Supplementary Information

Table S1

Summary of the Included Reports in Meta-analysis

See mbi_hivmeta_data_202303.xlsx

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Supplemental Analyses

Difference-in-Differences Score Analyses

A potential concern with the use of pre-post comparisons is whether comparing change across conditions is affected by pooling conditions from studies that differ in samples and methodology. As outlined in the main text, we think that the strengths of using pre-post comparisons outweigh the downsides, but to ensure the robustness of our results, we repeated our analyses using difference-in-difference scores to compare across groups within the same study.

Unfortunately, although all included studies had a comparison group, many included studies did not include a study arm that had either no recommendation or only one recommendation. The reason for this is ethical considerations and the fact that HIV trials adopt a comparative efficacy approach and use stringent controls (Routman et al., 2010). Thus, analyzing if multiple-behavior interventions work better than single-intervention or passive controls reduced the number of included reports from 331 to 70 and the overall effect size count from 1364 to 361.

We calculated Δ by taking the difference between the two effects (intervention – control), with positive effects representing an advantage of the multiple-behavior intervention relative to either a passive control or a single-behavior intervention. We calculated the variance of the effect size using the formula recommended by Huedo-Medina and Johnson (2011): $v = ((n_1+n_2)/(n_1 \times n_2))+((d^2)/(2 \times (n_1+n_2))$. This change in the calculation of the variance increased the associated effect size variance by 38.0% on average.

First, the average effect size comparing between multiple-behavior interventions and single-behavior interventions was not statistically different from zero, $b = 0.09$, $SE = 0.15$, $p = .554$. A similar result was also found comparing multiple-behavior interventions with passive

controls, $b = 0.12$, $SE = 0.11$, $p = .281$. These results provided no confirmation that the two analytical approaches led to consistent results.

Second, we repeated our analyses as described in the main text. When looking at the differences in efficacy across levels of country development, we see the same negative association between the level of development and multiple-behavior intervention efficacy (see Table S2). However, the associated error increased, and the statistically significant results were found in HDI, $b = -2.18$, $SE = 0.91$, $p = .031$, and HAQ, $b = -0.01$, $SE = -0.00$, $p = .038$. This finding is not surprising given both the reduction in the size of the dataset and the increase in effect-size variance when compared to the analyses reported in the main text. However, the pattern of coefficients and overall results were consistent across all indicators and models, suggesting that our general conclusions are robust.

Third, the representation of MSM data in this subset of the dataset was particularly weak ($k = 83$). The interaction patterns were the same for all countries and in the US, $p > .100$. Finally, we examined within the US reports whether the representation of disadvantaged groups was associated with negative results (see Table S4). These models predominantly show near zero effects, except for the marginally significant interaction with the percentages of Black participants. Therefore, the results mostly replicated the lack of results presented in the main analyses. In conclusion, the two different analytic methods produced comparable results.

Measurement-Level Analyses

We first repeated the mean estimation of the effect sizes of three intervention types (see Table S5). Next, we repeated the key analyses of examining the differential effects of multiple-behavior intervention as a function of country development indices (see Table S6), the percentages of MSM, different racial/ethnic minorities, and different ages across all countries

(see Table S7) and in the U.S. (see Tables S8 and S9) using the measurement level data. The meta-regression models with Robust Variance Estimation were clustered by report and clustered by outcome. Following the same procedures as described in the main text, all results were with small-sample corrections. In short, the results using the measurement-level data were the same as those using the mean-level data, except for the interactions between multiple-behavior interventions and GDP per capita, $p = .112$.

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Table S2

Differential Effects Related to Log GDP, GDP Per Capita, and HDI Based on the Models with Δd

Variable	Development indices							
	Log GDP		GDP per capita		HDI		HAQ	
	b (SE)	*df*	*b (SE)*	*df*	*b (SE)*	*df*	*b (SE)*	*df*
	(Cluster = 58, *k* = 318)		(Cluster = 58, *k* = 318)		(Cluster = 58, *k* = 318)		(Custer = 59, *k* = 321)	
Intercept	1.09 (0.76)	11.47	-0.33 (0.21)	12.21	-0.1 (0.27)	7.82	-0.11 (0.24)	10.93
Intervention type: MBI - SBI	0.06 (1.52)	15.89	-0.01 (0.24)	5.61	1.84* (0.79)	11.92	0.85† (0.42)	15.28
Development index	-0.06† (0.03)	12.03	0.00* (0.00)	21.30	-0.37 (0.35)	6.60	0.00 (0.00)	11.51
Development index × Intervention type: MBI - SBI	-0.00 (0.05)	18.24	-0.00 (0.00)	22.00	-2.18* (0.91)	13.44	-0.01* (0.01)	18.96
Covariates:								
Average age	0.02** (0.01)	19.97	0.02** (0.01)	20.96	0.01* (0.00)	16.64	0.01* (0.01)	21.79
Percentages of females	0.00 (0.00)	17.74	0.00 (0.00)	19.79	0.00 (0.00)	17.62	0.00 (0.00)	18.05
Expert facilitator	-0.03 (0.13)	23.02	0 (0.12)	23.80	0.02 (0.11)	20.28	-0.04 (0.11)	22.11
Medical recruitment setting	0.11 (0.12)	27.25	0.03 (0.11)	25.06	0.01 (0.09)	24.45	0.08 (0.1)	25.73
Culturally appropriate	0.18† (0.09)	24.40	0.09 (0.1)	22.34	0.02 (0.11)	21.16	0.03 (0.11)	22.37
Modified covariate for potential biases	0.94† (0.44)	7.62	1.02† (0.44)	8.25	1.06* (0.41)	7.52	0.87† (0.43)	7.58
I^2	95.29		95.24		94.91		95.11	

Note. *b* = unstandardized coefficient; *SE* = standard error; *p* = *p* value; *k* = number of effect sizes used in each model; Log GDP = log form of a region's overall Gross Domestic Product; GDP per capita = overall Gross Domestic Product of a region divided by its total population; HDI = human development index; HAQ = healthcare access and quality index; average age = average age of the sample; percentages of females = percentages of female participants; expert facilitator = the intervention program was facilitated by experts (e.g., clinical psychologists); medical recruitment setting = participant recruited from medical settings; culturally appropriate = the intervention was culturally appropriate; clinical delivery setting = the intervention was delivered in clinical settings. I^2 = proportion of variance due to between-group heterogeneity.
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table S3

Differential Effects of Multiple-Behavior Interventions Related to Gay/bisexual or MSM Representation and Being Young Adults Across Countries: Models with Δd

Variable	Disadvantaged group status			
	Gay/bisexual or MSM representation		Young adult	
	b (SE)	*df*	*b (SE)*	*df*
	(Cluster = 16, *k* = 83)		(Cluster = 61, *k* = 337)	
Intercept	-0.37 (1.91)	2.07	-0.4 (0.26)	13.24
Intervention type: MBI - SBI	-0.14 (2.02)	1.98	-0.14 (0.47)	22.06
Disadvantaged group status	-0.01 (0.02)	2.01	0.01 (0.01)	12.04
Disadvantaged group status × Intervention type: MBI - SBI	0.01 (0.03)	2.15	0.01 (0.02)	22.37
Covariates:				
Average age	0.01 (0.02)	3.18	-	-
Percentages of females	0.01 (0.03)	2.5	0.00 (0.00)	21.76
Expert facilitator	-0.02 (0.36)	3.75	0.22 (0.15)	27.06
Medical recruitment setting	0.35 (0.82)	3.92	0.22 (0.16)	33.44
Culturally appropriate	0.24 (0.32)	2.76	0.03 (0.1)	26.32
Modified covariate for potential biases	1.75 (2.47)	5.26	0.88† (0.44)	8.57
I^2	96.13		96.14	

Note. Report of the robust variance estimation meta-regression using single-behavior intervention as the reference (i.e., intercept). *b* = unstandardized coefficient; *SE* = standard error; *p* = *p* value; *k* = the number of effect sizes; gay/bisexual or MSM representation = percentage of gay/bisexual or MSM in the sample; average age = average age of the sample; percentages of females = percentages of female participants; expert facilitator = the intervention program was facilitated by experts (e.g., clinical psychologists); medical recruitment setting = participant recruited from medical settings; culturally appropriate = the intervention was culturally appropriate; clinical delivery setting = the intervention was delivered in clinical settings; I^2 = proportion of variance due to between-group heterogeneity.
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table S4

Differential Effects of Single and Multiple Intervention Type Related to Minority Groups in the U.S: Models with Δd

Variable	Minority group status					
	Non-White representation		Black representation		Latinx representation	
	b (SE)	*df*	*b (SE)*	*df*	*b (SE)*	*df*
	(Cluster = 30, *k* = 181)		(Cluster = 26, *k* = 153)		(Cluster = 24, *k* = 145)	
Intercept	-1.21 (0.79)	7.46	-1.5 (0.78)	5.27	-0.8 (0.57)	8.20
Intervention type: MBI - SBI	0.69 (0.4)	8.40	0.62† (0.33)	7.52	-0.02 (0.18)	11.29
Disadvantaged group status	0 (0)	6.24	0.01† (0.00)	5.58	0 (0)	3.37
Disadvantaged group status × Intervention type: MBI - SBI	-0.01 (0.01)	9.19	-0.01† (0.01)	6.29	0 (0.01)	3.84
Covariates:						
Average age	0.02 (0.01)	10.86	0.02† (0.01)	7.61	0.01 (0.01)	9.24
Percentages of females	0.01 (0)	9.29	0.01† (0)	10.23	0 (0.01)	6.90
Expert facilitator	0.44† (0.22)	11.86	0.22 (0.2)	6.43	0.16 (0.24)	7.64
Medical recruitment setting	-0.17 (0.17)	11.03	-0.18 (0.19)	7.69	-0.03 (0.26)	7.78
Culturally appropriate	-0.15 (0.22)	9.73	-0.09 (0.24)	6.57	0.21 (0.27)	7.19
Modified covariate for potential biases	2.08 (1.3)	3.14	2.62 (1.2)	2.28	2.63 (1.26)	2.16
I^2	89.72		89.16		90.80	
	Other representation		Gay/bisexual or MSM representation		Young adult	
	b (SE)	*df*	*b (SE)*	*df*	*b (SE)*	*df*
	(Cluster = 20, *k* = 123)		(Cluster = 11, *k* = 55)		(Cluster = 30, *k* = 181)	
Intercept	-1.37 (0.85)	6.12	-2.88 (2.02)	1.75	-0.8 (0.54)	9.71
Intervention type: MBI - SBI	0.23 (0.29)	6.62	3.9 (2.63)	2.30	-0.85 (0.68)	8.47
Disadvantaged group status	0.02 (0.02)	2.48	0.03 (0.02)	2.22	0.01 (0.01)	8.47
Disadvantaged group status × Intervention type: MBI - SBI	-0.03 (0.05)	4.67	-0.04 (0.03)	2.32	0.03 (0.03)	10.37
Covariates:						
Average age	0.02 (0.02)	6.96	0.02 (0.03)	1.87	-	-
Percentages of females	0 (0.01)	7.29	0.05 (0.03)	2.11	0.01† (0)	6.71
Expert facilitator	0.44 (0.29)	5.38	-0.35 (0.51)	2.21	0.49† (0.25)	7.19
Medical recruitment setting	-0.44 (0.29)	5.25	-0.64 (0.28)	1.26	-0.19 (0.22)	12.53
Culturally appropriate	-0.16 (0.39)	5.70	0.34 (0.44)	1.66	-0.19 (0.23)	10.36
Modified covariate for potential biases	3.01 (1.42)	1.53	-1.65 (2.95)	2.55	2.11 (1.35)	3.03
I^2	94.02		71.98		89.81	

Note. *b* = unstandardized coefficient; *SE* = standard error; *p* = *p* value; *k* = number of unique groups in the analysis; ES = number of effect sizes used in each model; age = average age of the sample; percentages of females = percentages of female participants; expert facilitator = the intervention program was facilitated by experts (e.g., clinical psychologists); medical recruitment setting = participant recruited from medical settings; culturally appropriate = the intervention was culturally appropriate; clinical delivery setting = the intervention was delivered in clinical settings. I^2 is the proportion of variance due to between-study heterogeneity.

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table S5

Mean Estimated Effect Sizes of Different Intervention Types (*Cluster* = 324, *k* = 2234)

Variable	*b (SE)*	*df*
Single-behavior intervention	0.25* (0.11)	80.53
Multiple-behavior intervention	0.3*** (0.08)	111.86
Passive control	0.05 (0.09)	59.22
I^2	95.22	

Note. Report of the robust variance estimation meta-regression using single-behavior intervention as the reference (i.e., intercept). *b* = unstandardized coefficient; *SE* = standard error; *df* = degrees of freedom; *p* = *p* value; *k* = number of effect sizes; I^2 = proportion of variance due to between-group heterogeneity.

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table S6

Differential Effects of Multiple-Behavior Interventions Related to Country Log GDP, GDP Per Capita, HDI, and HAQ

Variable	Development indices							
	Log GDP		GDP per capita		HDI		HAQ	
	b (SE)	*df*	*b (SE)*	*df*	*b (SE)*	*df*	*b (SE)*	*df*
	(Cluster = 278, *k* = 1934)		(Cluster = 278, *k* = 1934)		(Cluster = 276, *k* = 1926)		(Custer = 282, *k* = 1969)	
Intercept	-1.08 (0.74)	28.54	-0.17 (0.18)	66.30	-0.73† (0.38)	20.02	-0.43 (0.26)	27.53
Intervention type: MBI	2.51* (0.96)	51.79	0.2 (0.14)	56.51	1.48** (0.48)	32.79	0.87** (0.31)	38.99
Intervention type: PC	0.65 (0.96)	34.37	-0.03 (0.16)	41.57	0.5 (0.48)	21.79	0.19 (0.33)	23.29
Development index	0.03 (0.03)	31.84	0.00 (0.00)	36.60	0.77 (0.48)	20.49	0.01 (0.00)	27.73
Development index × Intervention type: MBI	-0.09* (0.03)	56.68	0.00 (0.00)	66.70	-1.79** (0.58)	39.37	-0.01** (0)	52.24
Development index × Intervention type: PC	-0.03 (0.03)	39.27	0.00 (0.00)	58.39	-0.76 (0.59)	28.20	-0.00 (0.00)	33.18
Covariates:								
Average age	0.01** (0.00)	97.24	0.01** (0.00)	100.74	0.01*** (0.00)	96.92	0.01** (0.00)	103.05
Percentages of females	-0.00 (0.00)	117.48	-0.00 (0.00)	119.53	-0.00 (0.00)	117.08	-0.00 (0.00)	120.10
Expert facilitator	0.14* (0.07)	144.97	0.16* (0.07)	151.56	0.14* (0.06)	144.90	0.12† (0.06)	147.37
Medical recruitment setting	0.01 (0.06)	157.12	0.02 (0.06)	156.06	0.01 (0.06)	155.56	0.04 (0.06)	160.18
Culturally appropriate	-0.04 (0.06)	102.16	-0.05 (0.07)	103.10	-0.05 (0.07)	101.66	-0.06 (0.07)	100.69
Modified covariate for potential biases	0.36 (0.34)	30.86	0.39 (0.35)	30.83	0.39 (0.34)	30.53	0.32 (0.32)	32.10
I^2	95.21		95.26		95.13		95.17	

Note. Log GDP = the log form of a country's overall gross domestic product; GDP per capita = overall gross domestic product of a country divided by its total population; HDI = human development index; HAQ = healthcare access and quality index; *b* = unstandardized coefficient; *SE* = standard error; *df* = degrees of freedom; *p* = *p* value; *k* = total number of effect sizes; average age = average age of the sample; percentages of females = percentages of female participants; expert facilitator = the intervention program was facilitated by experts (e.g., clinical psychologists); medical recruitment setting = participant recruited from medical settings; culturally appropriate = the intervention was culturally appropriate; clinical delivery setting = the intervention was delivered in clinical settings. I^2 = proportion of variance due to between-group heterogeneity.

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table S7

Differential Effects of Multiple-Behavior Interventions Related to MSM Representation and Being Young Adults Across Countries

Variable	Disadvantaged group status			
	Gay/bisexual or MSM representation		Young adult	
	b (SE)	*df*	*b (SE)*	*df*
	(Cluster = 89, *k* = 787)		(Cluster = 300, *k* = 2090)	
Intercept	-0.25 (0.23)	9.40	-0.1 (0.3)	30.21
Intervention type: MBI	0.57* (0.18)	8.86	0.17 (0.29)	41.97
Intervention type: PC	0.55† (0.3)	9.85	-0.03 (0.33)	38.02
Disadvantaged group status	0.00 (0.00)	11.48	0.01 (0.01)	31.81
Disadvantaged group status × Intervention type: MBI	-0.01* (0)	18.44	-0.00 (0.01)	51.92
Disadvantaged group status × Intervention type: PC	-0.01* (0)	14.13	-0.00 (0.01)	30.98
Covariates:				
Average age	0.00 (0.00)	27.37	-	-
Percentages of females	-0.00† (0.00)	22.38	-0.00 (0.00)	129.10
Expert facilitator	0.05 (0.12)	41.33	0.17* (0.07)	161.54
Medical recruitment setting	0.17 (0.15)	33.45	0.08 (0.06)	171.90
Culturally appropriate	0.09 (0.09)	20.71	-0.04 (0.06)	109.10
Modified covariate for potential biases	0.77* (0.32)	15.42	0.25 (0.31)	34.16
I^2	89.53		95.15	

Note. Report of the robust variance estimation meta-regression using single-behavior intervention as the reference (i.e., intercept). *b* = unstandardized coefficient; *SE* = standard error; *p* = *p* value; *k* = the number of effect sizes; gay/bisexual or MSM representation = percentage of MSM in the sample; average age = average age of the sample; percentages of females = percentages of female participants; expert facilitator = the intervention program was facilitated by experts (e.g., clinical psychologists); medical recruitment setting = participant recruited from medical settings; culturally appropriate = the intervention was culturally appropriate; clinical delivery setting = the intervention was delivered in clinical settings; I^2 = proportion of variance due to between-group heterogeneity.
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table S8

Differential Effects of Multiple-Behavior Interventions Related to Minority Group Status and Being Young Adults in the US

Variable	Minority group status					
	Non-White representation		Black representation		Latinx representation	
	b (SE)	*df*	*b (SE)*	*df*	*b (SE)*	*df*
	(Cluster = 174, *k* = 1235)		(Cluster = 151, *k* = 974)		(Cluster = 139, *k* = 945)	
Intercept	0.1 (0.18)	19.47	-0.12 (0.23)	28.63	-0.02 (0.31)	33.92
Intervention type: MBI	-0.26 (0.16)	16.16	-0.16 (0.2)	27.32	-0.28 (0.19)	28.80
Intervention type: PC	-0.24 (0.25)	9.82	-0.53† (0.26)	14.91	-0.22 (0.26)	18.09
Disadvantaged group status	0.00 (0.00)	14.65	0.00 (0.00)	14.73	-0.01 (0.01)	3.27
Disadvantaged group status × Intervention type: MBI	0.00 (0.00)	21.52	0.00 (0.00)	22.18	0.01 (0.01)	5.53
Disadvantaged group status × Intervention type: PC	0.00 (0.00)	16.24	0.01 (0.01)	22.71	0.00 (0.01)	2.79
Covariates:						
Average age	0.01** (0)	54.34	0.01** (0.00)	68.10	0.01* (0.00)	58.79
Percentages of females	0.00 (0.00)	55.99	0.00 (0.00)	50.05	0.00 (0.00)	49.89
Expert facilitator	0.1 (0.06)	82.67	0.07 (0.08)	69.65	0.14 (0.08)	64.52
Medical recruitment setting	0.02 (0.06)	79.21	-0.01 (0.07)	70.58	0.00 (0.07)	63.66
Culturally appropriate	0.01 (0.07)	46.74	0.02 (0.07)	42.24	0.00 (0.09)	41.11
Modified covariate for potential biases	0.53 (0.41)	21.99	0.74 (0.52)	17.80	0.81 (0.54)	17.48
I^2	94.19		94.14		94.55	
	Other representation		Gay/bisexual MSM representation		Young adult	
	b (SE)	*df*	*b (SE)*	*df*	*b (SE)*	*df*
	(Cluster = 138, *k* = 916)		(Cluster = 59, *k* = 510)		(Cluster = 174, *k* = 1235)	
Intercept	-0.09 (0.29)	41.28	-0.09 (0.22)	4.28	-0.33 (0.45)	16.06
Intervention type: MBI	-0.09 (0.17)	28.44	0.29† (0.14)	7.49	0.20 (0.40)	19.40
Intervention type: PC	-0.05 (0.25)	17.24	0.17 (0.57)	4.61	0.23 (0.43)	22.08
Disadvantaged group status	0.00 (0.01)	2.29	0.00† (0.00)	6.45	0.02 (0.01)	18.21
Disadvantaged group status × Intervention type: MBI	0.00 (0.01)	5.06	0.00† (0.00)	13.61	-0.01 (0.01)	28.26
Disadvantaged group status × Intervention type: PC	-0.01 (0.01)	3.57	0.00 (0.01)	5.93	-0.01 (0.01)	22.68
Covariates:						
Average age	0.01* (0.00)	50.53	-0.01 (0.00)	15.97	-	-
Percentages of females	0.00 (0.00)	50.70	0.00 (0.00)	9.06	0.00 (0.00)	57.25
Expert facilitator	0.1 (0.08)	71.61	0.18* (0.08)	21.66	0.1 (0.06)	85.95
Medical recruitment setting	0.02 (0.08)	65.29	-0.02 (0.08)	17.11	0.03 (0.06)	71.26
Culturally appropriate	-0.04 (0.1)	42.79	0.00 (0.11)	6.73	0 (0.07)	42.70
Modified covariate for potential biases	0.71 (0.6)	15.18	0.99** (0.27)	9.64	0.48 (0.39)	23.69

I^2	95.08	88.34	94.22

Note. Report of the robust variance estimation meta-regression using single-behavior intervention as the reference (i.e., intercept). *b* = unstandardized coefficient; *SE* = standard error; *df* = degrees of freedom; *p* = *p* value; *k* = the number of effect sizes; average age = average age of the sample; percentages of females = percentages of female participants; expert facilitator = the intervention program was facilitated by experts (e.g., clinical psychologists); medical recruitment setting = participant recruited from medical settings; culturally appropriate = the intervention was culturally appropriate; clinical delivery setting = the intervention was delivered in clinical settings; I^2 = proportion of variance due to between-group heterogeneity.

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table S9

Differential Effects of Multiple-Behavior Interventions Related to Intersectionality of Racial/Ethnic Minority and MSM Representation in the US

Variable	Minority group status					
	Non-White representation		Black representation		Latinx representation	
	b (SE)	*df*	*b (SE)*	*df*	*b (SE)*	*df*
	(Cluster = 98, *k* = 732)		(Cluster = 85, *k* = 562)		(Cluster = 80, *k* = 594)	
Intercept	0.29 (0.57)	12.85	-0.35 (0.56)	16.53	-0.56 (0.41)	20.26
MSM representation	-9.2 (10.12)	12.06	-2.13 (9.21)	14.96	2.65 (5.65)	19.95
Minority group status	0.00 (0.01)	12.61	0.00 (0.01)	12.70	0.00 (0.01)	9.18
MSM representation × Minority group status	0.06 (0.13)	15.77	0.01 (0.14)	13.93	0.04 (0.23)	7.91
Covariates:						
Average age	0.01* (0)	23.48	0.01* (0)	29.71	0.01** (0)	39.44
Percentages of females	0 (0)	33.85	0 (0)	31.09	0 (0)	31.86
Expert facilitator	0.04 (0.06)	47.47	-0.02 (0.08)	40.56	0.06 (0.08)	37.64
Medical recruitment setting	-0.01 (0.07)	44.84	-0.09 (0.09)	42.21	-0.10 (0.08)	37.95
Culturally appropriate	-0.02 (0.08)	28.94	0.05 (0.09)	27.91	0.10 (0.09)	26.67
Modified covariate for potential biases	1.09† (0.54)	17.61	1.51* (0.61)	12.78	1.54* (0.64)	13.06
I^2	91.29		91.50		91.12	

Note. Report of the robust variance estimation meta-regression using single-behavior intervention as the reference (i.e., intercept). *b* = unstandardized coefficient; *SE* = standard error; *df* = degrees of freedom; *p* = *p* value; *k* = the number of effect sizes; average age = average age of the sample; percentages of females = percentages of female participants; expert facilitator = the intervention program was facilitated by experts (e.g., clinical psychologists); medical recruitment setting = participant recruited from medical settings; culturally appropriate = the intervention was culturally appropriate; clinical delivery setting = the intervention was delivered in clinical settings; I^2 = proportion of variance due to between-group heterogeneity.

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table S10

Differential Effects of Multiple-Behavior Interventions Related to Related to MSM Representation Controlling for Methodological Characteristics

Variable	Gay/bisexual or MSM representation	
	b (SE)	*df*
	(Cluster = 87, *k* = 410)	
Intercept	-0.39 (0.22)	8.84
Intervention type: MBI	0.33† (0.17)	10.07
Intervention type: PC	0.51† (0.27)	9.14
Disadvantaged group status	0.00 (0.00)	13.88
Disadvantaged group status × Intervention type: MBI	-0.01† (0.00)	18.63
Disadvantaged group status × Intervention type: PC	-0.01* (0.00)	13.65
Covariates:		
Average age	0.00* (0.00)	25.69
Percentages of females	0.11 (0.10)	31.37
Expert facilitator	0.12 (0.13)	29.43
Medical recruitment setting	-0.02 (0.09)	16.46
Culturally appropriate	0.21** (0.07)	15.23
Target outcome	0.32** (0.09)	28.35
Target gender	0.78* (0.37)	23.06
Modified covariate for potential biases	0.00* (0.00)	25.69
I^2	84.07	

Note. Report of the robust variance estimation meta-regression using single-behavior intervention as the reference (i.e., intercept). *b* = unstandardized coefficient; *SE* = standard error; *df* = degrees of freedom; *p* = *p* value; *k* = number of effect sizes; I^2 = proportion of variance due to between-group heterogeneity.
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$