Behavioral Interventions for HIV Prevention: Role of Message Content

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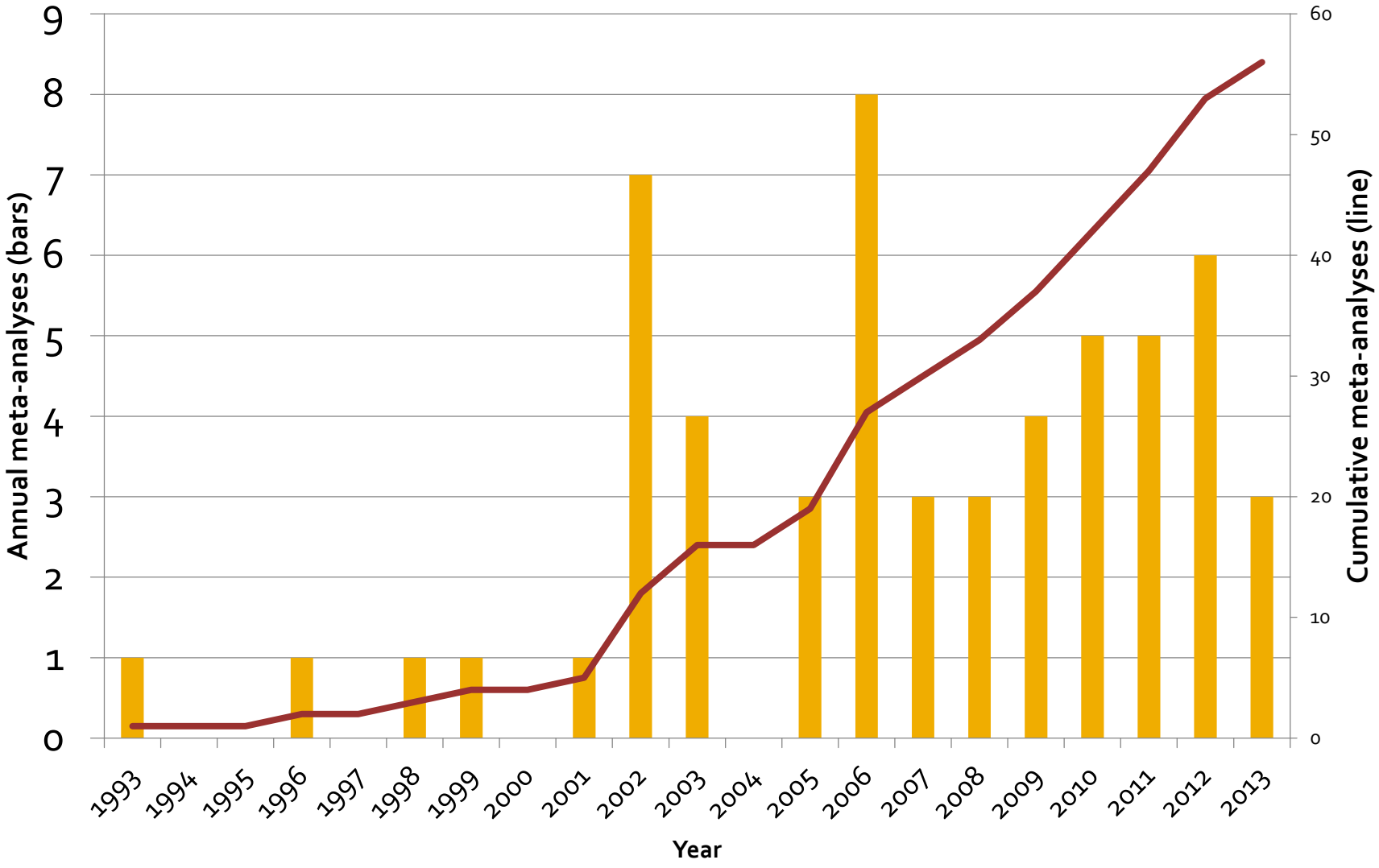
Outline

- Behavioral interventions—a great deal of evidence.
- Survey of recent meta-analyses that have examined how intervention content may relate to their success.
- Future of information content: Behavior change technique taxonomies.

A brief history of behavioral interventions

- Behavior change to reduce risk for HIV/AIDS.
- Decades of trials evaluating behavioral interventions (since 1980s).
- More behavioral interventions than any other health promotion domain (except maybe: family planning; tobacco smoking).
- Lessons from behavioral interventions are helpful :
  - even if a cure is found
  - even if an effective vaccine is developed

Meta-Analyses through August 2013



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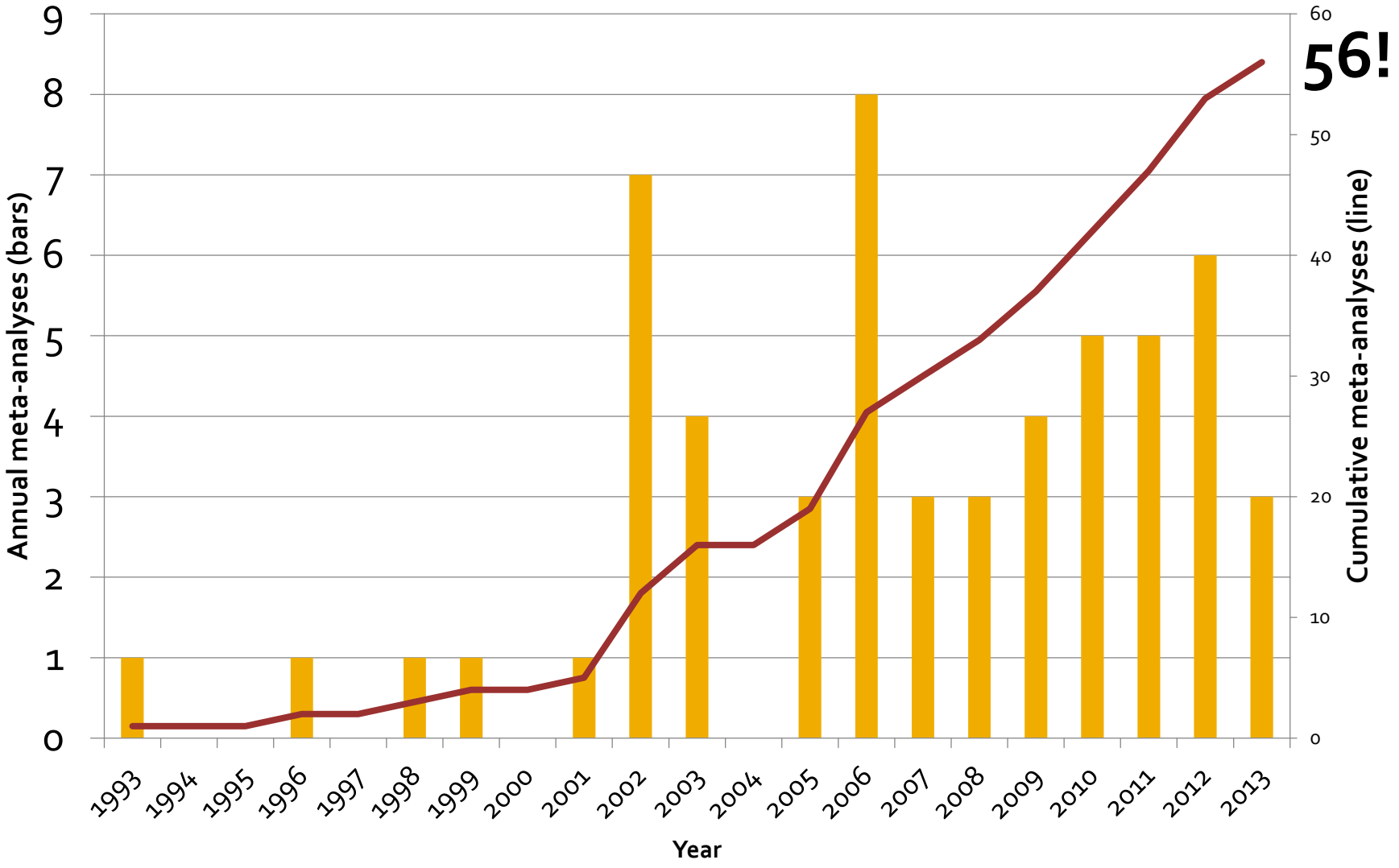
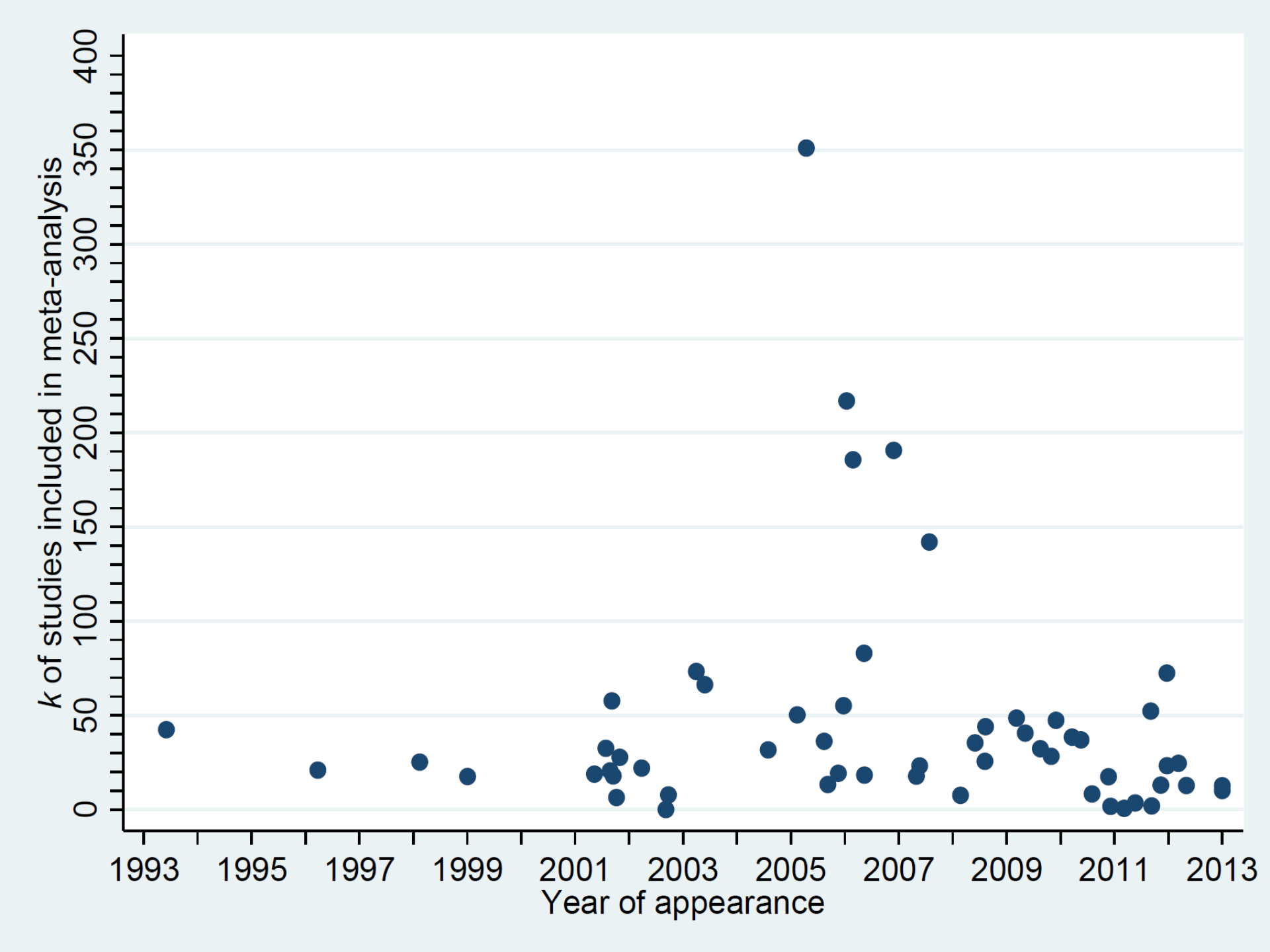
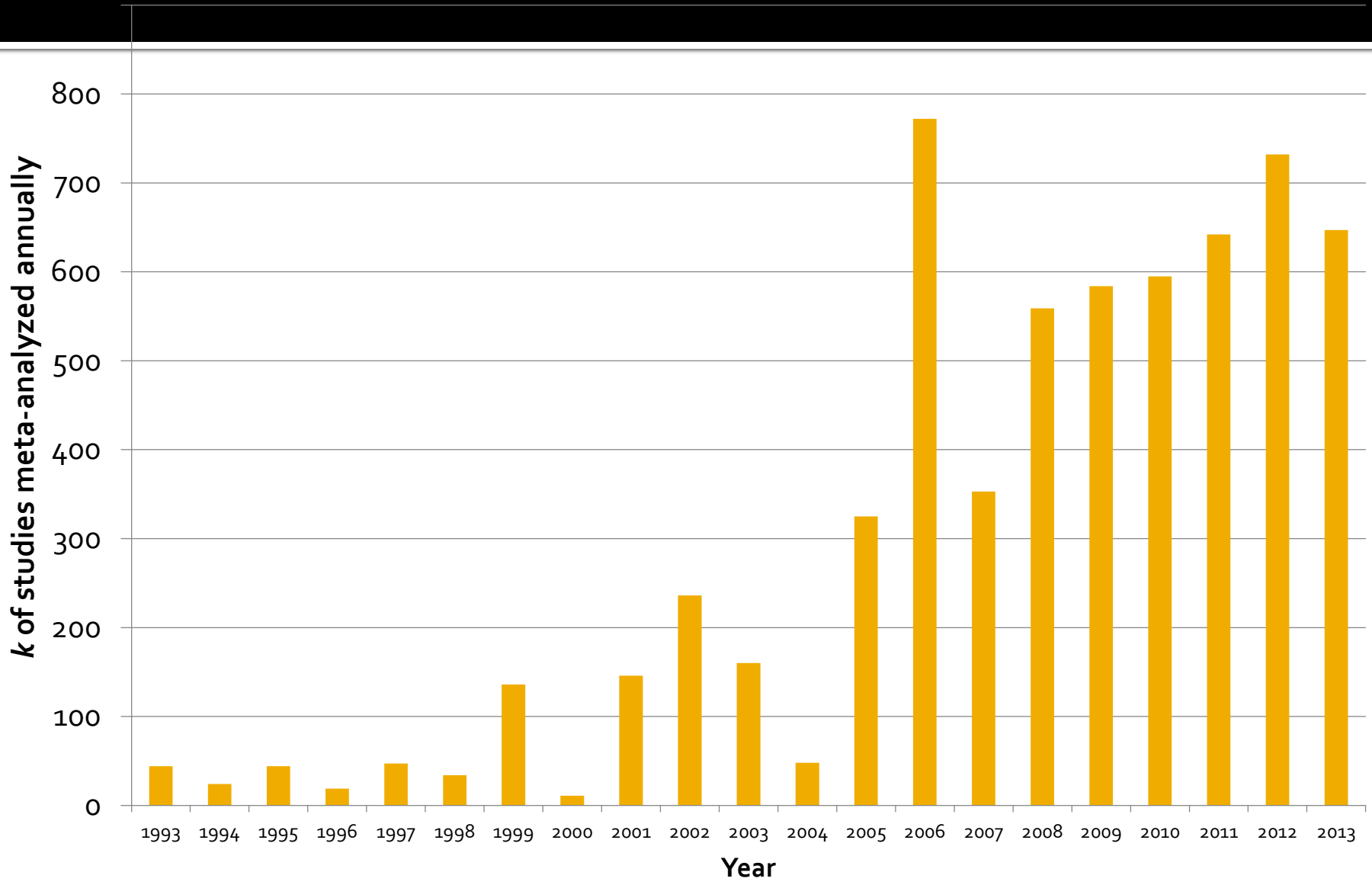



k of studies included in meta-analysis
0
50
100
150
200
250
300
350
400
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Year of appearance

Numbers of studies meta-analyzed each year



How well do they work?

- Noar's (2008, *AIDS and Behavior*) review of meta-analyses.
- Generally sexual risk is assessed with condom use or unprotected intercourse outcomes
- Drug risk is assessed with needle sharing behaviors.
- Some trials evaluate biological outcomes, including HIV (but more often STIs).

How well do they work?

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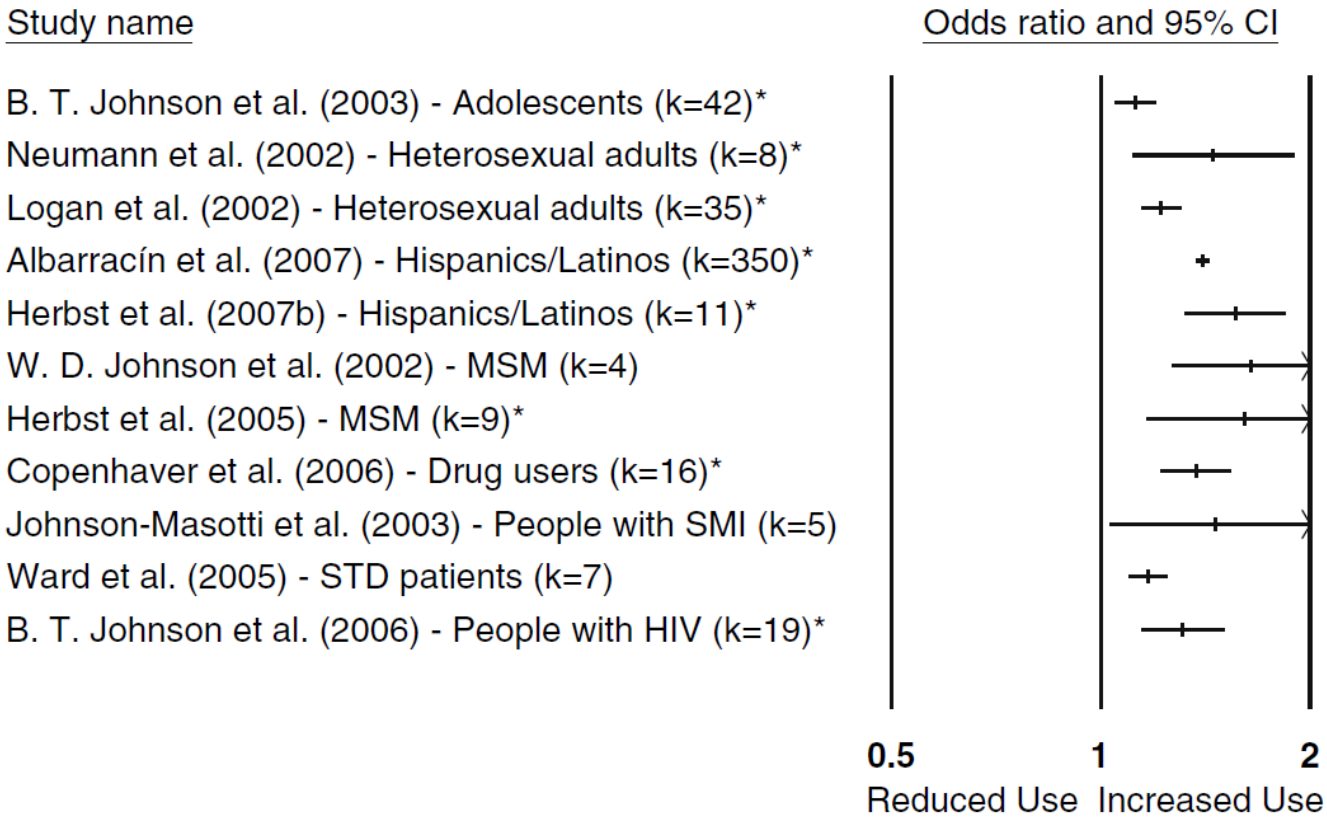

How well do they work?

- Johnson et al.'s (2010, AJPH) meta-meta-analysis of health promotion meta-analyses

Targeted Health Behavior Domain	No. of Meta-Analyses	d_{+i} (95% CI)
Stress management	5	0.45 (0.41, 0.48)
Improving participation in health services	5	0.35 (0.34, 0.36)
Eating and physical activity	12	0.22 (0.20, 0.23)
Addictions	13	0.21 (0.20, 0.22)
Screening and treatment behaviors for women	9	0.21 (0.20, 0.23)
Sexual behaviors	18	0.08 (0.07, 0.09)

Johnson, B. T., Scott-Sheldon, L. A. J., & Carey, M. P. (2010). Meta-synthesis of health behavior change meta-analyses. *American Journal of Public Health, 100,* 2193–2198.

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"Medium" effect size

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"Small" effect size

"Very Small" effect size

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How well do they work?

- Meta-analyses nearly always exhibit significant heterogeneity:
  - Thus, intervention efficacy varies widely from study to study (and from outcome to outcome).
  - Thus, **overall means are of little descriptive value.**

Knowing why interventions succeed and fail is the quest

- Heterogeneity implies that many interventions fail…
- … but also that many succeed quite well!
- Recent meta-analyses highlight that interventions can succeed quite admirably to change behavior using strategies matched to populations and (often) taking community-level factors into account.
- This work helps to highlight that even "failed" interventions are useful, in the big picture.

Brief interventions can succeed in meaningful behavior change

- *k*=29 single session interventions
  - Assessments taken at *M*=58 weeks following treatment
  - STIs 35% less likely in treatment (vs. control)
  - Interventions were actually **more** successful with shorter interventions

Eaton, L. A., Huedo-Medina, T. B., Kalichman, S. C., … & Johnson, B. T. (2012). Meta-analysis of single-session behavioral interventions for STI/HIV prevention: Implications for bundling multiple prevention packages. *American Journal of Public Health, 102*, e34–e44.

Long-term risk reduction

- Johnson et al. (2009, *JAIDS*): *k*=78 trials for African Americans (99 intervention comparisons)
- Relatively intense interventions were more successful at longer than at shorter intervals (and the reverse for brief interventions)

Biological outcomes

- Forty-two studies with 67 separate interventions (*N* = 40,665; *M* age = 26 years; 68% women; 59% Black)

		d + (95% CI)	
Outcome	**k**	**Fixed Effects**	**Random Effects**
Condom use	67	0.12 (0.10 to 0.14)	0.17 (0.04 to 0.29)
STIs	62	0.17 (0.14 to 0.19)	0.16 (0.04 to 0.29)
HIV	13	0.19 (0.15 to 0.23)	0.46 (0.13 to 0.79)

k, number of interventions; *d*+, weighted mean effect size; CI, confidence interval.

Scott-Sheldon, L. A. J., Huedo-Medina, T. B., Warren, M. R., Johnson, B. T., & Carey, M. P. (2011). Efficacy of behavioral interventions to increase condom use and reduce incident sexually transmitted infections: A meta-analytic review, 1991 to 2010. *Journal of Acquired Immune Deficiency Syndromes, 58,* 489-498.

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HIV results stronger for interventions with skills and motivational training

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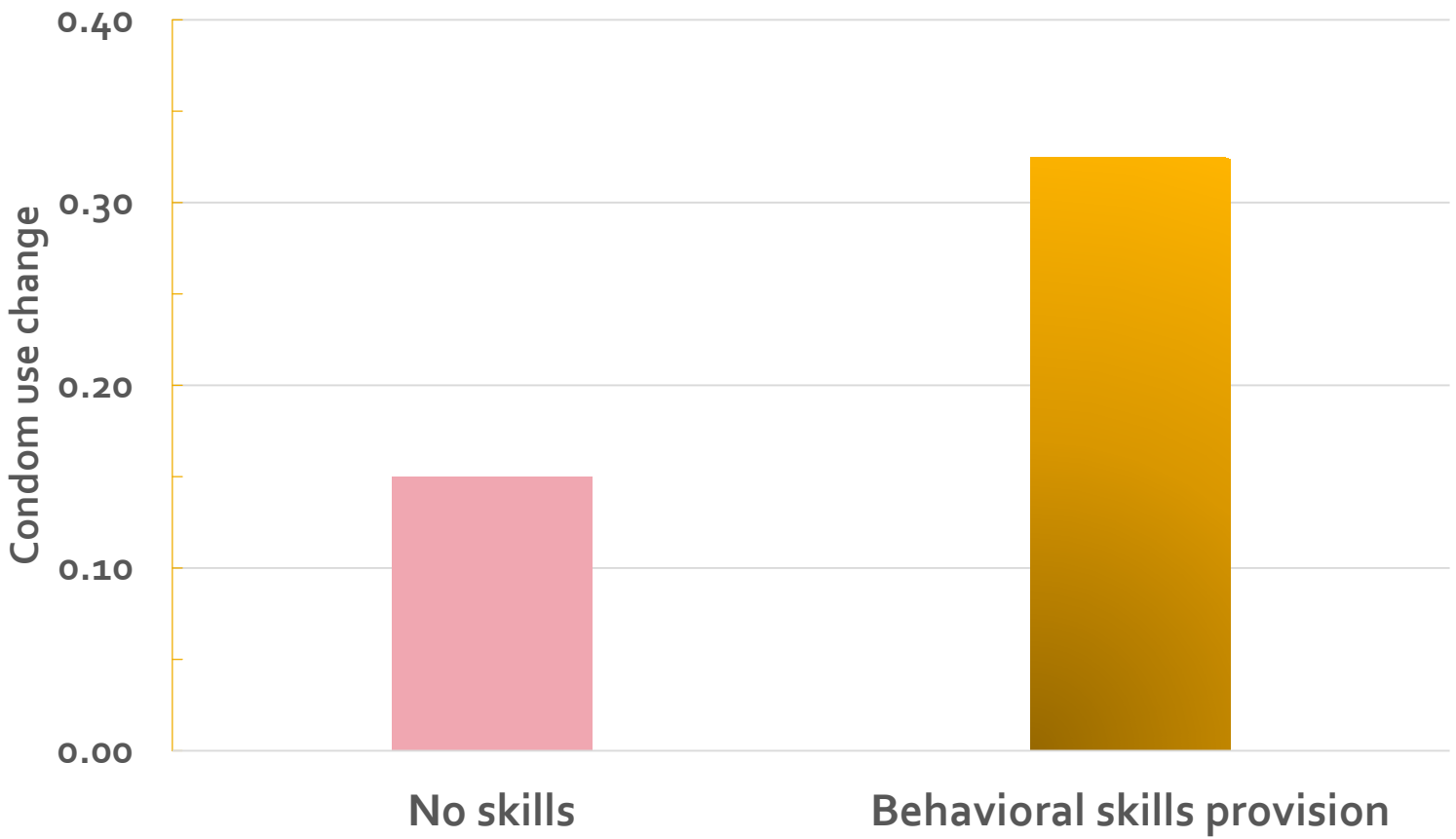
Nature of message content and risk reduction



Albarracín, D., Gillette, J. C., Earl, A. N., Glasman, L. R., Durantini, M. R., & Ho, M. H. (2005). A test of major assumptions about behavior change: A comprehensive look at the effects of passive and active HIV-prevention interventions since the beginning of the epidemic. *Psychological Bulletin*, *131*(6), 856-897.

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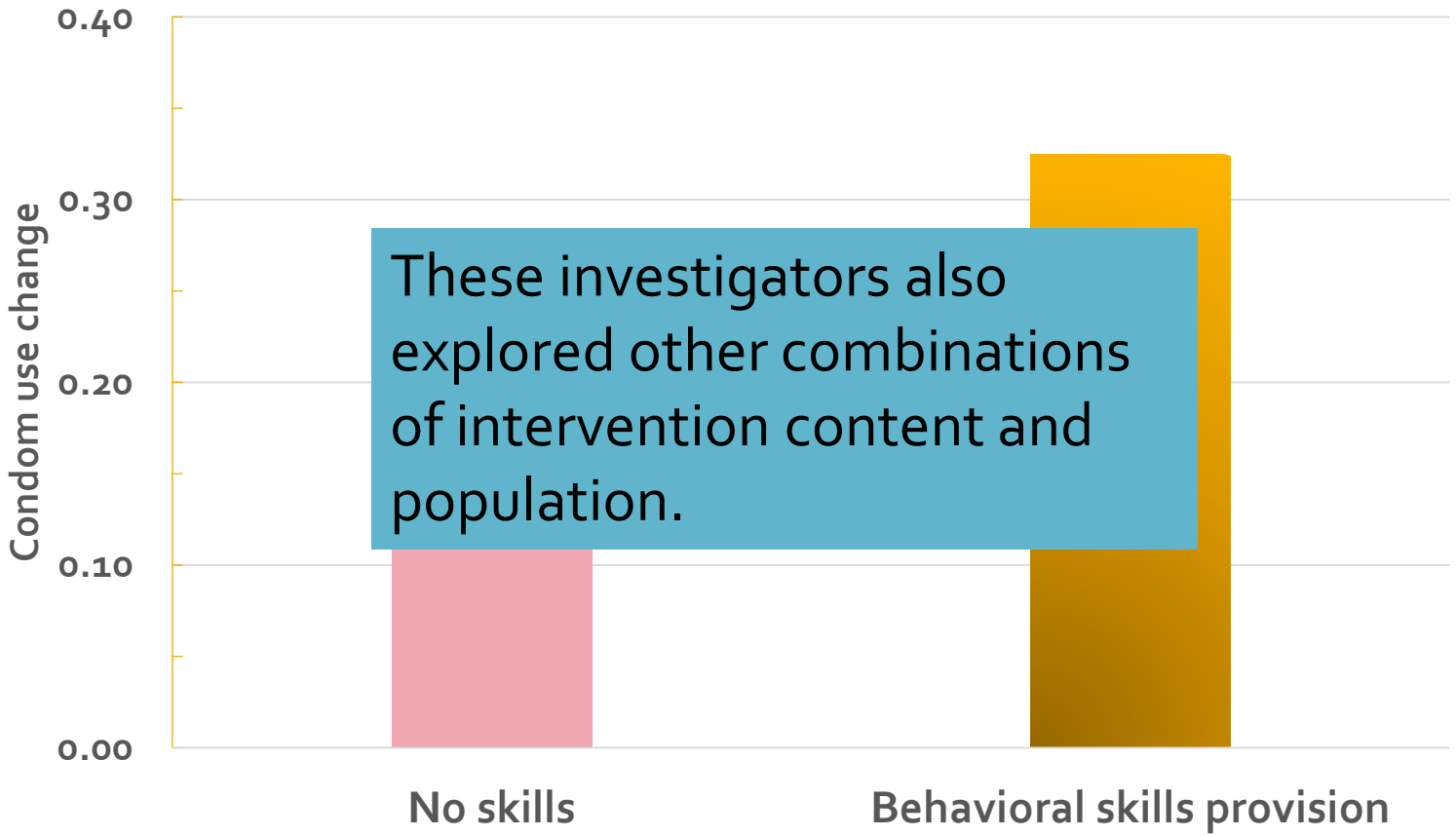

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Dose-response functions shown in behavioral interventions for adolescents

- *k*=91 interventions with condom use outcomes

Table 3. Estimates for Intervention Effects on Condom Use as a Function of Sample and Study Features[a]

Dimension and Level[b]	d_+ (95% CI)[c]	OR (95% CI)[c]
Condom skills training per session, minutes/session		
60	0.34 (0.11 to 0.56)	1.75 (1.20 to 2.52)
0	0.09 (0.02 to 0.16)	1.16 (1.04 to 1.30)
Motivation training per session, minutes/session		
46	0.45 (0.18 to 0.73)	2.10 (1.35 to 3.34)
0	0.11 (0.05 to 0.17)	1.20 (1.08 to 1.32)

Johnson, B. T., Scott-Sheldon, L. A. J., Huedo-Medina, T. B., & Carey, M. P. (2011). Interventions to reduce sexual risk for HIV in adolescents: A meta-analysis of trials, 1985-2008. *Archives of Pediatrics and Adolescent Medicine, 165*, 77-84.

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Results held up better in higher quality studies

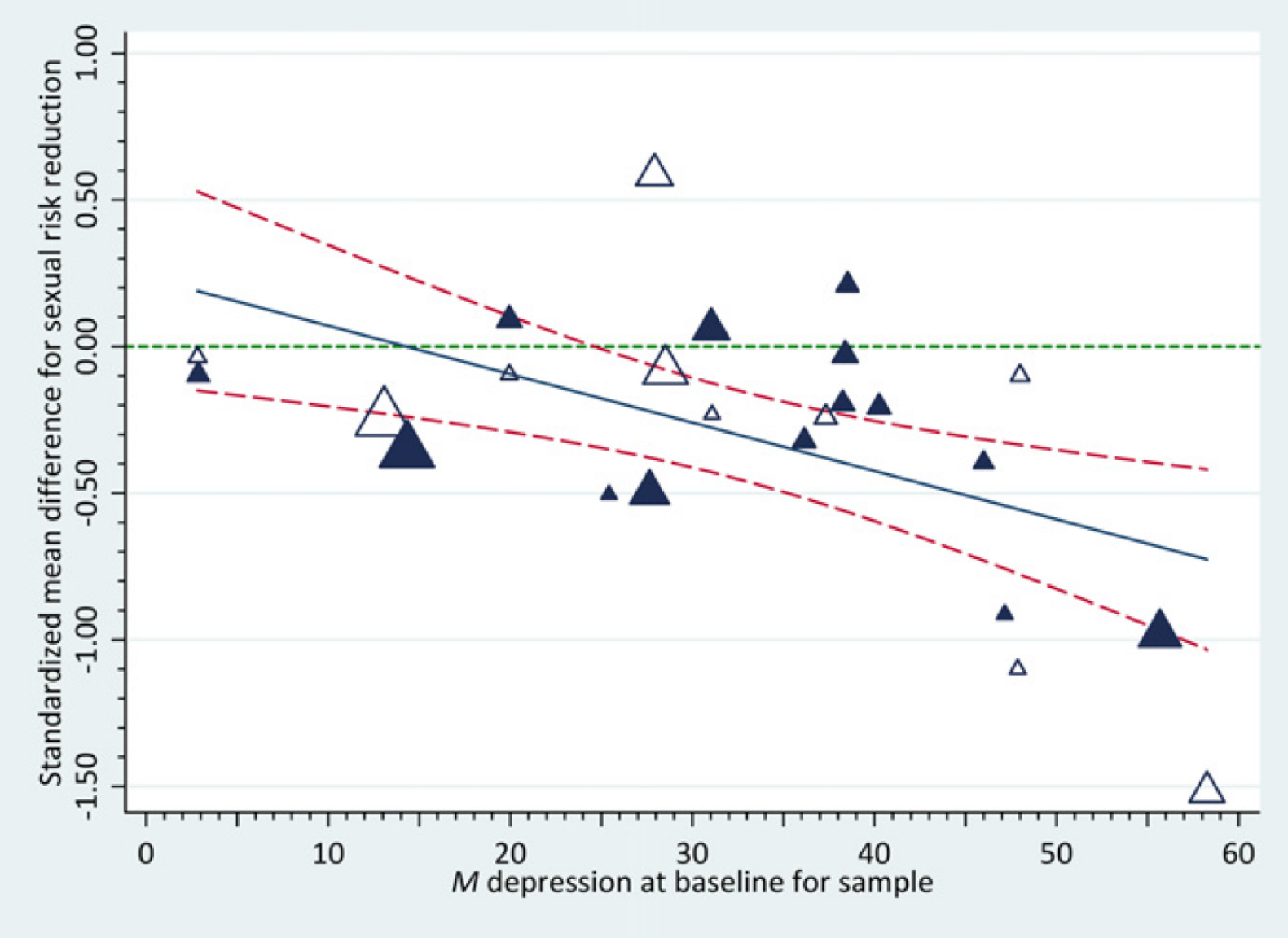
Johnson, B. T., S[illegible] (2011). Interventions to reduce sexual risk for HIV in adolescents: A meta-analysis of trials, 1985-2008. *Archives of Pediatrics and Adolescent Medicine, 165*, 77-84.

Secondary effects of behavioral interventions—what about depression?

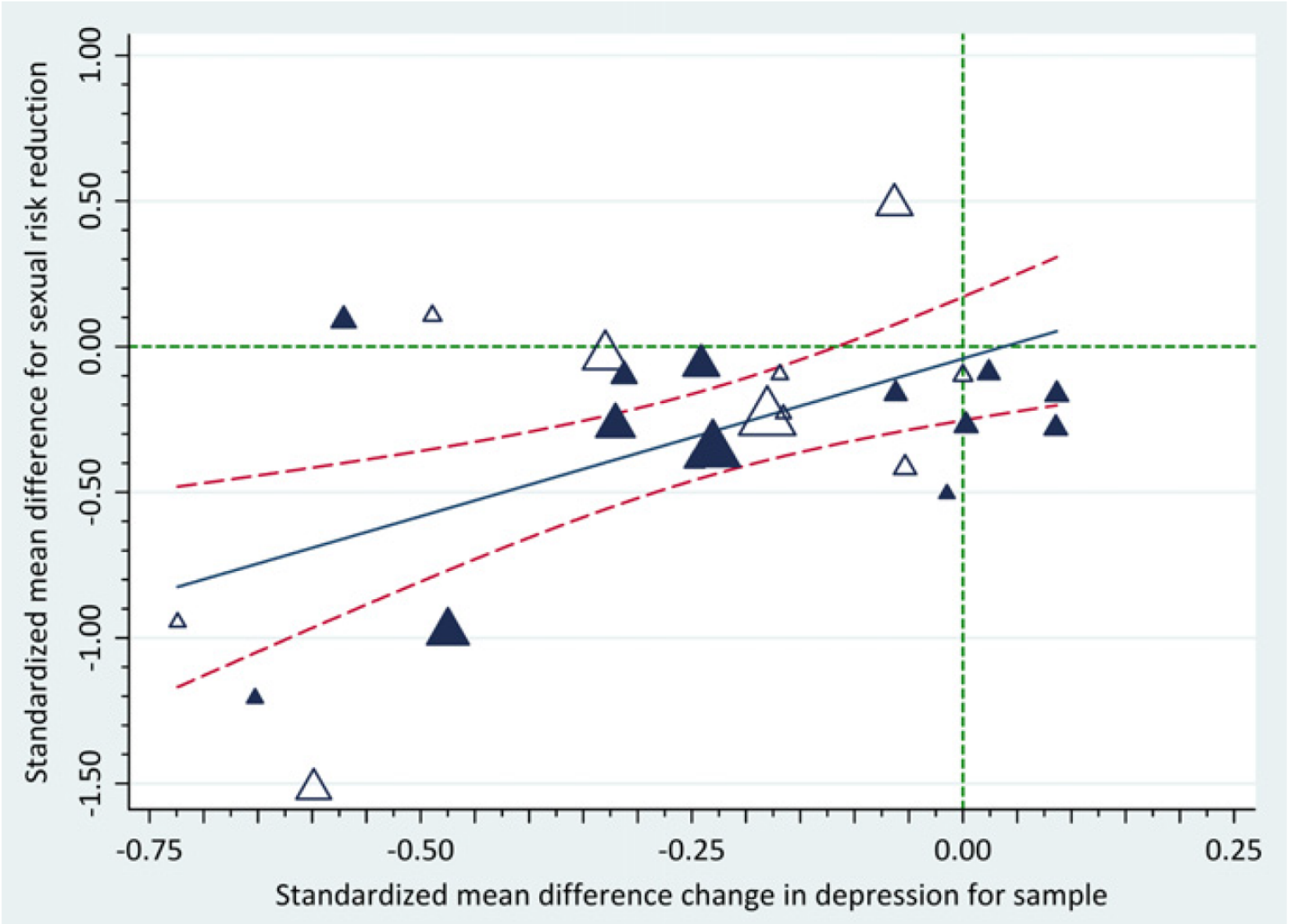
- 10 Separate studies, 24 effect sizes (*N*=4,195), from heterosexual women.
- These interventions assessed not only sexual risk but also depression.
- Focuses on the **secondary** role that engaging in behavioral interventions may have on outcomes that are indirectly related to the message.

Lennon, C. A., Huedo-Medina, T. B., Gerwien, D. P., & Johnson, B. T. (2012). A role for depression in sexual risk reduction for women? A meta-analysis of HIV prevention trials with depression outcomes. *Social Sciences & Medicine, 75*, 688-698.

Depression and risk reduction



Decrease in depression = increase in HIV risk reduction?



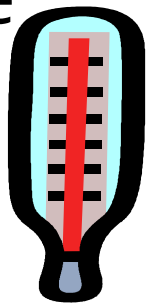
Community-Level Factors

- What about a role for racial stigma?
- Same *k*=99 trials as Johnson et al. (2009, *JAIDS*): Behavioral interventions for African Americans

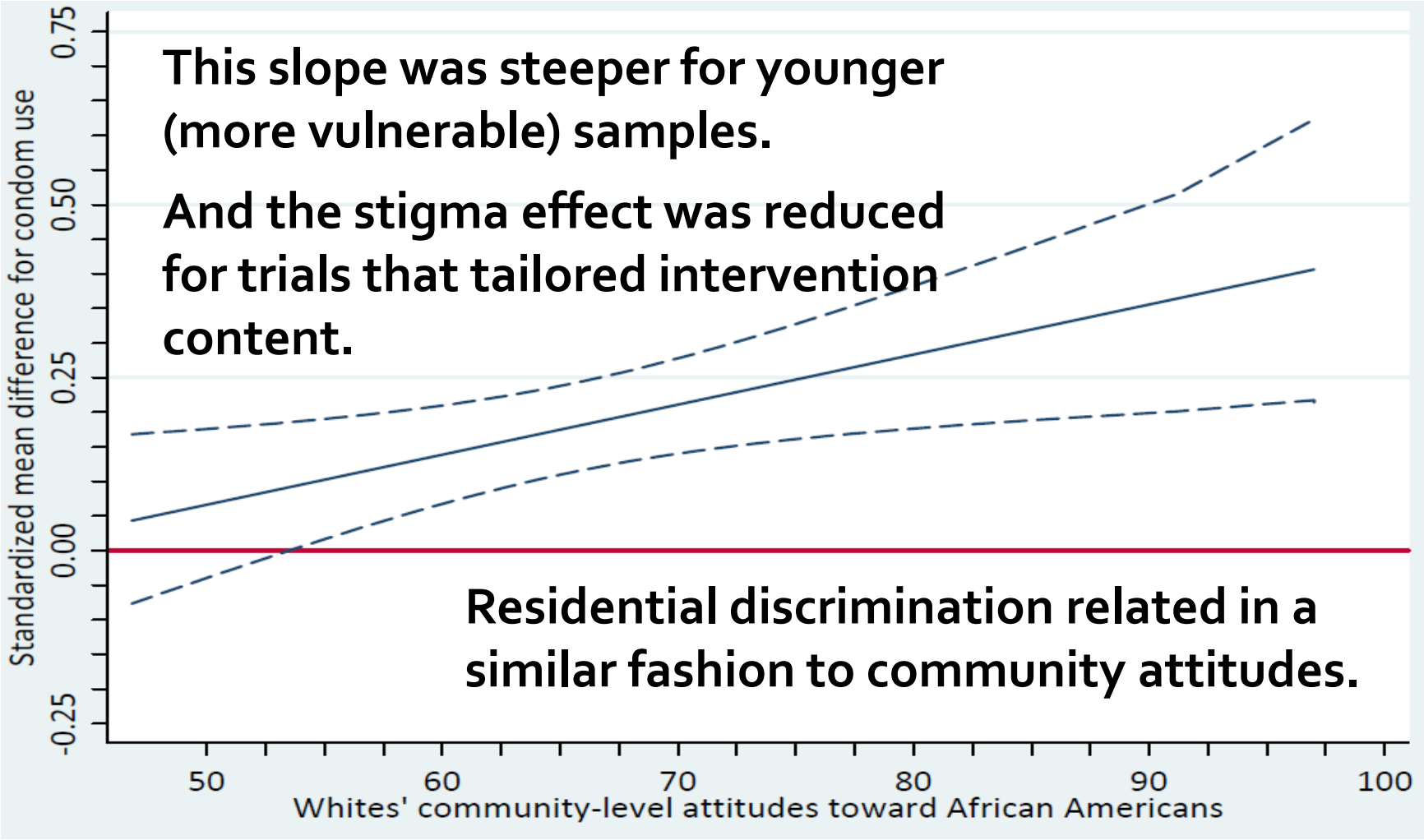
Reid, A. E., Dovidio, J. F., Ballester, E., & Johnson, B. T. (2014). HIV prevention interventions to reduce sexual risk for African Americans: The influence of community-level stigma and psychological processes. *Social Science and Medicine, 103,* 118-125.

Methods

- Community attitudes were gauged using the American National Election Studies (ANES) surveys
  - Whites' favorability toward African Americans (0=most negative; 50=neutral; 97=most positive)
  - Matched at county level in time to each intervention (or imputed)



Results: Whites' Attitudes and Efficacy of Trials



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Conclusions

- The literature on HIV prevention efforts continues to present outstanding opportunities for understanding not only the HIV epidemic but also human behavior more generally.
- These examples highlight how **individuals**, **networks**, and their **resources** are important to HIV risk reduction. (Michelle Kaufman's presentation will develop this theme more broadly.)

Making the Most of Efficacy Trials

- Modeling heterogeneity successfully—what works best, when, for whom?—maximizes knowledge and the yield of past investments in behavior change research.

Making the Most of Efficacy Trials

- And it is far better than the conclusion that behavioral interventions (merely) have a small impact on risk behaviors or risk-related outcomes.
- (We should get over a reliance on mean effect sizes when they are based on heterogeneous findings!)

Making the Most of Efficacy Trials

- Although there have been 56 meta-analyses to date, their usage of intervention content dimensions has varied widely.
- The meta-analyses routinely document significant change, but it is relatively rare that they speak to the mechanisms underlying the change, such as active communication components.

Making the Most of Efficacy Trials

- Led by Charles Abraham and Susan Michie, taxonomies of behavior change techniques (BCTs) have been developed over the last 10 years.
- Aims: Greater precision in identifying intervention components and economy in labeling them.

ann. behav. med.
DOI 10.1007/s12160-013-9486-6

ORIGINAL ARTICLE

The Behavior Change Technique Taxonomy (v1) of 93 Hierarchically Clustered Techniques: Building an International Consensus for the Reporting of Behavior Change Interventions

Susan Michie, DPhil, CPsychol · Michelle Richardson, PhD · Marie Johnston, PhD, CPsychol · Charles Abraham, DPhil, CPsychol · Jill Francis, PhD, CPsychol · Wendy Hardeman, PhD · Martin P. Eccles, MD · James Cane, PhD · Caroline E. Wood, PhD

Abstract

Background CONSORT guidelines call for precise reporting of behavior change interventions: we need rigorous methods of characterizing active content of interventions with precision and specificity.

Objectives The objective of this study is to develop an extensive, consensually agreed hierarchically structured taxonomy of techniques [behavior change techniques (BCTs)] used in behavior change interventions.

Methods In a Delphi-type exercise, 14 experts rated labels and definitions of 124 BCTs from six published classification systems. Another 18 experts grouped BCTs according to similarity of active ingredients in an open-sort task. Inter-rater agreement amongst six researchers coding 85 intervention descriptions by BCTs was assessed.

Results This resulted in 93 BCTs clustered into 16 groups. Of the 26 BCTs occurring at least five times, 23 had adjusted kappas of 0.60 or above.

Conclusions "BCT taxonomy v1," an extensive taxonomy of 93 consensually agreed, distinct BCTs, offers a step change as a method for specifying interventions, but we anticipate further development and evaluation based on international, interdisciplinary consensus.

Electronic supplementary material The online version of this article (doi:10.1007/s12160-013-9486-6) contains supplementary material, which is available to authorized users.

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W. Hardeman

BCT Taxonomy v1: 93 items in 16 groupings

Page	Grouping and BCTs	Page	Grouping and BCTs	Page	Grouping and BCTs
1	**1. Goals and planning**	8	**6. Comparison of behaviour**	16	**12. Antecedents**
	1.1. Goal setting (behavior) 1.2. Problem solving 1.3. Goal setting (outcome) 1.4. Action planning 1.5. Review behavior goal(s) 1.6. Discrepancy between current behavior and goal 1.7. Review outcome goal(s)		6.1. Demonstration of the behavior 6.2. Social comparison 6.3. Information about others' approval		12.1. Restructuring the physical environment 12.2. Restructuring the social environment 12.3. Avoidance/reducing exposure to cues for the behavior 12.4. Distraction 12.5. Adding objects to the
		9	**7. Associations**		
			7.1. Prompts/cues		

No.	Label	Definition	Examples
1. Goals and planning			
1.1	***Goal setting (behavior)***	Set or agree on a goal defined in terms of the behavior to be achieved *Note: only code goal-setting if there is sufficient evidence that goal set as part of intervention; if goal unspecified or a behavioral outcome, code* ***1.3, Goal setting (outcome)****; if the goal defines a specific context, frequency, duration or intensity for the behavior, also code* ***1.4, Action planning***	Agree on a daily walking goal (e.g. 3 miles) with the person and reach agreement about the goal Set the goal of eating 5 pieces of fruit per day as specified in public health guidelines

Evaluation:

- Generally good to excellent inter-coder reliability
- Reliability stays high over time doing coding (e.g., one month)
- Good test-retest reliability
- Wide expert agreement with frequently occurring BCTs

Making the Most of Communication Strategies

- To date, no published meta-analysis on HIV risk reduction has used a BCT taxonomy.
- Others have found that published articles often do not give all BCTs used in interventions (and especially control arms).
- de Bruin et al. (2010) have used BCTs with success in relation to ART therapy adherence:
  - Adherence higher with more social support BCTs.

Making the Most of Communication Strategies

- Our group has been using a BCT taxonomy with risk reduction interventions.
- **Example preliminary** result:
  - Intervention arms—between 1 and 28 BCTs.
  - Control arms—0 and 12 BCTs.

Making the Most of Communication Strategies

- Past meta-analyses focused on intervention content have **reported** examining as many as 18 dimensions.
- **Preliminary** finding: At least 46 different BCTs have appeared in past behavioral interventions.

Making the Most of Communication Strategies

- As BCTs become conventional in all intervention research:
  - Reasons for discrepancies in efficacy trial results should emerge
  - Replication of trial results should improve
  - Testing of theories should become more precise
  - Successful BCTs can be more readily translated to communities (effectiveness)

Thank you!

- Syntheses of HIV & AIDS Research Project (SHARP)
  - Michael P. Carey
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  - Michelle R. Warren
  - Lisa A. Eaton
  - Estrellita Ballester
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  - Susan Michie
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HEALTH COMMUNICATION CAPACITY COLLABORATIVE

QUESTIONS

USAID FROM THE AMERICAN PEOPLE