

**Promoting Physical Activity Among Cancer Survivors:  
Meta-Analysis and Meta-CART Analysis of Randomized Controlled Trials**

**Supplementary Materials**

Table S1

*Search Terms Used for Each Database*

**PubMed**

#13 Search (#8) OR #10

#10 Search (#3) AND ("Randomized Controlled Trial"[Publication Type] OR "clinical trial"[Publication Type] OR "Clinical Trials as Topic"[MeSH] OR "Double-Blind Method"[MeSH] OR ((randomized[tiab] OR randomised[tiab]) AND (trial[tiab] OR trials[tiab] OR evaluation\*[tiab] OR intervention\*[tiab])) OR ((single[tiab] OR double[tiab] OR doubled[tiab] OR triple[tiab] OR tripled[tiab] OR treble[tiab] OR trebled[tiab]) AND (blind\*[tiab] OR mask\*[tiab])) OR "RCT")

#8 Search (#1) AND #2 Filters: Systematic Reviews; Review; Randomized Controlled Trial; Clinical Trial

#3 Search (#1) AND #2

#2 Search ((neoplasms[MeSH] OR neoplasm OR neoplasms OR cancer OR cancers OR tumor OR tumors OR tumour OR tumours) AND (survivor\* OR patient OR patients OR participant\*))

#1 Search (Exercise[MeSH] OR Exercise[tiab] OR Exercise Movement Techniques[MeSH] OR Exercise Movement Techniques[tiab] OR Exercise Therapy[MeSH] OR Exercise Therapy[tiab] OR Physical Exertion[MeSH] OR Physical Exertion[tiab] OR Physical Activity[tiab] OR Physical Fitness[tiab] OR Physical Performance[tiab] OR Physical Training[tiab] OR Exercise Tolerance[tiab] OR Sports[tiab] OR Jogging[tiab] OR Walking[tiab] OR Running[tiab] OR Swimming[tiab] OR Calisthenics[tiab] OR Group Exercise[tiab] OR Aquatic Exercise[tiab] OR Biking[tiab] OR Bicycling[tiab] OR Jumping[tiab] OR Aerobics[tiab] OR Anaerobic Exercises[tiab] OR Strength Training[tiab] OR Muscle Training[tiab] OR Resistance Training[tiab] OR Yoga[tiab] OR Dance[tiab] OR Dancing[tiab] OR Stretching[tiab] OR Flexibility[tiab] OR Tai Chi[tiab] OR Abdominal Exercises[tiab] OR Plyometrics[tiab] OR fitness[tiab])

**Embase**

No. Query

#4 #1 AND #2 AND #3

#3 'physical activity'/exp OR 'physical activity, capacity, and performance'/exp OR 'exercise'/exp OR 'kinesiotherapy'/exp OR 'sport'/exp OR (physical OR exercise OR strength) NEAR/3 (fitness OR exertion OR training OR tolerance) OR sports OR biking OR bicycling OR dance OR dancing OR flexibility OR 'fitness'/exp OR fitness OR calisthenics

#2 'clinical trial(topic)'/exp OR 'double blind procedure'/exp OR randomized OR randomised NEAR/3 (trial OR trials OR evaluation\* OR intervention\*) OR single OR double OR doubled OR triple OR tripled OR treble NEAR/3 (blind\* OR mask\*) OR 'rct' OR 'randomized controlled trial'

#1 'neoplasm' OR 'neoplasm'/exp OR neoplasm OR 'neoplasms'/exp OR neoplasms OR 'cancer'/exp OR cancer OR 'cancers'/exp OR cancers OR 'tumor'/exp OR tumor

OR tumors OR 'tumour'/exp OR tumour OR tumours NEAR/3 (survivor\* OR patient OR patients OR participant\*)

### **Web of Science**

#4 #3 AND #2 AND #1

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, CCREXPANDED,

IC Timespan=All years

#3 TOPIC: (((Physical OR Exercise OR Strength OR Resistance OR Athletic) NEAR/3 (Activity OR Therapy OR Exertion OR Training OR Tolerance OR Fitness OR Performance)) OR ((Physical OR Exercise OR Strength OR Resistance OR Athletic) AND (Activity OR Therapy OR Exertion OR Training OR Tolerance OR Fitness OR Performance)) OR Exercise OR Physical Exercise OR Exercise Movement Techniques OR ((Abdominal OR Aerobic OR Anaerobic OR Aquatic OR Back OR Group OR Isokinetic OR Isometric OR Isotonic OR Arm) NEAR/3 (Exercise OR Exercises)) OR ((Abdominal OR Aerobic OR Anaerobic OR Aquatic OR Back OR Group OR Isokinetic OR Isometric OR Isotonic OR Arm) AND (Exercise OR Exercises)) OR Aerobics OR ((Aerobic) NEAR/3 (Dancing)) OR ((Aerobic) AND (Dancing)) OR Dance OR Swimming OR Biking OR Bicycling OR Jumping OR Running OR Jogging OR Calisthenics OR Lower Extremity Exercises OR ((Muscle) NEAR/3 (Strengthening)) OR ((Muscle) AND (Strengthening)) OR Pilates OR Plyometrics OR Stretching OR Upper Extremity Exercises OR Walking OR Sports OR ((Contact) NEAR/3 (Sports)) OR ((Contact) AND (Sports)) OR Cycling OR Sports OR Yoga OR Flexibility OR Tai Chi OR Tai Ji OR Tai-Ji OR Fitness)

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, CCREXPANDED,

IC Timespan=All years

#2 TOPIC: (((“clinical trial”[Publication Type] OR “Clinical Trials” OR “clinical trial” OR “Double-Blind Method” OR “double-blind study” OR “double-masked method” OR “double-masked study” OR ((TI randomized OR TS randomized OR TI randomised OR TS randomised) AND (TI trial or TS trial OR TI trials OR TS trials OR TI evaluation\* OR TS evaluation\* OR TI intervention\* OR TS intervention\*)) OR ((TI single OR TS single OR TI double OR TS double OR TI doubled OR TS doubled OR TI triple OR TS triple OR TI tripled OR TS tripled OR TI treble or TS treble) AND (TI blind\* OR TS blind\* OR TI mask\* OR TS mask\*)) OR ((randomized OR randomised) NEAR/3 (trial OR trials OR evaluation\* OR intervention\*)) OR ((single OR double OR doubled OR triple OR tripled OR treble) NEAR/3 (blind\* OR mask\*)) OR "RCT" OR "randomized controlled trial"))

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, CCREXPANDED,

IC Timespan=All years

#1 TOPIC: (((neoplasms OR cancer OR neoplasia OR neoplasm OR tumor OR neoplasm OR neoplasms OR cancer OR cancers OR tumor OR tumors OR tumour OR tumours) NEAR/3 (survivor\* OR patient OR patients OR participant\*)) OR ((neoplasms OR cancer OR neoplasia OR neoplasm OR tumor OR neoplasm OR neoplasms OR cancer OR cancers OR tumor OR tumors OR tumour OR tumours)

AND (survivor\* OR patient OR patients OR participant\*))  
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH,  
CCREXPANDED,  
IC Timespan=All years

### **Cochrane**

[mh neoplasms] or neoplasm or neoplasms or cancer or cancers or tumor or tumors or tumour or tumours) and (survivor\* or patient or patients or participant\*):ti,ab,kw and "clinical trial\*" or [mh "Double Blind Method"] or ((randomized or randomised or random\*) and (trial or trials or evaluation\* or intervention\*)) or ((single or double or doubled or triple or tripled or treble) and (blind\* or mask\*)) or "RCT" or "randomized controlled trial":ti,ab,kw and [mh Exercise] or [mh "Exercise Tolerance"] or [mh "Exercise Therapy"] or [mh "Exercise Movement Techniques"] or [mh "Muscle Stretching Exercises"] or [mh "Resistance Training"] or [mh "Physical Exertion"] or Physical Activity or Sports or Jogging or Walking or Running or Swimming or Calisthenics or Group Exercise or Aquatic Exercise or Biking or Bicycling or Jumping or Anaerobic Exercise or Strength Training or Muscle Training or Yoga or Dance or Dancing or Flexibility or Tai Chi or Abdominal Exercises or Plyometrics or Physical Fitness or Fitness:ti,ab,kw (Word variations have been searched)

### **ProQuest**

In ALL (anywhere except full text):

(su(cancer) OR ((neoplasms OR cancer OR neoplasia OR neoplasm OR tumor OR neoplasm OR neoplasms OR cancer OR cancers OR tumor OR tumors OR tumour OR tumours) AND (survivor\* OR patient OR patients OR participant\*)) ) AND (su(randomized controlled trial) OR su(clinical trial) OR su(randomized trial) OR "clinical trial" OR "Clinical Trials" OR "Double-Blind Method" OR "double-blind study" OR "double-masked method" OR "doublemasked study" OR RCT OR randomized controlled trial OR ((randomized OR randomised) AND (trial OR trials OR evaluation\* OR intervention\*)) OR ((single OR double OR doubled OR triple OR tripled OR treble) AND (blind\* OR mask\*))) AND (su(exercise) OR su(physical activity) OR su(fitness) OR ((Physical OR Exercise OR Strength OR Resistance OR Athletic) AND (Activity OR Therapy OR Exertion OR Training OR Tolerance OR Fitness OR Performance)) OR Exercise OR Physical Exercise OR Exercise Movement Techniques OR ((Abdominal OR Aerobic OR Anaerobic OR Aquatic OR Back OR Group OR Isokinetic OR Isometric OR Isotonic OR Arm) AND (Exercise OR Exercises)) OR Aerobics OR ((Aerobic) AND (Dancing)) OR Dance OR Swimming OR Biking OR Bicycling OR Jumping OR Running OR Jogging OR Calisthenics OR Lower Extremity Exercises OR ((Muscle) AND (Strengthening)) OR Pilates OR Plyometrics OR Stretching OR Upper Extremity Exercises OR Walking OR Sports OR ((Contact) AND (Sports)) OR Cycling OR Sports OR Yoga OR Flexibility OR Tai Chi OR Tai Ji OR Tai-Ji OR Fitness)

### **CINAL and PSYCInfo:**

((neoplasms OR cancer OR neoplasia OR neoplasm OR tumor OR neoplasm OR neoplasms OR cancer OR cancers OR tumor OR tumors OR tumour OR tumours) AND (survivor\* OR patient OR patients OR participant\*)) ) AND ( ("clinical trial"[Publication

Type] OR “Clinical Trials” OR “clinical trial” OR “Double-Blind Method” OR “double-blind study” OR “double-masked method” OR “double- masked study” OR ((TI randomized OR AB randomized OR TI randomised OR AB randomised) AND (TI trial or AB trial OR TI trials OR AB trials OR TI evaluation\* OR AB evaluation\* OR TI intervention\* OR AB intervention\*)) OR ((TI single OR AB single OR TI double or AB double OR TI doubled OR AB doubled OR TI triple OR AB triple OR TI tripled OR AB tripled OR TI treble or AB treble) AND (TI blind\* OR AB blind\* OR TI mask\* OR AB mask\*)))) ) AND ( Physical Activity OR Exercise OR Exercise Movement Techniques OR Exercise Therapy OR Physical Exertion OR Physical Training OR Exercise Tolerance OR Abdominal Exercises OR Aerobic Exercises OR Aerobics OR Anaerobic Exercises OR Aerobic Dancing OR Dance OR Aquatic Exercises OR Swimming OR Biking OR Bicycling OR Jumping OR Running OR Jogging, OR Back Exercises OR Calisthenics OR Group Exercise OR Lower Extremity Exercises OR Muscle Strengthening OR Strength Training OR Isokinetic Exercises OR Isometric Exercises OR Isotonic Exercises OR Resistance Training OR Pilates OR Plyometrics OR Stretching OR Upper Extremity Exercises OR Arm Exercises OR Walking OR Physical Fitness OR Physical Performance OR Sports OR Athletic Training OR Contact Sports OR Cycling OR Sports OR Yoga OR Flexibility OR Tai Chi OR Tai Ji OR Tai- Ji OR Fitness )

Table S2

*Characteristics of Interventions Included in the Review*

Authors	$N_C$	$N_E$	Age $M (SD/\text{range})$	Gender (%)	Cancer type	Setting	Follow-up (in weeks)	Measure
Anderson et al., 2015	25	26	49.2 (6.2)	100	Breast	NS	0	Self-report <sup>1</sup>
Arbane et al., 2014	38	40	68.0 (11.0)	45.0	Lung	Home, Clinic	0	Accelerometer
AvastPatel et al., 2013	26	24	56.0 (8.6)	100	Breast	NS	8	Self-report <sup>2</sup>
Backman et al., 2014	22	24	54.0 (-)	89.6	Mixed	Home, NS	0	Self-report <sup>3</sup>
Bantum et al., 2014	156	147	50.9 (11.0)	82.1	Mixed	Home	20	Self-report <sup>2</sup>
Basen-Engquist et al., 2006	25	35	55.1 (11.4)	100	Breast	Clinic, Comm. Ctr.	2	Self-report <sup>4</sup>
Belanger et al., 2014	63	65	-	60.8	Mixed	Home	12	Self-report <sup>2</sup>
Bennett et al., 2007	26	20	57.8 (10.0)	89.3	Mixed	NS	26	Self-report <sup>5</sup>
Bloom et al., 2008	192.5	192.5	-	100	Breast	Comm. Ctr.	13	Self-report <sup>3</sup>
Bourke et al., 2011	9	9	69.0 (7.4)	33.3	Colorectal	Home, Other	0	Self-report <sup>2</sup>
Bourke et al., 2014	35	33	71.0 (7.1)	0.0	Prostate	Clinic	14	Self-report <sup>2</sup>
Broderick et al., 2013	18	20	51.8 (9.2)	86.1	Mixed	Home, Clinic	4	Accelerometer
Caldwell et al., 2009	9	8	-	100	Breast	Home, Clinic	-	Self-report <sup>1</sup>
Campbell et al., 2005	9	10	47.5 (7.9)	100	Breast	NS	0	Self-report <sup>6</sup>
Cantarero-Villanueva et al., 2011	35	32	48.5 (9.0)	100	Breast	NS	18	Self-report <sup>7</sup>
Capozzi et al., 2016	29	31	56.1 (9.2)	18.3	Head/Neck	Home, Clinic	12	Self-report <sup>2</sup>
Carmack-Taylor 2016 <sup>a</sup>	34	35	69.2 (45-89)	0.0	Prostate	NS	26	Self-report <sup>4</sup>
Cormie et al., 2013	10	10	72.2 (7.2)	0.0	Prostate	Other	0	Accelerometer
Courneya et al., 2003a	31	62	60.5	100	Colorectal	Home, Clinic	0	Self-report <sup>2</sup>
Courneya et al., 2003b	45	51	51.6	0.39	Mixed	Home, Clinic	0	Self-report <sup>2</sup>
Courneya et al., 2007 <sup>b</sup>	60	141	49.2	84.4	Breast	Clinic	26	Self-report <sup>2</sup>
Courneya et al., 2012	55	55	53.0	41.0	Lymphoma	NS	0	Self-report <sup>2</sup>
Courneya et al., 2016	105	106	-	54.0	Colorectal	Home, Clinic	0	Self-report <sup>8</sup>
Cox et al., 2005	130	126	15.0 (1.9)	54.4	Mixed	Clinic	52	Self-report <sup>3</sup>
Culos-Reed et al., 2010	24	38	67.6 (8.6)	0.0	Prostate	Comm. Ctr.	26	Self-report <sup>2</sup>
Daley et al., 2007 <sup>c</sup>	36	31	51.1 (8.7)	100	Breast	Other	16	Self-report <sup>3</sup>

Demark-Wahnefried et al., 2006	83	77	71.7 (5.0)	57.0	Mixed	Home	26	Self-report <sup>5</sup>
Demark-Wahnefried et al., 2007; Mosher et al., 2013	253	236	57.0 (10.8)	56.4	Mixed	Home	21	Self-report <sup>4</sup>
Demark-Wahnefried et al., 2008 <sup>d</sup>	27	26	41.8 (5.6)	100	Breast	Home	0	Accelerometer
Djuric et al., 2011	17	13	52.3 (9.5)	100	Breast	Home	0	Self-report <sup>9</sup>
Dodd et al., 2010; DeNysschen et al., 2015	30	63	50.5 (9.4)	100	Mixed	Home, Clinic	0	Self-report <sup>3</sup>
Donnelly et al., 2011	17	16	53.0 (10.3)	100	Mixed	Home	14	Self-report <sup>4</sup>
Eakin et al., 2012	67	67	52.9 (8.9)	100	Breast	Home	43	Self-report <sup>10</sup>
Fiuza-Luces et al., 2016	18	20	10.5 (1.0)	28.6	Mixed	Clinic	9	Accelerometer
Furzer et al., 2016	19	18	48.9 (13.1)	-	Mixed	Comm. Ctr.	12	Self-report <sup>1</sup>
Galvao et al., 2014	50	50	71.7 (6.4)	0.0	Prostate	Home, Clinic	0	Pedometer
Gielissen et al., 2012	42	41	44.5 (10.2)	49.0	Mixed	NS	0	Accelerometer
Goedendorp et al., 2010 <sup>e</sup>	12.5	29	56.7 (10.8)	63.0	Mixed	Home, Clinic	-	Accelerometer
Goedendorp et al., 2010 <sup>f</sup>	12.5	34	56.7 (10.8)	63.0	Mixed	Home Clinic	-	Accelerometer
Gokal et al., 2016	25	25	52.0 (10.4)	100	Breast	Home	0	Self-report <sup>11</sup>
Greenlee et al., 2013	20	22	50.7 (8.9)	100	Breast	Comm. Ctr.	26	Self-report <sup>12</sup>
Greenlee et al., 2016	60	66	54.3 (11.5)	100	Breast	Clinic	26	Self-report <sup>3</sup>
Guinan et al., 2013	9	16	48.1 (8.8)	100	Breast	Home, Clinic	4	Accelerometer
Hacker et al., 2011	8	8	42.3 (16.2)	26.3	Leukemia	Home, Clinic	0	Accelerometer
Harrigan et al., 2016 <sup>g</sup>	15.5	24	59.0 (7.5)	100	Breast	Home, NS	0	Pedometer
Harrigan et al., 2016 <sup>h</sup>	15.5	30	59.0 (7.5)	100	Breast	Home, NS	0	Pedometer
Hatchett et al., 2013	38	36	-	100	Breast	Home	0	Self-report <sup>4</sup>
Hawkes et al., 2013; Lynch et al., 2014	163	159	66.4 (10.0)	46.1	Colorectal	Home	26	Self-report <sup>2</sup>
Hebert et al., 2012	21	26	70.4 (8.5)	0.0	Prostate	NS	12	Self-report <sup>5</sup>
Heim et al., 2007	29	30	-	100	Breast	Home, Clinic	12	Self-report <sup>3</sup>
Huang et al., 2014	13	12	-	60.5	Leukemia	Home	0	Accelerometer
Hung et al., 2014	16	15	58.7 (9.5)	46.0	Mixed	Home, Clinic	0	Self-report <sup>10</sup>
Husebø et al., 2014	28	25	52.2 (9.3)	100	Breast	Home	26	Self-report <sup>3</sup>
Hvid et al., 2016	7	12	68.9 (4.8)	0.0	Prostate	NS	0	Pedometer
Irwin et al., 2008	33	34	55.8 (8.6)	100	Breast	Home, Comm. Ctr.	0	Pedometer

Irwin et al., 2014	39.5	39.5	59.8 (8.6)	100	Breast	NS	70	Self-report <sup>13</sup>
Irwin et al., 2015	38	45	61.3 (7.0)	100	Breast	Home, Comm. Ctr.	0	Self-report <sup>3</sup>
Jacobsen et al., 2013 <sup>i</sup>	26	69	57.8 (11.3)	68.0	Mixed	Home	6	Self-report <sup>2</sup>
Jacobsen et al., 2013 <sup>j</sup>	26	62	57.8 (11.3)	68.0	Mixed	Home	6	Self-report <sup>2</sup>
Jacobsen et al., 2013 <sup>k</sup>	26	77	57.8 (11.3)	68.0	Mixed	Home	6	Self-report <sup>2</sup>
James et al., 2015	35	31	57.2 (11.9)	77.4	Mixed	Home, NS	12	Pedometer
Jarden et al., 2009	12	16	39.1 (12.2)	38.1	Mixed	Clinic	21	Self-report <sup>14</sup>
Jones et al., 2002 <sup>l</sup>	27.5	64	55.9 (11.8)	100	Breast	Clinic, Comm. Ctr.	5	Self-report <sup>2</sup>
Jones et al., 2002 <sup>m</sup>	27.5	75	55.9 (11.8)	100	Breast	Clinic, Comm. Ctr.	5	Self-report <sup>2</sup>
Jones et al., 2004 <sup>n</sup>	48.5	113	56.0 (12.0)	100	Breast	Clinic	5	Self-report <sup>2</sup>
Jones et al., 2004 <sup>o</sup>	48.5	119	56.0 (12.0)	100	Breast	Clinic	5	Self-report <sup>2</sup>
Kamen et al., 2016	10	10	56.0 (2.5)	63.6	Mixed	Home, Clinic	0	Pedometer
Kanera et al., 2016	216	178	55.9 (11.4)	85.4	Mixed	Home	26	Self-report <sup>15</sup>
Kiecolt-Glaser et al., 2014	90	96	51.6 (9.2)	100	Breast	NS	13	Self-report <sup>5</sup>
Kim et al., 2006	19	22	49.9 (7.8)	100	Breast	Clinic, Other	16	Self-report <sup>16</sup>
Kim et al., 2011	22	23	46.0 (8.7)	100	Breast	Home	0	Self-report <sup>1</sup>
Kim et al., 2015	20	23	56.0 (6.0)	100	Breast	Home	0	Self-report <sup>2</sup>
Knobf et al., 2016	64	62	51.9 (6.4)	100	Mixed	Comm. Ctr.	0	Self-report <sup>1</sup>
Kwiatkowski et al., 2013	108	114	52.1 (9.4)	100	Breast	NS	102	Self-report <sup>3</sup>
Lahart et al., 2016	33	37	53.6 (9.4)	100	Breast	Home, NS	0	Self-report <sup>1</sup>
Lee et al., 2006	8	7	45.3 (12.6)	43.8	Mixed	Clinic, Other	4	Accelerometer
Lee et al., 2013	9	8	55.2 (13.3)	41.2	Colorectal	Home, Clinic	0	Self-report <sup>1</sup>
Lee et al., 2014	28	29	42.4 (5.7)	100	Breast	Home, Clinic	0	Self-report <sup>3</sup>
Li et al., 2013; Chung et al., 2015	36	33	12.7 (2.1)	47.9	Mixed	Comm. Ctr.	52	Self-report <sup>3</sup>
Ligibel et al., 2012	51	48	54.3 (10.7)	92.6	Mixed	Home	0	Self-report <sup>4</sup>
Ligibel et al., 2016	43	33	50.0 (9.5)	100	Breast	Home, NS	0	Self-report <sup>4</sup>
Littman et al., 2012	27	30	59.4 (8.0)	100	Breast	Home, Comm. Ctr.	0	Self-report <sup>17</sup>
Livingston et al., 2015	39	31	65.6 (8.5)	0.0	Prostate	Home, Comm. Ctr.	0	Accelerometer

Matthews et al., 2007	10	13	54.1 (10.8)	100	Breast	Home, NS	0	Accelerometer
May et al., 2008; 2009	58	65	48.8 (10.9)	16.0	Mixed	Home, NS	39	Self-report <sup>18</sup>
McGowan et al., 2013 <sup>p</sup>	70.5	141	68.4 (47-89)	0.0	Prostate	Home	-	Self-report <sup>2</sup>
McGowan et al., 2013 <sup>q</sup>	70.5	141	68.4 (47-89)	0.0	Prostate	Home	-	Self-report <sup>2</sup>
Mefferd et al., 2007	29	47	56.3 (8.2)	100	Breast	Home, NS	0	Self-report <sup>4</sup>
Midtgaard et al., 2013	76	71	47.2 (10.9)	83.0	Mixed	NS	0	Self-report <sup>14</sup>
Morey et al., 2009	322	319	73.1 (5.1)	54.5	Mixed	Home	0	Self-report <sup>5</sup>
Moyer-Mileur et al., 2009	7	6	6.6 (0.7)	46.0	Leukemia	Home	0	Accelerometer
Mustian et al., 2009	19	19	60 (12.1)	71.0	Mixed	Home, Clinic	12	Pedometer
Mutrie et al., 2007; 2012	41	43	51.6 (9.5)	100	Breast	Home, Comm. Ctr.	249	Self-report <sup>6</sup>
Naraphong 2013	12	11	46.8 (7.99)	100	Breast	Home, Clinic	-	Self-report <sup>3</sup>
Nikander et al., 2012	30	37	53.2 (7.0)	100	Breast	Home, Comm. Ctr.	0	Self-report <sup>3</sup>
Park et al., 2015 <sup>r</sup>	29.5	50	51.8 (8.0)	88.3	Mixed	Clinic	4	Self-report <sup>2</sup>
Park et al., 2015 <sup>s</sup>	29.5	53	51.8 (8.0)	88.3	Mixed	Clinic	4	Self-report <sup>2</sup>
Park et al., 2016 <sup>t</sup>	25	43	56.4 (10.8)	100	Breast	Home	13	Self-report <sup>19</sup>
Park et al., 2016 <sup>u</sup>	25	40	56.4 (10.8)	100	Breast	Home	13	Self-report <sup>19</sup>
Perna et al., 2010	25.5	25.5	50.8 (11.8)	100	Breast	Home, Clinic	0	Self-report <sup>2</sup>
Piland 2011	9	8	53.5 (10.9)	100	Breast	Home, Clinic	4	Pedometer
Pinto et al., 2005; 2008	40	39	53.1 (9.7)	100	Breast	Home	26	Self-report <sup>4</sup>
Pinto et al., 2013	76	82	60.0 (9.0)	100	Breast	Home, Clinic	39	Self-report <sup>4</sup>
Pinto et al., 2013	20	19	57.3 (9.7)	57.0	Colorectal	Home, Other	39	Accelerometer
Pinto et al., 2015; 2016	31	36	55.6 (9.6)	100	Breast	Home	12	Accelerometer
Prinsen et al., 2013	14	23	49.6 (10.9)	51.4	Mixed	NS	-	Accelerometer
Rabin et al., 2011	10	8	32.2 (5.6)	55.6	Mixed	Home	0	Self-report <sup>4</sup>
Rabin et al., 2016	12	15	33.6 (4.0)	82.9	Mixed	Home	12	Accelerometer
Reif et al., 2013	114	120	57.8 (11.1)	71.7	Mixed	NS	20	Self-report <sup>20</sup>
Rock et al., 2015	250	256	56.0 (9.0)	100	Breast	NS	0	Self-report <sup>2</sup>
Rogers et al., 2009; 2009	17	19	53.0 (9.0)	100	Breast	Home, Other	12	Accelerometer
Rogers et al., 2013	10	11	56.0 (10.5)	100	Breast	Home, Other	0	Accelerometer
Rogers et al., 2014	22	20	56.2 (7.7)	100	Breast	Home, NS	0	Accelerometer
Rogers et al., 2015	108	105	54.4 (8.5)	100	Breast	Home, NS	12	Accelerometer

Roveda et al., 2016	21	19	56.7 (6.6)	100	Breast	NS	0	Accelerometer
Ruble et al., 2015	7	6	9.95 (8-12)	20.0	Mixed	Clinic, Other	0	Accelerometer
Saarto et al., 2012	237	263	52.4 (35-68)	100	Breast	Home, NS	0	Self-report <sup>3</sup>
Sajid et al., 2016 <sup>v</sup>	3	5	73.8 (7.6)	0.0	Prostate	Home	6	Pedometer
SantaMina et al., 2014	34	32	71.4 (9.2)	0.0	Prostate	Home	26	Self-report <sup>2</sup>
Sheppard et al., 2016	12	10	54.7 (9.8)	100	Breast	NS	0	Self-report <sup>1</sup>
Short et al., 2015 <sup>w</sup>	52	98	55.0 (33-82)	100	Breast	Home	30	Pedometer
Short et al., 2015 <sup>x</sup>	52	97	55.0 (33-82)	100	Breast	Home	30	Pedometer
Suh et al., 2013	31	32	71.1 (3.7)	0.44	Mixed	Home, Clinic	0	Self-report <sup>3</sup>
Swisher et al., 2015	10	13	53.7 (36-71)	100	Breast	Comm. Ctr.	0	Self-report <sup>21</sup>
Thorsen et al., 2005	52	59	39.1 (8.4)	68.0	Mixed	Home	0	Self-report <sup>3</sup>
Trinh et al., 2014	15	15	61.8 (9.8)	50.0	Kidney	Comm. Ctr.	0	Self-report <sup>2</sup>
Ungar et al., 2015	32	35	56.0 (12.3)	54.0	Mixed	NS	14	Self-report <sup>15</sup>
Vallance et al., 2007; 2008 <sup>y</sup>	22.67	62	58.0 (30-90)	100	Breast	Home	26	Self-report <sup>2</sup>
Vallance et al., 2007; 2008 <sup>z</sup>	22.67	69	58.0 (30-90)	100	Breast	Home	26	Self-report <sup>2</sup>
Vallance et al., 2007; 2008 <sup>aa</sup>	22.67	67	58.0 (30-90)	100	Breast	Home	26	Self-report <sup>2</sup>
Vallance et al., 2016	37	41	52.8 (9.8)	100	Breast	Home	0	Pedometer
Valle et al., 2013	34	32	31.8 (5.0)	91.0	Mixed	Home	0	Self-report <sup>2</sup>
vonGruenigen et al., 2008	18	17	54.8 (1.8)	100	Endometrial	Home, NS	26	Self-report <sup>2</sup>
vonGruenigen et al., 2012	24	35	58.0 (9.8)	100	Endometrial	Home, NS	0	Self-report <sup>2</sup>
Wang et al., 2011	37	35	50.4 (9.6)	100	Breast	Home, NS	0	Self-report <sup>2</sup>
Wilson 2011	8	9	68.6 (7.5)	0.0	Prostate	NS	0	Pedometer
Yang et al., 2011	21	19	51.8 (7.8)	100	Breast	Home	0	Self-report <sup>4</sup>
Zhao et al., 2016	3	4	57.0 (7.0)	5.0	Mixed	Home, NS	0	Accelerometer

*Note.* Comm. Ctr. = Community center; NS = Not specified

<sup>a</sup> Lifestyle Program vs. Control

<sup>b</sup> AET and RET vs. Usual Care (UC)

<sup>c</sup> AET vs. UC

<sup>d</sup> CA + EX vs. CA

<sup>e</sup> CBT vs. UC

<sup>f</sup> BNI vs. UC

<sup>g</sup> Telephone counseling vs. UC

h In-person counseling vs. UC  
 i SM vs. UCO  
 j EX vs. UCO  
 k SMEX vs. UCO  
 l Recommendation + Referral vs. Conventional Treatment  
 m Recommendation only vs. Conventional Treatment  
 n Recommendation + Referral vs. UC  
 o Recommendation only vs. UC  
 p Self-administered vs. Standard recommendation  
 q Telephone-assisted vs. Standard recommendation  
 r Exercise Recommendation with Motivation Package vs. Control  
 s Exercise Recommendation vs. Control  
 t SLM vs. UC  
 u TTMI vs. UC  
 v EXCAP vs. UC  
 w Tailored Intervention vs. Control  
 x Targeted Intervention vs. Control  
 y PM vs. SR  
 z PED vs. SR  
 aa COM vs. SR

1 = International Physical Activity Questionnaire (IPAQ); 2 = Godin Leisure-Time Exercise Questionnaire/Leisure Score Index; 3 = Study-specific questionnaire; 4 = 7-day Physical Activity Recall (7-day PAR); 5 = Community Healthy Activities Model Program for Seniors (CHAMPS); 6 = Scottish Physical Activity Questionnaire; 7 = Minnesota Leisure Time Physical Activity Questionnaire; 8 = Total Physical Activity Questionnaire; 9 = Women's Health Initiative Questionnaire; 10 = Active Australia Survey; 11 = General Practice Physical Activity Questionnaire; 12 = Kaiser Physical Activity Survey; 13 = Yale Physical Activity Survey; 14 = Saltin and Grimby Questionnaire; 15 = Short Questionnaire to Assess Health-Enhancing Physical Activity (SQUASH); 16 = 7-day Physical Activity Questionnaire; 17 = Modifiable Activity Questionnaire; 18 = Physical Activity Scale for the Elderly (PASE); 19 = Paffenbarger Activity Questionnaire; 20 = Freiburg Questionnaire on Physical Activity; 21 = Habitual Activity Estimation Scale

Table S3

*Description of CART Analysis and R Code*

Classification and regression trees analysis (CART; Breiman, Friedman, Olshen, & Stone, 1984) was used as a primary step in the analytic plan. For these analyses we use the publicly available rpart package (Therneau, Atkinson, & Ripley, 2012) and the freely available R software (R Core Team, 2012). A supervised machine learning algorithm, CART can identify combinations of intervention tactics that, when used together, increase the efficacy of an intervention program. By being fully data-driven it does not force combinations to exist – in fact, it is possible for there to be no splits in the tree. In this case, the average value of the outcome variable is the best predictor. On the other end of the spectrum, all variables could be retained in the tree, with the final nodes containing subgroups that had specific combinations of intervention efforts, and these combinations could predict those who benefited from those who did not. To our knowledge, CART has only been used in two meta-analyses (Dusseldorp, 2001; Dusseldorp et al., 2014). Importantly, since CART does not take into account intervention-level characteristics (such as sample size) and cannot distinguish between random and fixed effects, follow-up analysis includes traditional meta analysis (meta-regression and subgroup analyses) to corroborate differences between intervention strategies. Given the extant literature on CART (e.g., Dusseldorp et al., 2014) we only provide a brief outline here.

The primary outcome of interest for the present study is the effect size regarding the difference found in intervention and control groups. CART can aid in identifying combinations of intervention tactics that relate to efficacy in two ways. One, researchers can use a continuous variable such as effect size as the dependent variable on which to partition individuals. In this

case, the algorithm attempts to split cases based on their relative effect size to arrive at subgroups that received different intervention components and differed in their predicted effect sizes. Two, CART can be used with categorical outcomes. In this way, the tree identifies combinations of intervention components that relate to a binary split in the data (as done in Dusseldorp et al., 2014). For reasons described in the results section we conduct both forms of analysis.

Regardless the outcome variable the steps were the same. First, a tree was built using CART analysis using the following two criteria used as stopping rules: (1) no fewer than five interventions in each end node and (2) a minimum decrease in heterogeneity of 0.001 (Breiman et al., 1984). Next, cross-validation was used to identify the optimal cut point. Cross-validation means that the sample is split and one portion of the sample being used to train the algorithm. The classification obtained from the training group is applied to the leftover portion. From this one can identify how frequently classification is correct when trained on one subsample and applied to the other subsample. Cross-validation is an important step in CART analysis by providing the expected error rate when the classification obtained is used. We followed common practice by pruning the tree (i.e., arriving at the final split) by selecting the cross-validation error that is smaller than the minimum cross-validated error plus one standard error. If the smallest cross-validation error is more than a standard error below the next smallest cross-validation error, then the smallest one is chosen (Breiman et al., 1984). As is typical when conducting cross-validation analysis the runs were conducted 1,000 with the modal split considered best estimate of the tree size.

## **R Code**

Below we provide the R code used on the data.

# CART for Physical Activity Interventions

KM Gates

June 23, 2017

## CART Analysis

This document provides code and results obtained using the rpart R package on the data described in ... (refer to paper).

To begin, we conduct analysis using the continuous variable “d\_TOTAL” which represented the effect sizes for the differences between control and intervention groups. Each study provided one of these for a total of 138.

```
library(rpart)
library(rpart.plot)
library(knitr)

## Warning: package 'knitr' was built under R version 3.4.3

# Read data
data <- read.table("C:\\Users\\gateskm\\Dropbox\\Paschal\\Meta-CART\\Physical
activity meta-analysis\\fewer vars.csv", colClasses = "factor", header= TRUE,
sep = ",") # BCT and DMC Vars only
data2 <- as.data.frame(data)
# Since we read in the dataset as a factor, the continuous effect size got we
ird. So we read in the data again, this time ensuring that the d_TOTAL variab
le is read in correctly.
getdttotal <- read.table("C:\\Users\\gateskm\\Dropbox\\Paschal\\Meta-CART\\Ph
ysical activity meta-analysis\\fewer vars.csv", colClasses = "numeric", heade
r= TRUE, sep = ",")
data2$d_TOTAL <- getdttotal$d_TOTAL #swap in this correct d_TOTAL variable

# First Look at average cross-validation errors.

vals <- matrix(0,1000, 4)
for (p in 1:1000){
reg <- rpart(d_TOTAL ~ i..BCT_1 + BCT_2 + BCT_3 + BCT_4 + BCT_5 + BCT_6 +BCT_
7 +BCT_8 +BCT_9 +BCT_10 +BCT_11 +BCT_12 +BCT_13 +BCT_14 +BCT_15 +BCT_16 +BCT_
17 +BCT_18 +BCT_19 +BCT_20 +BCT_21+BCT_22 +BCT_23 + BCT_24 +BCT_25+BCT_26+BCT
_27+ BCT_28 + BCT_29 + BCT_30 + BCT_31 + BCT_32 + BCT_33 + BCT_34, data = dat
a2, control = rpart.control(minsplit = 5, cp = .001))
vals[p,1]<- reg$cpstable[1,4]
vals[p,2]<- reg$cpstable[2,4]
vals[p,3]<- reg$cpstable[3,4]
vals[p,4]<- reg$cpstable[4,4]
}
colMeans(vals) # We see below that cross-validation errors are, on average, g
```

reater than 1. This instability indicates a problem. So we move on to categorical analysis.

```
## [1] 1.015661 1.317903 1.390206 1.412993
```

*#dichotomize the effect size variable using a median split.*

```
med_total <- median(data2$d_TOTAL)
```

```
data2$med_d <- NA
```

```
data2$med_d[which(data2$d_TOTAL<med_total)] <- 0
```

```
data2$med_d[which(data2$d_TOTAL>=med_total)] <- 1
```

*# First Look at average cross-validation errors.*

```
vals_med <- matrix(0,1000, 4)
```

```
for (p in 1:1000){
```

```
cat <- rpart(med_d ~ i..BCT_1 + BCT_2 + BCT_3 + BCT_4 + BCT_5 + BCT_6+ BCT_7+  
BCT_8+BCT_9+ BCT_10+BCT_11+BCT_12+ BCT_13+BCT_14+ BCT_15+BCT_16+BCT_17+BCT_18  
+BCT_19+BCT_20+BCT_21+BCT_22+BCT_23+BCT_24+BCT_25+BCT_26+BCT_27+ BCT_28 + BCT  
_29 + BCT_30 + BCT_31 + BCT_32 + BCT_33 + BCT_34, data = data2, method = 'cla  
ss', control = rpart.control(minsplit = 5, cp = .001))
```

```
vals_med[p,1]<- cat$cptable[1,4]
```

```
vals_med[p,2]<- cat$cptable[2,4]
```

```
vals_med[p,3]<- cat$cptable[3,4]
```

```
vals_med[p,4]<- cat$cptable[4,4]
```

```
}
```

*kable(colMeans(vals\_med)) # Errors decrease. This is a good sign. Move on to  
prune tree to identify best final split.*

X

1.2059420

0.8742319

0.9083913

0.8962029

```
crossv <- matrix(0,1000, 4)
```

```
for (p in 1:1000){
```

```
cat <- rpart(med_d ~ i..BCT_1 + BCT_2 + BCT_3 + BCT_4 + BCT_5 + BCT_6+ BCT_7+  
BCT_8+BCT_9+ BCT_10+BCT_11+BCT_12+ BCT_13+BCT_14+ BCT_15+BCT_16+BCT_17+BCT_18  
+BCT_19+BCT_20+BCT_21+BCT_22+BCT_23+BCT_24+BCT_25+BCT_26+BCT_27+ BCT_28 + BCT  
_29 + BCT_30 + BCT_31 + BCT_32 + BCT_33 + BCT_34, data = data2, method = 'cla  
ss', control = rpart.control(minsplit = 5, cp = .001))
```

```
crossv[p,1]<- which.min(cat$cptable[,4]) # find minimum
```

```
crossv[p,2]<- cat$cptable[crossv[p,1],4] + cat$cptable[crossv[p,1],5] # add  
SE to value of minimum
```

```
crossv[p,3]<- cat$cptable[(crossv[p,1]-1),4] # get value of error rate for  
previous step
```

```
if (crossv[p,2] >= crossv[p,3])
```

```
  crossv[p,4]<- crossv[p,1]-1
```

```

if (crossv[p,2] < crossv[p,3])
  crossv[p,4] <- crossv[p,1]
}
table(crossv[,4]) # get the frequency that each row was selected as the best.
Row 1 is 'no split'. Note that this will change each time it's run.

##
##   2   3   4   5   6   7   8   9
## 644 136 105  26   2  10  31  46

cat <- rpart(med_d ~ i..BCT_1+ BCT_2 + BCT_3 + BCT_4 + BCT_5 + BCT_6+BCT_7+BC
T_8+BCT_9+BCT_10+BCT_11+BCT_12+BCT_13+BCT_14+BCT_15+BCT_16+BCT_17+BCT_18+BCT_
19+BCT_20+BCT_21+BCT_22+BCT_23+BCT_24+BCT_25+BCT_26+BCT_27+ BCT_28 + BCT_29 +
BCT_30 + BCT_31 + BCT_32 + BCT_33 + BCT_34, data = data2, method = 'class', c
ontrol = rpart.control(minsplit = 5, cp = .001))
pfit<- prune(cat, cp= cat$scptable[2,"CP"]) # 2 was the best cut
# plot the pruned tree
plot(pfit)
text(pfit)

```

Table S4

*Coding Categories for Behavior Change Techniques and Delivery Modes*

<b><u>Change Technique Category</u></b>	<b><u>Definition</u></b>
<i>Pre-defined categories of change technique included in a taxonomy of frequently-used techniques across three reviews (Abraham &amp; Michie, 2008)</i>	
1. Provide information on consequences	Information about the benefits or costs of action or inaction, focusing on what will happen if the person does/does not perform the behavior.
2. Prompt intention formation	Encouraging the person to decide to act or set a general goal e.g., to make a behavioral resolution such as “I will take more exercise next week”.
3. Prompt barrier identification	Identify barriers (e.g., lack of time, bad weather) to performing the behavior and plan ways of overcoming them.
4A. Provide general encouragement/reinforcement	Praising or reinforcing (e.g., verbally) the person for effort or performance without this being contingent on specified behaviors or standards of performance.
4B. Provide encouragement/reinforcement contingent on behavior	Praising or reinforcing (e.g., verbally) the person for effort or performance that is contingent on specified behaviors or standards of performance.
5. Set graded tasks	Set easy tasks, and increase difficulty until target behavior is performed (e.g., setting incremental exercise goals until ultimate exercise goal is achieved – not in the context of a supervised exercise program).
6. Provide instruction	Telling the person how to perform a behavior and/or preparatory behaviors. Examples include suggesting strategies to increase activity, telling how to perform an exercise or use exercise equipment, etc.
7. Model or demonstrate the behavior.	An expert shows the person how to correctly perform a behavior, for example, in class or on video

8A. Prompt specific goal setting - Participant-generated goal	Involves detailed planning of what the person will do including a definition of the behavior specifying frequency, intensity or duration as well as specification of at least one context, i.e., where, when, how or with whom. Participant is prompted to generate their own goal.
8B. Prompt specific goal setting - Collaborative goal setting	Involves detailed planning of what the person will do including a definition of the behavior specifying frequency, intensity or duration as well as specification of at least one context, i.e., where, when, how or with whom. Goal is generated by participant in collaboration with intervention personnel; for example, personnel may determine the specific amount and intensity while participants choose their preferred mode of activity
8C. Prompt specific goal setting - Assigned goal	Involves detailed planning of what the person will do including a definition of the behavior specifying frequency, intensity or duration as well as specification of at least one context, i.e., where, when, how or with whom. Participant is assigned a goal by intervention personnel.
9. Prompt review of behavioral goals	Review and/or reconsideration of previously set goals or intentions.
10. Prompt self-monitoring of behavior	The person is asked to keep a record of specified behavior/s (e.g., in a diary).
10_Pedometer	Participants were given a pedometer as method of self-monitoring.
10_Diary	Participants were given an exercise diary as method of self-monitoring.
11. Provide feedback on performance	Providing data about recorded behavior or evaluating performance in relation to a set standard or others' performance. Person received feedback.
12. Teach to use prompts/ cues	Teach the person to identify environmental cues which can be used to remind them to perform or avoid a behavior, including times of day, contexts or elements of contexts.
13. Prompt practice.	Prompt the person to rehearse and repeat the behavior or preparatory behaviors.

14. Use follow up prompts	Contacting the person again after the main part of the intervention is complete. Not simply outcome assessment.
15. Plan social support/social change	Prompting consideration of how others could change their behavior to offer the person help or (instrumental) social support, including “buddy” systems – and/or providing social support.
16. Relapse prevention	Following initial change, help identify situations likely to result in re-adopting risk behaviors or failure to maintain new behaviors and help the person plan to avoid or manage these situations.
17. Stress management	May involve a variety of specific techniques (e.g., progressive relaxation), which do not target the behavior but seek to reduce negative affect and stress.
18. Motivational interviewing	A clinical method including a set of techniques directed at minimizing resistance and resolving ambivalence to change. Interventions specify “motivational interviewing.”
19. Time management	Helping the person make time for the behavior (e.g., to fit it into a daily schedule).

<b><u>Change Technique Category</u></b>  <i>Derived from the intervention descriptions themselves</i>	<b><u>Definition</u></b>
20A. Assess motivational readiness to perform behavior and use to tailor intervention	Assess participants’ level of motivation to engage in physical activity and use to inform/tailor intervention
20B. Assess motivational readiness to perform behavior without tailoring intervention	Assess participants’ level of motivation to engage in physical activity, no mention of using this information to inform/tailor intervention
21. Enhance self-efficacy	Enhancement of self-efficacy through any mode

22. Establish outcome expectations	Encourage participants to imagine/expect realistic and positive outcomes of physical activity
23. Identify pros and cons of behavior	Help the participant to arrive at a clear understanding of his or her feelings about engaging in physical activity, why it is important to them personally, and any conflicting motivations
24. Enhance enjoyment	Any strategy designed to enhance participants' enjoyment of physical activity
25. Signposting	Give information about options for additional support where these are available (e.g., websites relating to physical activity in cancer patients, exercise groups, etc.)
26. Enable access to exercise equipment	Provide participants with exercise equipment and/or access to exercise facilities (e.g., resistance bands, gym memberships, etc.)
27. Provide descriptive norm information	Give information about how the participant's behavior and experience compares with other people's (e.g., testimonials from other cancer survivors)
28. Provide safety information	Provide participants with information on how to safely engage in physical activity (e.g., how to identify signs that one should stop exercising)
29. Prompt participant engagement in the intervention	Participants are asked to contribute thoughtful responses to prompts (e.g., responding to open-ended questions, participating in group discussions, etc.)
30A. Supervised exercise sessions with graded increases in exercise	Participants attended supervised exercise sessions in which the amount/intensity of exercise is increased gradually
30B. Supervised exercise sessions without mention of graded exercise	Participants attended supervised exercise sessions, no mention of graded increases in amount/intensity
31. Prompt self-reward	Participants are instructed to reward themselves for progress towards increased physical activity

32A. Meditation	Practice of spending time in quiet consciousness to achieve an emotional or spiritual benefit
32B. Mindfulness	A specific form of meditation that focuses on awareness of the present moment, used as a therapeutic technique
33. Tailored intervention to capability	Intervention exercise component is individualized to participants' ability/level of fitness
34. CBT for fatigue	Intervention uses components of cognitive behavioural therapy to reduce symptoms of fatigue

<b><u>Delivery Mode Characteristics</u></b>	<b><u>Definition</u></b>
1. Face-to-face sessions	Participants meet with a facilitator or counselor either one-on-one or in a group setting and interact with that person face-to-face
2. Digital materials	Participants receive some form of electronic resource (i.e. a video or DVD to watch, a link to a series of online modules) that they make use of via a computer, television, cellular phone or other hand-held computer device
3. Written materials	Participants receive written, print materials to read as part of the behavioral intervention (i.e. informational brochures, journal articles, etc.)
4. Telephone advice/counseling	Participants are contacted by the facilitator via telephone and advised/counseled over the phone
5. Provision of self-complete/tailored workbook	Participants are given a book that includes a combination of information and interactive activities/exercises, meant to be self-completed
6. Specialized training for facilitators and/or selection of specialized trained facilitators	The facilitator delivering the intervention completes a specialized training on how to deliver the intervention before doing so, or facilitators who have already been trained in the delivery are selected to implement it

7. Facilitators also cancer survivors	The facilitator who is delivering the intervention is a cancer survivor him/herself
8A. Multi-behavior intervention	The intervention targets multiple lifestyle/health behaviors (e.g., diet, smoking, alcohol consumption, sleep)
8B. Number of targeted behaviors other than physical activity	Specify number of behaviors
9. Mild intensity unsupervised exercise program	
10. Moderate intensity unsupervised exercise program	
11. Moderate-to-vigorous intensity unsupervised exercise program	
12. Mild intensity supervised exercise program	
13. Moderate intensity supervised exercise program	
14. Moderate-to-vigorous intensity supervised exercise program	

Table S5

*Meta-Regression of Effect Sizes on Sample, Intervention, and Methodological Features*

<b>Moderator Variable</b>	<b>Used (%)</b>	<b>B</b>	<b>SE</b>	<b>p</b>	<b>R<sup>2</sup></b>
<i>Sample features</i>					
Participants in remission	17 (12.3)	-.168	.090	.066	5.38
Time since diagnosis <sup>a</sup>	-	-.000	.000	.274	3.88
Gender (% female) <sup>b</sup>	-	.001	.001	.235	1.88
Race/ethnicity (% non-white) <sup>c</sup>	-	.003	.001	.053	9.86
Age <sup>d</sup>	-	-.007	.003	.029	4.34
Targeted sample	68 (49.3)	.154	.069	.026	2.77
BMI <sup>e</sup>	-	4.90	2.32	.038	4.00
<i>Intervention features</i>					
Primary aim was to increase PA	78 (56.5)	-.098	.071	.167	1.30
Setting of intervention					
Home	91 (65.9)	-.015	.074	.835	-1.54
Clinic/hospital	41 (29.7)	-.110	.078	.157	-0.54
Community center	17 (12.3)	.204	.104	.051	4.55
Other	9 (6.5)	.358	.172	.040	6.18
Intervention delivery					
One-to-one	79 (57.2)	.015	.070	.835	-1.38
Group session	46 (33.3)	.137	.073	.063	4.25
Online	11 (8.0)	.111	.130	.395	-0.64
Telephone	33 (23.9)	-.063	.082	.442	-0.52
Mail	27 (19.6)	-.178	.080	.028	7.75
Digital materials	21 (15.2)	.075	.096	.438	-0.37
Written materials	52 (37.7)	-.133	.070	.059	5.35
Telephone advice/counseling	44 (31.9)	-.130	.074	.081	2.67
SC/tailored workbook	13 (9.4)	-.289	.104	.006	12.12
Intensity					
Contact time of intervention <sup>f</sup>	-	.002	.001	.008	21.43
Number of sessions <sup>g</sup>	-	.001	.001	.089	2.82
Duration of intervention <sup>h</sup>	-	.011	.020	.579	-1.63
Source of intervention					
Researcher	27 (19.6)	-.130	.087	.136	1.25
Nurse	12 (8.7)	-.115	.123	.348	-1.10
Doctor	11 (8.0)	-.166	.118	.161	0.26
Counselor	8 (5.8)	.056	.143	.695	-1.83
Educator	1 (0.7)	-.232	.432	.592	-1.12
Physiologist	32 (23.2)	-.003	.083	.974	-1.63
Physical therapist	15 (10.9)	-.014	.111	.897	-1.75
Other	54 (39.1)	.074	.071	.300	0.54
<i>Methodological features</i>					
Pre-test, post-test design	134 (97.1)	.275	.193	.157	0.91

Time to follow-up <sup>i</sup>	-	.001	.002	.469	-1.60
Mention of treatment fidelity	111 (80.4)	.072	.087	.431	-1.06
Active control group	73 (52.9)	-.158	.069	.023	5.12
Usual care	57 (41.3)	.121	.071	.089	3.52
Waitlist control	28 (20.3)	.070	.085	.412	-.034
Control group told to maintain or not to increase current PA	27 (19.6)	.153	.087	.082	3.07
Theory was used to develop intervention	91 (65.9)	-.096	.075	.203	0.93
Booster sessions included	45 (32.6)	-.047	.075	.531	-1.32
Multi-behavior intervention	30 (21.7)	-.060	.084	.478	-0.13
Published vs. unpublished	130 (94.2)	.028	.054	.599	-

*Note.* SC = self-complete; PA = physical activity.

<sup>a</sup> 56 studies reported time since cancer diagnosis

<sup>b</sup> 137 studies reported gender information

<sup>c</sup> 78 studies reported race/ethnicity information

<sup>d</sup> 132 studies reported age information

<sup>e</sup> 84 studies reported participant BMI information

<sup>f</sup> 63 studies reported total contact time of intervention

<sup>g</sup> 117 studies reported the number of intervention sessions

<sup>h</sup> 130 studies reported the duration of the intervention

<sup>i</sup> 60 studies reported the time interval between the intervention and the last follow-up

Table S6

*Risk of Bias for Each Study Included in the Review*

<b>Study</b>	<b>Random Sequence Generation</b>	<b>Allocation Concealment</b>	<b>Blinding of Participants and Personnel</b>	<b>Blinding of Outcome Assessment</b>	<b>Incomplete Outcome Data</b>	<b>Selective Reporting</b>	<b>Other Bias</b>
Anderson 2015	Low	Low	High	Unclear	Unclear	Low	Low/Unclear
Arbane 2014	Low	Low	High	Low	High	Low	Low/Unclear
AsvatPatel 2013	Low	Low	Unclear	Low	Low	Low	Low/Unclear
Backman 2014	Unclear	Unclear	Unclear	Unclear	High	Low	Low/Unclear
Bantum 2014	Low	Unclear	High	Unclear	Low	Low	Low/Unclear
Basen-Engquist 2006	Low	Unclear	High	Low	Low	Low	High
Belanger 2014	Low	Low	Unclear	Unclear	High	Low	Low/Unclear
Bennett 2007	Low	Unclear	High	High	Unclear	Low	Low/Unclear
Bloom 2008	Unclear	Unclear	High	Unclear	Low	High	Low/Unclear
Bourke 2011	Low	Low	Unclear	Low	Low	Low	Low/Unclear
Bourke 2014	Low	Low	High	Low	Low	Low	Low/Unclear
Broderick 2013	Low	Low	Unclear	Low	Low	Low	Low/Unclear
Caldwell 2009	Low	High	Unclear	Unclear	Unclear	High	High
Campbell 2005	Low	Low	Unclear	Low	Unclear	Low	Low/Unclear
Cantarero-Villanueva 2011	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Capozzi 2016	Low	Low	High	Low	Low	Low	Low/Unclear
Carmack-Taylor 2016 (Study 1 LP vs Control)	Unclear	Unclear	Unclear	Low	Low	Low	Low/Unclear
Cormie 2013	Low	Low	High	Unclear	Low	Low	Low/Unclear
Courneya 2007 - AET & RET vs UC	Low	Low	Unclear	Unclear	Low	Low	High
Courneya 2003	Low	Low	High	High	Low	Low	Low/Unclear

Courneya 2003a	Low	Unclear	Unclear	High	Low	Low	Low/Unclear
Courneya 2012	Low	Low	Unclear	Unclear	Low	Low	High
Courneya 2016	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Cox 2005	Unclear	Unclear	Unclear	Unclear	Low	Low	High
Culos-Reed 2010	Unclear	Unclear	High	Unclear	High	Low	Low/Unclear
Daley 2007 - AET vs UC	Low	Low	High	High	Low	Low	Low/Unclear
Demark-Wahnefried 2006	Unclear	Low	Unclear	Unclear	Low	Low	Low/Unclear
Demark-Wahnefried 2007 & Mosher 2013	Unclear	Low	High	Unclear	Low	Low	Low/Unclear
Demark-Wahnefried 2008 (Study 1 – CA & EX vs CA)	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Djuric 2011	Low	Low	Unclear	Unclear	Unclear	Low	Low/Unclear
Dodd 2010 & DeNysschen 2015	Unclear	Unclear	High	Unclear	Unclear	Low	Low/Unclear
Donnelly 2011	Low	Low	High	Low	Low	Low	Low/Unclear
Eakin 2012	Low	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Fiuza-Luces 2016	Low	Low	Unclear	Low	Low	Low	Low/Unclear
Furzer 2016	Unclear	Unclear	Unclear	Unclear	Low	High	Low/Unclear
Galvao 2014	Low	Low	Unclear	Unclear	Low	High	High
Gielissen 2012	Low	Low	High	Unclear	Low	Low	Low/Unclear
Goedendorp 2010 (Study 1 - CBT vs UC)	Unclear	Low	Unclear	Unclear	High	Low	High
Goedendorp 2010 (Study 2 - BNI vs UC)	Unclear	Low	Unclear	Unclear	High	Low	High
Gokal 2016	Unclear	Unclear	Unclear	Unclear	Unclear	Low	Low/Unclear
Greenlee 2013	Unclear	Unclear	High	Unclear	Low	Low	Low/Unclear
Greenlee 2016	Low	Low	Low	Unclear	Unclear	Low	Low/Unclear
Guinan 2013	Low	Low	Unclear	Low	Low	Low	Low/Unclear
Hacker 2011	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Harrigan 2016 (Study 1 - Telephone vs Control)	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear

Harrigan 2016 (Study 2 - In-person vs Control)	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Hatchett 2013	Unclear	Unclear	High	Unclear	Low	Low	Low/Unclear
Hawkes 2013 & Lynch 2014	Low	Low	High	Low	Low	Low	Low/Unclear
Hebert 2012	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Heim 2007	High	Unclear	Unclear	Unclear	High	High	High
Huang 2014	Unclear	Unclear	High	Unclear	Low	High	Low/Unclear
Hung 2014	Low	Low	High	High	Low	High	Low/Unclear
Husebø 2014	Unclear	Unclear	Unclear	Unclear	Unclear	Low	Low/Unclear
Hvid 2016	Unclear	Unclear	Unclear	Unclear	Unclear	Low	Low/Unclear
Irwin 2008	Low	Low	Unclear	Low	Low	Low	Low/Unclear
Irwin 2014	Unclear	Unclear	High	Unclear	Low	Low	Low/Unclear
Irwin 2015	Unclear	Unclear	Unclear	Unclear	High	Low	High
Jacobsen 2013 (Study 1 - UCO vs SM)	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Jacobsen 2013 (Study 2 - UCO vs EX)	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Jacobsen 2013 (Study 3 - UCO vs SMEX)	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
James 2015	Low	Unclear	High	Unclear	Unclear	Low	High
Jarden 2009	Low	Low	High	Unclear	Low	Low	Low/Unclear
Jones 2002 (Study 1 - Rec & Ref vs Control)	Low	Low	Unclear	Low	High	Low	Low/Unclear
Jones 2002 (Study 2 - Rec vs Control)	Low	Low	Unclear	Low	High	Low	Low/Unclear
Jones 2004 (Study 1 - Rec & Ref vs Control)	Low	Low	High	Low	High	Low	Low/Unclear
Jones 2004 (Study 2 - Rec vs UC)	Low	Low	High	Low	High	Low	Low/Unclear
Kamen 2016	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Kanera 2016	Low	Low	Unclear	Unclear	High	Low	Low/Unclear

Kiecolt-Glaser 2014	Low	Low	High	Low	Unclear	Low	Low/Unclear
Kim 2006	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Kim 2011	Low	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Kim 2015	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Knobf 2016	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Kwiatkowski 2013	Unclear	Unclear	High	Unclear	High	Low	Low/Unclear
Lahart 2016	Low	Low	Unclear	High	Low	Low	Low/Unclear
Lee 2006	Low	Low	Unclear	Unclear	High	Low	High
Lee 2013	Low	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Lee 2014	Low	Low	High	Unclear	Low	Low	Low/Unclear
Li 2013 & Chung 2015	Low	Low	Unclear	Low	Low	Low	Low/Unclear
Ligibel 2012	Unclear	Unclear	Unclear	Low	Low	Low	Low/Unclear
Ligibel 2016	Unclear	Unclear	High	Low	Low	Low	Low/Unclear
Littman 2012	Unclear	Unclear	High	High	Low	Low	Low/Unclear
Livingston 2015	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Matthews 2007	Unclear	Unclear	High	Unclear	Unclear	Low	High
May 2008 & 2009	Low	Unclear	High	Unclear	Low	Low	High
McGowan 2013 (Study 1 - SA vs Control)	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
McGowan 2013 (Study 1 - TA vs Control)	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Mefferd 2007	Unclear	Unclear	High	Unclear	High	Low	High
Midtgaard 2013	Low	Low	Unclear	Low	Low	Low	Low/Unclear
Morey 2009	Unclear	Unclear	High	Unclear	Low	Low	Low/Unclear
Moyer-Mileur 2009	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Mustian 2009	Unclear	Low	High	Low	Low	Low	Low/Unclear
Mutrie 2007 A& 2012	Unclear	Low	High	Low	Low	Low	Low/Unclear
Naraphong 2013	Low	Low	High	High	Low	Low	High
Nikander 2012	Low	Low	High	Low	Low	High	High
Park 2015 (Study 1 - Rec &	Low	Low	High	Unclear	Unclear	Low	Low/Unclear

Motiv vs Control)							
Park 2015 (Study 2 – Rec vs Control)	Low	Low	High	Unclear	Unclear	Low	Low/Unclear
Park 2016 – (Study 1 - SLM vs Control)	Unclear	Unclear	High	Unclear	High	Low	High
Park 2016 – (Study 2 - TTMI vs Control)	Unclear	Unclear	High	Unclear	High	Low	High
Perna 2010	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Piland 2011	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Pinto 2005 & 2008	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Pinto 2013	Low	Low	High	Low	High	Low	Low/Unclear
Pinto 2013	Unclear	Unclear	Unclear	Low	Low	Low	Low/Unclear
Pinto 2015 & 2016	Unclear	Low	Unclear	Low	Low	Low	Low/Unclear
Prinsen 2013	Low	Low	High	Unclear	High	Low	High
Rabin 2011	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Rabin 2016	Unclear	Unclear	High	High	Low	High	Low/Unclear
Reif 2013	Low	Low	High	Low	High	Low	Low/Unclear
Rock 2015	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Rogers 2009 & 2009	Low	Low	High	Unclear	Low	Low	Low/Unclear
Rogers 2013	Low	Low	High	Unclear	Low	Low	Low/Unclear
Rogers 2014	Low	Low	High	Low	Low	Low	Low/Unclear
Rogers 2015	Low	Low	Unclear	Low	Low	Low	Low/Unclear
Roveda 2016	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Ruble 2015	Unclear	Unclear	Unclear	Unclear	Low	Low	High
Saarto 2012	Low	Low	High	Unclear	Low	Low	Low/Unclear
Sajid 2016 (Study 1 - EXCAP vs Control)	Unclear	Unclear	Unclear	Low	Low	Low	Low/Unclear
SantaMina 2014	Unclear	Low	High	High	High	Low	Low/Unclear
Sheppard 2016	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Short 2015 (Study 1 - Tailored	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear

Intervention vs Control)							
Short 2015 (Study 2 - Targeted Intervention vs Control)	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Suh 2013	Low	Low	High	Unclear	Low	Low	Low/Unclear
Swisher 2015	Unclear	Unclear	Unclear	Unclear	High	Low	Low/Unclear
Thorsen 2005	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Trinh 2014	Low	Low	High	Unclear	Low	Low	Low/Unclear
Ungar 2015	Unclear	Unclear	Unclear	Unclear	Unclear	High	Low/Unclear
Vallance 2007 & 2008 (Study 1 - SR vs PM)	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Vallance 2007 & 2008 (Study 2 - SR vs PED)	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Vallance 2007 & 2008 (Study 3 - SR vs COM)	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Vallance 2016	Low	Low	Unclear	Unclear	Low	Low	Low/Unclear
Valle 2013	Low	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
vonGruenigen 2008	Unclear	Unclear	High	Unclear	Low	Low	Low/Unclear
vonGruenigen 2012	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Wang 2011	Unclear	Unclear	Unclear	Unclear	Low	Low	Low/Unclear
Wilson 2011	Low	Low	High	Unclear	Low	Low	Low/Unclear
Yang 2011	Low	Unclear	High	Unclear	Low	Low	Low/Unclear
Zhao 2016	Low	Low	Unclear	Low	Low	Low	Low/Unclear

Table S7

*Frequency of Use of Psychological Change Techniques in Treatment and Control Conditions*

Change Technique	Treatment Group		Control Group	
	k	%	k	%
1. Provide information on consequences	43	31.2	11	8.0
2. Prompt intention formation	66	47.8	11	8.0
3. Prompt barrier identification	63	45.7	4	2.9
4. Provide encouragement/reinforcement	31	22.5	1	0.7
4A – Not contingent on performance	27	19.6	1	0.7
4B – Contingent on performance	4	2.9	0	0.0
5. Set graded tasks	41	29.7	3	2.2
6. Provide instruction	48	34.8	9	6.5
7. Model or demonstrate the behavior	18	13.0	1	0.7
8. Prompt specific goal setting	108	78.3	22	15.9
8A – Participant-generated goal	11	8.0	1	0.7
8B – Collaborative goal	32	23.2	3	2.2
8C – Assigned goal	77	55.8	18	13.0
9. Prompt review of behavioral goals	21	15.2	1	0.7
10. Prompt self-monitoring of behavior	81	58.7	12	8.7
10_DIARY	67	48.6	8	5.8
10_PEDOMETER	47	34.1	6	4.3
11. Provide feedback on performance	29	21.0	2	1.4
12. Teach to use prompts/cues	8	5.8	0	0.0
13. Prompt practice	5	3.6	0	0.0
14. Use follow-up prompts	22	15.9	2	1.4
15. Plan social support/social change	41	29.7	3	2.2
16. Relapse prevention	17	12.3	0	0.0
17. Stress management	14	10.1	2	1.4
18. Motivational interviewing	12	8.7	0	0.0
19. Time management	19	13.8	1	0.7
20. Tailor int. to motivational readiness	15	10.9	0	0.0
21. Enhance self-efficacy	49	35.5	1	0.7
22. Establish outcome expectations	14	10.1	0	0.0
23. Identify the pros/cons of behavior	12	8.7	0	0.0
24. Enhance enjoyment	17	12.3	1	0.7
25. Signposting	17	12.3	3	2.2
26. Enable access to exercise equipment	20	14.5	2	1.4
27. Provide descriptive norm information	12	8.7	0	0.0
28. Provide safety information	23	16.7	3	2.2
29. Prompt participant engagement	14	10.1	1	0.7
30. Supervised exercise sessions	54	39.1	2	1.4

30A – Used graded increases	27	19.6	0	0.0
30B – Did not use graded increases	27	19.6	2	1.4
31. Prompt self-reward	8	5.8	0	0.0
32. Meditation/Mindfulness	9	6.5	1	0.7
33. Tailored intervention to capability	25	18.1	3	2.2
34. CBT for fatigue	4	2.9	0	0.0

Table S8

*Meta-Regression of Effect Sizes on Change Techniques Used in Control Conditions*

<b>Change technique</b>	<b>Used (%)</b>	<b>B</b>	<b>SE</b>	<b><i>p</i></b>	<b>R<sup>2</sup></b>
1. Provide information on consequences	11 (8.0)	-.148	.126	.242	1.10
2. Prompt intention formation	11 (8.0)	-.168	.124	.177	2.43
3. Prompt barrier identification	4 (2.9)	-.327	.198	.101	1.70
6. Provide instruction	9 (6.5)	-.144	.141	.311	0.19
8. Prompt specific goal setting	22 (15.9)	-.249	.090	.006	7.87
8C – Assigned goal	18 (13.0)	-.243	.100	.016	5.12
10. Prompt self-monitoring of behavior	12 (8.7)	-.127	.127	.318	0.03
10_DIARY	8 (5.8)	-.061	.152	.686	-1.14
10_PEDOMETER	6 (4.3)	-.227	.175	.197	0.65

Table S9

*Meta-Regression of Effect Sizes on Change Techniques Used in Treatment Conditions*

<b>Change technique</b>	<b>Used (%)</b>	<b>B</b>	<b>SE</b>	<b><i>p</i></b>	<b>R<sup>2</sup></b>
1. Provide information on consequences	43 (31.2)	-.036	.074	.624	-0.60
2. Prompt intention formation	66 (47.8)	-.103	.069	.139	2.32
3. Prompt barrier identification	63 (45.7)	-.137	.069	.048	6.00
4. Provide encouragement/reinforcement	31 (22.5)	-.072	.084	.391	-0.86
4A – Not contingent on performance	27 (19.6)	-.115	.088	.195	0.22
4B – Contingent on performance	4 (2.9)	.166	.950	.397	-1.38
5. Set graded tasks	41 (29.7)	.046	.077	.547	-0.71
6. Provide instruction	48 (34.8)	-.066	.072	.361	0.19
7. Model or demonstrate the behavior	18 (13.0)	.032	.104	.758	-1.48
8. Prompt specific goal setting	108 (78.3)	-.031	.083	.703	-1.79
8A – Participant generated goal	11 (8.0)	-.145	.127	.255	0.39
8B – Collaborative goal	32 (23.2)	-.114	.081	.159	1.59
8C – Assigned goal	77 (55.8)	.017	.070	.805	-1.52
9. Prompt review of behavioral goals	21 (15.2)	-.088	.098	.368	0.35
10. Prompt self-monitoring of behavior	81 (58.7)	.037	.071	.604	-1.44
10_DIARY	67 (48.6)	-.021	.070	.765	-1.45
10_PEDOMETER	47 (34.1)	-.056	.074	.451	-0.25
11. Provide feedback on performance	29 (21.0)	-.111	.083	.180	1.40
12. Teach to use prompts/cues	8 (5.8)	-.007	.145	.963	-1.73
13. Prompt practice	5 (3.6)	-.194	.180	.282	-0.54
14. Use follow-up prompts	22 (15.9)	-.134	.100	.181	0.47
15. Plan social support/social change	41 (29.7)	.032	.075	.672	-1.37
16. Relapse prevention	17 (12.3)	-.029	.102	.774	-1.67
17. Stress management	14 (10.1)	.007	.114	.950	-1.63
18. Motivational interviewing	12 (8.7)	-.106	.126	.402	-0.46
19. Time management	19 (13.8)	.002	.099	.982	-1.76

20. Tailor intervention to motivational readiness	15 (10.9)	-.187	.109	.087	3.04
21. Enhance self-efficacy	49 (35.5)	-.032	.072	.657	-1.35
22. Establish outcome expectations	14 (10.1)	.137	.113	.230	0.72
23. Identify the pros/cons of behavior	12 (8.7)	.081	.123	.511	-0.68
24. Enhance enjoyment	17 (12.3)	.073	.105	.492	-1.55
25. Signposting	17 (12.3)	-.137	.098	.162	-0.26
26. Enable access to exercise equipment	20 (14.5)	-.021	.100	.831	-1.53
27. Provide descriptive norm information	12 (8.7)	-.074	.115	.523	-0.64
28. Provide safety information	23 (16.7)	-.013	.092	.891	-1.64
29. Prompt participant engagement	14 (10.1)	-.130	.106	.221	0.05
30. Supervised exercise sessions	54 (39.1)	.200	.070	.005	9.50
30A – Used graded increases	27 (19.6)	.224	.087	.011	8.54
30B – Did not use graded increases	27 (19.6)	.086	.091	.342	-0.53
31. Prompt self-reward	8 (5.8)	-.025	.150	.870	-1.53
32. Meditation/Mindfulness	9 (6.5)	-.018	.131	.889	-1.86
33. Tailored intervention to capability	25 (18.1)	.022	.095	.820	-1.56
34. CBT for fatigue	4 (2.9)	.025	.203	.901	-1.47

Table S10

*Subgroup Analyses for Variables Related to Cancer and Country of Study*

<b>Moderator variable</b>	<b><i>N</i></b>	<b><i>k</i></b>	<b><i>d</i></b>	<b><i>95% CI</i></b>	<b><i>Q</i></b>	<b><i>I</i><sup>2</sup></b>	<b>Heterogeneity <i>p</i> value</b>
Type of cancer							
Mixed	4822	44	.334	.122 to .546	3.09	.00	.542
Breast	6133	66	.387	.199 to .575			
Prostate	969	13	.106	-.186 to .398			
Colorectal	700	6	.278	-.018 to .574			
Other	426	9	.460	.050 to .870			
Stage of cancer							
Stage 2 or below	768	10	.402	.069 to .735	1.24	.00	.537
Stage 3 or below	4664	53	.402	.192 to .612			
Stage 4 or below	2735	27	.244	.030 to .458			
Cancer treatment status							
In treatment	2866	43	.384	.129 to .639	1.40	.00	.497
Not in treatment	8297	80	.370	.211 to .529			
Mixed	1727	14	.217	-.006 to .440			
Cancer treatment type							
Chemotherapy	1270	22	.446	.056 to .836	.88	.00	.347
Mix of surgery, chemotherapy, and radiation	3172	31	.238	.048 to .428			
Nationality							
United States	5905	61	.326	.155 to .497	3.75	.00	.710
Canada	3477	22	.195	.021 to .369			
Australia/New Zealand	1341	12	.229	-.071 to .529			
United Kingdom	1170	12	.545	.049 to 1.041			
Germany/Netherlands	1085	9	.263	-.092 to .618			
Scandinavia	1193	9	.386	-.135 to .907			
South Korea	428	8	.497	.113 to .881			

Table S11

*Meta-Regression of Effect Sizes on Risk of Bias Variables*

<b>Risk of bias domain</b>	<b>High/Unclear risk (%)</b>	<b>B</b>	<b>SE</b>	<b>p</b>	<b>R<sup>2</sup></b>
Random sequence generation	55 (39.9)	.075	.072	.298	-0.28
Allocation concealment	59 (42.8)	.108	.071	.130	3.16
Blinding of participants and personnel	137 (99.3)	.279	.357	.437	-1.00
Blinding of outcome assessment	104 (75.4)	-.030	.081	.715	-1.42
Incomplete outcome data	39 (28.3)	-.003	.077	.966	-1.67
Selective reporting	10 (7.25)	.091	.140	.520	-1.10
Other bias	21 (15.2)	.031	.100	.756	-1.26

*Note.* Other bias coded as high risk vs. low/unclear risk

Table S12

*Iterative Meta-Regression Analyses*

<b>Behavior Change Technique (BCT)</b>	<b>B</b>	<b>SE</b>	<b><i>p</i></b>	<b>R<sup>2</sup></b>
Supervised program				
Contact time	.005	.002	.044	18.73
Unsupervised program				
Contact time	.002	.001	.039	18.39
Graded tasks	.169	.082	.042	7.35
Assigned goal	.164	.076	.033	15.02
Self-monitoring	.161	.077	.042	8.77
Outcome expectations	.443	.128	.001	42.51
Barrier identification	-.204	.074	.008	35.70
Provide workbook	-.209	.093	.029	28.93
Non-contingent reinforcement	-.287	.102	.013	84.79
Targeted Sample	.131	.065	.047	-8.07
Provide feedback	-.273	.108	.016	29.84
Tailor to motivational readiness	-.295	.110	.011	21.88
Outcome expectations	.247	.099	.015	16.12
Barrier identification	-.140	.064	.031	14.41
Provide workbook	-.207	.077	.009	31.93

## References

*References preceded by an asterisk provided effect size data that were included in the meta-analysis. Other papers provided supplemental information used to code change techniques or intervention features.*

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Figure S1. Forest Plot of Effect Sizes

