes
- Distinguish the role of subjective over physiological arousal on SRB
- Develop content about the conjoint roles of alcohol and arousal in SRB
- Identify HOTM intervention junctures
  - Distinguish early vs. late sequence arousal
  - Recognize early sequence arousal as a prompt for “sexual safety check”
  - Recognize late sequence arousal as a prompt for condom request assertiveness & sex refusal assertiveness

Modify Existing Interventions

Intensify psychoeducation content about:

ART

- Education about PrEP
- Role of alcohol in adherence
- Accurate info about alcohol and ART interactions

Fodder for Innovating New Intervention Mechanisms

Build on heat-of-the-moment (HOTM) methods from basic research

- HOTM modules for pre/post-intervention assessment
- HOTM modules for teaching “reflective tool”
- HOTM modules for behavior rehearsal, while aroused, intoxicated, both
- Develop VR protocols

Women with CSA, ASA, and IPV Histories

- Routine evaluation of victimization histories
- Trauma-focused psycho-education content: CSA/ASA Hx influence current day responding to sexual encounters
- Emotion regulation foci

Future Basic Behavioral Research

- Can risk reduction strategies and skills be acquired and/or implemented during states of acute alcohol intoxication?
- Do risk-reduction strategies and skills acquired while sober generalize to alcohol-involved sexual encounters?
- How does alcohol intoxication affect PrEP adherence intentions?
- Given demonstrable emotional processes, more work is needed determining how emotion regulation models pertain: drinking motives, sex motives as predispositions and as in-the-moment factors?
- Many biomedical solutions necessitate behavioral expertise

Conclusions

Reprise: The capacity to prevent unsafe sex ultimately hinges on scientists' capacity to understand what transpires in those critical moments when sexual decisions are made or “just happen”

Thus, prevention science must remain linked to basic science aimed at evaluating theory-driven mechanisms explaining why people take these risks

Is this still true?

The End. Thank You.

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