

Table S2

Mediators in the relationship between physical activity and mental health.

|                                                                                  | First Author            | Year | Participants                                  | Physical activity        |                                                  | Mental Health                               |                                                                                                                       | Mediator                        |                                                                    | Mediation Results                                                                                                                                                                      | Coefficients                             |                                             |                                    | Sig. med |
|----------------------------------------------------------------------------------|-------------------------|------|-----------------------------------------------|--------------------------|--------------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------|------------------------------------|----------|
|                                                                                  |                         |      |                                               | Variable                 | Measure                                          | Variable                                    | Measure                                                                                                               | Variable                        | Measure                                                            |                                                                                                                                                                                        | $x \rightarrow m$                        | $m \rightarrow y$                           | $x \rightarrow y$                  |          |
| Affect, wellbeing, stress, and depression or anxiety symptomology or sensitivity | PSYCHOLOGICAL MEDIATORS |      |                                               |                          |                                                  |                                             |                                                                                                                       |                                 |                                                                    |                                                                                                                                                                                        |                                          |                                             |                                    |          |
|                                                                                  | You [228]               | 2021 | Middle school students                        | PA during PE (MVPA)      | One item – extent of sweating during PE          | Life satisfaction                           | Student Life Satisfaction Survey (SLSS)                                                                               | Internalizing problems          | Korean Emotional Behavioral Problem scale                          | Females: indirect effect: $\beta = 0.02, p < 0.05$                                                                                                                                     | $\beta = -.11, p < .05$                  | $\beta = -.21, p < .05$                     |                                    | Yes      |
|                                                                                  | You [228]               | 2021 | Middle school students                        | PA during PE (MVPA)      | One item – extent of sweating during PE          | Life satisfaction                           | Student Life Satisfaction Survey (SLSS)                                                                               | Internalizing problems          | Korean Emotional Behavioral Problem scale                          | Males: indirect effect: $\beta = 0.02, p < 0.05$                                                                                                                                       | $\beta = -.16, p < .05$                  | $\beta = -.20, p < .05$                     | $\beta = .10, p < .05$             | Yes      |
|                                                                                  | You [228]               | 2021 | Middle school students                        | PA during PE (MVPA)      | One item – extent of sweating during PE          | Life satisfaction                           | Student Life Satisfaction Survey (SLSS)                                                                               | Externalising problems          | Korean Emotional Behavioral Problem scale                          | Females: indirect effect: $\beta = 0.02, p < 0.05$                                                                                                                                     | $\beta = -.10, p < .05$                  | $\beta = -.22, p < .05$                     |                                    | Yes      |
|                                                                                  | You [228]               | 2021 | Middle school students                        | PA during PE (MVPA)      | One item – extent of sweating during PE          | Life satisfaction                           | Student Life Satisfaction Survey (SLSS)                                                                               | Externalising problems          | Korean Emotional Behavioral Problem scale                          | Males: indirect effect: $\beta = 0.02, p < 0.05$                                                                                                                                       | $\beta = -.10, p < .05$                  | $\beta = -.18, p < .05$                     | $\beta = .10, p < .05$             | Yes      |
|                                                                                  | Broman-Fulks [26]       | 2018 | Adults                                        | Physical activity        | One item rating the frequency of exercise        | Psychological symptoms                      | Brief Symptom Inventory-18 anxiety subscale                                                                           | Anxiety sensitivity             | AS Index-3                                                         | Indirect effect: $\beta = -.19, p < .001$ ,<br>Direct effect: $\beta = -.28, p < .001$                                                                                                 | $B = -1.50, p < .001$                    | $B = .12, p < .001$                         | $B = -.28, p < .001$               | Yes      |
|                                                                                  | Broman-Fulks [26]       | 2018 | Adults                                        | Physical activity        | One item rating the frequency of exercise        | Psychological symptoms                      | Brief Symptom Inventory-18 somatization subscale                                                                      | Anxiety sensitivity             | AS Index-3                                                         | Indirect effect: $\beta = -.10, p < .001$ ,<br>direct effect $\beta = -.41, p < .001$                                                                                                  | $B = -1.50, p < .001$                    | $B = .07, p < .001$                         | $B = -.41, p < .001$               | Yes      |
|                                                                                  | Broman-Fulks [26]       | 2018 | Adults                                        | Physical activity        | One item rating the frequency of exercise        | Psychological symptoms                      | Brief Symptom Inventory-18 depression subscale                                                                        | Anxiety sensitivity             | AS Index-3                                                         | Indirect effect: $\beta = -.18, p < .001$ ,<br>Direct effect $\beta = -.39, p < .001$                                                                                                  | $B = -1.50, p < .001$                    | $B = .12, p < .001$                         | $B = -.39, p < .001$               | Yes      |
|                                                                                  | Awick [8]               | 2017 | Older adults                                  | Physical activity (MVPA) | Actigraph accelerometer                          | $\Delta$ Life Satisfaction                  | SWLS                                                                                                                  | $\Delta$ Psychological distress | Perceived stress scale (PSS)                                       | Indirect effect: $B = .05, 90\% CI = .005, .125, p < .05$ ,<br>Direct effect ns ( $p = .28$ )                                                                                          | $B = -.10, p = .05$                      | $B = -.51, p = .001$                        | ns                                 | Yes      |
|                                                                                  | Elavsky [58]            | 2009 | Peri- and post-menopausal women               | Physical activity        | Average mins per week                            | Stress                                      | 4-item version of the Perceived Stress Scale                                                                          | Depressive symptoms             | One item - "Feeling depressed/having 'the blues'"                  | CFI = 1.000, SRMR = .012, RMSEA = .000,<br>direct path of PA on depressed mood: $\beta = -.15, p < .05$ ,<br>direct path of depressed mood on perceived stress: $\beta = .30, p < .05$ | $r = .18, p < .05$                       | $r = .46, p < .01$                          | $r = -.15, p < .05$                | Yes      |
|                                                                                  | Watt [210]              | 2022 | Psychology university students                | Physical activity        | Self-report                                      | Psychological distress                      | Kessler 10 (K10)                                                                                                      | Behavioural activation          | Behavioral Activation for Depression Scale – Short Form (BADS-SF). |                                                                                                                                                                                        | $\beta = .027, CI = .018, .037$          | $\beta = -.564, CI = -.634, -.493$          | $\beta = -.018, CI = -.026, -.009$ | Yes      |
|                                                                                  | Watt [210]              | 2022 | Psychology university students                | Physical activity        | Asked how often they undertook physical activity | Depression                                  | Kessler 10 (K10)                                                                                                      | Behavioural activation          | Behavioral Activation for Depression Scale – Short Form (BADS-SF). |                                                                                                                                                                                        | $\beta = 0.03, t (393) = 5.86, p < 0.01$ | $\beta = -0.33, t (388) = -12.55, p < 0.01$ |                                    | Yes      |
|                                                                                  | Watt [210]              | 2022 | Psychology university students                | Physical activity        | Asked how often they undertook physical activity | Anxiety                                     | Kessler 10 (K10)                                                                                                      | Behavioural activation          | Behavioral Activation for Depression Scale – Short Form (BADS-SF). |                                                                                                                                                                                        | $\beta = 0.03, t (393) = 5.86, p < 0.01$ | $\beta = -0.15, t (388) = -7.70, p < 0.01$  |                                    | Yes      |
|                                                                                  | Zhou [243]              | 2023 | College students                              | Physical activity        | Physical Activity Rating Scale                   | Life Satisfaction                           | Life Satisfaction Scale                                                                                               | Psychological distress          | Depression Anxiety Stress Scale                                    | $\beta = .03, CI = .01, .04$                                                                                                                                                           | $\beta = -.07, p > .05$                  | $\beta = -.25, p < .05$                     | $\beta = -.01, p > .05$            | Yes      |
|                                                                                  | Latimer [120]           | 2004 | Individuals with traumatic spinal cord injury | Exercise                 | Intervention vs control                          | Depression                                  | CES-D                                                                                                                 | Stress                          | 14-item Perceived Stress Scale (PSS)                               | $F (4,17) = 7.68, p < 0.01$ .                                                                                                                                                          | $\beta = .50, t = 3.03, p < .01$         | $\beta = .47, t = 3.01, p < .05$            | $\beta = .70, t = 3.50, p < .05$   | Yes      |
|                                                                                  | Zhang, X. [234]         | 2022 | Tik tok users                                 | Physical activity        | 2 items                                          | Mental health issues (depression & anxiety) | Chinese version of the Patient Health Questionnaire (PHQ-9) + Chinese version of Generalized Anxiety Disorder (GAD-7) | Stress                          | Chinese version of the Perceived Stress Scale (PSS-10)             | Indirect effect $\beta = -0.079 (95\% CI = -0.131, -0.032), p < .001$                                                                                                                  | $\beta = -.12, p < .01$                  | $\beta = .67, p < .001$                     |                                    | Yes      |
|                                                                                  | Yang [224]              | 2022 | College students                              | Physical activity        | Physical Activity Rating Scale (PARS-3)          | Depressive symptoms                         | Patient Health Questionnaire                                                                                          | Perceived stress                | Perceived Stress Scale (PSS-10)                                    | Indirect effect = $-0.058 (-0.086, -.032)$ , effect size 20.2%                                                                                                                         | $\beta = -.185, p < .001$                | $\beta = .211, p < .001$                    | $\beta = -.198, p < .001$          | Yes      |

|                  |      |                                      |                     |                                                                                             |                        |                                                                 |                                           |                                                                                          |                                                                                                                                                            |                           |                                     |                                     |                       |     |
|------------------|------|--------------------------------------|---------------------|---------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------------------|-------------------------------------|-----------------------|-----|
| Pacewicz [167]   | 2022 | Athletic trainers                    | Walking             | IPAQ                                                                                        | Life satisfaction      | Satisfaction with Life Scale                                    | Stress and then depersonalisation         | Perceived stress scale (PSS) + Maslach Burnout Inventory                                 | Indirect path = -.02, p > .07                                                                                                                              |                           |                                     |                                     | No                    |     |
| Pacewicz [167]   | 2022 | Athletic trainers                    | Walking             | IPAQ                                                                                        | Life satisfaction      | Satisfaction with Life Scale                                    | Stress and then exhaustion                | Perceived stress scale (PSS) + Maslach Burnout Inventory                                 | Indirect path = .09, p < .05                                                                                                                               |                           |                                     |                                     | Yes                   |     |
| Pacewicz [167]   | 2022 | Athletic trainers                    | Walking             | IPAQ                                                                                        | Life satisfaction      | Satisfaction with Life Scale                                    | Stress and then personal accomplishment   | Perceived stress scale (PSS) + Maslach Burnout Inventory                                 | Indirect path = .04, p > .06                                                                                                                               |                           |                                     |                                     | no                    |     |
| Wang [207]       | 2020 | Middle school students               | Sport Participation | Extracurricular sports subscale of the Middle School Student School Sports Assessment Scale | Life satisfaction      | The Satisfaction with Life Scale for Chinese Adolescents        | Academic stress                           | Academic stress subscale of the Middle School Student Psychological Health Questionnaire | Indirect effect = .10, SE = .01, 95% CI = .079, .124                                                                                                       | $r = -.29$ , $p < .001$   | $r = -.48$ , $p < .001$             | $r = .37$ , $p < .001$              | Yes                   |     |
| Maher [146]      | 2015 | Adults                               | Physical activity   | Modified version of the GLTEQ                                                               | Life satisfaction      | One item from the Satisfaction with Life Scale                  | Mental health                             | One item - "Today, my mental health was . . . ,                                          |                                                                                                                                                            |                           |                                     |                                     | Yes                   |     |
| Levante [124]    | 2024 | University students                  | Physical activity   | In the last months, how often have you done physical activity?                              | Psychological distress | DASS-21                                                         | Self-Reported Psychological Health Status | WHOQoL-Bref questionnaire                                                                | $\beta = 0.130$ ; Boot LLCI = 0.190; Boot ULCI = 0.072                                                                                                     |                           |                                     |                                     | Yes                   |     |
| Paxton [170]     | 2010 | Older adults                         | Physical activity   | Modified version of the GLTEQ                                                               | Life satisfaction      | SWLS and the World Health Organization Well-Being Index (WHO-5) | Mental health difficulties                | K-10                                                                                     | $\beta = -.25$ , $p < .05$                                                                                                                                 |                           | $\beta = -.36$ , $p < .05$          | $\beta = -.28$ , ns                 | Yes                   |     |
| Pickett [175]    | 2012 | Adults with depression or low mood   | Leisure time PA     | Leisure-Time Exercise Questionnaire (LTEQ)                                                  | Depression             | BDI-II                                                          | Affect                                    | PANAS                                                                                    | Total indirect effect: B = -.74, 95% CI = -1.18, -.32                                                                                                      |                           |                                     |                                     | Yes                   |     |
| Elavsky (b) [57] | 2005 | Sedentary older adults               | Physical activity   | Physical Activity Survey for the Elderly (PASE)                                             | Life Satisfaction      | SWLS                                                            | Affect                                    | Memorial University of New Foundland Scale of Happiness (MUNSH)                          | PA to affect $\beta = .18$ , $p < .05$ , affect to life satisfaction $\beta = .59$ , $p < .05$ , PA to life satisfaction direct effect = ns                |                           |                                     |                                     | Yes                   |     |
| Joseph [107]     | 2013 | Undergraduate students               | Physical activity   | GLTEQ                                                                                       | Life satisfaction      | SWLS                                                            | Positive affect                           | 10-item Bradburn Affect Balance Scale                                                    | $\beta = .27$ , $p < .001$                                                                                                                                 | $\beta = .10$ , $p < .01$ | $\beta = 0.27$ , $p < .001$         |                                     | Yes                   |     |
| Kratz [115]      | 2014 | Multiple sclerosis patients          | Physical activity   | 7-Day Physical Activity Recall Interview (PAR)                                              | Depressive symptoms    | HAM-D                                                           | Positive affect                           | PANAS                                                                                    | PA to positive affect: $\beta = .31$ , $p < .01$ , Positive affect to depression: $\beta = -.53$ , $p < .01$ , PA to depression: $\beta = .06$ , $p > .10$ |                           |                                     |                                     | Yes                   |     |
| Herzog [93]      | 2022 | People with moderate or high anxiety | Physical activity   | Physical Activity, Exercise, and Sport Questionnaire (BSA-F)                                | Anxiety                | Anxiety Sensitivity Index 3                                     | Positive affect                           | PANAS                                                                                    | $a \times b = 2.65$ , $z = 3.76$ , $p < .001$                                                                                                              |                           |                                     |                                     | Yes                   |     |
| Joseph [107]     | 2013 | Undergraduate students               | Physical activity   | GLTEQ                                                                                       | Life satisfaction      | SWLS                                                            | Negative affect                           | 10-item Bradburn Affect Balance Scale                                                    | $\beta = .14$ , $p < .001$                                                                                                                                 | $\beta = .08$ , $p < .01$ | $\beta = 0.27$ , $p < .001$         |                                     | Yes                   |     |
| Kratz [115]      | 2014 | Multiple sclerosis patients          | Physical activity   | 7-Day Physical Activity Recall Interview (PAR)                                              | Depressive symptoms    | HAM-D                                                           | Negative affect                           | PANAS                                                                                    | PA to negative affect: $\beta = -.16$ , $p > .10$ , negative affect to depression: $\beta = .38$ , $p < .01$ , PA to depression: $\beta = .06$ , $p > .10$ |                           |                                     |                                     | No                    |     |
| Hogan [96]       | 2015 | Adults                               | Physical activity   | IPAQ                                                                                        | Mental health          | SF-36 MCS                                                       | Positive emotions                         | Modified Differential Emotions Scale                                                     | Cross sectional: indirect point estimate = .015 95% CI = .01, .02<br>Longitudinal: indirect point estimate = .058 95% CI = .01, .13                        |                           | $r = .33$ , $p < .01$               | $r = .44$ , $p < .01$               | $r = .24$ , $p < .01$ | Yes |
| Hogan [96]       | 2015 | Adults                               | Physical activity   | IPAQ                                                                                        | Mental health          | SF-36 MCS                                                       | Negative emotions                         | Modified Differential Emotions Scale                                                     | Cross sectional: indirect point estimate = .003 95% CI = .001, .004<br>Longitudinal: indirect point estimate = .009 95% CI = -.01, .06                     |                           | $r = -.10$ , ns                     | $r = -.20$ , $p < .01$              | $r = .24$ , $p < .01$ | Yes |
| Watt [210]       | 2022 | Psychology university students       | Physical activity   | Asked how often they undertook physical activity                                            | Psychological distress | Kessler 10 (K10)                                                | Flow states                               | Short Dispositional Flow Scale (SDFS)                                                    | $\beta = .018$ , CI = -.012, .024                                                                                                                          |                           | $\beta = -.413$ , CI = -.554, -.271 | $\beta = -.018$ , CI = -.026, -.009 | Yes                   |     |

|               |      |                                         |                            |                                                                                          |                        |                                                                   |                      |                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |                          |                           |                          |     |
|---------------|------|-----------------------------------------|----------------------------|------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------|---------------------------|--------------------------|-----|
| Watt [210]    | 2022 | Psychology university students          | Physical activity          | Asked how often they undertook physical activity                                         | Depression             | Kessler 10 (K10)                                                  | Flow states          | Short Dispositional Flow Scale (SDFS)                                            | ns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                          | ns                        | No                       |     |
| Watt [210]    | 2022 | Psychology university students          | Physical activity          | Asked how often they undertook physical activity                                         | Anxiety                | Kessler 10 (K10)                                                  | Flow states          | Short Dispositional Flow Scale (SDFS)                                            | ns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                          | ns                        | No                       |     |
| Herzog [93]   | 2022 | People with moderate or high anxiety    | Physical activity          | Physical Activity, Exercise, and Sport Questionnaire (BSA-F)                             | anxiety                | Anxiety Sensitivity Index 3                                       | Subjective vitality  | Subjective Vitality Scale                                                        | a x b = 2.16, z = 3.38, p = .001                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |                          | Yes                       |                          |     |
| Tian [199]    | 2022 | College students                        | Physical activity          | IPAQ-SF                                                                                  | Anxiety                | Generalized Anxiety Disorder Scale (GAD-7)                        | Subjective wellbeing | General Well-Being Schedule (GWB)                                                | $\beta = .12, p < .01$                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                         |                          | $\beta = -.71, p < .01$   | $\beta = .0045, p > .05$ | Yes |
| Tian [199]    | 2022 | College students                        | Physical activity          | IPAQ-SF                                                                                  | Anxiety                | Generalized Anxiety Disorder Scale (GAD-7)                        | Subjective wellbeing | General Well-Being Schedule (GWB)                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |                          |                           | Yes                      |     |
| Zhuo [245]    | 2023 | College students                        | Physical activity          | Physical Activity Rating Scale                                                           | Depression             | Short-version Depression Scale compiled by Andresen et al. (1994) | Subjective wellbeing | Revised Subjective Well-Being Scale                                              | Indirect effect = -.03, 95% CI = -.05, -.02                                                                                                                                                                                                                                                                                                                                                                                                                                        | $-.14, p < .01$         | $.20, p < .01$           | $-.03, p < .01$           | Yes                      |     |
| Oshimi [166]  | 2022 | Adults                                  | MPA                        |                                                                                          | Life satisfaction      | Satisfaction with Life Scale (SWLS;                               | PERMA wellbeing      | Mirehie and Gibson's (2020) 15-item scale                                        | Indirect effect $\beta = .10$ , CI = .07, .14                                                                                                                                                                                                                                                                                                                                                                                                                                      |                         |                          |                           | Yes                      |     |
| Oshimi [166]  | 2022 | Adults                                  | VPA                        |                                                                                          | Life satisfaction      | Satisfaction with Life Scale (SWLS;                               | PERMA wellbeing      | Mirehie and Gibson's (2020) 15-item scale                                        | Indirect effect $\beta = .01$ , CI = -.03, .04                                                                                                                                                                                                                                                                                                                                                                                                                                     |                         |                          |                           | No                       |     |
| Görgülü [79]  | 2021 | Patients with major depressive disorder | MVPA                       | Accelerometer                                                                            | Depression             | Beck-Depression-Inventory-II (BDI-II)                             | Habitual wellbeing   | general habitual well-being using the FAHW questionnaire                         | Indirect effect: ab=- 0.43, 95% confidence interval: b = - 0.67 to b = - 0.14                                                                                                                                                                                                                                                                                                                                                                                                      |                         |                          | Yes                       |                          |     |
| Tao [197]     | 2022 | Young people                            | Physical activity          | One self-report item                                                                     | Subjective wellbeing   | One self-report item                                              | Life satisfaction    | One self-report item                                                             | mediation effect = 0.0391, CI = .0073, .0711, 34.1%                                                                                                                                                                                                                                                                                                                                                                                                                                |                         |                          | Yes                       |                          |     |
| Li [127]      | 2023 | High School students                    | Physical activity          | "Do you participate in physical activity regularly?"                                     | Psychological distress | Symptom Check-List-90                                             | Life satisfaction    | One item from the Child and Adolescent Quality of Life Scale                     | Indirect effect = -0.050 (low frequency of PA), -0.089 (medium frequency of PA), -0.100 (high frequency of PA)                                                                                                                                                                                                                                                                                                                                                                     |                         |                          | Yes                       |                          |     |
| Liu, X. [143] | 2024 | Middle-aged and elderly women           | Square dancing             | Physical Activity Rating Scale                                                           | Affect                 | PANAS                                                             | Life Satisfaction    | Satisfaction With Life Scale                                                     | Indirect effect = .003, 95% CI = -.002, .007                                                                                                                                                                                                                                                                                                                                                                                                                                       | $\beta = .023, p > .05$ | $\beta = .201, p < .001$ | $\beta = .080, p < .001$  | No                       |     |
| Ryan [182]    | 2008 | Undergraduate students                  | Aerobic activity           | Six-item Physical Activity subscale of the PSDQ                                          | Depression             | items from the SCL90R Depression subscale (SCL90R-D)              | Self esteem          | Physical Self-Description Questionnaire (PSDQ)                                   | PA to perceived endurance: $\beta = .43, p < .001$ (males), $\beta = .53, p < .001$ (females), perceived endurance to physical esteem: $\beta = .60, p < .001$ (males), $\beta = .54, p < .001$ (females), physical esteem to global esteem: $\beta = .64, p < .001$ (males), $\beta = .63, p < .001$ (females), global esteem to depression: $\beta = -.51, p < .001$ (males), $\beta = -.11$ ns (females), direct path: $\beta = .03$ , ns (males) $\beta = .00$ , ns (females). |                         |                          | Yes                       |                          |     |
| McPhie [152]  | 2012 | Adolescents                             | Physical activity          | Three items assessed the frequency of participation in activities during the past 7 days | Depressive symptoms    | 19-item version of the CES-D                                      | Self esteem          | Items modified from, or similar to items in, the Rosenberg Self-Esteem Inventory | Early adolescents: Boys - Sobel z = 8.05, $p < .001$ , girls ns. Late adolescents: Boys - Sobel z = 8.33, $p < .001$ , Girls Sobel z = 5.88, $p < .001$                                                                                                                                                                                                                                                                                                                            |                         |                          | Yes                       |                          |     |
| Wut [221]     | 2023 | working adults                          | Moderate physical activity | IPAQ-SF                                                                                  | Depression             | CES-D 20                                                          | Self-esteem          |                                                                                  | $\beta = .195, p = .047$                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                         |                          | $\beta = -.320, p = .006$ | Yes                      |     |
| Wut [221]     | 2023 | working adults                          | Moderate physical activity | IPAQ-SF                                                                                  | Anxiety                | GAD-7                                                             | Self-esteem          |                                                                                  | $\beta = .195, p = .047$                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                         |                          | $\beta = -.298, p = .041$ | Yes                      |     |
| Wut [221]     | 2023 | working adults                          | Moderate physical activity | IPAQ-SF                                                                                  | Mental wellbeing       | Warwick–Edinburgh Mental Well-being Scale                         | Self-esteem          |                                                                                  | $\beta = .195, p = .047$                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                         |                          | $\beta = .746, p < .001$  | Yes                      |     |
| Shang [186]   | 2021 | College students                        | Physical activity          | Physical activity rating scale (PARS-3)                                                  | Subjective wellbeing   | General well-being schedule                                       | Self esteem          | Self-esteem scale (SES) compiled by Rosenberg                                    | Single mediating path via body image [indirect effect = 0.011, 95% CI: (-0.003, 0.028)]                                                                                                                                                                                                                                                                                                                                                                                            |                         |                          | Yes                       |                          |     |
| Chen [36]     | 2022 | Older adults                            | Physical activity          | Physical Activity Rating Scale (PARS-3)                                                  | Subjective wellbeing   | Subjective Well-Being Scale (SWB)                                 | Self esteem          | Rosenberg Self-Esteem Scale (SES)                                                | Indirect effect $\beta = .0692$ , CI = .0374, .1071                                                                                                                                                                                                                                                                                                                                                                                                                                | $.056, p < .001$        | $.108, p < .001$         | $.031, p < .001$          | Yes                      |     |

|                  |      |                                         |                                |                                                                       |                        |                                                             |                                                   |                                                                                                                                                          |                                                                                   |                            |                             |                            |     |
|------------------|------|-----------------------------------------|--------------------------------|-----------------------------------------------------------------------|------------------------|-------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------|-----------------------------|----------------------------|-----|
| Görgülü [79]     | 2021 | Patients with major depressive disorder | MVPA                           | Actigraph                                                             | Depression             | Beck-Depression-Inventory-II (BDI-II)                       | Self esteem                                       | Multidimensional Self-Value Scale (MSWS)                                                                                                                 | Indirect effect $ab = -0.22$ , 95% confidence interval $b = -0.41$ to $b = -0.04$ |                            |                             |                            | Yes |
| Zhang, J. [238]  | 2022 | College students                        | Physical activity              | Physical Activity Scale                                               | Depression             | Self-Rating Depression Scale                                | Self-concept                                      | Self-concept scale                                                                                                                                       | $\beta = -.103$ , CI = $-.18, -.05$                                               |                            |                             |                            | Yes |
| Buffart [27]     | 2014 | Cancer survivors                        | Exercise intervention          | Intervention vs control                                               | Depression and anxiety | 14-item HADS                                                | Self-efficacy                                     | General self-efficacy scale                                                                                                                              | Indirect effect: $\beta = -.04$ , $p < .05$                                       | $\beta = .13$ , $p < .05$  | $\beta = .30$ , $p < .05$   | $\beta = .09$ , $p = .05$  | Yes |
| Barr [14]        | 2010 | Physically active men                   | Aerobic exercise               | Intervention vs control                                               | Affect                 | Activation Deactivation Adjective Checklist                 | Self-efficacy                                     | Eight items assessing belief in ability for the task                                                                                                     | $\beta = -.52$ , $p < .05$                                                        |                            |                             |                            | Yes |
| Ho [94]          | 2015 | School students                         | Physical activity              | Physical Activity Rating Questionnaire for Children and Youth (PARCY) | Mental health          | SF-36 MCS                                                   | Self-efficacy                                     | General Self-Efficacy Scale                                                                                                                              | $b = 0.19$ , $p < .001$ , mediation proportion = 36%                              | $B = .41$ , $p < .001$     | $B = 0.10$ , ns             | $B = .16$ , ns             | Yes |
| Wang [208]       | 2022 | College students                        | Physical activity              | Physical Activity Rating Scale (PARS-3)                               | Subjective Well-Being  | Subjective Well-Being Scale (SWS)                           | Self-efficacy                                     | General Self-Efficacy Scale (GSES)                                                                                                                       | ES = 0.057                                                                        |                            |                             |                            | Yes |
| Xiong [223]      | 2023 | Older adults                            | Physical activity              | The Physical Activity Rating Scale (PARS-3)                           | Depression             | Center for Streaming Depression Scale (CES-D)               | Self-efficacy                                     | Self-Efficacy Scale (GSES)                                                                                                                               | $\beta = -0.101$ , 95%CI $-0.149, -0.058$                                         |                            |                             |                            | Yes |
| Kong [112]       | 2022 | Older adults                            | Physical activity              | Self-report                                                           | Depressive symptoms    | K-GDS-SF                                                    | Self-efficacy                                     | Chinese version of the general self-efficacy scale, developed by Zhang and Schwarzer                                                                     | $B = 0.3407$ , 95%CI = $0.1190, 0.5625$                                           |                            |                             |                            | Yes |
| Zhao [240]       | 2021 | College students                        | Physical activity              | PARS-3                                                                | Psychological distress | Symptom self-rating scale                                   | Self-efficacy                                     | General self-efficacy scale                                                                                                                              |                                                                                   |                            |                             |                            | Yes |
| Baker [11]       | 2023 | Women                                   | Leisure-time physical activity | IPAQ                                                                  | Depressive symptoms    | CES-D 11                                                    | Self-efficacy                                     | adapted from other measures                                                                                                                              | $\beta = -0.018$ ( $-0.033, -0.003$ )                                             |                            |                             |                            | Yes |
| Baker [11]       | 2023 | Women                                   | Transport physical activity    | IPAQ                                                                  | Depressive symptoms    | CES-D 20                                                    | Self-efficacy                                     | adapted from other measures                                                                                                                              | $\beta = -0.011$ ( $-0.020, -0.004$ )                                             |                            |                             |                            | Yes |
| Baker [11]       | 2023 | Women                                   | Occupational physical activity | IPAQ                                                                  | Depressive symptoms    | CES-D 29                                                    | Self-efficacy                                     | adapted from other measures                                                                                                                              | $\beta = -0.008$ ( $-0.016, -0.002$ )                                             |                            |                             |                            | Yes |
| Baker [11]       | 2023 | Women                                   | Domestic physical activity     | IPAQ                                                                  | Depressive symptoms    | CES-D 38                                                    | Self-efficacy                                     | adapted from other measures                                                                                                                              | $\beta = -0.004$ ( $-0.009, -0.0002$ )                                            |                            |                             |                            | Yes |
| Dong [50]        | 2023 | Adolescents                             | Physical activity              | Physical Activity Questionnaire for Children (PAQ-C)                  | Mental health          | Mental Health Inventory of Middle School Students (MMHI-60) | Self-efficacy                                     | General self-efficacy scale                                                                                                                              | $-0.198 \times (-0.258) = -0.059$                                                 |                            |                             |                            | No  |
| Li, B. [129]     | 2024 | College students                        | Physical activity              | IPAQ-SF                                                               | Depression             | CES-D                                                       | Self-efficacy                                     | General Perceived Self-efficacy Scale                                                                                                                    | Total effect of this indirect pathway was 0.065                                   |                            |                             |                            | Yes |
| Guo [84]         | 2024 | College students                        | Physical activity              | Physical Activity Scale                                               | Life satisfaction      | SWLS + PANAS                                                | Self-efficacy                                     | Self-Efficacy Scale                                                                                                                                      | Indirect effect = 0.091, 95% CI = 0.067, 0.122                                    | $\beta = .358$ , $p < .01$ | $\beta = .3255$ , $p < .01$ | $\beta = .369$ , $p < .01$ | Yes |
| Castan [28]      | 2024 | Adults with spinal cord injury          | Leisure-time PA                | Physical Activity Recall Assessment for People with SCI (PARA-SCI)    | Psychological distress | Hospital Anxiety and Depression Scale (HADS-D)              | Self-efficacy                                     | General Self-Efficacy Scale                                                                                                                              |                                                                                   | $\beta = .25$ , $p < .05$  | $\beta = -.52$ , $p < .05$  | $\beta = .037$ , $p > .05$ | Yes |
| Phillips [174]   | 2013 | Community-dwelling adults               | Physical activity              | Physical Activity Scale for the Elderly (PASE)                        | Life satisfaction      | 5-item Satisfaction with Life Scale                         | Self-efficacy and then physical self-worth        | 6-item Exercise Self-efficacy Scale, 6-item Physical Self-Worth Scale (PSW) of the physical self-perception profile (PSP)                                | Indirect effect: $p < .05$                                                        |                            |                             |                            | Yes |
| Phillips [174]   | 2013 | Community-dwelling adults               | Physical activity              | Physical Activity Scale for the Elderly (PASE)                        | Life satisfaction      | 5-item Satisfaction with Life Scale                         | Self-efficacy and then via disability limitations | 6-item Exercise Self-efficacy Scale, eight-item disability limitations subscale of the abbreviated Late-Life Function and Disability Instrument (LL-FDI) | Indirect effect: ns                                                               |                            |                             |                            | Yes |
| Joseph [107]     | 2013 | Undergraduate students                  | Physical activity              | GLTEQ                                                                 | Life satisfaction      | SWLS                                                        | Physical self-esteem                              | 6-item Physical Self-Worth Scale (PSWS)                                                                                                                  | $\beta = .30$ , $p < .001$                                                        | $\beta = .10$ , $p < .001$ | $\beta = 0.30$ , $p < .001$ |                            | Yes |
| Elavsky (a) [56] | 2005 | Women                                   | Physical activity              | Aerobics Center Longitudinal Study Physical Activity Survey (ACLS)    | Life Satisfaction      | SWLS                                                        | Physical self-worth                               | Physical Self-Description Questionnaire (PSDQ)                                                                                                           | PA to PSW $\beta = .28$ , $p < 0.05$ , PSW to SWL $\beta = .48$ , $p < 0.05$      | $r = .40$ , $p < .001$     | $r = .55$ , $p < .001$      | $r = .20$ , $p < .05$      | Yes |

|                  |      |                               |                     |                                                 |                                  |                                                                            |                            |                                                                                                                                     |                                                                                                                                                                                                            |                                   |                                    |                                   |     |
|------------------|------|-------------------------------|---------------------|-------------------------------------------------|----------------------------------|----------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----|
| Aguinaga [2]     | 2018 | Low-active older adults       | Leisure-time PA     | GLTEQ                                           | Depression                       | HADS                                                                       | Physical Self-Worth.       | Subscale from the Physical Self-Perception Profile                                                                                  | Indirect effect: $\beta = -.05$ ; 95% confidence interval = $-.11, -.01$ , $p < .05$ , direct effect $\beta = 0.13$ , $p = .02$                                                                            | $r = .15$ , $p = .02$             | $r = -.36$ , $p = .001$            | $r = -.19$ , $p = .003$           | Yes |
| Aguinaga [2]     | 2018 | Low-active older adults       | Leisure-time PA     | GLTEQ                                           | Anxiety                          | HADS                                                                       | Physical Self-Worth.       | Subscale from the Physical Self-Perception Profile                                                                                  | Indirect effect: $\beta = -.04$ ; 95% confidence interval = $-.09, -.01$ , $p < .05$ , direct effect ns                                                                                                    | $r = .15$ , $p = .02$             | $r = -.30$ , $p = .001$            | $r = -.14$ , $p = .03$            | Yes |
| Elavsky (b) [57] | 2005 | Sedentary older adults        | Physical activity   | Physical Activity Survey for the Elderly (PASE) | Life Satisfaction                | SWLS                                                                       | Physical self-worth        | The Physical Self-Worth scale (PSW) of the Physical Self-Perception Profile                                                         | PA to physical self-worth: $\beta = .38$ , $p < .05$ , physical self-worth to life satisfaction = ns, PA to life satisfaction direct effect = ns                                                           |                                   |                                    |                                   | No  |
| Herring [92]     | 2021 | Young adults                  | Physical activity   | 7-day PA recall                                 | Generalised anxiety disorder     | 10-item GAD subscale of the Psychiatric Diagnostic Screening Questionnaire | Social Physique anxiety    | 12-item Social Physique Anxiety Scale (SPAS)                                                                                        | Indirect effect $\beta = -.21$ , $p = .021$ , direct effect $\beta = -.14$ , $p = .338$                                                                                                                    |                                   |                                    |                                   | Yes |
| Herring [92]     | 2021 | Young adults                  | Physical activity   | 7-day PA recall                                 | Social anxiety disorder          | 15-item SAD subscale of the Psychiatric Diagnostic Screening Questionnaire | Social Physique anxiety    | 12-item Social Physique Anxiety Scale (SPAS)                                                                                        | Indirect effect: $\beta = -.27$ , $p = .012$ , direct effect: $\beta = -.09$ , $p = .395$                                                                                                                  |                                   |                                    |                                   | Yes |
| Herring [92]     | 2021 | Young adults                  | Physical activity   | 7-day PA recall                                 | Panic disorder                   | 8-item PD subscale of the Psychiatric Diagnostic Screening Questionnaire   | Social Physique anxiety    | 12-item Social Physique Anxiety Scale (SPAS)                                                                                        | Indirect effect: $\beta = -.11$ , $p = .170$ , direct effect: $\beta = -.46$ , $p = .024$                                                                                                                  |                                   |                                    |                                   | No  |
| Greenleaf [80]   | 2009 | Undergraduate students        | School sport        | High School Sport Participation questionnaire   | Psychological wellbeing          | 5-item SWLS + 10-item Self-Esteem Scale (SES)                              | Body image                 | 8-item Body factor from the Body Parts Satisfaction Scale-Revised (BPSS-R) + The 10-item Body Shape Questionnaire-Revised (BSQR-10) | Sport to body image: $\beta = .06$ , $p > .05$ . Not a direct mediator but significant in multiple mediation model.                                                                                        |                                   |                                    |                                   | Yes |
| Shang [186]      | 2021 | College students              | Physical activity   | Physical activity rating scale (PARS-3)         | Subjective wellbeing             | general well-being schedule                                                | Body image                 | Multidimensional body self-relations questionnaire (MBSRQ)                                                                          | Single mediating path via self-esteem [indirect effect = 0.087, 95% CI: (0.037, 0.141)]                                                                                                                    |                                   |                                    |                                   | No  |
| Jia [104]        | 2023 | Obese primary school students | Physical activity   | Liang Deqing physical activity rating Scale     | Psychological distress           | DASS-c21                                                                   | Body image                 | Body image State Scale                                                                                                              | Indirect effect = 0.10, 95% CI = 0.04, 0.16                                                                                                                                                                |                                   |                                    |                                   | Yes |
| Chae [30]        | 2016 | High School students          | Physical activity   | Physical Activity Questionnaire - Adolescent    | Depression and anxiety           | Korean version of the Children's Depression Inventory                      | Body esteem - appearance   | The Body-Esteem Scale for Adolescents and Adults                                                                                    | BOYS: total indirect effect through appearance, weight, and attribution: $\beta = -.07$ , $p < .05$ , GIRLS: total indirect effect through appearance, weight, and attribution: $\beta = -.11$ , $p < .05$ | $\beta = .17$ , $p < .01$ (girls) | $\beta = -.49$ , $p < .05$ (girls) | $\beta = -.44$ , $p < .05$ (boys) | Yes |
| Chae [30]        | 2016 | High School students          | Physical activity   | Physical Activity Questionnaire - Adolescent    | Depression and anxiety           | Korean version of the Children's Depression Inventory                      | Body esteem - weight       | The Body-Esteem Scale for Adolescents and Adults                                                                                    | BOYS: total indirect effect through appearance, weight, and attribution: $\beta = -.07$ , $p < .05$ , GIRLS: total indirect effect through appearance, weight, and attribution: $\beta = -.11$ , $p < .05$ | $\beta = .01$ , $p > .05$ (girls) | $\beta = -.02$ , $p > .05$ (girls) | $\beta = -.03$ , $p > .05$ (boys) | Yes |
| Chae [30]        | 2016 | High School students          | Physical activity   | Physical Activity Questionnaire - Adolescent    | Depression and anxiety           | Korean version of the Children's Depression Inventory                      | Body esteem - attribution  | The Body-Esteem Scale for Adolescents and Adults                                                                                    | BOYS: total indirect effect through appearance, weight, and attribution: $\beta = -.07$ , $p < .05$ , GIRLS: total indirect effect through appearance, weight, and attribution: $\beta = -.11$ , $p < .05$ | $\beta = .21$ , $p < .01$ (girls) | $\beta = -.11$ , $p < .01$ (girls) | $\beta = -.10$ , $p > .05$ (boys) | Yes |
| Feuerhahn [64]   | 2012 | Adults                        | Exercise after work | Self-reported duration of exercise that evening | Positive affect (in the evening) | 6 items from the PANAS positive affect scale                               | Body attractiveness        | Physical appearance subscale from the Physical Self-Description Questionnaire (PSDQ) German measure                                 | $z = 3.37$ , $p < .01$                                                                                                                                                                                     | $r = .18$ , $p < .01$             | $r = .09$ , $p < .05$              | $r = .22$ , $p < .01$             | Yes |
| Tihanyi [201]    | 2015 | Advanced yoga participants    | Yoga                | Self-reported yoga frequency                    | Psychological wellbeing          | WHO-5                                                                      | Body awareness             | Body Awareness Questionnaire                                                                                                        | Indirect effect: $\beta = .18$ , $p < .05$                                                                                                                                                                 | $r = .24$ , $p < .001$            | $r = .39$ , $p < .001$             | $r = .26$ , $p < .001$            | Yes |
| Tihanyi [201]    | 2015 | Advanced yoga participants    | Yoga                | Self-reported yoga frequency                    | Psychological wellbeing          | WHO-5                                                                      | Body image dissatisfaction | Body Image Ideals Questionnaire                                                                                                     | Indirect effect: $\beta = .20$ , $p < .01$                                                                                                                                                                 | $r = -.21$ , $p < .01$            | $r = -.34$ , $p < .001$            | $r = .26$ , $p < .001$            | Yes |

|                      |      |                                                  |                     |                                                                                                                |                        |                                                                     |                                 |                                                                                                            |                                                                                                                                                                                                                                                                                                |                             |                             |                            |     |
|----------------------|------|--------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------|------------------------|---------------------------------------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------|----------------------------|-----|
| Condello [41]        | 2016 | Adults                                           | Physical activity   | American Alliance for Health, Physical Education, Recreation, and Dance exercise/medical history questionnaire | Mental health          | SF-12 MCS                                                           | Body dissatisfaction            | Body dissatisfaction index                                                                                 | Indirect effects: PA to BMI = 3.50, $p < .01$ , BMI to BDI = .97, $p < .01$ , BDI to MCS = .20, $p = .03$ , Direct effect = 4.97, $p = .04$                                                                                                                                                    |                             |                             |                            | Yes |
| Zhang [233]          | 2021 | Female cancer survivors                          | Physical activity   | Derived from the WHI Physical Activity Questionnaire                                                           | Depressive symptoms    | Yale Depression Screener                                            | Body image concerns             | Likert scale self-report 3 items                                                                           | RR = 0.934, CI = 0.904, 0.966, mediated 7%                                                                                                                                                                                                                                                     |                             |                             |                            | Yes |
| Zhang [233]          | 2021 | Female cancer survivors                          | Physical activity   | Derived from the WHI Physical Activity Questionnaire                                                           | Anxiety                | Self-report Likert scale items                                      | Body image concerns             | Likert scale self-report 3 items                                                                           | RR = 0.929, CI = 0.879, 0.982, mediated 8.8%                                                                                                                                                                                                                                                   |                             |                             |                            | Yes |
| Zhang [233]          | 2021 | Female cancer survivors                          | Physical activity   | Derived from the WHI Physical Activity Questionnaire                                                           | Psychological distress | Self-report Likert scale items                                      | Body image concerns             | Likert scale self-report 3 items                                                                           | RR = 0.934, CI = 0.881, 0.990, mediated 14.5%                                                                                                                                                                                                                                                  |                             |                             |                            | Yes |
| Gomez-Baya [77]      | 2017 | Adolescents                                      | Sport participation | One item – ‘How often do you practice some sports or gymnastics during out-of-school time?’                    | Depressive symptoms    | Children’s Depression Inventory                                     | Body satisfaction               | One item – ‘Do you like your physical appearance?’                                                         | Indirect effect: $k2 = .08$ , $SE = .01$ , 95% CI = .06, .10, indirect effect was moderated by gender, as indicated by the index of moderated mediation, $B = .04$ , $SE = .02$ , 95% CI = $-.01, .08$                                                                                         |                             |                             |                            | Yes |
| Chu [39]             | 2023 | Breast cancer survivors                          | Walking             | IPAQ-L                                                                                                         | Depression             | Chinese version of the Hospital Anxiety and Depression Scale (HADS) | Body image satisfaction         | body image subscale of the EORTC Quality of Life Questionnaire-breast cancer module (QLQ-BR23)             | Standardized estimate = $-0.07$ , 95% CI = $-0.11$ to $-0.04$ (indirect effect)                                                                                                                                                                                                                | $\beta = .27$ , $p < .001$  | $\beta = -.28$ , $p < .001$ | $\beta = -.14$ , $p < .01$ | Yes |
| Chu [39]             | 2023 | Breast cancer survivors                          | Walking             | IPAQ-L                                                                                                         | Anxiety                | Chinese version of the Hospital Anxiety and Depression Scale (HADS) | Body image satisfaction         | body image subscale of the EORTC Quality of Life Questionnaire-breast cancer module (QLQ-BR23)             | Standardized estimate = $-0.07$ , 95% CI = $-0.12$ to $-0.04$ (indirect effect)                                                                                                                                                                                                                | $\beta = .27$ , $p < .001$  | $\beta = -.28$ , $p < .001$ | $\beta = -.11$ , $p > .05$ | Yes |
| Shang [186]          | 2021 | College students                                 | Physical activity   | physical activity rating scale (PARS-3)                                                                        | Subjective wellbeing   | general well-being schedule                                         | Body image and self esteem      | Multidimensional body self-relations questionnaire (MBSRQ) + self-esteem scale (SES) compiled by Rosenberg | Serial mediating path via body image and self-esteem [indirect Effect = 0.038, 95% CI = 0.021, 0.158                                                                                                                                                                                           |                             |                             |                            | Yes |
| Riddervold [179]     | 2023 | Late adolescents                                 | Sport Participation | How often do you usually participate in these types of organised activities in your spare time?’               | Life satisfaction      | Huebner’s Students’ Life Satisfaction Scale                         | Body appreciation               | Body Appreciation Scale 2                                                                                  | $\beta = 0.120$ , 95% CI = 0.017, 0.147                                                                                                                                                                                                                                                        | $\beta = .224$ , $p = .001$ | $\beta = .533$ , $p < .001$ | $B = .026$ , $p = .609$    | Yes |
| Ryan [182]           | 2008 | Undergraduate students                           | Aerobic activity    | Six-item Physical Activity subscale of the PSDQ                                                                | Depression             | Items from the SCL90R Depression subscale (SCL90R-D)                | Task efficacy                   | Developed by the author                                                                                    | PA to Task efficacy: $\beta = .55$ , $p < .001$ (males), $\beta = .51$ , $p < .001$ (females), task efficacy to Depression $\beta = .31$ , $p < .05$ (males), $\beta = .36$ , $p < .001$ (females), direct path from PA to depression: $\beta = .03$ , ns (males) $\beta = .00$ , ns (females) |                             |                             |                            | Yes |
| Goldstein [76]       | 2020 | Adults                                           | Exercise            | Intervention vs control                                                                                        | Stress                 | 10-item Perceived Stress Scale (PSS)                                | Exercise self-efficacy          | Exercise Self-Efficacy Scale (ESES)                                                                        | Indirect effect: $\beta = -.01$ , $p = .464$ , direct effect $\beta = -.12$ , $p = .004$                                                                                                                                                                                                       |                             |                             |                            | No  |
| Theodoropoulou [198] | 2017 | Adults                                           | Physical activity   | IPAQ-SF                                                                                                        | Mental health          | SF-36 MCS                                                           | Exercise self-efficacy          | Self-efficacy scale                                                                                        | $\chi^2 = 517.029$ , $df = 479$ , $p = 0.001$ , $\chi^2/df = 1.079$ , CFI = 0.958, GFI = 0.924, IFI = 0.958, TLI = 0.953, RMSEA = 0.037                                                                                                                                                        | $\beta = .34$ , $p < .01$   | $\beta = .19$ , $p < .01$   | $\beta = .07$ , $p > .05$  | Yes |
| Chair [31]           | 2020 | Cardiac event or coronary heart disease patients | Leisure-time PA     | Godin–Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ)                                          | Depressive symptoms    | Chinese version of HADS (HADS-C)                                    | Physical activity self-efficacy | Self-Efficacy for Exercise (SEE-C) Cantonese version                                                       | Indirect effect: $\beta = -0.044$ , 95% CI: $-.064, -.027$ , direct effect: $\beta = .003$ ( $-.038, .044$ ), $p = .894$                                                                                                                                                                       |                             |                             |                            | Yes |
| Konopack [113]       | 2012 | Adults                                           | Physical activity   | Actigraph accelerometer                                                                                        | Mental health          | SF-36 MCS                                                           | Physical activity self-efficacy | Lifestyle Physical Activity Self-Efficacy Scale                                                            | PA to self-efficacy: $\beta = .34$ , self-efficacy to MH: $\beta = .10$                                                                                                                                                                                                                        |                             |                             |                            | No  |

|                  |      |                                |                                |                                                 |  |                                  |                                                                 |  |                                 |                                                                                             |                                                                                                                                                                        |                                     |                                      |                                      |     |
|------------------|------|--------------------------------|--------------------------------|-------------------------------------------------|--|----------------------------------|-----------------------------------------------------------------|--|---------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|-----|
| Guicciardi [82]  | 2019 | Adults with multiple sclerosis | Leisure-time PA                | GLTEQ                                           |  | Mental health                    | SF-36 MCS                                                       |  | Exercise self-efficacy          | Exercise Self-Efficacy                                                                      | PA to exercise self-efficacy: $\beta = .46$ , exercise self-efficacy to mental health: ns                                                                              |                                     |                                      |                                      | No  |
| Elavsky (b) [57] | 2005 | Sedentary older adults         | Physical activity              | Physical Activity Survey for the Elderly (PASE) |  | Life Satisfaction                | SWLS                                                            |  | Exercise self-efficacy          | Exercise Self-Efficacy scale                                                                | PA to self-efficacy $\beta = .29$ , $p < .05$ , self-efficacy to life satisfaction $\beta = .17$ , $p < .05$ , PA to life satisfaction direct effect = not significant |                                     |                                      |                                      | Yes |
| Joseph [107]     | 2013 | Undergraduate students         | Physical activity              | GLTEQ                                           |  | Life satisfaction                | SWLS                                                            |  | Exercise self-efficacy          | Exercise Self-Efficacy Scale                                                                | $\beta = .28$ , $p < .001$ ns                                                                                                                                          |                                     |                                      |                                      | No  |
| Paxton [170]     | 2010 | Older adults                   | Physical activity              | Modified version of the GLTEQ                   |  | Life satisfaction                | SWLS and the World Health Organization Well-Being Index (WHO-5) |  | Physical activity Self-efficacy | Modified version of the barrier self-efficacy scale and the self-efficacy for walking scale | $\beta = .61$ , $p < .05$ $\beta = .27$ , $p < .05$ $\beta = -.28$ , ns                                                                                                |                                     |                                      |                                      | Yes |
| Baker [11]       | 2023 | Women                          | Leisure-time physical activity | IPAQ                                            |  | Depressive symptoms              | CES-D 13                                                        |  | Behavioural intentions          | Adapted from other measures                                                                 | $\beta = -0.012$ (-0.024, -0.0002)                                                                                                                                     |                                     |                                      |                                      | Yes |
| Baker [11]       | 2023 | Women                          | Transport physical activity    | IPAQ                                            |  | Depressive symptoms              | CES-D 22                                                        |  | Behavioural intentions          | Adapted from other measures                                                                 | $\beta = -0.001$ (-0.004, 0.001)                                                                                                                                       |                                     |                                      |                                      | No  |
| Baker [11]       | 2023 | Women                          | Occupational physical activity | IPAQ                                            |  | Depressive symptoms              | CES-D 31                                                        |  | Behavioural intentions          | Adapted from other measures                                                                 | $\beta = 0.002$ (-0.001, 0.007)                                                                                                                                        |                                     |                                      |                                      | No  |
| Baker [11]       | 2023 | Women                          | Domestic physical activity     | IPAQ                                            |  | Depressive symptoms              | CES-D 40                                                        |  | Behavioural intentions          | Adapted from other measures                                                                 | $\beta = -0.001$ (-0.004, 0.001                                                                                                                                        |                                     |                                      |                                      | No  |
| Baker [11]       | 2023 | Women                          | Leisure-time physical activity | IPAQ                                            |  | Depressive symptoms              | CES-D 14                                                        |  | Behavioural skills              | Adapted from other measures                                                                 | $\beta = 0.005$ (-0.007, 0.016)                                                                                                                                        |                                     |                                      |                                      | No  |
| Baker [11]       | 2023 | Women                          | Transport physical activity    | IPAQ                                            |  | Depressive symptoms              | CES-D 23                                                        |  | Behavioural skills              | Adapted from other measures                                                                 | $\beta = 0.001$ (-0.001, 0.004)                                                                                                                                        |                                     |                                      |                                      | No  |
| Baker [11]       | 2023 | Women                          | Occupational physical activity | IPAQ                                            |  | Depressive symptoms              | CES-D 32                                                        |  | Behavioural skills              | Adapted from other measures                                                                 | $\beta = -0.002$ (-0.008, 0.003)                                                                                                                                       |                                     |                                      |                                      | No  |
| Baker [11]       | 2023 | Women                          | Domestic physical activity     | IPAQ                                            |  | Depressive symptoms              | CES-D 41                                                        |  | Behavioural skills              | Adapted from other measures                                                                 | $\beta = -0.001$ (-0.003, 0.001)                                                                                                                                       |                                     |                                      |                                      | No  |
| Greenleaf [80]   | 2009 | Undergraduate students         | School sport                   | High School Sport Participation questionnaire   |  | Psychological wellbeing          | 5-item SWLS + 10-item Self-Esteem Scale (SES)                   |  | Physical competence             | The Physical Self-Description Questionnaire (PDSQ)                                          | Sport to competence: $\beta = .60$ , $p < .05$ , competence to body image: $\beta = .25$ , $p < .05$ , body image to wellbeing: $\beta = .27$ , $p < .05$              |                                     |                                      |                                      | Yes |
| Feuerhahn [64]   | 2012 | Adults                         | Exercise after work            | Self-reported duration of exercise that evening |  | Positive affect (in the evening) | 6 items from the PANAS positive affect scale                    |  | Sports competence               | Sports competence subscale from the Physical Self-Description Questionnaire (PSDQ)          | $z = 3.12$ , $p < .01$                                                                                                                                                 | $r = .19$ , $p < .01$               | $r = .22$ , $p < .01$                | $r = .22$ , $p < .01$                | Yes |
| Buffart [27]     | 2014 | Cancer survivors               | Exercise intervention          | Intervention vs control                         |  | Depression and anxiety           | 14-item HADS                                                    |  | Mastery                         | Perlin Mastery Scale                                                                        | Indirect effect: $\beta = -.03$ , $p < .05$                                                                                                                            | $\beta = .19$ , $p < .05$           | $\beta = -.19$ , $p < .05$           | $\beta = -.09$ , $p = .05$           | Yes |
| Deng [46]        | 2016 | Young adults                   | Physical activity (MVPA)       | Self-reported questionnaire                     |  | Depressive symptoms              | 20-item CES-D                                                   |  | Sense of mastery                | Pearlin Mastery Scale                                                                       | Indirect path through master ( $\beta = -.043$ , $p < .001$ )                                                                                                          | $r = .14$ ( $p$ value not reported) | $r = -.35$ ( $p$ value not reported) | $r = -.07$ ( $p$ value not reported) | Yes |
| Stuntz [192]     | 2020 | Athletes                       | Exercise Intensity             | Ratings of Perceived Exertion (RPE) scale       |  | Positive affect                  | Feeling Scale                                                   |  | Accomplishment                  | One item – “How accomplished do you feel right now                                          | Indirect effect: $\beta = .19$ , $p < .001$ , direct effect: $\beta = -.14$ , $p = .06$                                                                                | $r = .61$ , $p < .01$               | $r = .26$ , $p < .01$                | $r = -.05$                           | Yes |

|             |                         |      |                               |                          |                                                                                                                                                                 |                                                 |                                                                             |                                         |                                                                                                                      |                                                                                                                                                                     |                                                                            |                                                                             |                             |                             |     |
|-------------|-------------------------|------|-------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------|-----------------------------|-----|
| Personality | Wilson [219]            | 2016 | Fist year university students | Physical activity (MVPA) | Global Physical Activity Questionnaire (GPAQ), Godin Leisure Time Exercise Questionnaire (GLTEQ), and the International Physical Activity Questionnaire (IPAQ). | Mental health                                   | SF-36 MCS                                                                   | Neuroticism and Extraversion            | International Personality Item Pool (IPIP)                                                                           | CFI = .84, RMSEA = .07, SRMR = .12                                                                                                                                  | Extraversi on $r = .22$ , $p < .001$ , Neuroticis m = $-.11$ , $p > .05$   | Extraversi on $r = .32$ , $p < .001$ , Neuroticis m = $-.66$ , $p < .001$   | $r = .17$ , $p < .05$       | No                          |     |
|             | Wilson [219]            | 2016 | Fist year university students | Physical activity (MVPA) | Actigraph accelerometer                                                                                                                                         | Mental health                                   | SF-36 MCS                                                                   | Neuroticism and Extraversion            | International Personality Item Pool (IPIP)                                                                           | CFI = .86, RMSEA = .06, SRMR = .11                                                                                                                                  | Extraversi on $r = .04$ , $p > .05$ , Neuroticis m $r = -.27$ , $p < .001$ | Extraversi on $r = .32$ , $p < .001$ , Neuroticis m $r = -.66$ , $p < .001$ | $r = .22$ , $p < .05$       | No                          |     |
|             | Sato [185]              | 2016 | Runners                       | Running                  | Participation in a running event                                                                                                                                | Life satisfaction                               | 5-item SWLS                                                                 | Pleasure                                | Nine involvement items of pleasure, centrality, and sign                                                             | Indirect path: $\beta = .00$ ns, direct path: $\beta = .04$ ns, indirect path through behavioural loyalty and then through pleasure: $\beta = .01$ , $p < .01$      |                                                                            |                                                                             | No                          |                             |     |
|             | Sato [185]              | 2016 | Runners                       | Running                  | Participation in a running event                                                                                                                                | Life satisfaction                               | 5-item SWLS                                                                 | Centrality                              | Nine involvement items of pleasure, centrality, and sign                                                             | Indirect path $\beta = -.00$ ns, direct path $\beta = .04$ ns, indirect path through behavioural loyalty and then through pleasure: $\beta = -.0011$ ns             |                                                                            |                                                                             | No                          |                             |     |
|             | Sato [185]              | 2016 | Runners                       | Running                  | Participation in a running event                                                                                                                                | Life satisfaction                               | 5-item Satisfaction with Life Scale                                         | Sign                                    | Nine involvement items of pleasure, centrality, and sign                                                             | Indirect path: $\beta = .00$ ns, direct path: $\beta = .04$ ns, indirect path through behavioural loyalty and then through pleasure: $\beta = .01$ , $p < .05$      |                                                                            |                                                                             | No                          |                             |     |
|             | González-Hernández [78] | 2019 | Adolescents                   | Physical activity        | Global Physical Activity Questionnaire (GPAQv2)                                                                                                                 | Psychological Wellbeing                         | Psychological flourishing scale                                             | Perfectionism                           | Multidimensional Perfection Scale                                                                                    | Vigorous PA indirect effect: $\beta = .58$ ; $p < .01$ ), Non-vigorous PA indirect effect: $\beta = -.26$ ; $p < .001$                                              |                                                                            |                                                                             | Yes                         |                             |     |
|             | Greenleaf [80]          | 2009 | Undergraduate students        | School sport             | High School Sport Participation questionnaire                                                                                                                   | Psychological wellbeing                         | SWLS + 10-item Self-Esteem Scale (SES)                                      | Instrumentality                         | 20-item Instrumentality Scale + 8-item Masculinity scale from the Personal Attributes Questionnaire—Short Form (PAQ) | Sport to instrumentality: $\beta = .60$ , $p < .05$ , instrumentality to body image: $\beta = .25$ , $p < .05$ , body image to wellbeing: $\beta = .27$ , $p < .05$ |                                                                            |                                                                             | Yes                         |                             |     |
|             | Kukihara [118]          | 2018 | Older adults                  | Physical activity        | No physical activity; physically active 3–4 days a week; or active 30-min every day                                                                             | Depression                                      | Geriatric Depression Scale Short Form                                       | Morale                                  | Philadelphia Geriatric Center Morale Scale                                                                           | $z = -2.34$ , $p = .01$                                                                                                                                             | $\beta = .13$ , $p = .009$                                                 | $B = -.754$ , $p = .0001$                                                   | $\beta = -.17$ , $p = .001$ | Yes                         |     |
|             | Kukihara [118]          | 2018 | Older adults                  | Physical activity        | No physical activity; physically active 3–4 days a week; or active 30-min every day                                                                             | Mental health                                   | The Medical Outcomes Short Form 8 (SF-8) mental health subscale             | Morale                                  | Philadelphia Geriatric Center Morale Scale                                                                           | $z = 2.32$ , $p = .01$                                                                                                                                              | $\beta = .13$ , $p = .009$                                                 | $B = .612$ , $p = .0001$                                                    | $\beta = .09$ , $p = .043$  | Yes                         |     |
|             | Cecchini [29]           | 2019 | College students              | Vigorous PA              | IPAQ                                                                                                                                                            | Depressive symptoms                             | Depressive Symptoms Scale (DSS)                                             | Approach-avoidance contrast temperament | Approach-Avoidance Temperament Questionnaire                                                                         | Total effect through approach-avoidance contrast temperament $\beta = -.015$ , $p < .001$ , direct effect $\beta = .05$ , $p > .05$                                 |                                                                            | $\beta = .31$ , $p < .001$                                                  | $\beta = -.28$ , $p < .001$ | $\beta = -.15$ , $p < .001$ | Yes |
|             | Chen [36]               | 2022 | Older adolescents and adults  | Exercise                 | Self-designed exercise questionnaire                                                                                                                            | Psychological distress (Depression and Anxiety) | Generalized Anxiety Disorder Scale-7 and the Patient Health Questionnaire-9 | Hope                                    | Adult Dispositional Hope Scale                                                                                       | $\beta = -0.046$ , 95% CI = $-0.064$ , $-0.027$ , $p < .001$                                                                                                        |                                                                            |                                                                             |                             | Yes                         |     |
|             | Chen [36]               | 2022 | Older adolescents and adults  | Exercise                 | self-designed exercise questionnaire                                                                                                                            | Psychological distress (Depression and Anxiety) | Generalized Anxiety Disorder Scale-7 and the Patient Health Questionnaire-9 | Hope                                    | Adult Dispositional Hope Scale                                                                                       | $\beta = -0.060$ , 95% CI = $-0.081$ , $-0.039$ , $p < .001$                                                                                                        |                                                                            |                                                                             |                             | Yes                         |     |
|             | Zhang, X. [237]         | 2022 | Adults                        | Exercise                 | Self-report                                                                                                                                                     | Subjective wellbeing                            | Brief Subjective Well-Being Scale for Chinese Citizens                      | Sense of hope                           | State Hope Scale                                                                                                     | Indirect effect = 0.131, CI = 0.094, 0.185                                                                                                                          |                                                                            |                                                                             |                             | Yes                         |     |

|                                                    |                |      |                                |                                |                                                                                             |                         |                                               |                                 |                                                                                                                                      |                                                                                      |                        |                        |                         |     |
|----------------------------------------------------|----------------|------|--------------------------------|--------------------------------|---------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------|------------------------|-------------------------|-----|
| Psychological factors related to physical activity | Jenkins [102]  | 2022 | Adults                         | Nature-based PA                | IPAQ-SF                                                                                     | Psychological wellbeing | Questionnaire for Eudaimonic Wellbeing (QWEB) | Motivation                      | BREQ-3                                                                                                                               |                                                                                      | $\beta = .29, p < .05$ | $\beta = .13, p > .05$ | $\beta = -.05, p > .05$ | Yes |
|                                                    | Jenkins [102]  | 2022 | Adults                         | Nature-based PA                | IPAQ-SF                                                                                     | Hedonic Wellbeing       | WHO-5                                         | Motivation                      | BREQ-3                                                                                                                               |                                                                                      | $\beta = .29, p < .05$ | $\beta = .09, p < .05$ | $\beta = .04, p > .05$  | Yes |
|                                                    | Jenkins [101]  | 2021 | Adults                         | Weekly physical activity       | IPAQ-SF                                                                                     | Psychological wellbeing | WHO-5                                         | Intrinsic motivation            | BREQ-3 PA                                                                                                                            | 0.06 (0.01–0.12)                                                                     | $\beta = .43, p < .05$ | $\beta = .14, p < .05$ | $\beta = .17, p < .05$  | Yes |
|                                                    | Smith [189]    | 2018 | Adolescents                    | Resistance training            | Intervention vs control                                                                     | Subjective wellbeing    | Psychological flourishing scale               | Intrinsic motivation            | Subscale from the Physical Self-Perception Profile                                                                                   | Indirect effect: $\beta = .05, 95\% \text{ CI} = -.101, .190$                        |                        |                        |                         | No  |
|                                                    | Smith [189]    | 2018 | Adolescents                    | Resistance training            | Intervention vs control                                                                     | Subjective wellbeing    | Psychological flourishing scale               | Identified regulation           | Subscale from the Physical Self-Perception Profile                                                                                   | Indirect effect: $\beta = -.02, 95\% \text{ CI} = -.183, .125$                       |                        |                        |                         | No  |
|                                                    | Jenkins [101]  | 2021 | Adults                         | Weekly physical activity       | IPAQ-SF                                                                                     | Psychological wellbeing | WHO-5                                         | Introjected regulation          | BREQ-3 PA                                                                                                                            | −0.03 (−0.05 to −0.01)                                                               | $\beta = .18, p < .05$ | $\beta = .17, p < .05$ | $\beta = .17, p < .05$  | Yes |
|                                                    | Kruk [116]     | 2019 | Adults                         | Leisure time PA T1             | GLTEQ                                                                                       | Depression T2           | CES-D                                         | PA liking T2                    | Liking of vigorous PA, liking sports, and PA enjoyment subscales derived from the Child Attraction to Physical Activity Scale (CAPA) | Indirect effect $B = <.01, <.01, p > .05$ , direct effect: $B = <.01, <.01, p > .05$ |                        |                        |                         | No  |
|                                                    | Lin (b) [133]  | 2022 | Undergrad students             | Exercise                       | Self-report                                                                                 | Subjective wellbeing    | Satisfaction with Life Scale (SWLS) + PANAS   | Psychological need satisfaction | Psychological Need Satisfaction in Exercise Scale                                                                                    | Indirect effect = 0.17, 95% CI = 0.12, 0.23                                          |                        |                        |                         | Yes |
|                                                    | Mack [145]     | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                       | Positive affect         | PANAS                                         | Autonomy                        | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                                                     | Indirect effect: $\beta = .03, 95\% \text{ CI} = -.03, .12, \text{ ns}$              | $r = .07$              | $r = .24^{**}$         | $r = .20^*$             | No  |
|                                                    | Mack [145]     | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                       | Negative affect         | PANAS                                         | Autonomy                        | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                                                     | Indirect effect: $\beta = .01, 95\% \text{ CI} = -.02, .09, \text{ ns}$              | $r = .07$              | $r = -.14$             | $r = -.18^*$            | No  |
|                                                    | Mack [145]     | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                       | Stress                  | 10-item Perceived Stress Scale (PSS)          | Autonomy                        | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                                                     | Indirect effect: $\beta = -.001, 95\% \text{ CI} = -.07, .05, \text{ ns}$            | $r = .07$              | $r = -.22^{**}$        | $r = -.06$              | No  |
|                                                    | Mack [146]     | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                       | Depression              | CES-D                                         | Autonomy                        | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                                                     | Indirect effect: $\beta = .01, 95\% \text{ CI} = -.02, .08, \text{ ns}$              | $r = .07$              | $r = -.13$             | $r = -.21^{**}$         | No  |
|                                                    | Doré [52]      | 2020 | Children                       | Leisure-time PA                | Free-time engagement in PA via a 36-item PA and sport checklist.                            | Mental health           | Mental Health Continuum-Short Form (MHC-SF)   | Autonomy                        | 7-item autonomy subscale of the Basic Psychological Needs in Life Scale                                                              | Indirect effect $\beta = 1.06, p < .05$ , direct effect $\beta = -.22, p > .05$      |                        |                        |                         | Yes |
|                                                    | O'Rourke [165] | 2023 | Adults with a disability       | Leisure-time physical activity | Leisure-Time Physical Activity Questionnaire for People with Spinal Cord Injury (LTPAQ-SCI) | Mental health           | Mental Health Continuum-Short Form (MHC-SF)   | Autonomy                        | Basic Psychological Need Satisfaction Scale in General (BNSG-S)                                                                      | $\beta = 0.05, 95\% \text{ CI} = 0.00, 0.12$                                         | $b = .001, p = .01$    | $b = 2.93, p = .02$    | $b = .019, p = .01$     | Yes |
|                                                    | Mack [145]     | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                       | Depression              | CES-D                                         | Competence                      | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                                                     | Indirect effect: $\beta = -.003, 95\% \text{ CI} = -.07, .02, \text{ ns}$            | $r = .21^*$            | $r = -.09$             | $r = -.21^{**}$         | No  |
|                                                    | Mack [145]     | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                       | Negative affect         | PANAS                                         | Competence                      | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                                                     | Indirect effect: $\beta = -.02, 95\% \text{ CI} = -.11, .01, \text{ ns}$             | $r = .21^*$            | $r = -.07$             | $r = -.18^*$            | No  |
|                                                    | Mack [145]     | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                       | Positive affect         | PANAS                                         | Competence                      | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                                                     | Indirect effect $\beta = .02, 95\% \text{ CI} = -.01, .10, \text{ ns}$               | $r = .21^*$            | $r = .23^{**}$         | $r = .20^*$             | No  |
|                                                    | Mack [145]     | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                       | Stress                  | 10-item Perceived Stress Scale (PSS)          | Competence                      | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                                                     | Indirect effect: $\beta = -.01, 95\% \text{ CI} = -.09, .02, \text{ ns}$             | $r = .21^*$            | $r = -.14$             | $r = -.06$              | No  |
|                                                    | Doré [52]      | 2020 | Children                       | Leisure-time PA                | Free-time engagement in PA via a 36-item PA and sport checklist.                            | Mental health           | Mental Health Continuum-Short Form (MHC-SF)   | Competence                      | Intrinsic Motivation Inventory                                                                                                       | Indirect effect: $\beta = -.67, p > .05$ , direct effect: $\beta = -.22, p > .05$    |                        |                        |                         | Yes |
|                                                    | O'Rourke [165] | 2023 | Adults with a disability       | Leisure-time physical activity | Leisure-Time Physical Activity Questionnaire for People with Spinal Cord Injury (LTPAQ-SCI) | Mental health           | Mental Health Continuum-Short Form (MHC-SF)   | Competence                      | Basic Psychological Need Satisfaction Scale in General (BNSG-S)                                                                      | $\beta = 0.16, 95\% \text{ CI} = 0.08, 0.25$                                         | $b = .002, p < .001$   | $b = 5.40, p < .001$   | $b = .019, p = .01$     | Yes |

|                 |      |                                |                                |                                                                                                                 |                                                 |                                                            |                                             |                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |                         |                        |     |
|-----------------|------|--------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------|------------------------|-----|
| Mack [145]      | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                                           | Negative affect                                 | PANAS                                                      | Relatedness                                 | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                   | Indirect effect: $\beta = -.05$ , 95% CI = $-.22, .02$ , ns                                                                                                                                                                                                                                                                                                                                                                       | $r = .13$              | $r = -.24^{**}$         | $r = -.18^*$           | No  |
| Mack [145]      | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                                           | Positive affect                                 | PANAS                                                      | Relatedness                                 | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                   | Indirect effect: $\beta = .04$ , 95% CI = $.01, .16$ , $p < .01$                                                                                                                                                                                                                                                                                                                                                                  | $r = .13$              | $r = .30^{**}$          | $r = .20^*$            | Yes |
| Mack [145]      | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                                           | Stress                                          | 10-item Perceived Stress Scale (PSS)                       | Relatedness                                 | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                   | Indirect effect: $\beta = -.04$ , 95% CI = $-.15, .01$ , ns                                                                                                                                                                                                                                                                                                                                                                       | $r = .13$              | $r = -.24^{**}$         | $r = -.06$             | No  |
| Mack [145]      | 2013 | Female breast cancer survivors | Leisure time PA                | GLTEQ                                                                                                           | Depression                                      | CES-D                                                      | Relatedness                                 | 18-item Psychological Need Satisfaction in Exercise Scale (PNSE;                                   | Indirect effect: $\beta = -.02$ , 95% CI = $-.11, .01$ , ns                                                                                                                                                                                                                                                                                                                                                                       | $r = .13$              | $r = -.20^*$            | $r = -.21^{**}$        | No  |
| Doré [52]       | 2020 | Children                       | Leisure-time PA                | Free-time engagement in PA via a 36-item PA and sport checklist.                                                | Mental health                                   | Mental Health Continuum-Short Form (MHC-SF)                | Relatedness                                 | Relatedness to Others in Physical Activity Scale                                                   | Indirect effect: $\beta = 1.45$ , $p < .05$ , direct effect $\beta = -.22$ , $p > .05$                                                                                                                                                                                                                                                                                                                                            |                        |                         |                        | Yes |
| O'Rourke [165]  | 2023 | Adults with a disability       | Leisure-time physical activity | Leisure-Time Physical Activity Questionnaire for People with Spinal Cord Injury (LTPAQ-SCI)                     | Mental health                                   | Mental Health Continuum-Short Form (MHC-SF)                | Relatedness                                 | Basic Psychological Need Satisfaction Scale in General (BNSG-S)                                    | $\beta = 0.08$ , 95% CI = 0.02 to 0.17                                                                                                                                                                                                                                                                                                                                                                                            | $b = .001$ , $p = .02$ | $b = 4.94$ , $p < .001$ | $b = .019$ , $p = .01$ | Yes |
| Chen [35]       | 2019 | Older adults                   | Physical activity              | 33 items that captured a wide range of activities (reading, walking, volunteering, visiting with friends, etc.) | Depressive symptoms                             | Modified version of the CES-D                              | Nature of engagement                        | Two questions asking how often respondents use their body and mind when they were doing activities | Full engagement mediated activity and depressive association when comparing moderate activity vs passive activity (95% CI = $-.20, -.01$ ). Full engagement mediated activity and depressive association when comparing high activity vs passive activity (95% CI = $-.56, -.04$ ). Full engagement did not mediate activity and depressive association when comparing low activity vs passive activity (95% CI = $-.15, .001$ ). |                        |                         |                        | Yes |
| Ryan [182]      | 2008 | Undergraduate students         | Aerobic activity               | Six-item Physical Activity subscale of the PSDQ                                                                 | Depression                                      | items from the SCL90R Depression subscale (SCL90R-D)       | Scheduling efficacy                         | Developed by the author                                                                            | PA to scheduling efficacy: $\beta = .54$ , $p < .001$ (males) $\beta = .52$ , $p < .001$ (females) Scheduling efficacy to Depression: $\beta = -.43$ , $p = .015$ (males) $\beta = -.30$ , $p = .02$ (females), direct path from PA to depression $\beta = .03$ , ns (males) $\beta = .00$ , ns (females)                                                                                                                         |                        |                         |                        | No  |
| Nezlek [162]    | 2018 | Regular runners                | Running                        | Indicated if they had ran the previous day                                                                      | Life satisfaction                               | three items based on the SWLS                              | Satisfaction with perceived progress        | One item - "How satisfied were you with this progress?"                                            | Indirect effect: $\beta = .10$ , $p < .001$                                                                                                                                                                                                                                                                                                                                                                                       |                        |                         |                        | Yes |
| Nezlek [162]    | 2018 | Regular runners                | Running                        | Indicated if they had ran the previous day                                                                      | Positive activated affect                       | Based on the circumplex mode                               | Satisfaction with perceived progress        | One item - "How satisfied were you with this progress?"                                            | Indirect effect: $\beta = .12$ , $p < .001$                                                                                                                                                                                                                                                                                                                                                                                       |                        |                         |                        | Yes |
| Nezlek [162]    | 2018 | Regular runners                | Running                        | Indicated if they had ran the previous day                                                                      | Positive deactivated affect                     | Based on the circumplex mode                               | Satisfaction with perceived progress        | One item - "How satisfied were you with this progress?"                                            | Indirect effect: $\beta = .09$ , $p < .001$                                                                                                                                                                                                                                                                                                                                                                                       |                        |                         |                        | Yes |
| Nezlek [162]    | 2018 | Regular runners                | Running                        | Indicated if they had ran the previous day                                                                      | Negative activated affect                       | Based on the circumplex mode                               | Satisfaction with perceived progress        | One item - "How satisfied were you with this progress?"                                            | Indirect effect: $\beta = -.07$ , $p < .001$                                                                                                                                                                                                                                                                                                                                                                                      |                        |                         |                        | Yes |
| Nezlek [162]    | 2018 | Regular runners                | Running                        | Indicated if they had ran the previous day                                                                      | Negative deactivated affect                     | Based on the circumplex mode                               | Satisfaction with perceived progress        | One item - "How satisfied were you with this progress?"                                            | Indirect effect: $\beta = -.10$ , $p < .001$                                                                                                                                                                                                                                                                                                                                                                                      |                        |                         |                        | Yes |
| Sato [185]      | 2016 | Runners                        | Running                        | Participation in a running event                                                                                | Life satisfaction                               | 5-item Satisfaction with Life Scale                        | Behavioural loyalty                         | the average number of days and miles run per week during the last 3 months                         | Indirect path: $\beta = .01$ ns, direct path $\beta = .04$ ns                                                                                                                                                                                                                                                                                                                                                                     |                        |                         |                        | No  |
| Zhang, Z. [235] | 2022 | College students               | Physical activity              | IPAQ-SF                                                                                                         | Psychological distress (Depression and Anxiety) | Chinese version of Depression Anxiety Stress Scale (DASS-2 | Exercise intensity-tolerance and preference | Chinese version (under review) of the Preference for and Tolerance of the Intensity of Exercise    | Indirect effect = 0.006714, 95% CI = 0.000032, 0.000128                                                                                                                                                                                                                                                                                                                                                                           |                        |                         |                        | Yes |

|                             |                 |      |                                |                                |                                                                                                       |                                                                         |                                                                                                                                                                           |                                                                                    |                                                                 |                                                                                                                        |                         |                        |                          |     |
|-----------------------------|-----------------|------|--------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------|--------------------------|-----|
|                             |                 |      |                                |                                |                                                                                                       |                                                                         |                                                                                                                                                                           |                                                                                    | Questionnaire (PRETIE-Q)                                        |                                                                                                                        |                         |                        |                          |     |
|                             | Zeibig [231]    | 2023 | Adults                         | Exercise                       | Group allocation to intervention vs control                                                           | Psychological distress                                                  | Symptom Checklist-90, SCL-90-R                                                                                                                                            | exercise-specific affect regulation                                                | Physical Activity-related Health Competence Questionnaire)      | $\beta = 0.28, p = .037$                                                                                               |                         |                        |                          | Yes |
|                             | Baker [11]      | 2023 | Women                          | Leisure-time physical activity | IPAQ                                                                                                  | Depressive symptoms                                                     | CES-D 10                                                                                                                                                                  | Enjoyment of PA                                                                    | Adapted from other measures                                     | $\beta = -0.016 (-0.030, -0.001)$                                                                                      |                         |                        |                          | Yes |
|                             | Baker [11]      | 2023 | Women                          | Transport physical activity    | IPAQ                                                                                                  | Depressive symptoms                                                     | CES-D 19                                                                                                                                                                  | Enjoyment of PA                                                                    | Adapted from other measures                                     | $\beta = -0.003 (-0.008, -0.0001)$                                                                                     |                         |                        |                          | No  |
|                             | Baker [11]      | 2023 | Women                          | Occupational physical activity | IPAQ                                                                                                  | Depressive symptoms                                                     | CES-D 28                                                                                                                                                                  | Enjoyment of PA                                                                    | Adapted from other measures                                     | $\beta = 0.000 (-0.004, 0.005)$                                                                                        |                         |                        |                          | No  |
|                             | Baker [11]      | 2023 | Women                          | Domestic physical activity     | IPAQ                                                                                                  | Depressive symptoms                                                     | CES-D 37                                                                                                                                                                  | Enjoyment of PA                                                                    | Adapted from other measures                                     | $\beta = -0.001 (-0.004, 0.001)$                                                                                       |                         |                        |                          | No  |
| Other psychological factors | Feuerhahn [64]  | 2012 | Adults                         | Exercise after work            | Self-reported duration of exercise that evening                                                       | Positive affect (in the evening)                                        | 6 items from the PANAS positive affect scale                                                                                                                              | Psychological detachment                                                           |                                                                 | $z = 2.74, p < .01$                                                                                                    | $r = .10, p < .01$      | $r = .20, p < .01$     | $r = .22, p < .01$       | Yes |
|                             | Ginoux [75]     | 2021 | Adults (during Covid lockdown) | Physical activity (MVPA)       | IPAQ                                                                                                  | Wellbeing (i.e., vitality, stress, and psychological need satisfaction) | French versions of the of the Subjective Vitality Scale, four-item Perceived Stress Scale (PSS), and Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS) | Recovery experience (i.e., psychological detachment, relaxation, mastery, control) | French version of the Recovery Experience Questionnaire         | Indirect effect: $\beta = .19, 95\% \text{ CI} = .01, .02$ , direct effect $\beta = -.02, 95\% \text{ CI} = -.01, .01$ |                         |                        |                          | Yes |
|                             | Marseille [149] | 206  | Regular walkers                | Walking                        | Perceived intensity                                                                                   | Positive affect                                                         | PANAS                                                                                                                                                                     | Perceived restorativeness                                                          | 16-item Perceived Restorativeness Scale                         | $ab = 0.11, p < .001, \text{ CI} = .06, .16$                                                                           | $B = .85, p < .05$      | $B = .13, p < .05$     | $B = .40, p < .001$      | Yes |
|                             | Marseille [149] | 206  | Regular walkers                | Walking                        | Perceived intensity                                                                                   | Negative affect                                                         | PANAS                                                                                                                                                                     | Perceived restorativeness                                                          | 16-item Perceived Restorativeness Scale                         | $ab = 0.01, p = .01, \text{ CI} = .02, .00$                                                                            | $B = .96, p < .05$      | $B = -.01, p < .05$    | $B = .04, \text{ ns}$    | Yes |
|                             | Marseille [149] | 2016 | Regular walkers                | Walking                        | Duration                                                                                              | Positive affect                                                         | PANAS                                                                                                                                                                     | Perceived restorativeness                                                          | 16-item Perceived Restorativeness Scale                         | $ab = .12, p = .05, \text{ CI} = .00, .25$                                                                             | $B = .91, \text{ ns}$   | $B = .13, p < .05$     | $B = .22, \text{ ns}$    | No  |
|                             | Marseille [149] | 2016 | Regular walkers                | Walking                        | Duration                                                                                              | Negative affect                                                         | PANAS                                                                                                                                                                     | Perceived restorativeness                                                          | 16-item Perceived Restorativeness Scale                         |                                                                                                                        | $B = 1.13, p < .05$     | $B = -.01, p < .05$    | $B = -.20, \text{ ns}$   | No  |
|                             | Tihanyi [201]   | 2015 | Advanced yoga participants     | Yoga                           | Self-reported yoga frequency                                                                          | Psychological wellbeing                                                 | WHO-5                                                                                                                                                                     | Mindfulness                                                                        | Mindful Attention and Awareness Scale                           | Indirect effect: $\beta = .20, p < .01$                                                                                | $r = .22, p < .01$      | $r = .33, p < .001$    | $r = .26, p < .001$      | No  |
|                             | Goldstein [76]  | 2020 | Adults                         | Exercise                       | Intervention vs control                                                                               | Stress                                                                  | 10-item Perceived Stress Scale (PSS)                                                                                                                                      | Mindful attention awareness                                                        | Mindful Attention Awareness Scale (MAAS)                        | Indirect effect $\beta = -.02, p = .03$ , direct effect $\beta = -.12, p = .004$                                       |                         |                        |                          | Yes |
|                             | Goldstein [76]  | 2020 | Adults                         | Exercise                       | Intervention vs control                                                                               | Stress                                                                  | 10-item Perceived Stress Scale (PSS)                                                                                                                                      | Mindfulness self-efficacy                                                          | Mindfulness-Based Self-Efficacy Scale - Revised (MSES-R)        | Indirect effect $\beta = -.06, p = .04$ , direct effect $\beta = -.12, p = .004$                                       |                         |                        |                          | Yes |
|                             | La Rocque [119] | 2021 | Women                          | Yoga                           | Intervention vs control                                                                               | Depression                                                              | 17-item HAM-D                                                                                                                                                             | Mindfulness acceptance                                                             | 20-item Philadelphia Mindfulness Scale                          | Indirect effect: Coef = -1.67, 95% CI = -4.09, .11                                                                     |                         |                        |                          | No  |
|                             | La Rocque [119] | 2021 | Women                          | Exercise                       | Intervention vs control                                                                               | Depression                                                              | 17-item HAM-D                                                                                                                                                             | Mindfulness acceptance                                                             | 20-item Philadelphia Mindfulness Scale                          | Indirect effect: Coef = -2.67, 95% CI = -5.26, -.55                                                                    |                         |                        |                          | Yes |
|                             | La Rocque [119] | 2021 | Women                          | Yoga                           | Intervention vs control                                                                               | Depression                                                              | 17-item HAM-D                                                                                                                                                             | Rumination                                                                         | Ruminative Responses Scale                                      | Indirect effect: Coef = -3.02, 95% CI = -5.67, -.50                                                                    |                         |                        |                          | Yes |
|                             | La Rocque [119] | 2021 | Women                          | Exercise                       | Intervention vs control                                                                               | Depression                                                              | 17-item HAM-D                                                                                                                                                             | Rumination                                                                         | Ruminative Responses Scale                                      | Indirect effect: Coef = -4.43, 95% CI = -6.99, -1.83                                                                   |                         |                        |                          | Yes |
|                             | Kukihara [118]  | 2018 | Older adults                   | Physical activity              | No physical activity; physically active 3–4 days a week; or active 30-min every day                   | Depression                                                              | Geriatric Depression Scale Short Form                                                                                                                                     | Sense of coherence                                                                 | The SOC Scale                                                   | not reported                                                                                                           | $\beta = .05, p = .183$ | $B = -4.994, p = .000$ | $\beta = -.17, p = .001$ | No  |
|                             | Kukihara [118]  | 2018 | Older adults                   | Physical activity              | No physical activity; physically active 3–4 days a week; or active 30-min physical activity every day | Mental health                                                           | The Medical Outcomes Short Form 8 (SF-8) mental health subscale                                                                                                           | Sense of coherence                                                                 | The SOC Scale                                                   | not reported                                                                                                           | $\beta = .05, p = .183$ | $B = 0.427, p = .0001$ | $\beta = .09, p = .043$  | No  |
|                             | Chen [36]       | 2022 | Older adults                   | Physical activity              | Physical Activity Rating Scale (PARS-3)                                                               | Subjective wellbeing                                                    | e Subjective Well-Being Scale (SWB)                                                                                                                                       | Sense of meaning in life                                                           | Meaningful Life Scale (MLQ)                                     | indirect effect $\beta = .0854, \text{ CI} = 0.0474, 0.1331$                                                           | .119, p<.001            | .063, p<.001           | .031, p<.001             | Yes |
|                             | Chen [36]       | 2022 | Older adults                   | Physical activity              | Physical Activity Rating Scale (PARS-3)                                                               | Subjective wellbeing                                                    | e Subjective Well-Being Scale (SWB)                                                                                                                                       | Sense of meaning in life + self esteem                                             | Meaningful Life Scale (MLQ) + Rosenberg Self-Esteem Scale (SES) | indirect effect $\beta = .0237, \text{ CI} = .0116, .0396$                                                             |                         |                        |                          | Yes |

|                 |      |                     |                     |                                                                                                        |                                                 |                                                                 |                                                   |                                                                     |                                                                                                                                                                                                                      |                                   |                                   |                                  |     |
|-----------------|------|---------------------|---------------------|--------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|----------------------------------|-----|
| Precht [176]    | 2021 | University students | Physical activity   | One item measure                                                                                       | Mental health                                   | Positive mental health scale                                    | Sense of control                                  | Two items                                                           | Indirect effect = .42, 95%CI = .207, .628                                                                                                                                                                            | $\beta = -.28$                    | $\beta = -1.46$                   | $\beta = .89$                    | Yes |
| Precht [176]    | 2021 | University students | Physical activity   | One item measure                                                                                       | Depression                                      | DASS-21                                                         | Sense of control                                  | Two items                                                           | Indirect effect = -.42, 95%CI = -.207, -.629                                                                                                                                                                         |                                   |                                   |                                  | Yes |
| Precht [176]    | 2021 | University students | Physical activity   | One item measure                                                                                       | Anxiety                                         | DASS-22                                                         | Sense of control                                  | Two items                                                           | Indirect effect = -.30, 95%CI = -.457, -.154                                                                                                                                                                         |                                   |                                   |                                  | Yes |
| Precht [176]    | 2021 | University students | Physical activity   | One item measure                                                                                       | Stress                                          | DASS-23                                                         | Sense of control                                  | Two items                                                           | Indirect effect = -.35, 95%CI = -.527, -.173                                                                                                                                                                         |                                   |                                   |                                  | Yes |
| Zhou [243]      | 2023 | College students    | Physical activity   | Physical Activity Rating Scale                                                                         | Life Satisfaction                               | Life Satisfaction Scale                                         | Self-control                                      | self-control scale                                                  | $\beta = .06$ , CI = .04, .10                                                                                                                                                                                        | $\beta = .21$ , $p < .05$         | $\beta = .30$ , $p < .05$         | $\beta = -.01$ , $p > .05$       | Yes |
| Kayani [109]    | 2021 | University students | Physical activity   | Self-report                                                                                            | Anxiety                                         | State-Trait Anxiety Inventory (STAI Y-6)                        | Self-criticism                                    | Level of SC scale (LOSC)                                            | -0.0498 (-0.1018, -0.0099)                                                                                                                                                                                           | $\beta = -.133$                   | $\beta = .372$                    | $\beta = -.176$                  | Yes |
| Tang [196]      | 2022 | College students    | Physical activity   | Physical activity rating scale (PARS-3)                                                                | Depression                                      | The “Depression Self-Rating Scale (SDS)”                        | Emotional regulation self-efficacy                | The “Emotional Regulation Self-Efficacy Scale (RES)”                | Indirect effect = -.031, CI = -.072, -.001                                                                                                                                                                           |                                   |                                   |                                  | Yes |
| Tang [196]      | 2022 | College students    | Physical activity   | Physical activity rating scale (PARS-3)                                                                | Anxiety                                         | The “Anxiety Scale (SAS-CR)”                                    | Emotional regulation self-efficacy                | The “Emotional Regulation Self-Efficacy Scale (RES)”                | Indirect effect = -.104, CI = -.160, -.057                                                                                                                                                                           |                                   |                                   |                                  | Yes |
| Wang [208]      | 2022 | College students    | Physical activity   | Physical Activity Rating Scale (PARS-3)                                                                | Subjective Well-Being                           | Subjective Well-Being Scale (SWS)                               | Emotional intelligence                            | Emotional Intelligence Scale (EIS)                                  | ES = 0.077                                                                                                                                                                                                           |                                   |                                   |                                  | Yes |
| Fernandes [62]  | 2024 | Adolescents         | Sport Participation | Single-item question                                                                                   | Life satisfaction                               | Satisfaction with Life Scale                                    | Emotional intelligence - self-emotional appraisal | Portuguese version of the Wong and Law Emotional Intelligence Scale | Indirect effect = .03, 95% CI = .01, .07                                                                                                                                                                             |                                   |                                   |                                  | Yes |
| Fernandes [62]  | 2024 | Adolescents         | Sport Participation | Single-item question                                                                                   | Life satisfaction                               | Satisfaction with Life Scale                                    | Emotional intelligence - use of emotion           | Portuguese version of the Wong and Law Emotional Intelligence Scale | Indirect effect = .06, 95% CI = .02, .12                                                                                                                                                                             |                                   |                                   |                                  | Yes |
| Kozielly [114]  | 2022 | Adults              | Physical activity   | Stanford Brief Activity Survey (SBAS)                                                                  | Psychological distress                          | 21-item Depression, Anxiety, and Stress Scale (DASS21)          | Stress appraisal                                  | Stress Appraisal Measure                                            | Effect = -0.28 (se = 0.13), CI.95 [-0.56, -0.06]                                                                                                                                                                     |                                   |                                   |                                  | Yes |
| Kozielly [114]  | 2022 | Adults              | Physical activity   | Stanford Brief Activity Survey (SBAS)                                                                  | Psychological distress                          | 21-item Depression, Anxiety, and Stress Scale (DASS21)          | Stress appraisal                                  | Stress Appraisal Measure                                            | Effect = -0.16 (se = 0.11), CI.95 [-0.39, 0.04]                                                                                                                                                                      |                                   |                                   |                                  | No  |
| Kozielly [114]  | 2022 | Adults              | Physical activity   | Stanford Brief Activity Survey (SBAS)                                                                  | Psychological distress                          | 21-item Depression, Anxiety, and Stress Scale (DASS21)          | Stress appraisal                                  | Stress Appraisal Measure                                            | Effect = -0.11 (se = 0.10), CI.95 [-0.32, 0.07]                                                                                                                                                                      |                                   |                                   |                                  | No  |
| Ho [94]         | 2015 | School students     | Physical activity   | Physical Activity Rating Questionnaire for Children and Youth (PARCY)                                  | Mental health                                   | SF-36 MCS                                                       | Resilience                                        | Connor-Davidson Resilience Scale (CD-RISC)                          | Single mediation model: b = .35, $p < .001$ , mediation proportion = 68%<br>Model including self-efficacy, resilience, and social connectedness: indirect effect b = .31, $p < .001$ , direct effect = 16, $p = .18$ | $B = 1.60$ , $p < .001$           | $B = .19$ , $p < .001$            | $B = .16$ , ns                   | Yes |
| Kukihara [118]  | 2018 | Older adults        | Physical activity   | No physical activity; physically active 3–4 days a week; or active 30-min every day                    | Depression                                      | Geriatric Depression Scale Short Form                           | Resilience                                        | The Resilience Scale                                                | $z = -3.10$ , $p = .0001$                                                                                                                                                                                            | $\beta = .18$ , $p = .001$        | $\beta = -.50$ , $p = .0001$      | $\beta = -.17$ , $p = .001$      | Yes |
| Kukihara [118]  | 2018 | Older adults        | Physical activity   | No physical activity; physically active 3–4 days a week; or active 30-min every day                    | Mental health                                   | The Medical Outcomes Short Form 8 (SF-8) mental health subscale | Resilience                                        | The Resilience Scale                                                | $z = 2.63$ , $p = .004$                                                                                                                                                                                              | $\beta = .18$ , $p = .001$        | $\beta = .30$ , $p = .0001$       | $\beta = .09$ , $p = .043$       | Yes |
| Yoshikawa [227] | 2016 | Employees           | Exercise Frequency  | One item – In the last six months, how often did you do relatively hard exercise for more than 20 min? | Depression                                      | CES-D                                                           | Resilience                                        | Resilience Scale                                                    | BCACI = -1.89 to -.094                                                                                                                                                                                               | $B = 3.20$ , SE = 1.30, $p = .01$ | $B = -0.30$ , SE = .02, $p < .01$ | $B = -.17$ , SE = .72, $p = .81$ | Yes |
| Zhang, Z. [235] | 2022 | College students    | Physical activity   | IPAQ-SF                                                                                                | Psychological distress (Depression and Anxiety) | Chinese version of Depression Anxiety Stress Scale (DASS-2)     | Resilience                                        | Chinese version of Connor-Davidson resilience scale (CD-RISC)       | Indirect effect = -.024934, 95% CI = -0.000406, -.000048                                                                                                                                                             |                                   |                                   |                                  | Yes |
| Liang [131]     | 2022 | Children with ADHD  | MVPA                | Accelerometer                                                                                          | Psychological distress                          | Depression Anxiety Stress Scale 21 (DASS-21)                    | Resilience                                        | Conner-Davidson Resilience Scale (CD-RISC-25)                       | -0.006%, 95% confidence interval [CI] = [-0.060, -0.020]                                                                                                                                                             |                                   |                                   |                                  | Yes |
| Xin [222]       | 2023 | Older adults        | Exercise            | Self-report                                                                                            | Anxiety                                         | generalized anxiety disorder 7-item (GAD-7)                     | Psychological resilience                          | Conner–Davidson resilience scale (CD-RISC)                          |                                                                                                                                                                                                                      |                                   |                                   |                                  | Yes |

|                 |      |                                    |                                |                                                  |                        |                                                                     |                                                                                    |                                                                                        |                                                                                                                                                             |      |       |       |     |
|-----------------|------|------------------------------------|--------------------------------|--------------------------------------------------|------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|-------|-----|
| Jia [104]       | 2023 | Obese primary school students      | Physical activity              | Liang Deqing physical activity rating Scale      | Psychological distress | DASS-c21                                                            | Resilience                                                                         | Connor-Davidson resilience Scale                                                       | indirect effect = 0.02, 95% CI = 0.01, 0.03                                                                                                                 |      |       |       | Yes |
| Liu, X. [143]   | 2024 | Middle-aged and elderly women      | Square dancing                 | Physical Activity Rating Scale                   | Affect                 | PANAS                                                               | Resilience                                                                         | Connor-Davidson Resilience Scale                                                       | indirect effect = .029, 95% CI = .017, .042 $\beta = .102, p < .001$ $\beta = .483, p < .001$ $\beta = .080, p < .001$                                      |      |       |       | Yes |
| Zheng [242]     | 2024 |                                    | Physical activity              | Physical Activity Readiness Scale                | Anxiety                | Self-Rating Anxiety Scale                                           | Resilience                                                                         | Connor–Davidson Resilience Scale                                                       | indirect effect = -.20, 95% CI = -.31, -.10 $\beta = .39, p < .01$ $\beta = -.20, p < .01$ $\beta = -.37, p < .01$                                          |      |       |       | Yes |
| Liu, M. [142]   | 2024 | Undergraduate students             | Physical activity              | PARS-3                                           | Psychological distress | DASS-21                                                             | Resilience                                                                         | Connor-Davidson resilience scale (CD-RISC)                                             | indiect effect = -0.0324, 95% CI = -0.0503, -0.0173                                                                                                         |      |       |       | Yes |
| Bae [10]        | 2024 | Elementary school students         | Physical activity              | Self-report                                      | Life satisfaction      | Satisfaction Life Satisfaction Scale                                | Grit                                                                               | Children's Grit Scale                                                                  | B = 0.083, 95% CI = 0.064, 0.106                                                                                                                            |      |       |       | Yes |
| Li [127]        | 2023 | College students                   | Physical activity              | IPAQ-SF                                          | Depression             | BDI-II                                                              | Drive                                                                              | Behavioral Inhibition/Activation System Scale                                          | B = -.028, 95% CI = -.043, -.016                                                                                                                            | 0.08 | -0.33 | -0.08 | Yes |
| Li [127]        | 2023 | College students                   | Physical activity              | IPAQ-SF                                          | Depression             | BDI-II                                                              | Reward responsiveness                                                              | Behavioral Inhibition/Activation System Scale                                          | B = -.004, 95% CI = -.011, 0                                                                                                                                | 0.07 | -0.06 | -0.08 | No  |
| Li [127]        | 2023 | College students                   | Physical activity              | IPAQ-SF                                          | Depression             | BDI-II                                                              | Fun seeking                                                                        | Behavioral Inhibition/Activation System Scale                                          | B = .005, 95% CI = .001, .011                                                                                                                               | 0.06 | 0.07  | -0.08 | Yes |
| Chu [39]        | 2023 | Breast cancer survivors            | Walking                        | IPAQ-L                                           | Depression             | Chinese version of the Hospital Anxiety and Depression Scale (HADS) | Posttraumatic Growth                                                               | Posttraumatic Growth Inventory-Short Form                                              | Standardized estimate = -0.08, 95% CI = -0.12 to -0.03 (indirect effect) $\beta = .19, p < .01$ $\beta = -.40, p < .001$ $\beta = -.14, p < .01$            |      |       |       | Yes |
| Chu [39]        | 2023 | Breast cancer survivors            | Walking                        | IPAQ-L                                           | Anxiety                | Chinese version of the Hospital Anxiety and Depression Scale (HADS) | Posttraumatic Growth                                                               | Posttraumatic Growth Inventory-Short Form                                              | Standardized estimate = -0.06, 95% CI = -0.10 to -0.03 (indirect effect) $\beta = .19, p < .01$ $\beta = -.31, p < .001$ $\beta = -.11, p > .05$            |      |       |       | Yes |
| Kayani [109]    | 2021 | University students                | Physical activity              | Self-report                                      | Anxiety                | State-Trait Anxiety Inventory (STAI Y-6)                            | Self enhancement                                                                   | Short form of SE Strategies scale (SFSESS)                                             | -0.0474 (-0.0918, -0.0058) $\beta = .275$ $\beta = -.172$ $\beta = -.176$                                                                                   |      |       |       | Yes |
| McIntyre [150]  | 2019 | Women with chronic illness         | Physical activity              | Adapted from the Active Australia Survey         | Depressive symptoms    | CESD-10                                                             | Health related quality of life                                                     | EQ-5D-3L                                                                               | Indirect effect = -.0009, 95%CI = -.0012, -.0006, $R^2 = .39$ , F (7,1684) = 153.61, $p < .0001$                                                            |      |       |       | Yes |
| Zuo [247]       | 2021 | Adults                             | Physical activity              | Physical Activity Rating Scale (PARS-3)          | Subjective wellbeing   | subjective well-being scale and the satisfaction with life scale    | Health values                                                                      | 4 item health values scale                                                             | B = .358, CI = .296, .420                                                                                                                                   |      |       |       | Yes |
| Santino [183]   | 2020 | Community dwelling individuals     | Leisure time PA                | Leisure-Time Physical Activity Questionnaire     | Life satisfaction      | Life Satisfaction Questionnaire-11                                  | Loneliness                                                                         | UCLA Loneliness Scale-3                                                                | Indirect effect = .003, 95% bootstrap CI = .0004 to .0062, direct effect = .002, -.001 to .0052 $r = -.15, p = .05$ $r = -.69, p < .001$ $r = .18, p = .02$ |      |       |       | Yes |
| Santino [184]   | 2022 | Community dwelling individuals     | Leisure time physical activity | Leisure Time Physical Activity Questionnaire-SCI | Life satisfaction      | Life Satisfaction Questionnaire-11                                  | Loneliness                                                                         | UCLA Loneliness Scale-3                                                                | Indirect effect=.003, 95% bootstrap CI=-.0004 to .0062, CSI=.113                                                                                            |      |       |       | Yes |
| Guicciardi [82] | 2019 | Adults with multiple sclerosis     | Leisure-time PA                | GLTEQ                                            | Mental health          | SF-36 MCS                                                           | Self-efficacy related to the management of multiple sclerosis - goal setting       | Self-Efficacy for Multiple Sclerosis Scale (SEMS)                                      | PA to symptom management self-efficacy: $\beta = .32$ , symptom management to MH = ns                                                                       |      |       |       | No  |
| Guicciardi [82] | 2019 | Adults with multiple sclerosis     | Leisure-time PA                | GLTEQ                                            | Mental health          | SF-36 MCS                                                           | Self-efficacy related to the management of multiple sclerosis - symptom management | Self-Efficacy for Multiple Sclerosis Scale                                             | PA to goal setting self-efficacy: $\beta = .37$ , goal setting to mental health: $\beta = .61, p < .001$                                                    |      |       |       | Yes |
| Pickett [175]   | 2012 | Adults with depression or low mood | Leisure time PA                | Leisure-Time Exercise Questionnaire (LTEQ)       | Depression             | BDI-II                                                              | Coping self-efficacy and PA self-efficacy                                          | Stop unpleasant emotions and thoughts subscale of the Coping Self-Efficacy Scale (CSE) | Total indirect effect B = -.36, 95% CI = -.74, .05                                                                                                          |      |       |       | No  |
| Pickett [175]   | 2012 | Adults with depression or low mood | Leisure time PA                | Leisure-Time Exercise Questionnaire (LTEQ)       | Positive affect        | PANAS                                                               | Coping self-efficacy                                                               | Stop unpleasant emotions and thoughts subscale of the Coping Self-Efficacy Scale (CSE) | Total indirect effect B = .43, 95% CI = .19, .70                                                                                                            |      |       |       | Yes |
| Pickett [175]   | 2012 | Adults with depression or low mood | Leisure time PA                | Leisure-Time Exercise Questionnaire (LTEQ)       | Negative affect        | PANAS                                                               | Coping self-efficacy and PA self-efficacy                                          | Stop unpleasant emotions and thoughts subscale of the Coping                           | Total indirect effect B = -.15, 95% CI = -.40, .11                                                                                                          |      |       |       | No  |

|                  |      |                              |                                |                                                                                                        |                        |                                                           |                                                                                       |                                                                  |                                                                                                                                                             |                                                                                                    |                             |                        |     |
|------------------|------|------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------|------------------------|-----|
|                  |      |                              |                                |                                                                                                        |                        |                                                           |                                                                                       |                                                                  | Self-Efficacy Scale (CSE)                                                                                                                                   |                                                                                                    |                             |                        |     |
| MalekRivan [148] | 2021 | middle aged and older adults | Physical activity              | IPAQ-SF                                                                                                | Psychological distress | GHQ-12                                                    | Coping strategies (positive reinterpretation, instrument support, denial, self-blame) | Brief COPE inventory                                             | Total effect = -.1448, p <.05                                                                                                                               |                                                                                                    |                             |                        | yes |
| Dahlstrand [44]  | 2023 | Adolescents                  | Leisure time PA (VPA)          | Accelerometer (ActiGraph GT3X+)                                                                        | Stress                 | The 10-item version of the perceived stress scale (PSS10) | Shift persist coping style (tendency to shift oneself in response to stressors)       | Positive Thinking scale of the Responses to Stress questionnaire | -.0040 (-.0056, -.0023)                                                                                                                                     | .0144*** (.0085, .0203)                                                                            | -.2743*** (-.303, -.2456)   | -.0022 (-.0061, .0016) | Yes |
| Liu, M. [142]    | 2024 | Undergraduate students       | Physical activity              | PARS-3                                                                                                 | Psychological distress | DASS-21                                                   | Coping styles                                                                         | Simplified coping style questionnaire (SCSQ)                     | Indirect effect = -0.0002, 95% CI = -0.0033, 0.0026                                                                                                         |                                                                                                    |                             |                        | No  |
| Baker [11]       | 2023 | Women                        | Leisure-time physical activity | IPAQ                                                                                                   | Depressive symptoms    | CES-D 12                                                  | Outcome expectancies                                                                  | adapted from other measures                                      | β = -0.002 (-0.008, 0.004)                                                                                                                                  |                                                                                                    |                             |                        | No  |
| Baker [11]       | 2023 | Women                        | Transport physical activity    | IPAQ                                                                                                   | Depressive symptoms    | CES-D 21                                                  | Outcome expectancies                                                                  | adapted from other measures                                      | β = -0.000 (-0.002, 0.002)                                                                                                                                  |                                                                                                    |                             |                        | No  |
| Baker [11]       | 2023 | Women                        | Occupational physical activity | IPAQ                                                                                                   | Depressive symptoms    | CES-D 30                                                  | Outcome expectancies                                                                  | adapted from other measures                                      | β = -0.001, (-0.005, 0.002)                                                                                                                                 |                                                                                                    |                             |                        | No  |
| Baker [11]       | 2023 | Women                        | Domestic physical activity     | IPAQ                                                                                                   | Depressive symptoms    | CES-D 39                                                  | Outcome expectancies                                                                  | adapted from other measures                                      | β = -0.001 (-0.003, 0.001)                                                                                                                                  |                                                                                                    |                             |                        | No  |
| Dong [49]        | 2022 | College students             | Physical activity              | IPAQ                                                                                                   | Trait anxiety          | State-trait Anxiety Inventory (STAI)                      | shifting function                                                                     | more-odd shifting task                                           | Indirect effect β = -0.034, p <.01, CI = -0.071, -0.00                                                                                                      |                                                                                                    |                             |                        | Yes |
| Li [126]         | 2021 | Adolescents                  | Exercise                       | Physical Exercise Questionnaire                                                                        | Psychological distress | Depression Anxiety Stress Scale-21                        | Learning burnout                                                                      | Learning Burnout Questionnaire                                   | Indirect effect β = -0.096, CI = -0.115 to -0.077                                                                                                           |                                                                                                    |                             |                        | Yes |
| SOCIAL MEDIATORS |      |                              |                                |                                                                                                        |                        |                                                           |                                                                                       |                                                                  |                                                                                                                                                             |                                                                                                    |                             |                        |     |
| Baker [11]       | 2023 | Women                        | Leisure-time physical activity | IPAQ                                                                                                   | Depressive symptoms    | CES-D 15                                                  | Social context of PA                                                                  | adapted from other measures                                      | β = -0.008 (-0.018, 0.002)                                                                                                                                  |                                                                                                    |                             |                        | No  |
| Baker [11]       | 2023 | Women                        | Transport physical activity    | IPAQ                                                                                                   | Depressive symptoms    | CES-D 24                                                  | Social context of PA                                                                  | adapted from other measures                                      | β = -0.001 (-0.004, 0.001)                                                                                                                                  |                                                                                                    |                             |                        | No  |
| Baker [11]       | 2023 | Women                        | Occupational physical activity | IPAQ                                                                                                   | Depressive symptoms    | CES-D 33                                                  | Social context of PA                                                                  | adapted from other measures                                      | β = 0.003 (-0.001, 0.008)                                                                                                                                   |                                                                                                    |                             |                        | No  |
| Baker [11]       | 2023 | Women                        | Domestic physical activity     | IPAQ                                                                                                   | Depressive symptoms    | CES-D 42                                                  | Social context of PA                                                                  | adapted from other measures                                      | β = 0.001 (-0.001, 0.004)                                                                                                                                   |                                                                                                    |                             |                        | No  |
| Taliaferro [195] | 2013 | Undergraduate students       | Sport Participation            | Two items assessing the number of sports teams                                                         | Depression             | CES-D 20                                                  | Social support                                                                        | 25 item Personal Resource Questionnaire                          | F (2, 447) = 111.53, p < .001, AR2 = .33, Indirect effect: β = -.57, p < .001                                                                               |                                                                                                    |                             |                        | Yes |
| Yoshikawa [227]  | 2016 | Employees                    | Exercise Frequency             | One item – In the last six months, how often did you do relatively hard exercise for more than 20 min? | Depression             | CES-D                                                     | Social support                                                                        | Social Support Questionnaire                                     | bias-corrected and accelerated confidence interval (BCACI) = -.61 to -.0350, 95% confidence interval (CI) and SSQ Satisfaction score (BCACI) = -.92 to -.18 |                                                                                                    |                             |                        | Yes |
|                  |      |                              |                                |                                                                                                        |                        |                                                           |                                                                                       |                                                                  | SSQ Number score: B = 0.60, SE = .28, p = .03, SSQ Satisfaction score: B = .29, SE = .11, p < .01                                                           | SSQ Number score: B = .60, SE = .28, p = .03, SSQ Satisfaction score: B = -1.63, SE = .26, p < .01 | B = -.17, SE = .72, p = .81 |                        |     |
| Zhang, J. [238]  | 2022 | College students             | Physical activity              | Physical Activity Scale                                                                                | Depression             | Self-Rating Depression Scale                              | social support                                                                        | Social Support Comprehension Scale                               | β = -.07, CI = -.10, -.03                                                                                                                                   |                                                                                                    |                             |                        | Yes |
| Zheng [242]      | 2024 |                              | Physical activity              | Physical Activity Readiness Scale                                                                      | Anxiety                | Self-Rating Anxiety Scale                                 | Social support                                                                        | Social Support Rating Scale                                      | Indirect effect = -.23, 95% CI = -.43, -.03                                                                                                                 |                                                                                                    |                             |                        | Yes |
| Guo [84]         | 2024 | College students             | Physical activity              | Physical Activity Scale                                                                                | Life satisfaction      | SWLS + PANAS                                              | Social support                                                                        | Social Support Scale                                             | Indirect effect = 0.128, 95% CI = 0.979, 0.164                                                                                                              |                                                                                                    |                             |                        | Yes |
| Zhang, X. [237]  | 2022 | Adults                       | Exercise                       | Self-report                                                                                            | Subjective wellbeing   | Brief Subjective Well-Being Scale for Chinese Citizens    | Social network                                                                        | three Likert self-report questions                               | Indirect effect = 0.011, CI = 0.004, 0.021                                                                                                                  |                                                                                                    |                             |                        | Yes |

|                   |      |                                |                                    |                                                                                                                                |                                  |                                                    |                           |                                                                   |                                                                                                                                                    |                                              |                                                |                                       |     |
|-------------------|------|--------------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------|---------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------|---------------------------------------|-----|
| Werneck (a) [215] | 2023 | Middle aged and older adults   | Physical activity                  | Self-report                                                                                                                    | Depressive symptoms              | URO-D scale.                                       | Social network quality    | self-report Likert                                                |                                                                                                                                                    |                                              |                                                |                                       | No  |
| Werneck (a) [215] | 2023 | Middle aged and older adults   | Physical activity                  | Self-report                                                                                                                    | Depressive symptoms              | URO-D scale.                                       | Social network size       | self-report Likert                                                | Indirect effect $\beta = -.054$ , 95% CI = $-.008, -.028$                                                                                          | $\beta = .050$ , CI = $.026, .075$           | $\beta = -.013$ , CI = $-.021, -.005$          | $\beta = -.052$ , CI = $-.078, -.026$ | Yes |
| Conley [42]       | 2020 | Children                       | Social based - physical activities | Sports Activities Involvement Questionnaire (SAIQ)                                                                             | Depression                       | Child Behavior Checklist (CBCL)                    | Social connections        | Measured by number of close friends                               | Indirect effect = $-.0003$ , 95% CI = $-.001, -.0001$ , $p < .001$ ; Direct effect = $-.01$ , 95% CI = $-.008, -.003$ , $p < .001$                 |                                              |                                                |                                       | Yes |
| Ho [94]           | 2015 | School students                | Physical activity                  | Physical Activity Rating Questionnaire for Children and Youth (PARCY)                                                          | Mental health                    | SF-36 MCS                                          | Social connectedness      | Resnick School Connectedness Scale (RSC)                          | Family connectedness: $b = .08$ , $p = .06$ , mediation proportion = 16%; School connectedness: $b = .07$ , $p = .10$ , mediation proportion = 15% |                                              |                                                |                                       | Yes |
| McNeil [152]      | 2022 | Adults                         | Nature based physical activity     | Self-report                                                                                                                    | Wellbeing                        | The World Health Organization—5 (WHO-5)            | Social connectedness      | Social Connectedness Scale Revised (SCS-R)                        | $b = 0.07$ , SE = $0.03$ , 95% CI = $0.01-0.14$ , $\beta = 0.04$                                                                                   | $.12$ , $p < .05$                            | $.32$ , $p < .05$                              | $.19$ , $p < .05$                     | No  |
| Zhang [239]       | 2023 | Adolescents                    | Physical activity                  | Self-report                                                                                                                    | Subjective wellbeing             | World Health Organization Well-Being Index (WHO-5) | School connectedness      | 5 items from the National Longitudinal Study of Adolescent Health | Indirect effect = $0.083$ , 95% CI = $0.066, 0.103$                                                                                                | $\beta = .155$ , $p < .001$                  | $\beta = .254$ , $p < .001$                    | $\beta = .114$ , $p < .001$           | Yes |
| Liu, N. [139]     | 2023 |                                | Sport Participation                | "In the past year, did you regularly engage in physical activity in your free time?"                                           | Subjective wellbeing             | Self-report                                        | Subjective class identity | Self-report                                                       | Indirect effect = $0.009$ , 95% CI = $0.003, 0.016$                                                                                                |                                              |                                                |                                       | Yes |
| Wu [220]          | 2024 | Older adults                   | Tai chi                            | Physical Activity Rating Scale (PARS-3)                                                                                        | Psychological distress           | Geriatric Health Questionnaire (GHQ-12)            | Social participation      | social participation index system                                 | Indirect effect = $-0.12$ , 95% CI = $-0.212, -0.005$                                                                                              |                                              |                                                |                                       | Yes |
| Wu [220]          | 2024 | Older adults                   | Ba duan jin                        | Physical Activity Rating Scale (PARS-3)                                                                                        | Psychological distress           | Geriatric Health Questionnaire (GHQ-12)            | Social participation      | social participation index system                                 | Indirect effect = $-0.049$ , 95% CI = $-0.093, -0.023$                                                                                             |                                              |                                                |                                       | Yes |
| Wu [220]          | 2024 | Older adults                   | Walking                            | Physical Activity Rating Scale (PARS-3)                                                                                        | Psychological distress           | Geriatric Health Questionnaire (GHQ-12)            | Social participation      | social participation index system                                 | Indirect effect = $-0.057$ , 95% CI = $-0.136, -0.011$                                                                                             |                                              |                                                |                                       | Yes |
| Wu [220]          | 2024 | Older adults                   | Tai chi                            | Physical Activity Rating Scale (PARS-3)                                                                                        | Psychological distress           | Geriatric Health Questionnaire (GHQ-12)            | Social participation      | social participation index system                                 | $t = -5.981$ , $p < 0.05$                                                                                                                          |                                              |                                                |                                       | Yes |
| Wu [220]          | 2024 | Older adults                   | Ba duan jin                        | Physical Activity Rating Scale (PARS-3)                                                                                        | Psychological distress           | Geriatric Health Questionnaire (GHQ-12)            | Social participation      | social participation index system                                 | $t = -4.544$ , $p < 0.05$                                                                                                                          |                                              |                                                |                                       | Yes |
| Wu [220]          | 2024 | Older adults                   | Walking                            | Physical Activity Rating Scale (PARS-3)                                                                                        | Psychological distress           | Geriatric Health Questionnaire (GHQ-12)            | Social participation      | social participation index system                                 | $t = -5.481$ , $p < 0.05$                                                                                                                          |                                              |                                                |                                       | Yes |
| VanKim [204]      | 2013 | Undergraduate college students | Vigorous PA                        | One item – On how many days did you exercise or participate in PA for at least 20 minutes that made you sweat or breathe hard? | Perceived stress                 | Cohen Perceived Stress Scale                       | Socialising               | Number of close friends and time spent socialising                | $B = -.57$ , $p < .0001$                                                                                                                           |                                              |                                                |                                       | Yes |
| VanKim [204]      | 2013 | Undergraduate college students | Vigorous PA                        | One item – On how many days did you exercise or participate in PA for at least 20 minutes that made you sweat or breathe hard? | Perceived stress                 | Cohen Perceived Stress Scale                       | Socialising               | Number of close friends and time spent socialising                | $B = -.80$ , $p < .0001$                                                                                                                           |                                              |                                                |                                       | Yes |
| Feuerhahn [64]    | 2012 | Adults                         | Exercise after work                | Self-reported duration of exercise that evening                                                                                | Positive affect (in the evening) | 6 items from the PANAS positive affect scale       | Sense of belonging        | Eight items adapted from the Sense of Belonging Instrument        | $z = 3.08$ , $p < .001$                                                                                                                            | $r = .24$ , $p < .01$                        | $r = .11$ , $p < .01$                          | $r = .22$ , $p < .01$                 | Yes |
| Watt [210]        | 2022 | Psychology university students | Physical activity                  | Asked how often they undertook physical activity                                                                               | Psychological distress           | Kessler 10 (K10)                                   | Sense of belonging        | Community Integration Measure (CIM)                               |                                                                                                                                                    | $\beta = .022$ , CI = $.015, .029$           | $\beta = -.502$ , CI = $-.608, -.397$          | $\beta = -.018$ , CI = $-.026, -.009$ | Yes |
| Watt [210]        | 2022 | Psychology university students | Physical activity                  | Asked how often they undertook physical activity                                                                               | Depression                       | Kessler 10 (K10)                                   | Sense of belonging        | Community Integration Measure (CIM)                               |                                                                                                                                                    | $\beta = 0.02$ , $t(393) = 6.12$ , $p < .01$ | $\beta = -0.16$ , $t(388) = -4.32$ , $p < .01$ |                                       | Yes |
| Watt [210]        | 2022 | Psychology university students | Physical activity                  | Asked how often they undertook physical activity                                                                               | Anxiety                          | Kessler 10 (K10)                                   | Sense of belonging        | Community Integration Measure (CIM)                               |                                                                                                                                                    | $\beta = 0.02$ , $t(393) = 6.12$ , $p < .01$ | $\beta = -0.94$ , $t(388) = -3.25$ , $p < .01$ |                                       | Yes |

|                              |      |                                          |                                     |                                                                                                    |                        |                                                                   |                                         |                                                                                        |                                                                                       |                                  |                                     |                                     |     |
|------------------------------|------|------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------|-------------------------------------|-------------------------------------|-----|
| Oberle [163]                 | 2019 | Elementary and secondary school students | Sport                               | No. of days in the past week                                                                       | Life satisfaction      | 5item Satisfaction with Life Scale-Adapted for Children           | Peer belonging                          | Adapted 3-item version of the Relational Provisional Loneliness Questionnaire          | Indirect effect est = .07, $p < .001$ , direct effect = .18, $p < .001$               |                                  |                                     |                                     | Yes |
| Oberle [163]                 | 2019 | Elementary and secondary school students | Sport                               | No. of days in the past week                                                                       | Depression             | Seattle Personality Questionnaire depression subscale             | Peer belonging                          | Adapted 3-item version of the Relational Provisional Loneliness Questionnaire          | Indirect effect est = .08, $p < .001$ , direct effect = .19, $p < .001$               |                                  |                                     |                                     | Yes |
| Oberle [163]                 | 2019 | Elementary and secondary school students | Sport                               | No. of days in the past week                                                                       | Anxiety                | Seattle Personality Questionnaire anxiety subscale                | Peer belonging                          | Adapted 3-item version of the Relational Provisional Loneliness Questionnaire          | Indirect effect est = .06, $p < .001$ , direct effect = .18, $p < .001$               |                                  |                                     |                                     | Yes |
| Bang [12]                    | 2024 | Adolescents                              | Team sports (school)                | Self-report participation groups                                                                   | Depression             | 7 self-report symptoms                                            | School belonging                        | Self-report items                                                                      | Indirect effect = 0.058***                                                            |                                  |                                     |                                     | Yes |
| Bang [12]                    | 2024 | Adolescents                              | Individual sports (school)          | Self-report participation groups                                                                   | Depression             | 8 self-report symptoms                                            | School belonging                        | Self-report items                                                                      | Indirect effect = 0.009                                                               |                                  |                                     |                                     | No  |
| Bang [12]                    | 2024 | Adolescents                              | Team and individual sports (school) | Self-report participation groups                                                                   | Depression             | 9 self-report symptoms                                            | School belonging                        | Self-report items                                                                      | Indirect effect = 0.053***                                                            |                                  |                                     |                                     | Yes |
| Quarta [178]                 | 2022 | Adults                                   | Sport                               | One item frequency measure                                                                         | Subjective wellbeing   | 9-item subjective wellbeing scale                                 | Quality of social relationship          | WHOQoL Brief social relationships items                                                | $\beta = .02$ , 95% CI = .003, .009                                                   | $\beta = .07$ , $p < .001$       | $\beta = .40$ , $p < .001$          | $\beta = -.05$ , $p > .05$          | Yes |
| Hou [97]                     | 2024 | Older adults                             | Physical activity                   | In the past year, how often have you participated in physical exercise in your free time?          | Depression             | 1-item self-report                                                | Social competence                       | Self-reported time spent with others                                                   | Indirect effect = 0.013, $p = .004$                                                   |                                  |                                     |                                     | Yes |
| Zhuo [245]                   | 2023 | College students                         | Physical activity                   | Physical Activity Rating Scale                                                                     | Depression             | Short-version Depression Scale compiled by Andresen et al. (1994) | Interpersonal relationship difficulties | Interpersonal Relationship Comprehensive Diagnostic Scale                              | Indirect effect = -0.12, 95% CI = .11, $p < .01$                                      | $-.85$ , $p < .01$               | $-.03$ , $p < .01$                  |                                     | Yes |
| Watt [210]                   | 2022 | Psychology university students           | Physical activity                   | Asked how often they undertook physical activity                                                   | Psychological distress | Kessler 10 (K10)                                                  | Coach Relationship                      | Coach Relationship Questionnaire (CRQ)                                                 |                                                                                       | $\beta = .020$ , CI = .006, .034 | $\beta = -.077$ , CI = -.137, -.018 | $\beta = -.018$ , CI = -.026, -.009 | Yes |
| Watt [210]                   | 2022 | Psychology university students           | Physical activity                   | Asked how often they undertook physical activity                                                   | Depression             | Kessler 10 (K10)                                                  | Coach Relationship                      | Coach Relationship Questionnaire (CRQ)                                                 |                                                                                       | ns                               | ns                                  |                                     | No  |
| Watt [210]                   | 2022 | Psychology university students           | Physical activity                   | Asked how often they undertook physical activity                                                   | Anxiety                | Kessler 10 (K10)                                                  | Coach Relationship                      | Coach Relationship Questionnaire (CRQ)                                                 |                                                                                       | ns                               | ns                                  |                                     | No  |
| <b>BEHAVIOURAL MEDIATORS</b> |      |                                          |                                     |                                                                                                    |                        |                                                                   |                                         |                                                                                        |                                                                                       |                                  |                                     |                                     |     |
| Doré [52]                    | 2020 | Children                                 | Leisure-time PA                     | Free-time engagement in PA via a 36-item PA and sport checklist.                                   | Mental health          | Mental Health Continuum-Short Form (MHC-SF)                       | MVPA                                    | 2-item self-report measure                                                             | Indirect effect $\beta = 1.07$ , $p < .05$ , direct effect $\beta = -.22$ , $p > .05$ |                                  |                                     |                                     | Yes |
| Levante [124]                | 2024 | University students                      | Physical activity                   | In the last months, how often have you done physical activity?                                     | Psychological distress | DASS-21                                                           | Time Spent on Leisure Activities        | In the last month, how often have you spent time in nature? With friends? With family? | $(\beta = 0.012$ ; Boot LLCI = 0.028; Boot ULCI = 0.001                               |                                  |                                     |                                     | Yes |
| Dong [50]                    | 2023 | Adolescents                              | Physical activity                   | Physical Activity Questionnaire for Children (PAQ-C)                                               | Mental health          | Mental Health Inventory of Middle School Students (MMHI-60)       | Sleep                                   | Self-report                                                                            | $0.319 \times (-0.164) = -0.052$                                                      |                                  |                                     |                                     | No  |
| Choi [38]                    | 2024 | Older adults                             | Physical activity                   | ever went walking for exercise (yes or no), and ever spent time on vigorous activities (yes or no) | Psychological distress | Patient Health Questionnaire-4 (PHQ-4)                            | Sleep                                   | Three questions about sleep                                                            | Indirect effect (0.01, 95% CI = [-0.02, 0.09], $z = 5.05$ , $p = .67$ )               |                                  |                                     |                                     | No  |
| Mu [159]                     | 2024 | College students                         | Physical activity                   | Physical activity rating scale (PARS-3)                                                            | Psychological distress | Depression anxiety and stress scale (DASS-21)                     | Sleep                                   | Pittsburgh sleep quality index (PSQI)                                                  | Indirect effect = -.408, 95% CI = -.523, -.287                                        | $p < .001$                       | .389, $p < .001$                    | $-.018$ , $p < .01$                 | Yes |
| Zhang [232]                  | 2020 | College students                         | Physical activity                   | IPAQ-SF                                                                                            | Stress                 | DASS-21                                                           | Sleep Quality                           | Pittsburgh Sleep Quality Index (PSQI)                                                  | Indirect effect = .003, $p = .552$                                                    |                                  |                                     |                                     | No  |
| Zhang [232]                  | 2020 | College students                         | Physical activity                   | IPAQ-SF                                                                                            | Anxiety                | DASS-21                                                           | Sleep Quality                           | Pittsburgh Sleep Quality Index (PSQI)                                                  | Indirect effect = .002, $p = .504$                                                    |                                  |                                     |                                     | No  |
| Zhang [232]                  | 2020 | College students                         | Physical activity                   | IPAQ-SF                                                                                            | Depression             | DASS-21                                                           | Sleep Quality                           | Pittsburgh Sleep Quality Index (PSQI)                                                  | Indirect effect = .001, $p = .536$                                                    |                                  |                                     |                                     | No  |

|                       |      |                          |                                |                                                                                                                       |                        |                                                                                                    |                           |                                                                                                             |                                                                                                             |                           |                            |                            |     |
|-----------------------|------|--------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------|----------------------------|-----|
| Fontana [66]          | 2022 | teachers                 | Physical activity              | IPAQ-SF                                                                                                               | Stress                 | Perceived Stress Scale (PSS-10)                                                                    | Sleep quality             | Short Pittsburgh Sleep Quality Index                                                                        | Indirect effects: OR = 0.62; 95%CI = 0.42–0.82; $p < 0.001$ ; mediation proportion = 72.1%                  |                           |                            |                            | Yes |
| Lin (b) [133]         | 2022 | Undergrad students       | Exercise                       | Self-report                                                                                                           | Subjective wellbeing   | Satisfaction with Life Scale (SWLS) + PANAS                                                        | Sleep quality             | Chinese version of the Pittsburgh Sleep Quality Index                                                       | Indirect effect = 0.06, 95% CI [0.03, 0.09])                                                                |                           |                            |                            | Yes |
| Barham [13]           | 2022 | Adults                   | Physical activity change       | Single item                                                                                                           | Depression             | Hospital Anxiety and Depression Scale (HADS-D)                                                     | Sleep health              | six sleep dimensions including regularity, satisfaction, alertness, timing, efficiency, and duration        | Indirect effect: $\beta = -.022$ , 95% CI [-.036 to-.008]                                                   | $\beta = .08$ , $p < .05$ | $\beta = -.27$ , $p < .05$ | $\beta = -.14$ , $p < .05$ | Yes |
| Lewis [125]           | 2021 | adults                   | Physical activity              | IPAQ                                                                                                                  | Anxiety symptoms       | Generalized Anxiety Disorder 7-item (GAD-7)                                                        | Sleep regularity          | self-report                                                                                                 | Indirect effect $\beta = -0.002$ , CI = -0.008, 0.005                                                       |                           |                            |                            | No  |
| Vandendriessche [203] | 2019 | Children                 | Physical activity              | One item – Over the past 7 days, on how many days were you physically active for a total of at least 60 min per day?" | Psychological distress | Three items from the Health Behaviour in School-Aged Children (HBSC) Symptom Check List (HBSC-SCL) | Sleep duration - weekdays | When do you usually go to bed? When do you usually wake up?                                                 | Indirect effect $\beta = .001$ , $p < .001$ , direct effect $\beta = -.03$ , $p < .001$                     |                           |                            |                            | Yes |
| Vandendriessche [203] | 2019 | Children                 | Physical activity              | One item – Over the past 7 days, on how many days were you physically active for a total of at least 60 min per day?" | Psychological distress | Three items from the Health Behaviour in School-Aged Children (HBSC) Symptom Check List (HBSC-SCL) | Sleep duration - weekends | When do you usually go to bed? When do you usually wake up?                                                 | Indirect effect $\beta = .001$ , $p < .001$ , direct effect $\beta = -.03$ , $p < .001$                     |                           |                            |                            | Yes |
| Leahy [123]           | 2023 | Adolescents              | School PA                      | Intervention versus control                                                                                           | Perceived stress       | 10-item perceived stress scale                                                                     | Sleep duration (weekday)  | Participants reported the time they usually went to bed and woke up on school                               | Indirect effect = 0.04, 95% CI = -0.10, 0.18                                                                |                           |                            |                            | No  |
| Leahy [123]           | 2023 | Adolescents              | School PA                      | Intervention versus control                                                                                           | Perceived stress       | 10-item perceived stress scale                                                                     | Sleep duration (weekend)  | Participants reported the time they usually went to bed and woke up on school                               | Indirect effect = -0.06, 95% CI = -0.23, 0.11                                                               |                           |                            |                            | No  |
| Leahy [123]           | 2023 | Adolescents              | School PA                      | Intervention versus control                                                                                           | Perceived stress       | 10-item perceived stress scale                                                                     | Sleep latency             | In the last two weeks, after you go to bed, how long does it usually take you to fall asleep?               | Indirect effect = -0.01, 95% CI = -0.12, 0.11                                                               |                           |                            |                            | No  |
| Leahy [123]           | 2023 | Adolescents              | School PA                      | Intervention versus control                                                                                           | Perceived stress       | 10-item perceived stress scale                                                                     | Awakenings                | In the last two weeks, how many times a night do you usually wake up at night for longer than five minutes? | Indirect effect = -0.03, 95% CI = -0.15, 0.10                                                               |                           |                            |                            | No  |
| Leahy [123]           | 2023 | Adolescents              | School PA                      | Intervention versus control                                                                                           | Perceived stress       | 10-item perceived stress scale                                                                     | Daytime sleepiness        | During your daytime activities, how much of a problem do you have with sleepiness?                          | Indirect effect = -0.19, 95% CI = -0.44, 0.06                                                               |                           |                            |                            | No  |
| Vandendriessche [203] | 2019 | Children                 | Physical activity              | One item – Over the past 7 days, on how many days were you physically active for a total of at least 60 min per day?" | Psychological distress | Three items from the Health Behaviour in School-Aged Children (HBSC) Symptom Check List (HBSC-SCL) | Sleep difficulties        | Sleep item from the HBSC-SCL                                                                                | Indirect effect $\beta = -.01$ , $p < .001$ , direct effect $\beta = -.02$ , $p < .001$                     |                           |                            |                            | Yes |
| Kaseva [108]          | 2019 | Children and adolescents | Leisure time PA                | Five questions assessing the intensity and frequency of leisure-time physical activity                                | Depressive symptoms    | BDI-II                                                                                             | Sleep difficulties        | Four items reflecting participants' experiences of sleep problems                                           | Indirect effect: $B = -.00$ , $p = .29$ , $r = -.04$ , ns                                                   | $r = .21$ , $p < .01$     | $r = -.09$ , $p < .01$     |                            | No  |
| Zhang, B. [236]       | 2022 | University students      | Physical activity              | IPAQ Chinese version                                                                                                  | Psychological distress | General Health Questionnaire 12-item (GHQ-12)                                                      | Sleep disorder            | Athens Insomnia Scale (CAIS)                                                                                | Indirect effect $\beta = -0.042$ , CI = -0.214, -0.056                                                      |                           |                            |                            | No  |
| Werneck [212]         | 2020 | Adults                   | Physical inactivity            | Meeting guidelines yes/no                                                                                             | Anxiety                | One item - In the period of the pandemic, how often have you felt worried, anxious, or nervous?    | Worsening sleep quality   | One item – Has the pandemic affected the quality of your sleep?                                             | Indirect effect OR: 1.16, 95% CI = 1.06, 1.26, 21.9% mediated, direct effect OR = 1.68, 95% CI = 1.31, 2.15 |                           |                            |                            | Yes |
| Lewis [125]           | 2021 | adults                   | Physical activity              | IPAQ                                                                                                                  | Anxiety symptoms       | Generalized Anxiety Disorder 7-item (GAD-7)                                                        | Insomnia severity         | Insomnia Severity Index (ISI)                                                                               | Indirect effect $\beta = 0.014$ , CI = -0.022, 0.050                                                        |                           |                            |                            | No  |
| Baker [11]            | 2023 | Women                    | Leisure-time physical activity | IPAQ                                                                                                                  | Depressive symptoms    | CES-D 17                                                                                           | Sitting time              | Adapted from other measures                                                                                 | $\beta = 0.001$ (-0.001, 0.003)                                                                             |                           |                            |                            | No  |

|               |      |                           |                                |                                                                |                        |                                                         |                                                |                                                                       |                                                              |                                     |                                   |     |
|---------------|------|---------------------------|--------------------------------|----------------------------------------------------------------|------------------------|---------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------|-----------------------------------|-----|
| Baker [11]    | 2023 | Women                     | Transport physical activity    | IPAQ                                                           | Depressive symptoms    | CES-D 26                                                | Sitting time                                   | Adapted from other measures                                           | $\beta = -0.001$ (-0.003, 0.004)                             |                                     |                                   | No  |
| Baker [11]    | 2023 | Women                     | Occupational physical activity | IPAQ                                                           | Depressive symptoms    | CES-D 35                                                | Sitting time                                   | Adapted from other measures                                           | $\beta = 0.006$ (-0.006, 0.018)                              |                                     |                                   | No  |
| Baker [11]    | 2023 | Women                     | Domestic physical activity     | IPAQ                                                           | Depressive symptoms    | CES-D 44                                                | Sitting time                                   | Adapted from other measures                                           | $\beta = 0.001$ (-0.003, 0.006)                              |                                     |                                   | No  |
| Baker [11]    | 2023 | Women                     | Leisure-time physical activity | IPAQ                                                           | Depressive symptoms    | CES-D 18                                                | Screen time                                    | Adapted from other measures                                           | $\beta = 0.000$ (-0.001, 0.002)                              |                                     |                                   | No  |
| Baker [11]    | 2023 | Women                     | Transport physical activity    | IPAQ                                                           | Depressive symptoms    | CES-D 27                                                | Screen time                                    | Adapted from other measures                                           | $\beta = -0.001$ (-0.004, 0.002)                             |                                     |                                   | No  |
| Baker [11]    | 2023 | Women                     | Occupational physical activity | IPAQ                                                           | Depressive symptoms    | CES-D 36                                                | Screen time                                    | Adapted from other measures                                           | $\beta = -0.001$ (-0.012, 0.009)                             |                                     |                                   | No  |
| Baker [11]    | 2023 | Women                     | Domestic physical activity     | IPAQ                                                           | Depressive symptoms    | CES-D 45                                                | Screen time                                    | Adapted from other measures                                           | $\beta = 0.004$ (-0.009, 0.0001)                             |                                     |                                   | No  |
| Li [126]      | 2021 | Adolescents               | Exercise                       | Physical Exercise Questionnaire                                | Psychological distress | Depression Anxiety Stress Scale-21                      | Problematic phone use                          | Self-rating Questionnaire for Adolescent Problematic Mobile Phone Use | Indirect effect $\beta = -0.059$ , CI = -0.077 to -0.044     |                                     |                                   | Yes |
| Precht [177]  | 2022 | Adults                    | Physical activity              | Liker scale self-report                                        | Mental health          | unidimensional Positive Mental Health Scale (PMH-Scale) | Addictive social media use                     | Brief version of the Bergen Social Media Addiction Scale (BSMAS)      | $\beta = -.465$ , CI = -.854, -.077                          | $\beta = -.222$ , CI = -.376, -.068 | $\beta = .597$ , CI = .014, 1.180 | Yes |
| Precht [177]  | 2022 | Adults                    | Physical activity              | Liker scale self-report                                        | Stress                 | Depression Anxiety Stress Scales 21 (DASS-2)            | Addictive social media use                     | Brief version of the Bergen Social Media Addiction Scale (BSMAS)      | $\beta = -.465$ , CI = -.854, -.077                          | $\beta = .235$ , CI = .111, .360    | $\beta = -.370$ , -.843, .102     | Yes |
| Ji [103]      | 2024 | Secondary school students | Physical activity              | 2 self-report items                                            | Depressive symptoms    | CESD                                                    | Internet Addiction                             | Adapted from Young's Diagnostic Questionnaire (YDQ)                   | Indirect effect = -0.114, 95% CI = -.148, -.089, $p < 0.001$ |                                     |                                   | Yes |
| Baker [11]    | 2023 | Women                     | Leisure-time physical activity | IPAQ                                                           | Depressive symptoms    | CES-D 16                                                | Fruit and veg intake                           | Adapted from other measures                                           | $\beta = -0.007$ (-0.018, 0.002)                             |                                     |                                   | No  |
| Baker [11]    | 2023 | Women                     | Transport physical activity    | IPAQ                                                           | Depressive symptoms    | CES-D 25                                                | Fruit and veg intake                           | Adapted from other measures                                           | $\beta = -0.000$ (-0.002, 0.004)                             |                                     |                                   | No  |
| Baker [11]    | 2023 | Women                     | Occupational physical activity | IPAQ                                                           | Depressive symptoms    | CES-D 34                                                | Fruit and veg intake                           | Adapted from other measures                                           | $\beta = -0.000$ (-0.002, 0.002)                             |                                     |                                   | No  |
| Baker [11]    | 2023 | Women                     | Domestic physical activity     | IPAQ                                                           | Depressive symptoms    | CES-D 43                                                | Fruit and veg intake                           | Adapted from other measures                                           | $\beta = 0.000$ (-0.002, 0.003)                              |                                     |                                   | No  |
| You [230]     | 2024 | Adults                    | Leisure-time PA                | Global Physical Activity Questionnaire                         | Depressive symptoms    | Patient's Health Questionnaire (PHQ-9)                  | Intake of medium live microbe-containing foods | 24 h dietary recall data                                              | Indirect effect = -0.0003 (-0.0005, -0.0001), $p < 0.001$    |                                     |                                   | Yes |
| You [230]     | 2024 | Adults                    | Leisure-time PA                | Global Physical Activity Questionnaire                         | Depressive symptoms    | Patient's Health Questionnaire (PHQ-9)                  | Intake of high live microbe-containing foods   | 24 h dietary recall data                                              | Indirect effect = -0.0001 (-0.00015, -0.00001)               |                                     |                                   | Yes |
| You [230]     | 2024 | Adults                    | Leisure-time PA                | Global Physical Activity Questionnaire                         | Depressive symptoms    | Patient's Health Questionnaire (PHQ-9)                  | Intake of low live microbe-containing foods    | 25 h dietary recall data                                              | $\beta$ indirect = 0.0001, $p = 0.216$                       |                                     |                                   | No  |
| Levante [124] | 2024 | University students       | Physical activity              | In the last months, how often have you done physical activity? | Psychological distress | DASS-21                                                 | Adherence to the Mediterranean Diet            | 14-MEDAS questionnaire                                                | $\beta = 0.000$ ; Boot LLCI = 0.020; Boot ULCI = 0.018       |                                     |                                   | No  |

## PHYSIOLOGICAL MEDIATORS

|                               |                        |      |                                              |                            |                                                                                                            |                        |                                               |                                      |                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                         |                                   |                                     |                                    |     |
|-------------------------------|------------------------|------|----------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------|------------------------------------|-----|
| Fitness related               | Lindwall [135]         | 2012 | Adults                                       | Physical activity          | Adapted version of the widely used four-level scale originally developed by Saltin and Grimby              | Depression             | Hospital and Anxiety Depression Scale (HADS)  | Aerobic fitness                      | Åstrand indirect test of maximal oxygen uptake (VO2max)                                                                                                                                                                                                   | Indirect effect B = -.19, SE = 0.19, 95% CI = 0.54, 0.17, direct effect B = -.89, SE = 0.4, $p < .05$                                                                                                                                                                                                                                   | B = 3.22, $p < .01$               | B = -.05, ns                        | B = -.89, $p < .05$                | No  |
|                               | Lindwall [135]         | 2012 | Adults                                       | Physical activity          | Adapted version of the widely used four-level scale originally developed by Saltin and Grimby              | Anxiety                | Hospital and Anxiety Depression Scale (HADS)  | Aerobic fitness                      | Åstrand indirect test of maximal oxygen uptake (VO2max)                                                                                                                                                                                                   | Indirect effect B = .07, SE = .07, 95% CI = -0.04, 0.24, direct effect B = -.84, SE = 0.22, $p < .01$                                                                                                                                                                                                                                   | B = 3.22, $p < .01$               | B = .02, ns                         | B = -.84, $p < .01$                | No  |
|                               | Adams [1]              | 2018 | Testicular cancer survivors                  | HIIT exercise intervention | Intervention vs control                                                                                    | Δ Mental health        | SF-36 MCS                                     | Cardiorespiratory fitness            | VO2peak                                                                                                                                                                                                                                                   | Indirect effect B = 2.6, CI = 0.2; 5.8, $p < .05$ , direct effect B = 1.1, CI = -3.4; 5.6, $p > .05$                                                                                                                                                                                                                                    | B = 3.9, CI = 2.5; 5.4, $p < .05$ | B = 0.7, CI = -.003; 1.3, $p < .10$ | B = 1.1, CI = -3.4; 5.6, $p > .05$ | Yes |
|                               | Perez-Sousa [171]      | 2020 | Middle aged and older adults with depression | Physical activity          | Intervention vs control                                                                                    | Depression             | Geriatric Depression Scale (GDS) short form   | Physical fitness                     | Physical fitness test battery including functional reach [16], chair sit-and-reach [17], the 3-metre version of the Timed Up and Go Test (TUG) [18], bi-handgrip strength [19], back scratch [20] and the 6-min walk test along a 20-metre corridor [20]. | Indirect effects: Flexibility: $\beta$ = 0.04 (– 0.07 to – 0.01) back scratch: $\beta$ = 0.06 (– 0.12 to – 0.02) cardiorespiratory fitness: $\beta$ = 0.09 (– 0.15 to – 0.04) Direct effect: $\beta$ = 0.44 (– 0.60 to – 0.28) functional reach, timed Up and go test, handgrip strength, and 6-min walk test were ns indirect effects. |                                   |                                     |                                    | Yes |
|                               | Syue [194]             | 2022 | Older adults                                 | Physical activity          | IPAQ-SF                                                                                                    | Life satisfaction      | A single item with an 11-point scale          | Functional fitness                   | A test battery                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                         |                                   |                                     |                                    | No  |
| Health and disability related | Backström-Eriksson [9] | 2016 | Patients with Cystic Fibrosis                | Exercise                   | Retrieved from medical records                                                                             | Anxiety                | Hospital Anxiety and Depression Scale (HADS)  | Medical status                       | Forced expiratory volume, BMI, immunoglobulin G, physical working capacity                                                                                                                                                                                | Direct effect $\beta$ = .06, $p$ = .12, indirect effect $\beta$ = .05, $p$ = .07                                                                                                                                                                                                                                                        |                                   |                                     |                                    | No  |
|                               | Backström-Eriksson [9] | 2016 | Patients with Cystic Fibrosis                | Exercise                   | Retrieved from medical records                                                                             | Depression             | Hospital Anxiety and Depression Scale (HADS)  | Medical status                       | Forced expiratory volume, BMI, immunoglobulin G, physical working capacity                                                                                                                                                                                | Direct effect $\beta$ = .16, $p$ = .17, indirect effect $\beta$ = .18, $p$ = .11                                                                                                                                                                                                                                                        |                                   |                                     |                                    | No  |
|                               | Liu, N. [139]          | 2023 |                                              | Sport Participation        | "In the past year, did you regularly engage in physical activity in your free time?"                       | Subjective wellbeing   | self-report                                   | Health                               | Self-report                                                                                                                                                                                                                                               | Indirect effect = 0.065, 95% CI = 0.042, 0.089                                                                                                                                                                                                                                                                                          | $\beta$ = .101, $p < .001$        | $\beta$ = .356, $p < .001$          | $\beta$ = .099, $p < .001$         | Yes |
|                               | Li, B. [129]           | 2024 | College students                             | Physical activity          | IPAQ-SF                                                                                                    | Depression             | CES-D                                         | Self-rated health                    | 36-item Short Form Health Survey (SF-36)                                                                                                                                                                                                                  | Indirect pathway was –0.043                                                                                                                                                                                                                                                                                                             |                                   |                                     |                                    | Yes |
|                               | Mu [159]               | 2024 | College students                             | Physical activity          | Physical activity rating scale (PARS-3)                                                                    | Psychological distress | Depression anxiety and stress scale (DASS-21) | Self-rated health                    | Short Form Health Survey-12                                                                                                                                                                                                                               | Indirect effect = -.829, 95% CI = -.907, -.751                                                                                                                                                                                                                                                                                          | .225, $p < .001$                  | -.154, $p < .001$                   | -.018, $p < .02$                   | Yes |
|                               | Levante [124]          | 2024 | University students                          | Physical activity          | In the last months, how often have you done physical activity?                                             | Psychological distress | DASS-21                                       | Self-Reported Physical Health Status | WHOQoL-Bref questionnaire                                                                                                                                                                                                                                 | $\beta$ = 0.034; Boot LLCI = 0.001; Boot ULCI = 0.072                                                                                                                                                                                                                                                                                   |                                   |                                     |                                    | Yes |
|                               | Li [127]               | 2023 | High School students                         | Physical activity          | "Do you participate in physical activity regularly?"                                                       | Psychological distress | Symptom Check-List-90                         | Satisfaction with health             | One item from the Child and Adolescent Quality of Life Scale                                                                                                                                                                                              | Indirect effect = –0.059 (low frequency of PA), –0.124 (medium frequency of PA), –0.146 (high frequency of PA)                                                                                                                                                                                                                          |                                   |                                     |                                    | Yes |
|                               | Deng [47]              | 2018 | Middle-aged and older adults                 | Leisure-time PA            | How much time they spent performing activities for exercise, entertainment, job demand, and other purposes | Depressive symptoms    | 10-item CES-D                                 | Functional health status             | Instrumental Activities of Daily Living (IADLs)                                                                                                                                                                                                           | Indirect effect: $\beta$ = -.02, 95% CI = -.03, -.01, direct effect: $\beta$ = .02, 95% CI = -.03, .06                                                                                                                                                                                                                                  |                                   |                                     |                                    | Yes |
|                               | Deng [47]              | 2018 | Middle-aged and older adults                 | Total physical activity    | How much time they spent performing activities for exercise, entertainment, job demand, and other purposes | Depressive symptoms    | 10-item CES-D                                 | Functional health status             | Instrumental Activities of Daily Living (IADLs)                                                                                                                                                                                                           | RURAL: indirect effect $\beta$ = -.07, 95% CI = -.08, -.06, direct effect $\beta$ = .12, 95% CI = .09, .15<br>URBAN: indirect effect $\beta$ = -.06, 95% CI = -.07, -.05, direct                                                                                                                                                        |                                   |                                     |                                    | Yes |

|                   |      |                                                                              |                                              |                                                                                                                            |                        |                                                          |  |                  |                                                                           |                                                                                                                                |                                        |                                        |                                        |     |  |
|-------------------|------|------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------|--|------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|-----|--|
|                   |      |                                                                              |                                              |                                                                                                                            |                        |                                                          |  |                  |                                                                           | effect $\beta = .10$ , 95% CI = $.08, .13$                                                                                     |                                        |                                        |                                        |     |  |
| Meadows [153]     | 2017 | Breast cancer survivors                                                      | Physical activity                            | Nine items that assess recreational walking and light, moderate, and vigorous PA using a frequency and duration item forma | Life satisfaction      | SWLS                                                     |  | Function         | Late-Life Function and Disability Instrument                              | Indirect effect estimate = $.10$ , $p = .08$<br>Total indirect effects (fatigue and function) estimate = $.161$ , $p = .012$ . | $\beta = -.42$ , $p < .05$             | $\beta = -.25$ , $p < .05$             | $\beta = .14$ , ns                     | Yes |  |
| Castan [28]       | 2024 | Adults with spinal cord injury                                               | Leisure-time PA                              | Physical Activity Recall Assessment for People with SCI (PARA-SCI)                                                         | Psychological distress | Hospital Anxiety and Depression Scale (HADS-D)           |  | Functionality    | Functional Independence Measure                                           |                                                                                                                                | $\beta = .25$ , $p < .05$              | $\beta = -.14$ , $p > .05$             | $\beta = .037$ , $p > .05$             | Yes |  |
| Baruth [16]       | 2016 | Adults                                                                       | Leisure-time PA                              | Community Health Activities Model Program for Seniors (CHAMPS) questionnaire                                               | Depression             | CES-D 10                                                 |  | Disability       | Health Assessment Questionnaire (HAQ) Disability Index                    | Indirect effect: $\beta = .001$ , $p > .05$ , direct effect $\beta = .15$ , $p > .05$                                          | $\beta = -.07$ , $p < .05$             | $\beta = .55$ , $p < .05$              | $\beta = -.05$ , $p > .05$             | No  |  |
| Meadows [153]     | 2017 | Breast cancer survivors                                                      | Physical activity                            | Nine items that assess recreational walking and light, moderate, and vigorous PA using a frequency and duration item forma | Life satisfaction      | SWLS                                                     |  | Disability       | Late-Life Function and Disability Instrument                              |                                                                                                                                | $\beta = -.02$ , ns                    | $\beta = -.12$ , ns                    | $\beta = .14$ , ns                     | No  |  |
| Baruth [16]       | 2016 | Adults                                                                       | Leisure-time PA                              | Community Health Activities Model Program for Seniors (CHAMPS) questionnaire                                               | Depression             | CES-D 10                                                 |  | Stiffness        | Participants rated their arthritis symptoms using a Visual Numeric Scale. | Indirect effect $\beta = .02$ , $p > .05$ , direct effect $\beta = .14$ , $p > .05$                                            | $\beta = -.24$ , $p > .05$             | $\beta = .09$ , $p < .05$              | $\beta = -.07$ , $p > .05$             | No  |  |
| Baruth [16]       | 2016 | Adults                                                                       | Leisure-time PA                              | Community Health Activities Model Program for Seniors (CHAMPS) questionnaire                                               | Depression             | CES-D 10                                                 |  | Pain             | Participants rated their arthritis symptoms using a Visual Numeric Scale. | Indirect effect $\beta = .02$ , $p > .05$ , direct effect $\beta = .13$ , $p > .05$                                            | $\beta = -.34$ , $p < .05$             | $\beta = .11$ , $p < .05$              | $\beta = -.05$ , $p > .05$             | No  |  |
| Barr [14]         | 2010 | Physically active men                                                        | Aerobic exercise                             | Intervention vs control                                                                                                    | Affect                 | Activation Deactivation Adjective Checklist (AD-ACL)     |  | Pain             | One item from the Brief Pain Inventory                                    | $\beta = -.44$ , $p < .05$                                                                                                     |                                        |                                        |                                        | Yes |  |
| Latimer [120]     | 2004 | Individuals with traumatic spinal cord injury                                | Exercise                                     | Intervention vs control                                                                                                    | Stress                 | 14-item Perceived Stress Scale (PSS)                     |  | Pain             | Two-item pain subscale from the 36-Item Short-Form Health Survey (SF-36)  | $F [4,17] = 7.72$ , $p < .01$                                                                                                  | $\beta = .54$ , $t = 3.04$ , $p < .01$ | $\beta = .59$ , $t = 2.99$ , $p < .05$ | $\beta = .47$ , $t = 3.01$ , $p < .05$ | Yes |  |
| Choi [38]         | 2024 | Older adults                                                                 | Physical activity                            | ever went walking for exercise (yes or no), and ever spent time on vigorous activities (yes or no)                         | Psychological distress | Patient Health Questionnaire-4 (PHQ-4)                   |  | Pain             | Asked if they were bothered by pain in the past month (yes = 1, no = 0).  | Indirect effect ( $-0.06$ , 95% CI = $[-0.09, -0.02]$ , $z = -3.18$ , $p = .001$ )                                             |                                        |                                        |                                        | Yes |  |
| Perez-Sousa [172] | 2023 | Women with Rheumatoid Arthritis                                              | Aquatics exercise                            | Group allocation to intervention or control                                                                                | Depression             | e Portuguese version of the Beck Depression Inventory-II |  | Pain             | Visual analog scale (VAS)                                                 | $\beta$ : $-9.36$ , 95%CI ( $-17.68, -2.66$ )                                                                                  |                                        |                                        |                                        | Yes |  |
| Ginis [74]        | 2003 | Individuals with spinal cord injury                                          | Aerobic and resistance training twice weekly | Intervention vs control                                                                                                    | Depression             | CES-D                                                    |  | Perceived Pain   | Two pain items from the Short-Form 36-Item Health Survey (SF-36)          | Variance explained by pain $R^2 = .19$ , $p < .01$                                                                             |                                        |                                        |                                        | Yes |  |
| Baruth [16]       | 2016 | Adults                                                                       | Leisure-time PA                              | Community Health Activities Model Program for Seniors (CHAMPS) questionnaire                                               | Depression             | CES-D 10                                                 |  | Fatigue          | Participants rated their arthritis symptoms using a Visual Numeric Scale. | Indirect effect $\beta = -.04$ , $p > .05$ , direct effect $\beta = .19$ , $p < .05$                                           | $\beta = -.20$ , $p > .05$             | $\beta = .15$ , $p < .05$              | $\beta = -.06$ , $p > .05$             | No  |  |
| Annesi [5]        | 2019 | People participating in Parkinson Disease tailored physical activity classes | $\Delta$ Leisure-Time PA                     | Leisure-Time Physical Activity Questionnaire                                                                               | $\Delta$ Depression    | Profile of Mood States depression subscale               |  | $\Delta$ Fatigue | Profile of Mood States fatigue subscale                                   | Indirect effect: $\beta = -.02$ , 95% CI = $-.065, -.001$<br>Direct effect: $\beta = -.03$ , $p = .169$                        | $\beta = -.09$ , $p = .01$             | $\beta = -.27$ , $p = .045$            | $\beta = -.06$ , $p = .05$             | Yes |  |
| Meadows [153]     | 2017 | Breast cancer survivors                                                      | Physical activity                            | Nine items that assess recreational walking and light, moderate, and vigorous PA using a frequency and duration item forma | Life satisfaction      | SWLS                                                     |  | Fatigue          | Functional Assessment of Cancer Therapy instrument (FACIT)                | Indirect effect estimate = $.06$ , $p = .09$<br>Total indirect effects (fatigue and function) estimate = $.161$ , $p = .012$   | $\beta = -.23$ , $p < .05$             | $\beta = -.21$ , $p < .05$             | $\beta = .14$ , ns                     | Yes |  |
| Roppolo [180]     | 2013 | Women with multiple sclerosis                                                | Aerobic and Strength training                | Intervention vs control                                                                                                    | Depression             | BDI                                                      |  | Fatigue          | Modified Fatigue Impact Scale (MFIS)                                      | Mediation effect = $4.52$ , $p < .05$                                                                                          |                                        |                                        |                                        | Yes |  |

|                           |      |                                                     |                                |                                                                                                                          |                        |                                                                         |                                     |                                                                                                                      |                                                                                                                                               |                         |                         |                          |     |
|---------------------------|------|-----------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|--------------------------|-----|
| Fisher [65]               | 2017 | Women with non-metastatic stage 0-III breast cancer | Physical activity change       | Seven-Day Physical Activity Recall Questionnaire                                                                         | Depressive symptoms    | Hamilton Rating Scale for Depression (HRSD)                             | Fatigue related daily interference  | 7-item Perceived Interference subscale of the 12-item Fatigue Symptom Inventory (FSI)                                | Indirect effect $\beta = -.02, p = .04$                                                                                                       | $\beta = -.05, p < .01$ | $\beta = .40, p > .05$  | Yes                      |     |
| Fisher [65]               | 2017 | Women with non-metastatic stage 0-III breast cancer | Physical activity change       | Seven-Day Physical Activity Recall Questionnaire                                                                         | Depressed mood         | Depression subscale of the 40-item Affect Balance Scale (ABS)           | Fatigue related daily interference  | 7-item Perceived Interference subscale of the 12-item Fatigue Symptom Inventory (FSI)                                | Indirect effect $\beta = -.02, p = .13$                                                                                                       | $\beta = -.05, p < .01$ | $\beta = .50, p < .01$  | No                       |     |
| Condello [41]             | 2016 | Adults                                              | Physical activity              | AAHPERD (American Alliance for Health, Physical Education, Recreation, and Dance) exercise/medical history questionnaire | Mental health          | SF-12 MCS                                                               | BMI                                 | Height and weight derived                                                                                            | Indirect effects: PA to BMI = 3.50, $p < .01$ , BMI to BDI = 0.97, $p < .01$ , BDI to MCS = 0.20, $p = .03$ ; Direct effect = 4.97, $p = .04$ |                         |                         | Yes                      |     |
| Eddolls [55]              | 2018 | Children                                            | Vigorous PA                    | Actigraph accelerometer                                                                                                  | Depressive symptoms    | Center for Epidemiologic Studies Depression Scale for Children (CES-DC) | BMI                                 | Stature and body mass were measured, using a stadiometer and body mass scale                                         | Indirect effect: $\beta = -.03, p < .001$                                                                                                     | $\beta = -.29, p < .01$ | $\beta = .12, p < .05$  | $\beta = -.03, p < .001$ | Yes |
| Werneck [213]             | 2022 | Adults                                              | Leisure time physical activity | Self-report                                                                                                              | Well-being             | Warwick-Edinburgh scale                                                 | BMI                                 |                                                                                                                      | 0.003 (0.001 to 0.005)*                                                                                                                       |                         |                         | Yes                      |     |
| Werneck [213]             | 2022 | Adults                                              | Leisure time physical activity | Self-report                                                                                                              | Psychological distress | Malaise Inventory                                                       | BMI                                 |                                                                                                                      | -0.001 (-0.002 to 0.001)                                                                                                                      |                         |                         | no                       |     |
| Meyer [155]               | 2021 | Teenagers                                           | Physical activity              | Over the past 7 days, on how many days were you physically active for a total of at least 60 min per day?                | Life satisfaction      | Single item – where on the ladder do you feel you stand at the moment?" | Weight perception - underweight     | One item - "Do you think your body is ...?" much too thin, a bit too thin, about right, a bit too fat, much too fat? | Indirect effect: $b = .004, 95\% \text{ MC CI} = .0035, .0045$                                                                                | $r = -.04, p < .001$    | $r = -.10, p < .001$    | $r = .15, p < .001$      | Yes |
| Meyer [155]               | 2021 | Teenagers                                           | Physical activity              | Over the past 7 days, on how many days were you physically active for a total of at least 60 min per day?                | Life satisfaction      | Single item – where on the ladder do you feel you stand at the moment?" | Weight perception - overweight      | One item - "Do you think your body is ...?" much too thin, a bit too thin, about right, a bit too fat, much too fat? | Indirect effect: $b = .010, 95\% \text{ MC CI} = .0090, .011$                                                                                 | $r = -.11, p < .001$    | $r = -.22, p < .001$    | $r = .15, p < .001$      | Yes |
| Quarta [178]              | 2022 | Adults                                              | Sport                          | One item frequency measure                                                                                               | subjective wellbeing   | 9-item subjective wellbeing scale                                       | Energy levels                       | three items adapted from the Lee's Fatigue scale                                                                     | $\beta = .09, 95\% \text{ CI} = .058, .129$                                                                                                   | $\beta = .21, p < .001$ | $\beta = .64, p < .001$ | $\beta = -.05, p > .05$  | Yes |
| Zou [246]                 | 2023 | Adults                                              | Physical activity              | Global Physical Activity Questionnaire                                                                                   | Depressive symptoms    | 9-item Patient Health Questionnaire                                     | Glycemic control                    | Blood sample                                                                                                         | $p = .48$                                                                                                                                     |                         |                         | No                       |     |
| NEUROBIOLOGICAL MEDIATORS |      |                                                     |                                |                                                                                                                          |                        |                                                                         |                                     |                                                                                                                      |                                                                                                                                               |                         |                         |                          |     |
| Booij [22]                | 2014 | Adolescents                                         | Exercise                       | Self-reported hours per week across a range of exercise types at Time 2                                                  | Depression             | Affective Problem Scale at time 3                                       | HPA axis functioning                | AUCgCort                                                                                                             | Indirect effect $B = -.00, \text{CI} = -.02, .00$                                                                                             |                         |                         | No                       |     |
| Booij [22]                | 2014 | Adolescents                                         | Exercise                       | Self-reported hours per week across a range of exercise types at Time 2                                                  | Depression             | Affective Problem Scale at time 3                                       | Cortisol reactivity                 | AUCiCort                                                                                                             | Indirect effect $B = .01, \text{CI} = -.00, .04$                                                                                              |                         |                         | No                       |     |
| Booij [22]                | 2014 | Adolescents                                         | Exercise                       | Self-reported hours per week across a range of exercise types at Time 2                                                  | Depression             | Affective Problem Scale at time 3                                       | Heart rate during social stress     | AUCgHR                                                                                                               | Indirect effect $B = -.03, \text{CI} = -.07, -.01$                                                                                            |                         |                         | Yes                      |     |
| Booij [22]                | 2014 | Adolescents                                         | Exercise                       | Self-reported hours per week across a range of exercise types at Time 2                                                  | Depression             | Affective Problem Scale at time 3                                       | Heart rate reactivity               | AUCiHR                                                                                                               | Indirect effect $B = -.00, \text{CI} = -.02, .00$                                                                                             |                         |                         | No                       |     |
| Booij [22]                | 2014 | Adolescents                                         | Exercise                       | Self-reported hours per week across a range of exercise types at Time 2                                                  | Depression             | Affective Problem Scale at time 3                                       | High sensitivity C-reactive protein | HsCRP                                                                                                                | Indirect effect $B = .00$                                                                                                                     |                         |                         | No                       |     |
| Olson [164]               | 2017 | Adults with major depressive disorder               | Aerobic exercise               | Intervention vs control                                                                                                  | Depressive symptoms    | BDI-II                                                                  | Changes in N2 TFSF amplitude        | EEG                                                                                                                  | Indirect effect $B = -3.72, 95\% \text{ CI} = -12.02, 0.91$                                                                                   |                         |                         | No                       |     |
| Huang [99]                | 2022 | Older diabetes patients                             | Physical activity              | Self-report                                                                                                              | Depression             | DSM-IV                                                                  | Inflammation                        | High-sensitivity C-reactive protein (HsCRP)                                                                          | $z = -2.01, p = 0.045$                                                                                                                        |                         |                         | Yes                      |     |
| You [229]                 | 2022 | Adults                                              | Leisure time physical activity | Self-report                                                                                                              | Depressive symptoms    | Patient Health Questionnaire-9 (PHQ9)                                   | inflammatory potential of the diet  | dietary inflammatory index (D                                                                                        | Direct effect = $-.0076, p < .001$ , Indirect effect = $-.0003, p = .046$                                                                     |                         |                         | Yes                      |     |

|              |      |                            |                           |                                             |                        |                                        |               |                                                                                  |                                                                    |                                       |                         |                        |                            |     |
|--------------|------|----------------------------|---------------------------|---------------------------------------------|------------------------|----------------------------------------|---------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------------|-------------------------|------------------------|----------------------------|-----|
| Huang [98]   | 2021 | Adults                     | Physical activity         | Self-reported against guidelines            | Depression             | Patient Health Questionnaire-9 (PHQ-9) | Triglycerides | Mediation effect = 0.06(0.01,0.10), $p = .014$ , proportion attributable = 6.28% |                                                                    |                                       |                         |                        |                            | Yes |
| Gujral [83]  | 2024 | Older adults               | Physical activity         | self-reported and calculated as METs        | Psychological distress | DASS                                   |               | APOE ε4 carrier status                                                           | TaqMan genotyping assays on DNA extracted from whole blood samples |                                       |                         |                        |                            | Yes |
| Gujral [83]  | 2024 | Older adults               | Physical activity         | self-reported and calculated as METs        | Psychological distress | DASS                                   |               | BDNF Val66Met polymorphism                                                       | TaqMan genotyping assays on DNA extracted from whole blood samples |                                       |                         |                        |                            | No  |
| Donyaei [51] | 2023 | Women with type 2 diabetes | Exercise training program | Group allocation to intervention or control | Depression             | BDI                                    |               | BDNF                                                                             | Blood sample                                                       | Indirect effect $B = -57$ , $p = .04$ | $b = 1.10$ , $p = .001$ | $b = -.57$ , $p = .04$ | $b = -11.25$ , $p = .0006$ | Yes |

COGNITIVE MEDIATORS

|               |      |                  |                                |                                                |                        |                                      |           |                       |                                      |                                                               |                        |                        |                         |     |
|---------------|------|------------------|--------------------------------|------------------------------------------------|------------------------|--------------------------------------|-----------|-----------------------|--------------------------------------|---------------------------------------------------------------|------------------------|------------------------|-------------------------|-----|
| Birch [20]    | 2016 | Older adults     | Physical activity              | Rapid Assessment of Physical Activity (RAPA 1) | Depression             | CES-D                                |           | Cognitive functioning | Montreal Cognitive Assessment (MoCA) | $p = .04$                                                     | $r = .15$ , $p = .006$ | $r = .15$ , $p < .001$ | $r = -.23$ , $p < .001$ | Yes |
| Werneck [213] | 2022 | Adults           | Leisure time physical activity | Self-report                                    | well-being             | Warwick-Edinburgh scale              | Cognition |                       | vocabulary test                      | 0.000 (−0.001 to 0.001)                                       |                        |                        |                         | no  |
| Werneck [213] | 2022 | Adults           | Leisure time physical activity | Self-report                                    | Psychological distress | Malaise Inventory                    | Cognition |                       | vocabulary test                      | 0.000 (−0.002 to 0.002)                                       |                        |                        |                         | no  |
| Dong [49]     | 2022 | College students | Physical activity              | IPAQ                                           | Trait anxiety          | State-trait Anxiety Inventory (STAI) |           | inhibition function   | Stroop task                          | Indirect effect $\beta = -0.018$ , $p < .05$ , CI = -0.047, 0 |                        |                        |                         | Yes |

ENVIRONMENTAL MEDIATORS

|               |      |        |                                |                            |                         |                                               |                                             |                                                                             |                                                                                |                         |                        |                         |     |
|---------------|------|--------|--------------------------------|----------------------------|-------------------------|-----------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------|------------------------|-------------------------|-----|
| Jenkins [102] | 2022 | Adults | Nature-based PA                | IPAQ-SF                    | Psychological wellbeing | Questionnaire for Eudaimonic Wellbeing (QWEB) | Nature relatedness                          | Nature Relatedness Scale                                                    |                                                                                | $\beta = .36, p < .05$  | $\beta = .22, p < .05$ | $\beta = -.05, p > .05$ | Yes |
| Jenkins [102] | 2022 | Adults | Nature-based PA                | IPAQ-SF                    | Hedonic Wellbeing       | WHO-5                                         | Nature relatedness                          | Nature Relatedness Scale                                                    |                                                                                | $\beta = .36, p < .05$  | $\beta = .08, p > .05$ | $\beta = .04, p > .05$  | Yes |
| Quarta [178]  | 2022 | Adults | Sport                          | One item frequency measure | subjective wellbeing    | 9-item subjective wellbeing scale             | Time spent in nature                        | During the last month, how often did you spend time in nature?              | $\beta = .007, 95\% \text{ CI} = -.001, .015$                                  | $\beta = .22, p < .001$ | $\beta = .04, p > .05$ | $\beta = -.05, p > .05$ | No  |
| McNeil [151]  | 2022 | Adults | Nature based physical activity | Self-report                | Wellbeing               | The World Health Organization—5 (WHO-5;       | Nature connectedness                        | Nature Relatedness Scale (NRS)                                              | $b = 0.03, SE = 0.03, 95\% \text{ CI} = -0.02 \text{ to } 0.05, \beta = 0.01.$ | $.30, p < .05$          | $.05, p > .05$         | $.19, p < .05$          | Yes |
| McNeil [151]  | 2022 | Adults | Nature based physical activity | Self-report                | Wellbeing               | The World Health Organization—5 (WHO-5;       | Nature connectedness + social connectedness | Nature Relatedness Scale (NRS) + Social Connectedness Scale Revised (SCS-R) |                                                                                |                         |                        |                         | Yes |

*Note:* CESD = Center for Epidemiologic Studies Depression Scale; DASS = Depression Anxiety Stress Scale; GHQ = General Health Questionnaire; GLTEQ = Godin Leisure-time Exercise Questionnaire; HADS = Hospital Anxiety and Depression Scale; IPAQ = International Physical Activity Questionnaire; IPAQSF = International Physical Activity Questionnaire Short Form; PA = physical activity, PANAS = Positive and Negative Affect Schedule; MVPA = Moderate to Vigorous Physical Activity; Only the first author is listed for brevity; the numbers in parentheses following the first authors' names refer to the individual study IDs of the 247 included studies.

Table S3

Moderators of the relationship between physical activity and mental health.

|                                                                                  | First Author  | Year | Participants                                | Physical activity            |                                                                                                       | Mental health       |                                                                                                          | Moderator                         | Moderation Results                                                                                              |                                                                     | Sig. mod |
|----------------------------------------------------------------------------------|---------------|------|---------------------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------|
|                                                                                  |               |      |                                             | Variable                     | Measure                                                                                               | Variable            | Measure                                                                                                  | Variable                          | Measure                                                                                                         |                                                                     |          |
| PSYCHOLOGICAL MODERATORS                                                         |               |      |                                             |                              |                                                                                                       |                     |                                                                                                          |                                   |                                                                                                                 |                                                                     |          |
| Affect, wellbeing, stress, and depression or anxiety symptomology or sensitivity | Brière [25]   | 2018 | Adolescents                                 | Sport participation          | One item – Do you regularly take part in an organised sport?                                          | Depression          | CES-D                                                                                                    | Pre-existing depressive symptoms  | CES-D                                                                                                           | $\beta = -.04, p < .05$                                             | Yes      |
|                                                                                  | Wichers [218] | 2012 | Female twins                                | Daily Life Physical Activity | Experience Sampling Method                                                                            | Positive affect     | PANAS                                                                                                    | Depression Risk                   | Structured Clinical Interview for Diagnostic and Statistical Manual for Mental Health (DSM)–IV axis I disorders | $B = 0.05, p = .254, Bt = 10.07, p = .138, Bt = 20.13, p = .012$ .  | Yes      |
|                                                                                  | Annesi [4]    | 2018 | Adolescent candidates for Bariatric Surgery | Leisure-time PA              | Leisure-Time Physical Activity Questionnaire                                                          | Negative mood       | Profile of Mood States-Brief Form (depression, fatigue, tension, vigour, anger, and confusion subscales) | Depressive symptoms               | Quick Inventory of Depressive Symptomology (QIDS)                                                               | Interaction term $\beta = .01, p = .45$                             | No       |
|                                                                                  | Walsh [206]   | 2023 | Young adults                                | Physical activity            | Actigraph accelerometer                                                                               | Depression          | BDI-II                                                                                                   | Risk of bipolar spectrum disorder | Structured clinical diagnostic interview                                                                        |                                                                     | Yes      |
|                                                                                  | Walsh [205]   | 2022 | Young adults                                | Physical activity            | Actigraph accelerometer                                                                               | Depressive symptoms | BDI-II                                                                                                   | Bipolar disorder                  | Psychiatric diagnoses (DSM-IV-TR and RDC)                                                                       | $B = -.0.145, SE = 0.066, p = .002$                                 | Yes      |
|                                                                                  | Walsh [205]   | 2022 | Young adults                                | Physical activity            | Actigraph accelerometer                                                                               | Depressive symptoms | BDI-II                                                                                                   | Bipolar disorder                  | Psychiatric diagnoses (DSM-IV-TR and RDC)                                                                       |                                                                     | No       |
|                                                                                  | Lin (a) [132] | 2022 | University students                         | Sport                        | Sport Participation Level Scale                                                                       | Depression          | Depression Level Scale                                                                                   | Flow experiences                  | Flow experience scale                                                                                           | $\beta = -.02, p > .05$                                             | No       |
|                                                                                  | Johnson [106] | 2022 | University students                         | Exercise                     | Single bout of aerobic exercise at a self-selected intensity compared to studying for class (control) | Positive affect     | PANAS                                                                                                    | Positive affect                   | PANAS                                                                                                           | Group $\times$ Time, $F(1, 78) = 7.08, p \leq .01, \eta p^2 = 0.08$ | Yes      |
| Global self-esteem, self-worth, body image, and appearance                       | Han [90]      | 2023 | College students                            | Physical activity            | IPAQ-SF                                                                                               | Depression          | Self-rating Depression Scale (SDS)                                                                       | Body image                        | Body Image Questionnaire (BIQ)                                                                                  | $\beta = .17, CI = -.05, .389$                                      | No       |
|                                                                                  | Han [90]      | 2023 | College students                            | Physical activity            | IPAQ-SF                                                                                               | Anxiety             | Self-rating Anxiety Scale (SAS)                                                                          | Body image                        | Body Image Questionnaire (BIQ)                                                                                  | $\beta = .270, CI = .054, .485$                                     | Yes      |

|                                                        |               |      |                                                                                  |                           |                                                                                             |                                                           |                                                          |                   |                                                                                     |                                                                                                                      |     |
|--------------------------------------------------------|---------------|------|----------------------------------------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----|
| Esteem and confidence in relation to physical activity | Cho [37]      | 2017 | College students                                                                 | Weekend physical activity | Number of weekend hours spent in physical activities                                        | Negative affect                                           | Negative affect subscale from PANAS                      | Mastery           | Four types of weekend recovery experiences using Sonnentag and Fritz's (2007) scale | $\gamma = 0.03$ , $SE = 0.03$ , $p > 0.05$                                                                           | No  |
|                                                        |               |      |                                                                                  |                           |                                                                                             |                                                           |                                                          |                   |                                                                                     |                                                                                                                      |     |
| Personality                                            | Chan [32]     | 2018 | Older adults                                                                     | Leisure-time PA           | Godin–Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ)                       | Subjective wellbeing (i.e., life satisfaction and affect) | SWLS and PANAS                                           | Extraversion      | The Big Five Inventory                                                              | Interaction $\beta = .14$ , $p < .001$                                                                               | Yes |
|                                                        | Giacobbi [72] | 2006 | Individuals with physical disabilities with experience playing wheelchair sports | Leisure time PA           | Leisure-Time Exercise Questionnaire (LTEQ)                                                  | Positive affect                                           | PANAS                                                    | Extroversion      | NEO-Five Factor Inventory                                                           | Coef = $-.00$ , $t = -.01$ , $p > .05$                                                                               | No  |
|                                                        | Giacobbi [72] | 2006 | Individuals with physical disabilities with experience playing wheelchair sports | Leisure time PA           | Leisure-Time Exercise Questionnaire (LTEQ)                                                  | Negative affect                                           | PANAS                                                    | Extroversion      | NEO-Five Factor Inventory                                                           | Coef = $.00$ , $t = .52$ , $p > .05$                                                                                 | No  |
|                                                        | Wang [207]    | 2020 | Middle school students                                                           | Sport Participation       | Extracurricular sports subscale of the Middle School Student School Sports Assessment Scale | Life satisfaction                                         | The Satisfaction with Life Scale for Chinese Adolescents | Extraversion      | Extraversion subscale of the NEO Personality Inventory                              | High extraversion: $b$ simple slope = $-.32$ , $p < .001$<br>Low extraversion: $b$ simple slope = $-.15$ , $p < .01$ | Yes |
|                                                        | Chan [33]     | 2024 | Older adults                                                                     | Physical activity         | one -item measure                                                                           | Subjective wellbeing                                      | Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS)        | Extraversion      | The 50-item International Personality Item Pool                                     | $\beta = -.02$ , $p > .05$                                                                                           | No  |
|                                                        | Chan [32]     | 2018 | Older adults                                                                     | Leisure-time PA           | Godin–Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ)                       | Subjective wellbeing (i.e., life satisfaction and affect) | SWLS and PANAS                                           | Agreeableness     | The Big Five Inventory                                                              | Interaction $\beta = .02$ , $p > .05$                                                                                | No  |
|                                                        | Giacobbi [72] | 2006 | Individuals with physical disabilities with experience playing wheelchair sports | Leisure time PA           | Leisure-Time Exercise Questionnaire (LTEQ)                                                  | Positive affect                                           | PANAS                                                    | Agreeableness     | NEO-Five Factor Inventory                                                           | Coef = $-.01$ , $t = -2.02$ , $p < .05$                                                                              | Yes |
|                                                        | Giacobbi [72] | 2006 | Individuals with physical disabilities with experience playing wheelchair sports | Leisure time PA           | Leisure-Time Exercise Questionnaire (LTEQ)                                                  | Negative affect                                           | PANAS                                                    | Agreeableness     | NEO-Five Factor Inventory                                                           | Coef = $.01$ , $t = 1.78$ , $p > .05$                                                                                | No  |
|                                                        | Chan [33]     | 2024 | Older adults                                                                     | Physical activity         | One -item measure                                                                           | Subjective wellbeing                                      | Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS)        | Agreeableness     | The 50-item International Personality Item Pool                                     | $\beta = -.02$ , $p > .06$                                                                                           | No  |
|                                                        | Chan [32]     | 2018 | Older adults                                                                     | Leisure-time PA           | Godin–Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ)                       | Subjective wellbeing (i.e., life satisfaction and affect) | SWLS and PANAS                                           | Conscientiousness | The Big Five Inventory                                                              | Interaction $\beta = .08$ , $p > .05$                                                                                | No  |
|                                                        | Giacobbi [72] | 2006 | Individuals with physical disabilities with experience playing wheelchair sports | Leisure time PA           | Leisure-Time Exercise Questionnaire (LTEQ)                                                  | Positive affect                                           | PANAS                                                    | Conscientiousness | NEO-Five Factor Inventory                                                           | Coef = $-.01$ , $t = -2.16$ , $p < .05$                                                                              | Yes |
|                                                        | Giacobbi [72] | 2006 | Individuals with physical disabilities with experience playing wheelchair sports | Leisure time PA           | Leisure-Time Exercise Questionnaire (LTEQ)                                                  | Negative affect                                           | PANAS                                                    | Conscientiousness | NEO-Five Factor Inventory                                                           | Coef = $.00$ , $t = .41$ , $p > .05$                                                                                 | No  |

|                                                    |               |      |                                                                                  |                           |                                                                       |                                                           |                                                                                                          |                         |                                                                                                                  |                                                            |     |
|----------------------------------------------------|---------------|------|----------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-----|
| Psychological factors related to physical activity | Chan [32]     | 2018 | Older adults                                                                     | Leisure-time PA           | Godin–Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) | Subjective wellbeing (i.e., life satisfaction and affect) | SWLS and PANAS                                                                                           | Neuroticism             | The Big Five Inventory                                                                                           | Interaction $\beta = -.03, p > .05$                        | No  |
|                                                    | Giacobbi [72] | 2006 | Individuals with physical disabilities with experience playing wheelchair sports | Leisure time PA           | Leisure-Time Exercise Questionnaire (LTEQ)                            | Positive affect                                           | PANAS                                                                                                    | Neuroticism             | NEO-Five Factor Inventory                                                                                        | Coef = .01, $t = 3.27, p < .01$                            | Yes |
|                                                    | Giacobbi [72] | 2006 | Individuals with physical disabilities with experience playing wheelchair sports | Leisure time PA           | Leisure-Time Exercise Questionnaire (LTEQ)                            | Negative affect                                           | PANAS                                                                                                    | Neuroticism             | NEO-Five Factor Inventory                                                                                        | Coef = -.01, $t = -3.66, p < .01$                          | Yes |
|                                                    | Chan [32]     | 2018 | Older adults                                                                     | Leisure-time PA           | Godin–Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) | Subjective wellbeing (i.e., life satisfaction and affect) | SWLS and PANAS                                                                                           | Openness to experience  | The Big Five Inventory                                                                                           | Interaction $\beta = .16, p < .001$                        | Yes |
|                                                    | Giacobbi [72] | 2006 | Individuals with physical disabilities with experience playing wheelchair sports | Leisure time PA           | Leisure-Time Exercise Questionnaire (LTEQ)                            | Positive affect                                           | PANAS                                                                                                    | Openness                | NEO-Five Factor Inventory                                                                                        | Coef = -.00, $t = -.80, p > .05$                           | No  |
|                                                    | Giacobbi [72] | 2006 | Individuals with physical disabilities with experience playing wheelchair sports | Leisure time PA           | Leisure-Time Exercise Questionnaire (LTEQ)                            | Negative affect                                           | PANAS                                                                                                    | Openness                | NEO-Five Factor Inventory                                                                                        | Coef = -.00, $t = -.37, p > .05$                           | No  |
|                                                    | Cho [37]      | 2017 | College students                                                                 | Weekend physical activity | Number of weekend hours spent in physical activities                  | Negative affect                                           | Negative affect subscale from PANAS                                                                      | Control                 | Four types of weekend recovery experiences using Sonnentag and Fritz's (2007) scale                              | $\gamma = 0.02, SE = 0.06, p > 0.05$ for control           | No  |
|                                                    | Annesi [4]    | 2018 | Adolescent candidates for Bariatric Surgery                                      | Leisure-time PA           | Leisure-Time Physical Activity Questionnaire                          | Negative mood                                             | Profile of Mood States-Brief Form (depression, fatigue, tension, vigour, anger, and confusion subscales) | Preoccupation with food | Modified Trait and State Food-Cravings Questionnaire (trait version) preoccupation with food subscale (MTFCQ-PR) | Interaction term $\beta = -.01, p = .35$                   | No  |
|                                                    | Annesi [4]    | 2018 | Adolescent candidates for Bariatric Surgery                                      | Leisure-time PA           | Leisure-Time Physical Activity Questionnaire                          | Negative mood                                             | Profile of Mood States-Brief Form (depression, fatigue, tension, vigour, anger, and confusion subscales) | Emotional cravings      | Modified Trait and State Food-Cravings Questionnaire (trait version) emotional cravings subscale (MTFCQ-EM)      | Interaction term $\beta = .00, p = .48$                    | No  |
|                                                    | White [216]   | 2018 | Adolescents                                                                      | Leisure-time PA (MVPA)    | Adapted version of the WHO Health Behavior in School-aged Children    | Positive Affect                                           | Short version of the PANAS-C                                                                             | Motivation              | BREQ-2                                                                                                           |                                                            | No  |
|                                                    | White [216]   | 2018 | Adolescents                                                                      | Leisure-time PA (MVPA)    | Adapted version of the WHO Health Behavior in School-aged Children    | Negative Affect                                           | Short version of the PANAS-C                                                                             | Motivation              | BREQ-2                                                                                                           | $\beta = -.03, p < .05$                                    | Yes |
|                                                    | White [216]   | 2018 | Adolescents                                                                      | Leisure-time PA (MVPA)    | Actigraph accelerometer                                               | Positive Affect                                           | Short version of the PANAS-C                                                                             | Motivation              | BREQ-2                                                                                                           |                                                            | No  |
|                                                    | White [216]   | 2018 | Adolescents                                                                      | Leisure-time PA (MVPA)    | Actigraph accelerometer                                               | Negative Affect                                           | Short version of the PANAS-C                                                                             | Motivation              | BREQ-2                                                                                                           | $\beta = -.003, p < .001$                                  | Yes |
|                                                    | White [216]   | 2018 | Adolescents                                                                      | Active travel PA (MVPA)   | 48-h recall travel diary                                              | Positive Affect                                           | Short version of the PANAS-C                                                                             | Motivation              | MATSS                                                                                                            |                                                            | No  |
|                                                    | White [216]   | 2018 | Adolescents                                                                      | Active travel PA (MVPA)   | 48-h recall travel diary                                              | Negative Affect                                           | Short version of the PANAS-C                                                                             | Motivation              | MATSS                                                                                                            |                                                            | No  |
|                                                    | White [216]   | 2018 | Adolescents                                                                      | Active travel PA (MVPA)   | Actigraph accelerometer                                               | Positive Affect                                           | Short version of the PANAS-C                                                                             | Motivation              | MATSS                                                                                                            | $\beta = .09, p < .05$                                     | Yes |
|                                                    | White [216]   | 2018 | Adolescents                                                                      | Active travel PA (MVPA)   | Actigraph accelerometer                                               | Negative Affect                                           | Short version of the PANAS-C                                                                             | Motivation              | MATSS                                                                                                            | $\beta = -.01, p < .001$                                   | Yes |
|                                                    | Lau [121]     | 2023 | Community dwelling stroke survivors                                              | Physical activity         | Accelerometer                                                         | Affect (positive affect)                                  | Adapted from validated measures                                                                          | Motivation              | Adapted from BREQ-3                                                                                              | Aut mot = .01 (–0.09 0.21), Con mot = –0.02 (–0.20 0.06)   | No  |
|                                                    | Lau [121]     | 2023 | Community dwelling stroke survivors                                              | Physical activity         | Accelerometer                                                         | Affect (depressed affect)                                 | adapted from validated measures                                                                          | Motivation              | Adapted from BREQ-2                                                                                              | Aut mot = .02 (–0.03, 0.15), Con mot = –0.02 (–0.10, 0.06) | No  |

|               |      |                                       |                       |                                       |                     |                                                     |                                                 |                                                          |                                                                                                                                       |     |
|---------------|------|---------------------------------------|-----------------------|---------------------------------------|---------------------|-----------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----|
| Shin [188]    | 2014 | Active college students               | Exercise              | Cycle ergometer and running lab based | Affect              | Feeling Scale                                       | Intrinsic motivation                            | Four items taken from the Intrinsic Motivation Inventory | Standardized factor loading of the path from intrinsic motivation to the slopes was statistically significant (FL = 0.47, $p = .04$ ) | Yes |
| Solberg [191] | 2014 | Older adults                          | Exercise              | Intervention vs control               | Life Satisfaction   | 5-item SWLS                                         | Autonomous motivation towards exercise          | 15-item BREQ                                             | ES = -.23, $\pm .4$ (sig level not determined)                                                                                        | Yes |
| Solberg [191] | 2014 | Older adults                          | Exercise              | Intervention vs control               | Positive affect     | 12-item version of the PANAS                        | Autonomous motivation towards exercise          | 15-item BREQ                                             | ES = .12, $\pm .56$ (sig level not determined)                                                                                        | No  |
| Solberg [191] | 2014 | Older adults                          | Exercise              | Intervention vs control               | Negative affect     | 12-item version of the PANAS                        | Autonomous motivation towards exercise          | 15-item BREQ                                             | ES = -.30, $\pm .49$ (sig level not determined)                                                                                       | No  |
| Solberg [191] | 2014 | Older adults                          | Exercise              | Intervention vs control               | Life Satisfaction   | 12-item version of the PANAS                        | Introjected regulation towards exercise         | 15-item BREQ                                             | ES = .17. $\pm .41$ (sig level not determined)                                                                                        | No  |
| Solberg [191] | 2014 | Older adults                          | Exercise              | Intervention vs control               | Positive affect     | 12-item version of the PANAS                        | Introjected regulation towards exercise         | 15-item BREQ                                             | ES = .28, $\pm .50$ (sig level not determined)                                                                                        | No  |
| Solberg [191] | 2014 | Older adults                          | Exercise              | Intervention vs control               | Negative affect     | 12-item version of the PANAS                        | Introjected regulation towards exercise         | 15-item BREQ                                             | ES = -.23, $\pm .52$ (sig level not determined)                                                                                       | No  |
| Solberg [191] | 2014 | Older adults                          | Exercise              | Intervention vs control               | Life Satisfaction   | 12-item version of the PANAS                        | External regulation towards exercise            | 15-item BREQ                                             | ES = .31. $\pm .41$ (sig level not determined)                                                                                        | Yes |
| Solberg [191] | 2014 | Older adults                          | Exercise              | Intervention vs control               | Positive affect     | 12-item version of the PANAS                        | External regulation towards exercise            | 15-item BREQ                                             | ES = -.05, $\pm .54$ (sig level not determined)                                                                                       | Yes |
| Solberg [191] | 2014 | Older adults                          | Exercise              | Intervention vs control               | Negative affect     | 12-item version of the PANAS                        | External regulation towards exercise            | 15-item BREQ                                             | ES = -.35. $\pm .49$ (sig level not determined)                                                                                       | Yes |
| Guérin [81]   | 2013 | Female runners                        | Preferred exercise    | 30-minute acute bout of exercise      | Positive affect     | PANAS                                               | Situational motivation - intrinsic motivation   | Situational Motivation Scale (SIMS)                      | High activation positive affect: F (1,39) = .23, $p = .34$ , $\eta^2 = .01$ .<br>Low activation positive affect: ns                   | No  |
| Guérin [81]   | 2013 | Female runners                        | Preferred exercise    | 30-minute acute bout of exercise      | Positive affect     | PANAS                                               | Situational motivation - identified regulation  | Situational Motivation Scale (SIMS)                      | High activation positive affect: F (1,39) = .92, $p = .34$ , $\eta^2 = .02$<br>Low activation positive affect: ns                     | No  |
| Guérin [81]   | 2013 | Female runners                        | Preferred exercise    | 30-minute acute bout of exercise      | Positive affect     | PANAS                                               | Situational motivation - introjected regulation | Situational Motivation Scale (SIMS)                      | High activation positive affect: F (1, 39) = 4.71, $p < .05$ , $\eta^2 = .11$<br>Low activation positive affect: ns                   | Yes |
| Toups [202]   | 2017 | Adults with major depressive disorder | Exercise intervention | High versus low dose group            | Depression symptoms | Quick Inventory of Depression Symptomatology (QIDS) | Motivation and energy                           | Motivation and Energy Inventory                          | $p = .015$                                                                                                                            | Yes |

|                             |                |      |                                         |                           |                                                                               |                   |                                                                           |                           |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                       |     |
|-----------------------------|----------------|------|-----------------------------------------|---------------------------|-------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|                             | Gerber [71]    | 2014 | Physically active vocational students   | Vigorous PA               | Two items from the International Physical Activity Questionnaire              | Stress            | Adolescent Stress Questionnaire                                           | Exercise self-regulation  | Three items assessed the degree to which adolescents form exercise-related plans during leisure time | Cross sectional: low exercise self-regulation $\beta = -.14, p < .05$ , moderate exercise self-regulation $\beta = -.13, p < .05$ , high exercise self-regulation $\beta = -.01, p > .05$ , Longitudinal: low exercise self-regulation $\beta = .02$ , moderate exercise self-regulation $\beta = .02$ , high exercise self-regulation $\beta = .03$ (all $p > .05$ ) | Yes |
| Other psychological factors | Maher [147]    | 2021 | Undergraduate students                  | Physical activity         | IPAQ                                                                          | Positive affect   | PANAS                                                                     | Stressful life events     | Social Readjustment Rating Scale                                                                     | $B = 0.00003$ , ns                                                                                                                                                                                                                                                                                                                                                    | No  |
|                             | Maher [147]    | 2021 | Undergraduate students                  | Physical activity         | IPAQ                                                                          | Positive affect   | PANAS                                                                     | Stressful life events     | Social Readjustment Rating Scale                                                                     | $B = 0.00001$ , ns                                                                                                                                                                                                                                                                                                                                                    | No  |
|                             | Wen [211]      | 2018 | Children                                | Physical activity (MVPA)  | Actigraph accelerometer                                                       | Positive affect   | PANAS-C                                                                   | Mother's perceived stress | Perceived Stress Scale                                                                               | Within person MVPA 60-mins before recording affect x Mother's stress $\beta = -.01, p < .05$ , 30-mins before $\beta = -.02, p > .05$                                                                                                                                                                                                                                 | Yes |
|                             | Wen [211]      | 2018 | Children                                | Physical activity (MVPA)  | Actigraph accelerometer                                                       | Negative affect   | PANAS-C                                                                   | Mother's perceived stress | Perceived Stress Scale                                                                               | Within person MVPA 60-mins before recording affect x Mother's stress $\beta = .01, p > .05$ , 30-mins before $\beta = .01, p > .05$                                                                                                                                                                                                                                   | No  |
|                             | Cho [37]       | 2017 | College students                        | Weekend physical activity | Number of weekend hours spent in physical activities                          | Negative affect   | Negative affect subscale from PANAS                                       | Psychological detachment  | Four types of weekend recovery experiences using Sonnentag and Fritz's (2007) scale                  | $\gamma = -0.09$ , SE = 0.03, $p < 0.01$                                                                                                                                                                                                                                                                                                                              | Yes |
|                             | Cho [37]       | 2017 | College students                        | Weekend physical activity | Number of weekend hours spent in physical activities                          | Negative affect   | Negative affect subscale from PANAS                                       | Relaxation                | Four types of weekend recovery experiences using Sonnentag and Fritz's (2007) scale                  | $\gamma = 0.03$ , SE = 0.04, $p > 0.05$                                                                                                                                                                                                                                                                                                                               | No  |
|                             | Klussman [111] | 2021 | Adults                                  | Physical activity         | IPAQ                                                                          | Depression        | Patient Health Questionnaire (PHQ-4)                                      | Self-connection           | 12-item Self-Connection Scale                                                                        | $F(3, 109) = 2.00$ , $p = .12$ , $\eta^2 = .05$                                                                                                                                                                                                                                                                                                                       | Yes |
|                             | Klussman [111] | 2021 | Adults                                  | Physical activity         | IPAQ                                                                          | Anxiety           | Patient Health Questionnaire (PHQ-4)                                      | Self-connection           | 12-item Self-Connection Scale                                                                        | $F(3, 109) = 2.26$ , $p = .09$ , $\eta^2 = .06$                                                                                                                                                                                                                                                                                                                       | No  |
|                             | Klussman [111] | 2021 | Adults                                  | Physical activity         | IPAQ                                                                          | Positive affect   | PANAS                                                                     | Self-connection           | 12-item Self-Connection Scale                                                                        | ns                                                                                                                                                                                                                                                                                                                                                                    | No  |
|                             | Klussman [111] | 2021 | Adults                                  | Physical activity         | IPAQ                                                                          | Negative affect   | PANAS                                                                     | Self-connection           | 12-item Self-Connection Scale                                                                        | $F(3, 114) = 1.04$ , $p = .38$ , $\eta^2 = .03$                                                                                                                                                                                                                                                                                                                       | No  |
|                             | Klussman [111] | 2021 | Adults                                  | Physical activity         | IPAQ                                                                          | Life satisfaction | Single validated item – In general, how satisfied are you with your life? | Self-connection           | 12-item Self-Connection Scale                                                                        | Not reported as ns                                                                                                                                                                                                                                                                                                                                                    | No  |
|                             | Liu, R. [140]  | 2024 | Adults                                  | Physical activity         | Self-report Likert scale                                                      | Mental health     | adapted 5-point Likert scale                                              | Quality of life           | Adapted 5-point Likert scale                                                                         | Interaction effect = $-0.054$ , $p = .164$                                                                                                                                                                                                                                                                                                                            | No  |
|                             | Gyasi [86]     | 2024 | Older adults from low and middle income | physical activity         | IPAQ-SF                                                                       | Depression        | CES-D 10                                                                  | Loneliness                | UCLA Loneliness Scale                                                                                | $b = -0.045$ , 95% CI = $-.064, -.025$                                                                                                                                                                                                                                                                                                                                | Yes |
|                             | Borges [23]    | 2022 | Smokers                                 | Exercise                  | Rating of Perceived Exertion during the one-mile Rockport treadmill walk test | Mood              | National Institute of Mental Health self-rating scale                     | Distress tolerance        | perceived ability to tolerate distressing affective states                                           | $(b = -0.21, SE = 0.07, CI95\% = -0.35, -0.06, p < 0.01)$                                                                                                                                                                                                                                                                                                             | Yes |
|                             | Borges [23]    | 2022 | Smokers                                 | Exercise                  | Rating of Perceived Exertion during the one-mile Rockport treadmill walk test | Anxiety           | National Institute of Mental Health self-rating scale                     | Distress tolerance        | perceived ability to tolerate distressing affective states                                           | $(R^2 = 0.02, F(5,187) = 0.81, p = 0.55)$                                                                                                                                                                                                                                                                                                                             | No  |
|                             | Xin [222]      | 2023 | Smokers                                 | Exercise                  | Self-report                                                                   | Anxiety           | generalized anxiety disorder 7-item (GAD-7)                               | Concern about COVID-19    | Likert scale self-report                                                                             |                                                                                                                                                                                                                                                                                                                                                                       | Yes |

## SOCIAL MODERATORS

|                 |      |                                         |                          |                                                                                                                      |                        |                                                                                                                                    |                                        |                                                                                            |                                                                                                                                                              |     |
|-----------------|------|-----------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Dunton [54]     | 2015 | Adults                                  | Momentary activity level | During each EMA question sequence, participants were asked to indicate their current activity level                  | Positive affect        | items were selected to represent activated (happy, cheerful) and deactivated (calm or relaxed) pleasure                            | Social context (alone vs with another) | Participants were asked to answer either "yes" or "no" to indicate whether they were alone | $\beta = .30$ , $SE = .13$ , $p = .024$                                                                                                                      | Yes |
| Dunton [54]     | 2015 | Adults                                  | Momentary activity level | During each EMA question sequence, participants were asked to indicate their current activity level                  | Negative affect        | items represented combinations of activated (nervous or anxious, stressed) and deactivated (sad or depressed, frustrated, or angry | Social context (alone vs with another) | Participants were asked to answer either "yes" or "no" to indicate whether they were alone |                                                                                                                                                              | No  |
| Johansson [105] | 2011 | University students                     | Walking                  | 20-minute walk                                                                                                       | Anxiety/Depression     | Anxiety/Depression subscale from the Negative Mood Scale                                                                           | Social context                         | With or without a friend                                                                   | $F(1,18) = 0.36$ , $p = .556$                                                                                                                                | No  |
| Gyasi [85]      | 2019 | Older adults                            | Physical activity        | General Physical Activity Questionnaire (GPAQ)                                                                       | Psychological distress | K10                                                                                                                                | Social support                         | Frequency of contact with family/friends, frequency of social events                       | $OR = .65$ , $p < .005$                                                                                                                                      | Yes |
| Moya [158]      | 2021 | Older adults                            | Physical activity        | IPAQ                                                                                                                 | Depressive symptoms    | Five-item Geriatric Depression Scale (GDS-5)                                                                                       | Social support                         | Tilburg Frailty Indicator (TFI)                                                            | $p < .05$                                                                                                                                                    | Yes |
| Xiong [223]     | 2023 | Older adults                            | Physical activity        | The Physical Activity Rating Scale (PARS-3)                                                                          | Depression             | Center for Streaming Depression Scale (CES-D)                                                                                      | Social support                         | Social Support Rating Scale (SSRS)                                                         | $t = -9.144$ , $p < 0.01$                                                                                                                                    | Yes |
| Gyasi [86]      | 2024 | Older adults from low and middle income | physical activity        | IPAQ-SF                                                                                                              | Depression             | CES-D 10                                                                                                                           | Social isolation                       | Social Network Index                                                                       | $b = -0.02$ , 95% CI = $-.030$ , $-.011$                                                                                                                     | Yes |
| Brady [24]      | 2021 | Rheumatoid arthritis patients           | Physical activity        | National Institutes of Health American Association of Retired Persons (NIH-AARP) Diet and Health Study questionnaire | Anxiety                | HADS                                                                                                                               | Covid isolation                        | Yes/No                                                                                     | Light PA: $\beta = -.11$ , 95% CI = $-.32$ , $.09$<br>Walking: $\beta = .04$ , 95% CI = $-.17$ , $.25$<br>Exercise: $\beta = -.08$ , 95% CI = $-.30$ , $.15$ | No  |
| Brady [24]      | 2021 | Rheumatoid arthritis patients           | Physical activity        | National Institutes of Health American Association of Retired Persons (NIH-AARP) Diet and Health Study questionnaire | Depression             | HADS                                                                                                                               | Covid isolation                        | Yes/No                                                                                     | Light PA: $\beta = -.10$ , 95% CI = $-.30$ , $.10$<br>Walking: $\beta = .05$ , 95% CI = $-.15$ , $.26$<br>Exercise: $\beta = -.06$ , 95% CI = $-.28$ , $.16$ | No  |

## BEHAVIOURAL MODERATORS

|              |      |                                         |                           |                                                      |                        |                                        |                              |                                                                |                                                                                                                                                                                                                                                |     |
|--------------|------|-----------------------------------------|---------------------------|------------------------------------------------------|------------------------|----------------------------------------|------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Asztalos [7] | 2015 | Adults                                  | Physical activity         | IPAQ                                                 | Psychological distress | General Health Questionnaire           | Sitting Time                 | Hours                                                          | $\beta = -.08$ , $p = .019$                                                                                                                                                                                                                    | Yes |
| Asztalos [7] | 2015 | Adults                                  | Physical activity         | IPAQ                                                 | Depression             | Symptom Check List depression subscale | Sitting Time                 | Hours                                                          | $\beta = -.10$ , $p = .004$                                                                                                                                                                                                                    | Yes |
| Asztalos [7] | 2015 | Adults                                  | Physical activity         | IPAQ                                                 | Anxiety                | Symptom Check List anxiety subscale    | Sitting Time                 | Hours                                                          | $\beta = -.07$ , $p = .038$                                                                                                                                                                                                                    | Yes |
| Cho [37]     | 2017 | College students                        | Weekend physical activity | Number of weekend hours spent in physical activities | Negative affect        | Negative affect subscale from PANAS    | Sleep                        | Number of hours slept on Saturday and Sunday nights            | $\gamma = -.02$ , $SE = 0.01$ , $p < .05$                                                                                                                                                                                                      | Yes |
| Alfini [3]   | 2020 | Older adults                            | Acute exercise            | Intervention vs control                              | Positive Affect        | PANAS                                  | Sleep Disturbance            | Actigraph + sleep diary                                        | $\beta = -.08$ , 95% CI = $-.14$ to $-.02$ , $p = .005$                                                                                                                                                                                        | Yes |
| Gyasi [86]   | 2024 | Older adults from low and middle income | physical activity         | IPAQ-SF                                              | Depression             | CES-D 10                               | Sleep problems               | Self-report                                                    | $b = -0.02$ , 95% CI = $-.030$ , $-.010$                                                                                                                                                                                                       | Yes |
| Mumba [160]  | 2021 | Adults                                  | Physical activity         | Self-report                                          | Psychological distress | Self-report                            | Alcohol consumption          | Self-report                                                    | $F(4, 160453) = 727.05$ , $p < .001$                                                                                                                                                                                                           | Yes |
| Mumba [160]  | 2021 | Adults                                  | Physical activity         | Self-report                                          | Psychological distress | Self-report                            | Smoking                      | Self-report                                                    | $F(4, 282366) = 1109.07$ , $p < .001$                                                                                                                                                                                                          | Yes |
| Chang [34]   | 2020 | Adults                                  | Exercise                  | One question on exercise frequency                   | Positive Mood          | Profile of Mood States (POMS)          | Exercise frequency pre-covid | One question on how often people exercised before the pandemic | Exercise during pandemic: $\beta = .14$ , $p = .004$<br>Exercise pre-pandemic x exercise during pandemic: $\beta = -.48$ , $p = .01$ (for those in lower pre pandemic exercise category)<br>$\beta = .33$ , $p = .02$ (for those in higher pre | Yes |

|                                        |                  |      |                                                                          |                                  |                                                 |                         |                                                                                                          |                                       |                                                                                  |                                                                                               |     |
|----------------------------------------|------------------|------|--------------------------------------------------------------------------|----------------------------------|-------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----|
|                                        |                  |      |                                                                          |                                  |                                                 |                         |                                                                                                          |                                       |                                                                                  | pandemic exercise category)                                                                   |     |
|                                        | Laurier [122]    | 2021 | Adolescents                                                              | Sport                            | Self-report                                     | Anxiety                 | Psychological Distress Index                                                                             | Sport participation prior to lockdown | Self-report                                                                      | Interaction effect = - 0.33, <i>p</i> >.05                                                    | No  |
|                                        | Laurier [122]    | 2021 | Adolescents                                                              | Sport                            | Self-report                                     | Depression              | Psychological Distress Index                                                                             | Sport participation prior to lockdown | Self-report                                                                      | Interaction effect = - 1.93, <i>p</i> <.01                                                    | Yes |
| PHYSIOLOGICAL MODERATORS               |                  |      |                                                                          |                                  |                                                 |                         |                                                                                                          |                                       |                                                                                  |                                                                                               |     |
| Physical health and disability related | Giacobbi [72]    | 2006 | Individuals with physical disabilities who have played wheelchair sports | Leisure time PA                  | Leisure-Time Exercise Questionnaire (LTEQ)      | Positive affect         | PANAS                                                                                                    | Years disabled                        | Years                                                                            | Coef = -.00, <i>t</i> = -.88, <i>p</i> >.05                                                   | No  |
|                                        | Giacobbi [72]    | 2006 | Individuals with physical disabilities who have played wheelchair sports | Leisure time PA                  | Leisure-Time Exercise Questionnaire (LTEQ)      | Negative affect         | PANAS                                                                                                    | Years disabled                        | Years                                                                            | Coef = .00, <i>t</i> = .65, <i>p</i> >.05                                                     | No  |
|                                        | Bhandari [18]    | 2020 | Older adults                                                             | Physical activity                | Self-reported engagement in physical activities | Anxiety                 | General Health Questionnaire – anxiety items                                                             | Disability                            | Ability to see, hear, walk, chew, speak and remember                             | β = .004, <i>p</i> = .727                                                                     | No  |
|                                        | Bhandari [18]    | 2020 | Older adults                                                             | Physical activity                | Self-reported engagement in physical activities | Depression              | General Health Questionnaire – depression items                                                          | Disability                            | Ability to see, hear, walk, chew, speak and remember                             | β = -.02, <i>p</i> = .129                                                                     | No  |
|                                        | Fessler [63]     | 2023 | Adults                                                                   | Physical activity                | 2 self-report items                             | Psychological wellbeing | CASP-19                                                                                                  | Multimorbidity                        | Self-reported chronic conditions                                                 | b = 0.36 (0.28; 0.44)***                                                                      | Yes |
|                                        | Fessler [63]     | 2023 | Adults                                                                   | Physical activity                | 2 self-report items                             | Depression              | EURO-D scale                                                                                             | Multimorbidity                        | Self-reported chronic conditions                                                 | b = 0.28 (0.31; 0.25)***                                                                      | Yes |
|                                        | Bhandari [18]    | 2020 | Older adults                                                             | Physical activity                | Self-reported engagement in physical activities | Anxiety                 | General Health Questionnaire – anxiety items                                                             | Functionality                         | Number of active daily living activities needing assistance                      | β = .04, <i>p</i> = .086                                                                      | No  |
|                                        | Bhandari [18]    | 2020 | Older adults                                                             | Physical activity                | Self-reported engagement in physical activities | Depression              | General Health Questionnaire – depression items                                                          | Functionality                         | Number of active daily living activities needing assistance                      | β = .02, <i>p</i> = .269                                                                      | No  |
|                                        | Gyasi [86]       | 2024 | Older adults from low and middle income                                  | physical activity                | IPAQ-SF                                         | Depression              | CES-D 10                                                                                                 | Functional limitations                | Medical Outcomes Study Short Form-36                                             | b = -0.041, 95% CI = -.057, -.026                                                             | Yes |
|                                        | Gyasi [86]       | 2024 | Older adults from low and middle income                                  | physical activity                | IPAQ-SF                                         | Depression              | CES-D 10                                                                                                 | Pain inference                        | Medical Outcomes Study Short Form-36                                             | b = -0.022, 95% CI = -.033, -.013                                                             | Yes |
|                                        | Gyasi [86]       | 2024 | Older adults from low and middle income                                  | physical activity                | IPAQ-SF                                         | Depression              | CES-D 10                                                                                                 | Pain severity                         | Medical Outcomes Study Short Form-36                                             | b = -0.016, 95% CI = -.025, -.008                                                             | Yes |
|                                        | Kong [112]       | 2022 | Older adults                                                             | Physical activity                | Self-report                                     | Depressive symptoms     | K-GDS-SF                                                                                                 | Lower body muscle strength            | 5 times sit-to-stand test (5STST)                                                | β = .3407, 95%CI = .1190, .5625                                                               | Yes |
|                                        | Bhandari [18]    | 2020 | Older adults                                                             | Physical activity                | Self-reported engagement in physical activities | Depression              | General Health Questionnaire – depression items                                                          | Non-communicable diseases             | Self-reported presence of non-communicable diseases                              | β = -.11, <i>p</i> <.001                                                                      | Yes |
|                                        | Bhandari [18]    | 2020 | Older adults                                                             | Physical activity                | Self-reported engagement in physical activities | Anxiety                 | General Health Questionnaire – anxiety items                                                             | Non-communicable diseases             | Self-reported presence of non-communicable diseases                              | β = -.15, <i>p</i> <.001                                                                      | No  |
|                                        | Smith [190]      | 2021 | Weight discordant siblings                                               | Within person physical activity  | Actigraph accelerometer                         | Negative affect         | EMA reported current sad, frustrated, angry, and/or stress                                               | BMI                                   | Height and weight were measured with an electronic scale and digital stadiometer | Between participants B = -.02, <i>p</i> = .637, within participants B = -.02, <i>p</i> = .01  | Yes |
|                                        | Smith [190]      | 2021 | Weight discordant siblings                                               | Between person physical activity | Actigraph accelerometer                         | Negative affect         | EMA reported current sad, frustrated, angry, and/or stress                                               | BMI                                   | Height and weight were measured with an electronic scale and digital stadiometer | Between participants B = -.09, <i>p</i> = .661, within participants B = -.04, <i>p</i> = .071 | No  |
|                                        | Rutherford [181] | 2022 | Adults                                                                   | Total physical activity          | Global Physical Activity Questionnaire (GPAQ)   | Depression              | Patient Health Questionnaire (PHQ-9)                                                                     | BMI                                   | weight in kilograms divided by height in meters squared                          | <i>p</i> = 0.814                                                                              | No  |
|                                        | Han [90]         | 2023 | College students                                                         | Physical activity                | IPAQ-SF                                         | Depression              | Self-rating Depression Scale (SDS)                                                                       | BMI                                   |                                                                                  | β = .009, CI = -.558, .577                                                                    | no  |
|                                        | Han [90]         | 2023 | College students                                                         | Physical activity                | IPAQ-SF                                         | Anxiety                 | Self-rating Anxiety Scale (SAS)                                                                          | BMI                                   |                                                                                  | β = -.183, CI = -.750, .384                                                                   | no  |
|                                        | Annesi [4]       | 2018 | Adolescent candidates for Bariatric Surgery                              | Leisure-time PA                  | Leisure-Time Physical Activity Questionnaire    | Negative mood           | Profile of Mood States-Brief Form (depression, fatigue, tension, vigour, anger, and confusion subscales) | Impact of Weight on Quality of Life   | Impact of Weight on Quality of Life-Kids (IWQOL)                                 | Interaction term β = .01, <i>p</i> = .20                                                      | No  |

## NEUROBIOLOGICAL MODERATORS

|                   |      |                     |                   |                                                           |                     |                                          |                                          |                                                                                                      |                                                                                                                                                                                                                                       |     |
|-------------------|------|---------------------|-------------------|-----------------------------------------------------------|---------------------|------------------------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Dotson [53]       | 2016 | Older adults        | Physical activity | Intervention vs control                                   | Depression          | CES-D                                    | BDNF                                     | DNA blood test                                                                                       | F (1, 347) = 3.09, $p = .079$                                                                                                                                                                                                         | Yes |
| Ku [117]          | 2017 | Adults              | Exercise          | One item - "Did you usually engage in physical exercise?" | Depressive symptoms | Chinese version of the CES-D             | Apolipoprotein E type 4 allele (APOE-e4) | Genotypes were groups as APOE-e4 carrier and APOE-e4 non-carrier determined via blood sample         | The interaction between APOE-e4 carrier status and exercise was also significant ( $p = .046$ ). Compared to high active non carriers (RR = 1.00), high active APOE-e4 carriers had higher risk of depression (RR = 1.66, $p < .01$ ) | Yes |
| Petruzzello [173] | 1997 | University students | Cycling           | Submaximal workload tests                                 | State anxiety       | State Anxiety Inventory (SAI) short form | Left versus right activated              | EEG activity was recorded from the left and right midfrontal (F3, F4) and parietal (P3, P4) regions. | Group x Time interaction F (2,4,28.8) = 4.07, $p = .028$ . E = .48.                                                                                                                                                                   | Yes |
| Huang [98]        | 2021 | Adults              | Physical activity | Self-reported against guidelines                          | Depression          | Patient Health Questionnaire-9 (PHQ-9)   | Triglycerides                            |                                                                                                      | Interaction effect = 0.17(-0.03,0.36), $p = .09$ , proportion attributable = 18.97%                                                                                                                                                   | No  |

## COGNITIVE MODERATORS

|            |      |              |                   |                                                |            |       |                       |                                      |                                               |     |
|------------|------|--------------|-------------------|------------------------------------------------|------------|-------|-----------------------|--------------------------------------|-----------------------------------------------|-----|
| Birch [20] | 2016 | Older adults | Physical activity | Rapid Assessment of Physical Activity (RAPA 1) | Depression | CES-D | Cognitive functioning | Montreal Cognitive Assessment (MoCA) | OR = 0.991, 95% CI [0.985, 0.997], $p = .005$ | Yes |
|------------|------|--------------|-------------------|------------------------------------------------|------------|-------|-----------------------|--------------------------------------|-----------------------------------------------|-----|

## ENVIRONMENTAL MODERATORS

|                 |      |                             |                          |                                                                                                     |                                 |                                                                                                                            |                                               |                                                                                   |                                                                         |     |
|-----------------|------|-----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----|
| Geniole [70]    | 2016 | Young adults                | Walking                  | Experimental (all participants undertook a walk and reported affect after)                          | Affect                          | The Affect Grid                                                                                                            | Location                                      | Urban vs natural                                                                  | Location by Time interaction: F [1,30] = 6.38, $p = .017$ , $Z_p = .18$ | Yes |
| Dunton [54]     | 2015 | Adults                      | Momentary activity level | During each EMA question sequence, participants were asked to indicate their current activity level | Positive affect                 | Items were selected to represent activated (happy, cheerful) and deactivated (calm or relaxed) pleasure                    | Location (indoors vs outdoors)                | Participants were asked "where were you just before the beep went off?"           |                                                                         | No  |
| Dunton [54]     | 2015 | Adults                      | Momentary activity level | During each EMA question sequence, participants were asked to indicate their current activity level | Negative affect                 | Items represented activated (nervous or anxious, stressed) and deactivated (sad or depressed, frustrated, or angry) affect | Location (indoors vs outdoors)                | Participants were asked "where were you just before the beep went off?"           | $\beta = .206$ , SE = .097, $p = .034$                                  | Yes |
| Bodin [21]      | 2001 | Regular runners             | Running                  | All participants engaged in running and reported measures post run                                  | Depression/Anxiety              | Anxiety/Depression subscale from the Negative Mood Scale                                                                   | Environment                                   | Park versus urban                                                                 | F (1,10) = 0.93, $p = .36$                                              | No  |
| Johansson [105] | 2011 | University students         | Walking                  | 20-minute walk                                                                                      | Anxiety/Depression              | Anxiety/Depression subscale from the Negative Mood Scale                                                                   | Environment                                   | Street versus park                                                                | F (1,18) = 1.30, $p = .270$                                             | No  |
| Fauth [60]      | 2007 | Youth                       | Sport                    | Self-reported participation in sport                                                                | Anxious and depressive symptoms | Child Behavior Checklist (CBCL)                                                                                            | Presence of neighbourhood resources for youth | Neighbourhood-level measures— both drawn from the Community Survey                | Sports x resources: $\beta = .05$ , $p > .05$                           | No  |
| Fauth [60]      | 2007 | Youth                       | Sport                    | Self-reported participation in sport                                                                | Anxious and depressive symptoms | Child Behavior Checklist (CBCL)                                                                                            | Perceived neighbourhood violence              | Neighbourhood-level measures— both drawn from the Community Survey                | Sports x violence: $\beta = .00$ , $p > .05$                            | No  |
| Asiamah [6]     | 2022 | Full-time African academics | Physical activity        | IPAQ-SF                                                                                             | Mental health                   | 9-item standard scale                                                                                                      | Neighbourhood walkability                     | NEWS-A (the Australian version of the Neighborhood Environment Walkability Scale) |                                                                         | Yes |

## INDIVIDUAL DEMOGRAPHIC MODERATORS

|                      |      |                                         |                     |                                                              |            |                                              |     |  |                                                                                    |    |
|----------------------|------|-----------------------------------------|---------------------|--------------------------------------------------------------|------------|----------------------------------------------|-----|--|------------------------------------------------------------------------------------|----|
| Brière [25]          | 2018 | Adolescents                             | Sport participation | One item "Do you regularly take part in an organized sport?" | Depression | CES-D                                        | Age |  |                                                                                    | No |
| Wassink-Vossen [209] | 2018 | Patients with major depressive disorder | Physical activity   | IPAQ                                                         | Depression | Inventory of Depressive Symptomatology (IDS) | Age |  | Interaction between PA and age: B = .11, $p = .015$ , stratified results <60 years | No |

B = 2.03,  $p = .022$ ,  
>60 years B = 2.24,  
 $p = .128$

|                 |      |                                  |                                  |                                                                                              |                              |                                                                                                    |        |                                                                                                                                                    |     |
|-----------------|------|----------------------------------|----------------------------------|----------------------------------------------------------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Gomez-Baya [77] | 2017 | Adolescents                      | Sport participation              | One item - 'How often do you practice some sports or gymnastics during out-of-school time?'  | Depressive symptoms          | Children's Depression Inventory                                                                    | Age    | not reported                                                                                                                                       | No  |
| Hogan [95]      | 2013 | Adults                           | Single bout of moderate exercise | Intervention vs control                                                                      | Low arousal positive affect  | Modified version of the emotion sampler used by Carstensen and colleagues (2011)                   | Age    | $b^* = 0.55$ , $p = .028$ , $\Delta R^2 = .03$                                                                                                     | Yes |
| Hogan [95]      | 2013 | Adults                           | Single bout of moderate exercise | Intervention vs control                                                                      | High arousal positive affect | Modified version of the emotion sampler used by Carstensen and colleagues (2011)                   | Age    | $b^* = 0.45$ , $p = .046$ ; $\Delta R^* = .02$                                                                                                     | Yes |
| Lindwall [134]  | 2011 | Older adults                     | Physical activity                | "Frequency of moderate physical activity"                                                    | Depression                   | Adapted version of the EURO-D scale                                                                | Age    | $\Delta$ chi square = 106.37                                                                                                                       | Yes |
| Maher [146]     | 2015 | Adults                           | Physical activity                | Modified version of the Godin Leisure Time Exercise Questionnaire (GLTEQ)                    | Life satisfaction            | Single item from the SWLS                                                                          | Age    | Age x usual physical activity: Parameter estimate = .12, $p < .05$ ;<br>Age x daily physical activity: Parameter estimate = -.01, ns               | Yes |
| Lopes [144]     | 2023 | Older adolescents and adults     | Domestic physical activity       | Telephone interview questions adapted from IPAQ                                              | Depressive symptoms          | Patient Health Questionnaire-9 (PHQ-9)                                                             | Age    |                                                                                                                                                    | Yes |
| Lopes [144]     | 2023 | Older adolescents and adults     | Transport physical activity      | Telephone interview questions adapted from IPAQ                                              | Depressive symptoms          | Patient Health Questionnaire-9 (PHQ-10)                                                            | Age    |                                                                                                                                                    | Yes |
| Lopes [144]     | 2023 | Older adolescents and adults     | Leisure time physical activity   | Telephone interview questions adapted from IPAQ                                              | Depressive symptoms          | Patient Health Questionnaire-9 (PHQ-11)                                                            | Age    |                                                                                                                                                    | Yes |
| Lopes [144]     | 2023 | Older adolescents and adults     | Occupational physical activity   | Telephone interview questions adapted from IPAQ                                              | Depressive symptoms          | Patient Health Questionnaire-9 (PHQ-12)                                                            | Age    |                                                                                                                                                    | No  |
| Brière [25]     | 2018 | Adolescents                      | Sport participation              | One item "Do you regularly take part in an organized sport?"                                 | Depression                   | CES-D                                                                                              | Sex    |                                                                                                                                                    | No  |
| Costigan [43]   | 2019 | High School students             | Vigorous PA                      | Actigraph accelerometer                                                                      | Positive Affect              | PANAS-C                                                                                            | Sex    |                                                                                                                                                    | No  |
| Costigan [43]   | 2019 | High School students             | Vigorous PA                      | Actigraph accelerometer                                                                      | Negative affect              | PANAS-C                                                                                            | Sex    | $\beta = -.038$ , SE = .02                                                                                                                         | Yes |
| Dotson [53]     | 2016 | Older adults                     | Physical activity                | Intervention vs control                                                                      | Depression                   | CES-D                                                                                              | Sex    | $F(1, 347) = 4.13$ , $p = .043$ ,                                                                                                                  | Yes |
| Smith [189]     | 2018 | Adolescents                      | Resistance training              | Intervention vs control                                                                      | Subjective wellbeing         | Psychological flourishing scale                                                                    | Sex    | $p = > .10$                                                                                                                                        | No  |
| Gianotta [73]   | 2023 | Adolescents                      | Vigorous PA                      | How often do you exercise at least 30 min in your spare time so that you get tired/ sweaty?" | Depression                   | Depression Self-Rating Scale Adolescent version, DSRS-A                                            | Sex    | Constrained model: CFI = .96, RMSEA = .06, free model: CFI = .96, RMSEA = .06                                                                      | No  |
| Evans [59]      | 2017 | Physically active healthy adults | Exercise                         | Exercise diary                                                                               | Depressed mood               | A subset of items from the original 14 items developed by King, Taylor, Haskell, and DeBusk (1989) | Gender | Exercise duration x gender $\beta = .16$ , $p < .05$ , effect for males $\beta = -.20$ , $p < .05$ , effect for females $\beta = -.03$ , $p > .05$ | Yes |
| Evans [59]      | 2017 | Physically active healthy adults | Exercise                         | Exercise diary                                                                               | Anxiety                      | A subset of items from the original 14 items developed by King, Taylor, Haskell, and DeBusk (1989) | Gender | Exercise duration x gender $\beta = .18$ , $p < .01$ Effect for males $\beta = -.24$ , $p < .05$ , Effect for females $\beta = -.06$ , $p > .05$   | Yes |
| Evans [59]      | 2017 | Physically active healthy adults | Exercise intensity               | Exercise diary                                                                               | Depressed mood               | A subset of items from the original 14 items developed                                             | Gender | Exercise intensity x gender $\beta = .24$ , $p < .05$                                                                                              | Yes |

|                   |      |                                                    |                     |                                                                                                                                                                                       |                                        |                                                                                                    |        |                                                                                                                                                                   |     |
|-------------------|------|----------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|                   |      |                                                    |                     |                                                                                                                                                                                       |                                        | by King, Taylor, Haskell, and DeBusk (1989)                                                        |        | Effect for males $\beta = -.33, p < .05$<br>Effect for females $\beta = -.09, p > .05$                                                                            |     |
| Evans [59]        | 2017 | Physically active healthy adults                   | Exercise intensity  | Exercise diary                                                                                                                                                                        | Anxiety                                | A subset of items from the original 14 items developed by King, Taylor, Haskell, and DeBusk (1989) | Gender | Exercise duration x gender $p > .05$                                                                                                                              | No  |
| Tiggelman [200]   | 2014 | Adolescents with asthma                            | Habitual PA         | Self-reported time spent engaging in activities                                                                                                                                       | Anxiety and Depression (One construct) | HADS                                                                                               | Gender | Total group: $\beta = -.07, p = .06$<br>Boys: $\beta = -.07, p = .07$<br>Girls: $\beta = -.11, p = .05$<br>$X^2(1) = 8.34, p < .01$                               | Yes |
| Bartholomew [15]  | 1998 | Undergraduate students in exercise science classes | Resistance training | Intervention vs control                                                                                                                                                               | Anxiety                                | State Trait Anxiety Inventory                                                                      | Gender | Low intensity: $F(5,13) = 3.84, p < .05$<br>Moderate intensity: $F(5,13) = 4.61, p < .05$<br>High intensity: $F(5,13) = 3.92, p < .05$                            | Yes |
| Fredericks [69]   | 2006 | Year 11 students                                   | Sport participation | "Were you a member of any athletic or sports team at school?" and "Were you involved in any organized summer or after school sports or recreational program over the past 12 months?" | Depressive symptoms                    | Reduced version of the Children's Depression Inventory                                             | Gender | Sport x gender: $F = 0.01, p > .05$                                                                                                                               | No  |
| Gomez-Baya [77]   | 2017 | Adolescents                                        | Sport participation | One item - 'How often do you practice some sports or gymnastics during out-of-school time?'                                                                                           | Depressive symptoms                    | Children's Depression Inventory                                                                    | Gender | not reported                                                                                                                                                      | No  |
| Halliday [89]     | 2019 | Adolescents                                        | Physical activity   | Physical Activity Questionnaire for Adolescents (PAQ-A)                                                                                                                               | Depression                             | DASS-21                                                                                            | Gender | 2017 wave: $F(1,357) = .05, p = .831$<br>2016 wave: $F(1,461) = .47, p = .494$<br>2015 wave: $F(1,412) = .02, p = .883$<br>2014 wave: $F(1,384) = .32, p = .573$  | No  |
| Halliday [89]     | 2019 | Adolescents                                        | Physical activity   | Physical Activity Questionnaire for Adolescents (PAQ-A)                                                                                                                               | Anxiety                                | DASS-21                                                                                            | Gender | 2017 wave: $F(1,357) = 1.40, p = .238$<br>2016 wave: $F(1,461) = .12, p = .728$<br>2015 wave: $F(1,412) = .06, p = .804$<br>2014 wave: $F(1,384) = .19, p = .665$ | No  |
| Halliday [89]     | 2019 | Adolescents                                        | Physical activity   | Physical Activity Questionnaire for Adolescents (PAQ-A)                                                                                                                               | Stress                                 | DASS-21                                                                                            | Gender | 2017 wave: $F(1,357) = .85, p = .357$<br>2016 wave: $F(1,441) = .16, p = .687$<br>2015 wave: $F(1,412) = .04, p = .842$<br>2014 wave: $F(1,384) = .68, p = .411$  | No  |
| Hunt-Shanks [100] | 2009 | Cardiac patients                                   | Leisure time PA     | GLTEQ                                                                                                                                                                                 | Depression                             | HADS                                                                                               | Gender | $F(1, 796) = 4.56, p = 0.03$                                                                                                                                      | Yes |
| Hunt-Shanks [100] | 2009 | Cardiac patients                                   | Leisure time PA     | GLTEQ                                                                                                                                                                                 | Anxiety                                | HADS                                                                                               | Gender | $F(1, 796) = 4.58, p = 0.03$                                                                                                                                      | Yes |
| Hunt-Shanks [100] | 2009 | Cardiac patients                                   | Leisure time PA     | GLTEQ                                                                                                                                                                                 | Negative affect                        | HADS                                                                                               | Gender | Not reported as ns                                                                                                                                                | No  |
| Lindwall [134]    | 2011 | Older adults                                       | Physical activity   | Frequency of moderate physical activity                                                                                                                                               | Depression                             | Adapted version of the EURO-D scale                                                                | Gender |                                                                                                                                                                   | No  |

|                 |      |                     |                           |                                                                                                                                                                                       |                         |                                                                                                                    |                 |                                                                                               |                                                                    |     |
|-----------------|------|---------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-----|
| Pan [168]       | 2022 | Early adolescents   | Weekday physical exercise | Self-reporting of extra-curricular activities                                                                                                                                         | Depression              | Items from the Patient Health Questionnaire (PHQ-9) and the Center for Epidemiological Studies-Depression (CES-D). | Gender          |                                                                                               | $\beta = .025, p > .05$                                            | No  |
| Pan [168]       | 2022 | Early adolescents   | Weekend physical exercise | Self-reporting of extra-curricular activities                                                                                                                                         | Depression              | Items from the Patient Health Questionnaire (PHQ-9) and the Center for Epidemiological Studies-Depression (CES-D). | Gender          |                                                                                               | $\beta = .026, p > .05$                                            | No  |
| Tian [199]      | 2022 | College students    | Physical activity         | IPAQ-SF                                                                                                                                                                               | Anxiety                 | Generalized Anxiety Disorder Scale (GAD-7)                                                                         | Gender          |                                                                                               | male: $\beta = -0.03, p > 0.05$ , female: $\beta = 0.10, p < 0.05$ | Yes |
| Fredericks [69] | 2006 | Year 11 students    | Sport participation       | "Were you a member of any athletic or sports team at school?" and "Were you involved in any organized summer or after school sports or recreational program over the past 12 months?" | Depressive symptoms     | Reduced version of the Children's Depression Inventory                                                             | Race            |                                                                                               | Sport x race: $F = 1.45, p > .05$                                  | No  |
| Liu, Y. [141]   | 2024 | Adults              | Physical activity         | Accelerometer                                                                                                                                                                         | Depressive symptoms     | Patient Health Questionnaire                                                                                       | Race            | Self-report                                                                                   | Interaction term: $p < .05$                                        | Yes |
| Biese [19]      | 2024 | Adolescent athletes | Sport participation       | Self-report - categorical played or did not play                                                                                                                                      | Depression              | Patient Health Questionnaire-9 Item (PHQ-9)                                                                        | Race            |                                                                                               | $b = -1.19 \pm 0.6, p = 0.05$                                      | Yes |
| Biese [19]      | 2024 | Adolescent athletes | Sport participation       | Self-report - categorical played or did not play                                                                                                                                      | Anxiety                 | General Anxiety Disorder-7 Item (GAD-7)                                                                            | Race            |                                                                                               | Interaction estimate [b] = $-1.18 \pm 0.6, p = 0.04$               | Yes |
| Hayes [91]      | 1986 | Adults              | Exercise                  | Self-reported number of activities                                                                                                                                                    | Psychological wellbeing | Eight psychological items from the Langner index (1962)                                                            | Income          |                                                                                               | Exercise x income $\beta = -.19, p < .05$                          | Yes |
| Smith [189]     | 2018 | Adolescents         | Resistance training       | Intervention vs control                                                                                                                                                               | Subjective wellbeing    | Psychological flourishing scale                                                                                    | SES             | Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (IRSD) | $p > .10$                                                          | No  |
| Liu, Y. [141]   | 2024 | Adults              | Physical activity         | Accelerometer                                                                                                                                                                         | Depressive symptoms     | Patient Health Questionnaire                                                                                       | SES             | Self-report data on household income level, education attainment and occupation               | Interaction term: $p < .06$                                        | Yes |
| Biese [19]      | 2024 | Adolescent athletes | Sport participation       | Self-report - categorical played or did not play                                                                                                                                      | Depression              | Patient Health Questionnaire-9 Item (PHQ-9)                                                                        | SES             |                                                                                               | $b = -1.21 \pm 0.6, p = 0.03$                                      | Yes |
| Biese [19]      | 2024 | Adolescent athletes | Sport participation       | Self-report - categorical played or did not play                                                                                                                                      | Anxiety                 | General Anxiety Disorder-7 Item (GAD-7)                                                                            | SES             |                                                                                               | $b = -1.23 \pm 0.5, p = 0.02$                                      | Yes |
| Pan [168]       | 2022 | Early adolescents   | Weekday physical exercise | Self-reporting of extra-curricular activities                                                                                                                                         | Depression              | Items from the Patient Health Questionnaire (PHQ-9) and the Center for Epidemiological Studies-Depression (CES-D). | Family SES      |                                                                                               | $\beta = -.018, p > .05$                                           | No  |
| Pan [168]       | 2022 | Early adolescents   | Weekend physical exercise | Self-reporting of extra-curricular activities                                                                                                                                         | Depression              | Items from the Patient Health Questionnaire (PHQ-9) and the Center for Epidemiological Studies-Depression (CES-D). | Family SES      |                                                                                               | $\beta = -.022, p > .05$                                           | No  |
| White [217]     | 2020 | Women               | Work-related PA           | IPAQ                                                                                                                                                                                  | Psychological distress  | GHQ-30                                                                                                             | Occupation type | International Standard Classification of Occupations (2008)                                   | $F [8, 55] = 2.26, p = .036$                                       | Yes |

|                   |      |        |                                |                                                                                                                                                                        |            |                                 |                 |                                                                                                                                                                                                                                                                                                                       |     |
|-------------------|------|--------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Werneck (b) [215] | 2023 | Adults | Leisure-time PA                | Specific questionnaire based on the Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Survey from the Brazilian Ministry of Health | Depression | Patient Health Questionnaire-9  | Occupation type | REF = Managers/qualified professionals<br>Technicians/associate professionals = 0.073 (0.024; 0.121) $p = 0.003$<br>Clerks/service workers = 0.028 (-0.014; 0.070) $p = 0.184$<br>Qualified manual workers = 0.067 (0.025; 0.110) $p = 0.002$<br>Elementary manual workers = 0.065 (0.016; 0.115) $p = 0.010$         | Yes |
| Werneck (b) [215] | 2023 | Adults | Transport physical activity    | Specific questionnaire based on the Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Survey from the Brazilian Ministry of Health | Depression | Patient Health Questionnaire-10 | Occupation type | REF = Managers/qualified professionals<br>Technicians/associate professionals = -0.004 (-0.048; 0.040) $p = 0.857$<br>Clerks/service workers = -0.001 (-0.032; 0.031) $p = 0.971$<br>Qualified manual workers = -0.001 (-0.031; 0.028) $p = 0.930$<br>Elementary manual workers = -0.007 (-0.039; 0.025) $p = 0.660$  | No  |
| Werneck (b) [215] | 2023 | Adults | Occupational physical activity | Specific questionnaire based on the Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Survey from the Brazilian Ministry of Health | Depression | Patient Health Questionnaire-11 | Occupation type | REF = Managers/qualified professionals<br>Technicians/associate professionals = -0.002 (-0.013; 0.010) $p = 0.798$<br>Clerks/service workers = -0.001 (-0.011; 0.011) $p = 0.964$<br>Qualified manual workers = -0.013 (-0.023; -0.003) $p = 0.013$<br>Elementary manual workers = -0.008 (-0.018; 0.003) $p = 0.144$ | Yes |
| Werneck (b) [215] | 2023 | Adults | Household PA                   | Specific questionnaire based on the Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Survey from the Brazilian Ministry of Health | Depression | Patient Health Questionnaire-12 | Occupation type | REF = Managers/qualified professionals<br>Technicians/associate professionals = 0.001 (-0.032; 0.033) $p = 0.974$<br>Clerks/service workers = 0.010 (-0.009; 0.029) $p = 0.302$<br>Qualified manual workers = 0.004 (-0.014; 0.022) $p = 0.638$<br>Elementary manual workers = 0.001 (-0.021; 0.021) $p = 0.977$      | No  |

|              |      |                               |                   |                                           |                        |                               |                            |                                                                 |                                                                                 |     |
|--------------|------|-------------------------------|-------------------|-------------------------------------------|------------------------|-------------------------------|----------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------|-----|
| Meckes [154] | 2020 | First responders              | Physical activity | IPAQ-SF                                   | Psychological distress | DASS-21                       | First responder role       | Traditional or emotional support                                | Service role X PA: $\beta = .24, p = .01$                                       | Yes |
| Berger [17]  | 1987 | College students              | Swimming          | Intervention vs control                   | State anxiety          | State Trait Anxiety Inventory | Swimming experience        | Beginner versus intermediate                                    | $F(1, 40) = 4.83, p < .04$                                                      | Yes |
| Forshaw [68] | 2023 | University students           | Physical activity | Accelerometer                             | Depressive symptoms    | CESD-R scale                  | Physical activity identity | Five items of the validated Exercise Identity Scale             | Interaction $\beta = -.03$ , 95% CI = $-.14, -.03, p = .03$                     | Yes |
| Forshaw [68] | 2023 | University students           | Physical activity | Accelerometer                             | Depressive symptoms    | CESD-R scale                  | Physical activity identity | Five items of the validated Exercise Identity Scale             | Interaction $\beta = -.08$ , 95% CI = $-.14, -.03, p < .01$                     | Yes |
| Miller [157] | 2005 | Female undergraduate students | Aerobic exercise  | 20-minute experimental exercise condition | Positive affect        | PANAS                         | Mode preference            | Stair stepper, treadmill, rower, cycle ergometer, cross-country | Group (mode preference) $\times$ time interaction: $F(6, 198) = 5.45, p < .001$ | Yes |
| Miller [157] | 2005 | Female undergraduate students | Aerobic exercise  | 20-minute experimental exercise condition | Negative affect        | PANAS                         | Mode preference            | Stair stepper, treadmill, rower, cycle ergometer, cross-country | Group (mode preference) $\times$ time interaction, $F(3, 198) = 6.57, p < .001$ | No  |

Note: CESD = Center for Epidemiologic Studies Depression Scale; DASS = Depression Anxiety Stress Scale; GHQ = General Health Questionnaire; GLTEQ = Godin Leisure-time Exercise Questionnaire; HADS = Hospital Anxiety and Depression Scale; IPAQ = International Physical Activity Questionnaire; IPAQSF = International Physical Activity Questionnaire Short Form; PA = physical activity, PANAS = Positive and Negative Affect Schedule; MVPA = Moderate to Vigorous Physical Activity; Only the first author is listed for brevity; the numbers in parentheses following the first authors' names refer to the individual study IDs of the 247 included studies.