**Supplementary Digital Content**

**Genetic pathways underlying individual differences in regular physical activity**

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# PHYSICAL ACTIVITY PHENOTYPING IN FAMILY AND TWIN STUDIES

The four classes of PA phenotypes used in the family and twin studies used in the main text are not always clearly separated, and large heterogeneity exists even within each class the PA phenotyping. Many (twin) family studies furthermore assessed more than one PA phenotype (1-13), and the same is true for twin studies (14-29). Some studies report on the same PA phenotype repeatedly for specific (parts of) weekdays or weekend days (12, 13, 30).

A number of studies used reported on partly overlapping samples, most notably the Netherlands and Finnish twin registers. In overlapping studies that reported on identical PA phenotypes, the study that was older or had a smaller sample size was discarded for meta-analyses (31-35). Studies with overlapping samples were retained if they reported on different PA phenotypes or provided additional statistics, e.g. sibling, parent-offspring, twin correlations not reported in the (extended) family study used for the A,C, and E estimates (3, 14, 36-38). Two family studies used the same accelerometer data from the Viva La Familia study sample (4, 39) and the meta-analysis only retained heritability estimates from the study not correcting for the effects of quantitative trait loci (QTLs) detected in a parallel linkage analysis (4).

Across the family and twin studies used for the meta-analyses reported, TPA is the most homogeneous theoretical construct as it subsumes *all* daily physical activities. However, assessment strategies differ widely which can still result in a heterogeneous PA phenotype. Assessment of TPA include different strategies like (1) the double labeled water method (40, 41) which may largely capture energy expenditure due to basal metabolic rate and food thermogenesis (~70%) rather than to daily physical activities (Black et al., 1996), (2) pedometer or accelerometer derived movement counts with different devices at different body sites, and translated into TPA by different and worn for period between 3 to 14 days algorithms (13, 18, 21-23, 27, 30, 41-45), and (3) survey and interview based methods relying on a single or multiple items of self-report of different mixtures of frequency, duration and type of activity across a specific set of days (e.g. (14, 46, 47), across an average week (e.g. (20, 28, 48), or ‘in general’ (e.g. (5, 8, 17, 29, 49).

A similar broad range of assessment strategies applies to LTPA and MVPA, which have diffuse borders with quite some overlapping items in the self-report measures. Studies have used either time-based estimates in terms of frequency per week or total minutes engaged in LTPA and MVPA per day or week (e.g. (1, 5, 8, 15, 24, 26, 50) or a conversion to daily/weekly energy expenditure (e.g. (11, 14, 51, 52) based on values for specific activities (e.g. walking, stair climbing, jogging) obtained for the ’average’ child/adolescent (53) or adult (54). Many studies further convert these continuous measures into 2 to 5 categories of e.g. sufficient or insufficient MVPA (55-57) or low, moderate, high LTPA/MVPA levels (e.g. (2, 15, 17, 25, 29, 36, 58, 59). This accommodates the substantial amount of people with zero LTPA or MVPA, which severely distort the normal distribution of PA phenotypes assumed in many analytic approaches. A liability threshold model can then be used in the genetic analysis to recapture the normal distribution of the latent liabilities to be low, moderate, or high active (17, 29, 59, 60).

Perhaps the most homogenous assessment strategy is that used for PA in leisure time, and specifically so for voluntary exercise and sports activities (VEB), which is exclusively based on self-report. A major source of concerns in reporting TPA and MVPA is that it is particularly difficult to estimate the both duration and frequency of physical activities that are light to moderate in intensity, including common activities like walking and standing, or household activities. When people are asked to report PA confined to structured activities in leisure time that are moderate to vigorous in intensity, self-reporting seems to fare better (61). The cognitive salience of such intensive physical activities is higher, reducing recall bias compared to light-to-moderate intense activities occurring as part of daily routine.

Furthermore, in contrast to TPA and MVPA, the activities that fall under LTPA and VEB are largely under the individuals’ volitional control, which may further increase recall precision. In our own research, we have shown a high short-term test-retest reliability for weekly METminutes spent on voluntary exercise behavior (29, 62) as well as substantial tracking over periods of up to 20 years (63). However, some heterogeneity of phenotyping is reintroduced even when a restricted VEB phenotype is used. The twin and family studies on VEB use different minimal intensity and frequency thresholds to select which exercise and sports activities are counted, report either weekly frequency or minutes spent weekly/daily (e.g. (1, 8, 16, 17, 19, 20, 64-69) or energy expenditure by also factoring in intensity of the activities (e.g. (1, 28, 38, 66, 70-73), and by either maintaining a continuous (skewed) phenotype (e.g. (16, 17, 19, 20, 28, 38, 65, 66, 68-73), or converting to a categorical VEB variable (e.g. (29, 60, 67, 74-81).

# FAMILY STUDIES USED IN META-ANALYSES

Detailed study information from the family/pedigree based studies used to compute sample size-weighted Parent-offspring (PO), sibling (SIB) correlations, and inverse variance weighted A , C, and E estimation (ACE). Studies could contribute information on multiple different PA phenotypes, or on the same PA phenotype using different assessment strategies. Each line is a unique combination of Study (Reference) and PA Phenotype. The column Total N reflects the total number of family/pedigree members reported on. The column ‘Used in’ indicates whether estimates were provided that could be used in the meta-analyses for the parent-offspring correlations (PO), sibling correlations (SIB), and/or broad sense heritability estimation (ACE). TPA = Total Physical Activity, MVPA = Moderate-to-Vigorous Physical Activity, LTPA = Leisure Time Physical Activity, VEB = Voluntary Exercise Behavior, EE = energy expenditure, CAT = categorical scale, CON = continuous scale, DI = yes/no dichotomy.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Period of data collection** | **Country** | **Sample/Population** | **Pheno-type** | **Device/Selfreport** | **Scale** | **Instrument** | **Measurement details** | **Total N** | **Used in** |
| **Butte et al., 2006(4)** | **2000-2004** | **USA** | **The Viva La Familia study**  | **TPA** | **Device** | **CON** | **Actiwatch accelerometer** | **Average counts per minute across a 3 day recording in counts/d** | **1030** | **ACE** |
| **Jacobi et al., 2011(30)** | **1999** | **France** | **Nuclear families - Fleurbaix-Laventie Ville-Sante (FLVS II study)** | **TPA** | **Device** | **CON** | **Yamax DW 450 pedometer** | **Average daily step count on WEDNESDAYS** | **1156** | **PO/SIB** |
| **Jacobi et al., 2011(30)** | **1999** | **France** | **Nuclear families - Fleurbaix-Laventie Ville-Sante (FLVS II study)** | **TPA** | **Device** | **CON** | **Yamax DW 450 pedometer** | **Average daily step count over >0 WEEKEND DAYS** | **1156** | **PO/SIB** |
| **Jacobi et al., 2011(30)** | **1999** | **France** | **Nuclear families - Fleurbaix-Laventie Ville-Sante (FLVS II study)** | **TPA** | **Device** | **CON** | **Yamax DW 450 pedometer** | **Average daily step count over >1 WEEK DAYS** | **1156** | **PO/SIB** |
| **Jacobi et al., 2011(30)** | **1999** | **France** | **Nuclear families - Fleurbaix-Laventie Ville-Sante (FLVS II study)** | **TPA** | **Device** | **CON** | **Yamax DW 450 pedometer** | **Average daily step count over entire WEEK** | **1156** | **PO/SIB** |
| **Butte et al., 006(4)** | **2000-2004** | **USA** | **The Viva La Familia study**  | **MVPA** | **Device** | **CON** | **Actiwatch accelerometer** | **% of the awake time that counts were higher than a LPA but lower than a MPA criterion value** | **1030** | **ACE** |
| **Petersen et al., 2021(13)** | **2017-2019** | **Denmark** | **Lolland–Falster Health Study (LOFUS)** | **MVPA** | **Device** | **CON** | **Axivity AX3 accelerometer** | **Time spent in MPA; cut off 1680/3075/3522/3522 for age 0–6/ 7–11/ 12–17/ ≥18, Weekday 4-10** | **1576** | **PO/SIB** |
| **Petersen et al., 2021(13)** | **2017-2019** | **Denmark** | **Lolland–Falster Health Study (LOFUS)** | **MVPA** | **Device** | **CON** | **Axivity AX3 accelerometer** | **Time spent in MPA; cut off 1680/3075/3522/3522 for age 0–6/ 7–11/ 12–17/ ≥18, Weekday 8-4** | **1576** | **PO/SIB** |
| **Petersen et al., 2021(13)** | **2017-2019** | **Denmark** | **Lolland–Falster Health Study (LOFUS)** | **MVPA** | **Device** | **CON** | **Axivity AX3 accelerometer** | **Time spent in MPA; cut off 1680/3075/3522/3522 for age 0–6/ 7–11/ 12–17/ ≥18, Weekend 8 am -10 pm** | **1576** | **PO/SIB** |
| **Carson et al., 2020(12)** | **2009-2017** | **Canada** | **subsample Canadian Health Measures Survey (CHMS)** | **MVPA** | **Device** | **CON** | **Actical accelerometer** | **Average min/day of MVPA for parents and children for all valid weekdays** | **2232** | **PO** |
| **Carson et al., 2020(12)** | **2009-2017** | **Canada** | **subsample Canadian Health Measures Survey (CHMS)** | **MVPA** | **Device** | **CON** | **Actical accelerometer** | **Average min/day of MVPA for parents and children for all valid days** | **2232** | **PO** |
| **Carson et al., 2020(12)** | **2009-2017** | **Canada** | **subsample Canadian Health Measures Survey (CHMS)** | **MVPA** | **Device** | **CON** | **Actical accelerometer** | **Average min/day of MVPA for parents and children for all valid weekend days** | **2232** | **PO** |
| **Fuemmeler et al., 2011(82)** | **2010** | **USA** | **subsample Southwest US family study.** | **MVPA** | **Device** | **CON** | **MTI Actigraph accelerometer** | **Time spent on MVPA in the 18 hours between 6 am and 12 am in the WEEKEND in minutes** | **135** | **PO** |
| **Fuemmeler et al., 2011(82)** | **2010** | **USA** | **subsample Southwest US family study.** | **MVPA** | **Device** | **CON** | **MTI Actigraph accelerometer** | **Time spent on MVPA in the 4 hours between 3 pm and 7 pm during the WEEK in minutes** | **135** | **PO** |
| **Fuemmeler et al., 2011(82)** | **2010** | **USA** | **subsample Southwest US family study.** | **MVPA** | **Device** | **CON** | **MTI Actigraph accelerometer** | **Time spent on MVPA in the 6 hours between 6 am and 12 am during the WEEK in minutes** | **135** | **PO** |
| **Zovko et al., 2021(10)** | **2018** | **Slovenia** | **Children age 11-14, parents, grandparents Rural Slovenia**  | **MVPA** | **Device** | **CON** | **RM42 accelerometer** | **Time spent in MVPA(> 3 METs) in minutes/d** | **451** | **PO** |
| **Butte et al., 2006(4)** | **2000-2004** | **USA** | **The Viva La Familia study**  | **MVPA** | **Device** | **CON** | **Actiwatch accelerometer** | **% of the awake time that counts were higher than an experimn. establishe MPA criterion value** | **1030** | **ACE** |
| **Petersen et al., 2021(13)** | **2017-2019** | **Denmark** | **Lolland–Falster Health Study (LOFUS)** | **MVPA** | **Device** | **CON** | **Axivity AX3 accelerometer** | **Time spent in VPA; cut off 3368/5543/5755/6016 for age 0–6/ 7–11/ 12–17/ ≥18, Weekday 4-10** | **1576** | **PO/SIB** |
| **Petersen et al., 2021(13)** | **2017-2019** | **Denmark** | **Lolland–Falster Health Study (LOFUS)** | **MVPA** | **Device** | **CON** | **Axivity AX3 accelerometer** | **Time spent in VPA; cut off 3368/5543/5755/6016 for age 0–6/ 7–11/ 12–17/ ≥18, Weekday 8-4** | **1576** | **PO/SIB** |
| **Petersen et al., 2021(13)** | **2017-2019** | **Denmark** | **Lolland–Falster Health Study (LOFUS)** | **MVPA** | **Device** | **CON** | **Axivity AX3 accelerometer** | **Time spent in VPA; cut off 3368/5543/5755/6016 for age 0–6/ 7–11/ 12–17/ ≥18, Weekend 8 am -10 pm** | **1576** | **PO/SIB** |
| **Barbosa et al., 2019(83)** | **2008-2009** | **Brazil** | **Two-generation families - Muzambinho** | **TPA** | **Selfreport** | **CON** | **Multiple Interview items** | **METminutes/wk of TPA across commuting, occupational, school, and/or leisure time** | **483** |  |
| **Choh et al., 2009(6)** | **2003-2004** | **USA** | **The Southwest Ohio Family Study** | **TPA** | **Selfreport** | **CON** | **Baecke Questionnaire**  | **The TPA index is obtained from the unweighted sum of all three indices (PSI, WSI, LTPAI)** | **512** | **ACE** |
| **de Chaves et al., 2014(49)** | **2010** | **Portugal** | **The ‘Active Vouzela study’ - central part of Portugal**  | **TPA** | **Selfreport** | **CON** | **Baecke Questionnaire**  | **The TPA index is the unweighted sum of all three indices (PSI, WSI, LTPAI) ranging from 3 to 15**  | **616** | **PO/SIB/ACE** |
| **Diego et al., 2015(9)** | **2015** | **Portugal** | **Three generation families - Porto** | **TPA** | **Selfreport** | **CON** | **IPAQ-SF (interview for age < 15)**  | **The TPA index is the unweighted sum of all three indices (PSI, WSI, LTPAI) ranging from 3 to 15**  | **724** | **ACE** |
| **Forjaz et al., 2012(48)** | **2008-2009** | **Brazil** | **Two-generation families - Muzambinho** | **TPA** | **Selfreport** | **CON** | **Interview** | **Time spent on TPA (commuting +occupational + leisure time + school (including PE) in minutes/wk** | **424** | **PO/SIB/ACE** |
| **Gomes et al., 2014(84)** | **2006-2008** | **Portugal** | **Portuguese Healthy Family Study (FAMS) - north and centre Portugal**  | **TPA** | **Selfreport** | **CON** | **Baecke Questionnaire**  | **The TPA index is obtained from the unweighted sum of all three indices (PSI, WSI, LTPAI)** | **10644** |  |
| **Horimoto et al., 2011(7)** | **2005** | **Brazil** | **The Baependi Heart Study**  | **TPA** | **Selfreport** | **CAT** | **Multiple Survey items** | **Categories (4) for daily PA (excluding sports) : extremely light, light, moderate,and vigorous**  | **1693** | **PO/SIB/ACE** |
| **Leite et al., 2020(11)** | **2006-2016** | **Brazil** | **The Baependi Heart Study**  | **TPA** | **Selfreport** | **CON** | **IPAQ-SF Questionnaire** | **The TPA index is the unweighted sum of all three indices (PSI, WSI, LTPAI) ranging from 3 to 15**  | **2239** | **ACE** |
| **Maia et al., 2014(8)** | **2006-2008** | **Portugal** | **Portuguese Healthy Family Study (FAMS) - north and centre Portugal**  | **TPA** | **Selfreport** | **CON** | **Baecke Questionnaire**  | **The TPA index is obtained from the unweighted sum of all three indices (PSI, WSI, LTPAI)** | **10644** | **PO/SIB** |
| **Mitchell et al., 2003(46)** | **1992-1995** | **USA** | **The San Antonio Family Heart Study (SAFHS)**  | **TPA** | **Selfreport** | **CON** | **Stanford 7-day PA recall**  | **METhours/wk on TPA summing across hours MPA, VPA, and LPA (=168 - hours M+VPA) \* fixed MET** | **1364** | **PO/SIB/ACE** |
| **Perusse et al. , 1989(14)** | **1987** | **Canada** | **Quebec Family Study** | **TPA** | **Selfreport** | **CON** | **B3DPAR three-day PA record**  | **Sum of EE in all 96\*15 minute periods, averaged across 3 days.** | **1610** | **PO/SIB/ACE** |
| **Santos et al., 2014(85)** | **2006-2008** | **Portugal** | **Portuguese Healthy Family Study (FAMS) - north and centre Portugal**  | **TPA** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **Tertiles of the TPA index: Sedentary; light active ; high active** | **1345** | **ACE** |
| **Seabra et al. , 2008(5)** | **2006-2008** | **Portugal** | **Portugese nuclear families Porto, Viseu, Vila Real & Braganca** | **TPA** | **Selfreport** | **CON** | **Baecke Questionnaire**  | **The TPA index is obtained from the unweighted sum of all three indices (PSI, WSI, LTPAI)** | **9500** | **PO/SIB/ACE** |
| **Diego et al., 2015(9)** | **2015** | **Portugal** | **Three generation families - Porto** | **MVPA** | **Selfreport** | **CON** | **IPAQ-SF (interview for age < 15)**  | **METminutes/wk based on intensity, frequency and duration of PA above ~4.0 MET** | **724** | **ACE** |
| **Leite et al., 2020(11)** | **2006-2016** | **Brazil** | **The Baependi Heart Study**  | **MVPA** | **Selfreport** | **CON** | **IPAQ-SF Questionnaire** | **METminutes/wk based on intensity, frequency and duration of PA above ~4.0 MET** | **2239** | **ACE** |
| **Perusse et al. , 1989(14)** | **1987** | **Canada** | **Quebec Family Study** | **MVPA** | **Selfreport** | **CON** | **B3DPAR three-day PA record**  | **Sum of EE in all 15 minute periods > 4,9 METS, averaged across 3 days.** | **1610** | **PO/SIB/ACE** |
| **Sallis et al., 1988(1)** | **1984 - 1985** | **USA** | **San Diego Family Health - HIS** | **MVPA** | Selfreport | **CON** | **7-day PA Recall interview** | **EE in moderate, high-, and very high-intensity activities in kcal/ kg/d** | **204** | **PO/SIB** |
| **Sallis et al., 1988(1)** | **1984 - 1985** | **USA** | **San Diego Family Health - HIS** | **MVPA** | **Selfreport** | **CON** | **7-day PA Recall interview** | **Time spent in hard and very hard activities during leisure (hard leisure) in minutes/d** | **204** | **PO/SIB** |
| **Diego et al., 2015(9)** | **2015** | **Portugal** | **Three generation families - Porto** | **MVPA** | **Selfreport** | **CON** | **IPAQ-SF (interview for age < 15)**  | **METminutes/wk based on intensity, frequency and duration of PA with ~8.0 MET** | **724** | **ACE** |
| **Aarnio et al., 1997(36)** | **1952** | **Finland** | **parents + grandparents FinnTwin16 study** | **LTPA** | **Selfreport** | **CAT** | **Multiple Survey items**  | **Parents as above, grandparents as reported by parents: 3 categories**  | **6795** | **PO** |
| **Aarnio et al., 1997(36)** | **1991-1993** | **Finland** | **Adolescent twins + parents FinnTwin16 study** | **LTPA** | **Selfreport** | **CAT** | **Multiple Survey items**  | **Twin: 5 categories (Very active - inactive); Parent: 5 categories (quintiles METh/wk)**  | **4514** | **PO/SIB** |
| **Choh et al., 2009(6)** | **2003-2004** | **USA** | **The Southwest Ohio Family Study** | **LTPA** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **The Leisure time Index is a composite of 4 Likert type items (from 1 to 5) on non-exercise related LTPA** | **518** | **ACE** |
| **Maia et al., 2014(8)** | **2006-2008** | **Portugal** | **Portuguese Healthy Family Study (FAMS) - north and centre Portugal**  | **LTPA** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **The Leisure time Index is a composite of 4 Likert type items (from 1 to 5) on non-exercise related LTPA** | **10644** | **PO/SIB** |
| **Perusse et al., 1988(2)**  | **1981** | **Canada** | **Canada Fitness Survey**  | **LTPA** | **Selfreport** | **CAT** | **Multiple Survey items** | **Categories (3): <3h/wk&<9mth/year; 3h/wk&<9mths/year; 3 h/wk&9mths/year** | **14298** | **PO/SIB** |
| **Perusse et al., 1988(2)** | **1981** | **Canada** | **Canada Fitness Survey**  | **LTPA** | **Selfreport** | **CON** | **Multiple Survey items** | **EE expressed in kJ/day/kg.** | **4120** | **PO/SIB** |
| **Perusse et al., 1988(2)** | **1981** | **Canada** | **Canada Fitness Survey**  | **LTPA** | **Selfreport** | **CON** | **Multiple Survey items** | **Time spent in minutes for all the LTPA reported in the last year.** | **4120** | **PO/SIB** |
| **Seabra et al. , 2008(5)** | **2006-2008** | **Portugal** | **Portugese nuclear families Porto, Viseu, Vila Real & Braganca** | **LTPA** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **The Leisure time Index is a composite of 4 Likert type items (from 1 to 5) on non-exercise related LTPA** | **9500** | **PO/SIB/ACE** |
| **Simonen et al. , 2002(3)** | **1989-1997** | **Canada** | **subsample Quebec Family Study** | **LTPA** | **Selfreport** | **CON** | **Multiple Survey items** | **Time spent on the most common LTPA during the previous year in hours/wk**  | **696** | **PO/SIB/ACE** |
| **Choh et al., 2009(6)** | **2003-2004** | **USA** | **The Southwest Ohio Family Study** | **VEB** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **The Sports Participation Index is a composite score based on the two most frequently played sports** | **519** | **ACE** |
| **de Moor et al., 2011(86)** | **2000** | **Netherlands** | **adult Netherlands Twin Register** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **6663** | **PO/SIB** |
| **Horimoto et al., 2011(7)** | **2005** | **Brazil** | **The Baependi Heart Study**  | **VEB** | **Selfreport** | **CON** | **Multiple Survey items** | **Time spent on sports activities (weekly PA) in minutes/wk**  | **1693** | **PO/SIB/ACE** |
| **Maia et al., 2014(8)** | **2006-2008** | **Portugal** | **Portuguese Healthy Family Study (FAMS) - north and centre Portugal**  | **VEB** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **The Sports Participation Index is a composite score based on the two most frequently played sports** | **10644** | **PO/SIB** |
| **Nikolaidis et al, 2011(69)** | **2010** | **Czech Rep.** | **Nuclear families - Prague** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly exercise participation in minutes/wk** | **610** | **PO/SIB** |
| **Sallis et al., 1988(1)** | **1984 - 1985** | **USA** | **San Diego Family Health - EA** | **VEB** | **Selfreport** | **CON** | **7-day PA Recall interview** | **EE in moderate, high-, and very high-intensity activities in kcal/ kg/d** | **180** | **PO/SIB** |
| **Sallis et al., 1988(1)** | **1984 - 1985** | **USA** | **San Diego Family Health - EA** | **VEB** | **Selfreport** | **CON** | **7-day PA Recall interview** | **Time spent in hard and very hard activities during leisure (hard leisure) in minutes/d** | **180** | **PO/SIB** |
| **Seabra et al. , 2008(5)** | **2006-2008** | **Portugal** | **Portugese nuclear families Porto, Viseu, Vila Real & Braganca** | **VEB** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **The Sports Participation Index is a composite score based on the two most frequently played sports** | **9500** | **PO/SIB/ACE** |
| **Seabra et al., 2014 (64)** | **2008** | **Portugal** | **Portugese nuclear families -Porto, Viseu, Vila Real and Braganca** | **VEB** | **Selfreport** | **CAT** | **Multiple Survey items** | **Categories (5) of time spent on most frequent sport: <1 h ; 1- 2 hrs ; 2- 3 hrs ; 3 4 hrs ; >4 hrs** | **9500** | **PO/SIB/ACE** |
| **Seabra et al., 2014 (64)** | **2008** | **Portugal** | **Portugese nuclear families -Porto, Viseu, Vila Real and Braganca** | **VEB** | **Selfreport** | **CAT** | **Multiple Survey items** | **Categories (3) based on intensity of the most frequently played sport** | **9500** | **PO/SIB/ACE** |
| **Seabra et al., 2014 (64)** | **2008** | **Portugal** | **Portugese nuclear families -Porto, Viseu, Vila Real and Braganca** | **VEB** | **Selfreport** | **CAT** | **Multiple Survey items** | **Categories (4) for % of the year that most frequent sport is played: 1 -3 m; 4- 6 m; 7-9 m ; >9 m** | **9500** | **PO/SIB/ACE** |
| **Seabra et al., 2014 (64)** | **2008** | **Portugal** | **Portugese nuclear families -Porto, Viseu, Vila Real and Braganca** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO sports participation based on "Do you play sports?"** | **9500** | **PO/SIB/ACE** |
| **van der Zee et al., 2020(38)** | **1991-2014** | **Netherlands** | **adult Netherlands Twin Register** | **VEB** | **Selfreport** | **CAT** | **Multiple Survey items**  | **METhours/wk on non-incidental exercise activities, summed across all activities** | **50690** | **PO/SIB/ACE** |

# TWIN STUDIES USED IN META-ANALYSES

Detailed study information from the twin studies (and family studies separately reporting on twins) used to compute sample size-weighted zygosity-specific twin correlations, and inverse variance weighted estimation of A and C estimation through structural equation modeling (ACE). Studies could contribute information on multiple different PA phenotypes, or on the same PA phenotype using different assessment strategies. Each line is a unique combination of Study (Reference), PA Phenotype, and Mean Age. Combinations that had less than 10 twin pairs in any of the reported zygosity groups were excluded for meta-analyses on per zygosity-group twin correlations (22, 23, 27, 41) but retained in the heritability meta-analyses. The column N twin pairs reflects the total number of complete pairs reported on, followed by the total male and female twins for which the PA phenotype was analyzed. The column ‘Used in’ indicates whether estimates were provided that could be used in the meta-analyses for twin correlations (TwinCor) and/or the A and C estimation (ACE). NTR = Netherlands Twin Register, FTC = Finnish Twin Cohort, EA = Educational Achievement, TPA = Total Physical Activity, MVPA = Moderate-to-Vigorous Physical Activity, LTPA = Leisure Time Physical Activity, VEB = Voluntary Exercise Behavior, EE = energy expenditure, CAT = categorical scale, CON = continuous scale, DI = yes/no dichotomy.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Period of data collection** | **Country** | **Sample/Population** | **Coding** | **Device/SelfReport** | **Scale** | **Instrument** | **Measurement Details** | **N twin** **pairs** | **N males** | **N females** | **Mean****Age** | **Used in** |
| **TPA/MVPA objective measurement ages 2 to 12** |
| **Saudino et al., 2009(44)** | **2005-2008** | **USA** | **Boston University Twin Project** | **TPA** | **Device** | **CON** | **Actigraph accelerometer** | **Composite actigraph scores (rate per minute) across two days and four limbs** | **312** | **300** | **324** | **2,1** | **ACE/TwinCor** |
| **Franks et al., 2005(40)** | **1993-2002** | **USA** | **Twins of mixed ethnicity, Arizona** | **TPA** | **Device** | **CON** | **Double labeled water method** | **EE in PA (PAEE) in kcal/day**  | **100** | **106** | **94** | **7,1** | **ACE/TwinCor** |
| **Franks et al., 2005(40)** | **1993-2002** | **USA** | **Twins of mixed ethnicity, Arizona** | **TPA** | **Device** | **CON** | **Double labeled water method** | **EE in PA (PAEE) in kcal/day, corrected for body weight**  | **100** | **106** | **94** | **7,1** | **ACE/TwinCor** |
| **Franks et al., 2005(40)** | **1993-2002** | **USA** | **Twins of mixed ethnicity, Arizona** | **TPA** | **Device** | **CON** | **Double labeled water method** | **Physical activity level (PAL) as total EE/ RMR and measured in kcal/day.**  | **100** | **106** | **94** | **7,1** | **ACE/TwinCor** |
| **Plomin & Foch, 1980(42)** | **1980** | **USA** | **Twins recruited through mothers-of twins clubs & newspaper** | **TPA** | **Device** | **CON** | **Pedometer (waist)** | **Week-long assessment of up and down movements of the trunk**  | **48** | **48** | **48** | **7,6** | **ACE/TwinCor** |
| **Wood et al., 2008(45)** | **2008** | **UK** | **Twins Early development Study (TEDS)** | **TPA** | **Device** | **CON** | **Actigraph accelerometer** | **Sum of counts across a 2.5 hours lab setting with unstructured breaks** | **263** | **510** | **532** | **8,5** | **ACE/TwinCor** |
| **Maia et al., 2013(22)** | **1999-2012** | **Portugal** | **Twins Portugal, Azores & Madeira** | **MVPA** | **Device** | **CON** | **TRITRAC R3D accelerometer**  | **Sum of counts during PA of moderate intensity (MPA)** | **31** | **31** | **31** | **9,0** | **TwinCor** |
| **Maia et al., 2013(22)** | **1999-2012** | **Portugal** | **Twins Portugal, Azores & Madeira** | **MVPA** | **Device** | **CON** | **TRITRAC R3D accelerometer**  | **Sum of counts during PA of very vigorous intensity (VVPA)** | **31** | **31** | **31** | **9,0** | **TwinCor** |
| **Maia et al., 2013(22)** | **1999-2012** | **Portugal** | **Twins Portugal, Azores & Madeira** | **MVPA** | **Device** | **CON** | **TRITRAC R3D accelerometer**  | **Sum of counts during PA of vigorous intensity (VPA)**  | **31** | **31** | **31** | **9,0** | **TwinCor** |
| **Fisher et al., 2010(18)** | **2005-2006** | **UK** | **Twins Early development Study (TEDS)** | **MVPA** | **Device** | **CON** | **Actigraph 7164 accelerometer**  | **Time spent in MVPA with count > 2000 over 7 consecutive days in minutes/d** | **117** | **108** | **126** | **11,0** | **ACE/TwinCor** |
| **Fisher et al., 2010(18)** | **2005-2006** | **UK** | **Twins Early development Study (TEDS)** | **TPA** | **Device** | **CON** | **Actigraph 7164 accelerometer**  | **Average counts per minute across a 7 day recording in counts/d**  | **117** | **108** | **126** | **11,0** | **ACE/TwinCor** |
| **TPA/MVPA Objective measurement ages 12 to 18** |
| **Maia et al., 2013(22)** | **1999-2012** | **Portugal** | **Twins Portugal, Azores & Madeira** | **MVPA** | **Device** | **CON** | **TRITRAC R3D accelerometer**  | **Sum of counts of the accelerometer across wear time in 5 days** | **162** |  |  | **13,0** | **ACE** |
| **Maia et al., 2013(22)** | **1999-2012** | **Portugal** | **Twins Portugal, Azores & Madeira** | **MVPA** | **Device** | **CON** | **TRITRAC R3D accelerometer**  | **Sum of counts during PA of very vigorous intensity (VVPA)** | **107** |  |  | **14,5** | **ACE** |
| **Maia et al., 2013(22)** | **1999-2012** | **Portugal** | **Twins Portugal, Azores & Madeira** | **TPA** | **Device** | **CON** | **TRITRAC R3D accelerometer**  | **Sum of counts of the accelerometer across wear time in 5 days** | **51** |  |  | **15,0** | **ACE** |
| **TPA/MVPA Objective measurement, above age 18** |
| **Gielen et al., 2014(23)** | **2014** | **Netherlands** | **Adult NTR & East-Flanders EFPTS** | **MVPA** | **Device** | **CON** | **Tracmor accelerometer**  | **Time spent on moderate (cut-off: walking at 5 km/h in minutes/d**  | **52** | **42** | **62** | **22,0** | **ACE/TwinCor** |
| **Gielen et al., 2014(23)** | **2014** | **Netherlands** | **Adult NTR & East-Flanders EFPTS** | **MVPA** | **Device** | **CON** | **Tracmor accelerometer**  | **Time spent on vigorous (> walking at 5 km/h in minutes/d**  | **52** | **42** | **62** | **22,0** | **ACE/TwinCor** |
| **Gielen et al., 2014(23)** | **2014** | **Netherlands** | **Adult NTR & East-Flanders EFPTS** | **TPA** | **Device** | **CON** | **Tracmor accelerometer**  | **Sum of counts from the 3 axes across 14 days in Mcnts/d**  | **52** | **42** | **62** | **22,0** | **ACE/TwinCor** |
| **Joosen et al., 2005(41)** | **2005** | **Netherlands** | **Twin/sibs in Maastricht area** | **TPA** | **Device** | **CON** | **Tracmor accelerometer**  | **Sum of counts from the 3 axes across 15 days in kcounts/d**  | **18** | **12** | **24** | **25,0** | **ACE/TwinCor** |
| **Joosen et al., 2005(41)** | **2005** | **Netherlands** | **Twin/sibs in Maastricht area** | **TPA** | **Device** | **CON** | **Double labeled water method** | **EE in PA (PAEE) was measured in kcal/day**  | **18** | **12** | **24** | **25,0** | **ACE/TwinCor** |
| **Schutte et al., 2020(26)** | **2014-2017** | **Netherlands** | **Adult NTR** | **MVPA** | **Device** | **CON** | **ActigraphGT3X+ accelerometer**  | **Time spent in MVPA at 2020-5998 counts/min or MVPA at > 5998 counts/min in minutes/d** | **248** | **193** | **150** | **32,6** | **ACE/TwinCor** |
| **Spinath et al., 2002(43)** | **2000** | **Germany** | **German Obs.Study Adult Twins (GOSAT)** | **TPA** | **Device** | **CON** | **Four-limb actimetry (K&W M101)** | **Average motor activity from 4 limbs across 6 hours of a standardized experiment** | **225** | **109** | **351** | **34,3** | **ACE/TwinCor** |
| **den Hoed et al., 2013(21)** |  | **UK** | **TwinsUK registry** | **MVPA** | **Device** | **CON** | **Actiheart accelerometer + HR**  | **Time spent in MVPA (> 3MET) in minutes/d** | **770** | **44** | **1500** | **56,0** | **ACE/TwinCor** |
| **den Hoed et al., 2013(21)** |  | **UK** | **TwinsUK registry** | **TPA** | **Device** | **CON** | **accelerometry + HR (Actiheart)** | **Average daily acceleration of the trunk along the vertical axis in m/s2** | **772** | **44** | **1500** | **56,0** | **ACE/TwinCor** |
| **den Hoed et al., 2013(21)** |  | **UK** | **TwinsUK registry** | **TPA** | **Device** | **CON** | **accelerometry + HR (Actiheart)** | **PAEE (J/min/kg) across > 4 days \* body mass to compute the average daily PAEE in kJ/d** | **772** | **44** | **1500** | **56,0** | **ACE/TwinCor** |
| **Waller et al. , 2018(25)** | **2016** | **Finland** | **MOBILETWIN (subset FTC <1958)** | **MVPA** | **Device** | **CON** | **Hookie AM20 accelerometer**  | **EE during most intense 10-minute period of PA**  | **186** | **171** | **200** | **72,9** | **ACE/TwinCor** |
| **Waller et al. , 2018(25)** | **2016** | **Finland** | **MOBILETWIN (subset FTC <1958)** | **MVPA** | **Device** | **CON** | **Hookie AM20 accelerometer**  | **Time spent on MPA(3–6 MET) or VPA (over 6 MET) in minutes/d** | **186** | **171** | **200** | **72,9** | **ACE/TwinCor** |
| **TPA/MVPA Self report ages 12 to 18** |
| **White et al., 2014(47)** | **2014** | **USA** | **Michigan State U. Twin Registry** | **TPA** | **Selfreport** | **CON** | **3-day PA recall (3D-PAR)** | **METminutes/day across all activities on the three days**  | **148** | **94** | **202** | **12,0** | **ACE/TwinCor** |
| **Perusse et al., 1989(14)** | **1987** | **Canada** | **Quebec Family Study** | **MVPA** | **Selfreport** | **CON** | **B3DPAR three-day PA record**  | **Sum of EE in all 15 minute periods > 4,9 METS, averaged across 3 days.** | **111** | **111** | **111** | **14,0** | **TwinCor** |
| **Perusse et al., 1989(14)** | **1987** | **Canada** | **Quebec Family Study** | **TPA** | **Selfreport** | **CON** | **B3DPAR three-day PA record**  | **Sum of EE in all 96\*15 minute periods, averaged across 3 days.** | **111** | **111** | **111** | **14,0** | **TwinCor** |
| **TPA/MVPA Self report, above age 18** |
| **Mustelin et al., 2012(20)** | **1997-2007** | **Finland** | **FinnTwin12 cohort**  | **TPA** | **Selfreport** | **CON** | **Baecke Questionnaire**  | **The TPA index is the unweighted sum of all three indices (PSI, WSI, LTPAI) ranging from 3 to 15**  | **576** | **525** | **627** | **22,4** | **ACE/TwinCor** |
| **Nelson et al., 2006(56)** | **1996** | **USA** | **Add Health** | **MVPA** | **Selfreport** | **CON** | **7-day PA Recall questionnaire** | **Frequency per week of engagement in MVPA (5-8 METS)** | **718** | **718** | **718** | **22,9** | **TwinCor** |
| **Nelson et al., 2006(56)** | **1996** | **USA** | **Add Health** | **MVPA** | **Selfreport** | **DI** | **7-day PA Recall questionnaire** | **Time spent watching TV/videos and/or playing video/computer games in hours/wk** | **718** | **718** | **718** | **22,9** | **ACE/TwinCor** |
| **Nelson et al., 2006(56)** | **1996** | **USA** | **Add Health** | **MVPA** | **Selfreport** | **DI** | **7-day PA Recall questionnaire** | **YES/NO Adherence to guidelines: MVPA (5-8 METS) frequency >5 bouts/wk** | **718** | **718** | **718** | **22,9** | **ACE** |
| **Nelson et al., 2006(56)** | **2001-2002** | **USA** | **Add Health** | **MVPA** | **Selfreport** | **DI** | **7-day PA Recall questionnaire** | **YES/NO Adherence to guidelines: MVPA (5-8 METS) frequency >5 bouts/wk** | **718** | **718** | **718** | **26,2** | **ACE/TwinCor** |
| **Nelson et al., 2006(56)** | **2001-2002** | **USA** | **Add Health** | **MVPA** | **Selfreport** | **CON** | **7-day PA Recall questionnaire** | **Frequency per week of engagement in MVPA (5-8 METS)** | **730** | **730** | **730** | **26,2** | **TwinCor** |
| **Duncan et al., 2008(55)** | **1999-2006** | **USA** | **U. Washington Twin Registry (UWTR)** | **MVPA** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO Adherence to guidelines: MVPA > 150 min/wk**  | **1389** | **1056** | **1722** | **30,0** | **ACE/TwinCor** |
| **Duncan et al., 2008(55)** | **1999-2006** | **USA** | **U. Washington Twin Registry (UWTR)** | **MVPA** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO participation in MVPA at least 60 min/wk** | **1389** | **1056** | **1722** | **30,0** | **ACE/TwinCor** |
| **Eriksson et al. , 2006(17)** | **2002** | **Sweden** | **Swedish Young Male Twins Study** | **TPA** | **Selfreport** | **CON** | **Baecke Questionnaire** | **The TPA index is the unweighted sum of all three indices (PSI, WSI, LTPAI) ranging from 3 to 15**  | **475** | **950** |  | **31,0** | **ACE/TwinCor** |
| **Schutte et al., 2020(26)** | **2014-2017** | **Netherlands** | **Adult NTR** | **MVPA** | **Selfreport** | **CON** | **IPAQ-SF Questionnaire** | **Time spent in MVPA in minutes/wk** | **248** | **193** | **150** | **32,6** | **ACE/TwinCor** |
| **Kujala et al., 2002(15)** | **1975-1981** | **Finland** | **Finnish Twin Cohort (born< 1982)**  | **MVPA** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO engaging in LTPA on average as strenous as walking/jogging, jogging, or running**  | **5323** | **3544** | **7102** | **35,0** | **ACE/TwinCor** |
| **Wang et al., 2016(57)** | **2011-2013** | **China** | **Chinese National twin Registry (CNTR)** | **MVPA** | **Selfreport** | **DI** | **Single Survey item** | **YES/NO Adherence to guidelines: MVPA > 150 min/wk**  | **9654** | **12090** | **7218** | **38,0** | **ACE/TwinCor** |
| **Johnson et al., 2020(28)** | **1997-2000** | **Denmark** | **GEMINAKAR**  | **TPA** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly METhours across all exercise activities > 4 MET** | **625** | **731** | **776** | **38,0** | **TwinCor** |
| **Duncan et al., 2015(50)** | **2008-2013** | **USA** | **U. Washington Twin Registry (UWTR)** | **MVPA** | **Selfreport** | **CON** | **Multiple Survey items** | **Frequency of days with at least 20 min VPA or 30 min MVPA in days/wk** | **6476** | **4632** | **8320** | **39,4** | **ACE/TwinCor** |
| **Lauderdale et al., 1997(79)** | **1990** | **USA** | **Vietnam Era Twin Registry (males)**  | **MVPA** | **Selfreport** | **CAT** | **Multiple Survey items** | **Six items capturing that active (climbing stairs, walking) are favored over less active options**  | **1536** | **3072** |  | **41,0** | **ACE/TwinCor** |
| **LTPA/VEB Self report ages 7 to 12** |
| **Huppertz et al., 2012(71)** | **2000-2012** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly METhours across all sports/exercise activities > 3 MET**  | **1968** | **1955** | **1981** | **7,5** | **ACE/TwinCor** |
| **Huppertz et al.,2016(58)** | **2000-2016** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CAT** | **Multiple Survey items (by parents)** | **Categories (3) based on METh/wk low <5; middle >5 & <20; high >20**  | **3646** | **3674** | **3618** | **7,5** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - High parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items (by parents)** | **Weekly METhours across all sports/exercise activities > 3 MET**  | **1717** | **1721** | **1713** | **7,5** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - Low parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items (by parents)** | **Weekly METhours across all sports/exercise activities > 3 MET**  | **1752** | **1760** | **1744** | **7,5** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - High parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items (by parents)** | **Weekly METhours across all sports/exercise activities > 3 MET**  | **1783** | **1853** | **1713** | **9,8** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - Low parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items (by parents)** | **Weekly METhours across all sports/exercise activities > 3 MET**  | **2105** | **2068** | **2142** | **9,8** | **ACE/TwinCor** |
| **Huppertz et al.,2016(58)** | **2000-2016** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CAT** | **Multiple Survey items (by parents)** | **Categories (3) based on METh/wk low <5; middle >5 & <20; high >20**  | **3966** | **3992** | **3940** | **9,8** | **ACE/TwinCor** |
| **Huppertz et al., 2012(71)** | **2000-2012** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly METhours across all sports/exercise activities > 3 MET**  | **1761** | **1723** | **1799** | **10,1** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **1983-1987** | **Finland** | **Finnwin12 cohort -High parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **944** | **966** | **922** | **11,4** | **ACE/TwinCor** |
| **Huppertz et al., 2012(71)** | **1983-1987** | **Finland** | **Finnwin12 cohort -Low parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **1199** | **1199** | **1199** | **11,4** | **ACE/TwinCor** |
| **Aaltonen et al., 2020(87)** | **1995-2007** | **Finland** | **FinnTwin12 cohort**  | **LTPA** | **Selfreport** | **CAT** | **Single Survey item** | **Frequency (5) exercise/sports in leisure per week (no …- .. every day)** | **2379** | **2403** | **2355** | **11,5** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - High parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items (by parents)** | **Weekly METhours across all sports/exercise activities > 3 MET**  | **2863** | **2842** | **2884** | **12,2** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - Low parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items (by parents)** | **Weekly METhours across all sports/exercise activities > 3 MET**  | **3940** | **3800** | **4080** | **12,2** | **ACE/TwinCor** |
| **Huppertz et al.,2016(58)** | **2000-2016** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CAT** | **Multiple Survey items (by parents)** | **Categories (3) based on METh/wk low <5; middle >5 & <20; high >20**  | **7204** | **7066** | **7342** | **12,3** | **ACE/TwinCor** |
| **Huppertz et al., 2012(71)** | **2000-2012** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly METhours across all sports/exercise activities > 3 MET**  | **4286** | **4182** | **4390** | **12,3** | **ACE/TwinCor** |
| **LTPA/VEB Self report ages 12 to 18** |
| **Stubbe et al., 2005(88)** | **1991-2000** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **646** | **578** | **714** | **13,5** | **ACE/TwinCor** |
| **Aaltonen et al., 2020(87)** | **1995-2007** | **Finland** | **FinnTwin12 cohort**  | **LTPA** | **Selfreport** | **CAT** | **Single Survey item** | **Frequency (5) exercise/sports in leisure per week (no …- .. every day)** | **2168** | **2172** | **2164** | **14,0** | **ACE/TwinCor** |
| **Simonen et al., 2004(68)** | **2004** | **Finland** | **Twin Spine Study (subset FTC<1958)** | **LTPA** | **Selfreport** | **CON** | **Multiple Interview items**  | **Recalled weekly hours spent in any LTPA during adolescence (age 12–18)**  | **300** | **600** |  | **14,0** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **1983-1987** | **Finland** | **Finnwin12 cohort -High parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **870** | **875** | **865** | **14,1** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **1983-1987** | **Finland** | **Finnwin12 cohort -Low parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **1069** | **1071** | **1067** | **14,1** | **ACE/TwinCor** |
| **Huppertz et al.,2016(58)** | **2000-2016** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CAT** | **Multiple Survey items**  | **Categories (3) based on METh/wk low <5; middle >5 & <20; high >20**  | **3784** | **3295** | **4273** | **14,6** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - High parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Interview items**  | **Weekly METhours across all sports/exercise activities > 3 MET**  | **1570** | **1429** | **1711** | **14,6** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - Low parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Interview items**  | **Weekly METhours across all sports/exercise activities > 3 MET**  | **1910** | **1649** | **2171** | **14,6** | **ACE/TwinCor** |
| **Beunen & Thomis, 1999(65)** | **1999** | **Belgium** | **Leuven Longitudinal Twin Study** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Time spent on sports each week within the past year, in number of hours/wk** | **104** | **105** | **103** | **15,0** | **ACE/TwinCor** |
| **Haberstick et al., 2014(24)** | **2014** | **USA** | **Longitudinal/Community Twin Study** | **LTPA** | **Selfreport** | **CON** | **Multiple Survey items** | **Time spent o leisure time physical activities in hours/d** | **2845** | **2707** | **2982** | **15,1** | **ACE/TwinCor** |
| **Stubbe et al., 2005(88)** | **1991-2000** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **763** | **711** | **815** | **15,5** | **ACE/TwinCor** |
| **Aarnio et al., 1997(36)** | **1991-1993** | **Finland** | **FinnTwin16 cohort** | **LTPA** | **Selfreport** | **CAT** | **Multiple Survey items**  | **Twin: 5 categories (Very active - inactive); Parent: 5 categories (quintiles METh/wk)**  | **748** | **676** | **820** | **16,0** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **1991-1995** | **Finland** | **Finnwin16 cohort -High parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **759** | **719** | **799** | **16,2** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **1991-1995** | **Finland** | **Finnwin16 cohort -Low parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **1516** | **1456** | **1576** | **16,2** | **ACE/TwinCor** |
| **Aaltonen et al., 2013(75)** | **1990-1995** | **Finland** | **FinnTwin16 cohort** | **VEB** | **Selfreport** | **CAT** | **Single Survey item** | **Categories (3): inactive < 1x wk; moderate 1-3x wk; very active, > 4x wk** | **2512** | **2336** | **2688** | **16,2** | **ACE/TwinCor** |
| **de Moor et al., 2011(37)** | **1991-1995** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **2284** | **1449** | **3119** | **16,4** | **ACE/TwinCor** |
| **de Geus et al., 2003(70)** | **2003** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly METhours across all sports/exercise activities > 4 MET**  | **157** | **158** | **156** | **16,7** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - High parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Interview items**  | **Weekly METhours across all sports/exercise activities > 3 MET**  | **947** | **887** | **1007** | **16,9** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - Low parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Interview items**  | **Weekly METhours across all sports/exercise activities > 3 MET**  | **1178** | **954** | **1402** | **16,9** | **ACE/TwinCor** |
| **Huppertz et al.,2016(58)** | **2000-2016** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CAT** | **Multiple Survey items**  | **Categories (3) based on METh/wk low <5; middle >5 & <20; high >20**  | **2264** | **1949** | **2579** | **16,9** | **ACE/TwinCor** |
| **Schutte et al., 2019(73)** | **2019** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly METhours across all exercise activities > 4 MET** | **161** | **155** | **167** | **16,9** | **ACE** |
| **Boomsma et al., 1989(89)** | **1989** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **DI** | **Single Survey item** | **YES/NO Sports participation: "Have you been involved in sports activities during the last 3 months?"**  | **90** | **76** | **104** | **17,0** | **ACE/TwinCor** |
| **Maia et al., 2002(16)** | **2002** | **Portugal** | **6000 nuclear families, Portugal** | **LTPA** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **The Leisure time Index is a composite of 4 Likert type items (from 1 to 5) on non-exercise related LTPA** | **411** | **361** | **461** | **17,0** | **ACE/TwinCor** |
| **Maia et al., 2002(16)** | **2002** | **Portugal** | **6000 nuclear families, Portugal** | **VEB** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **The Sports Participation Index is a composite score based on the two most frequently played sports** | **411** | **361** | **461** | **17,0** | **ACE/TwinCor** |
| **Aaltonen et al., 2013(75)** | **1991-1996** | **Finland** | **FinnTwin16 cohort** | **VEB** | **Selfreport** | **CAT** | **Single Survey item** | **Categories (3): inactive < 1x wk; moderate 1-3x wk; very active, > 4x wk** | **2338** | **2137** | **2539** | **17,1** | **ACE/TwinCor** |
| **Schutte et al., 2019(73)** | **2019** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CON** | **Multiple Interview items**  | **Weekly METhours across all exercise activities > 4 MET** | **217** | **212** | **222** | **17,1** | **ACE** |
| **Huppertz et al., 2017(66)** | **1992-1996** | **Finland** | **Finnwin16 cohort -High parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **726** | **677** | **775** | **17,1** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **1992-1996** | **Finland** | **Finnwin16 cohort -Low parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **1413** | **1335** | **1491** | **17,1** | **ACE/TwinCor** |
| **Stubbe et al., 2005(88)** | **1991-2000** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **643** | **578** | **708** | **17,5** | **ACE/TwinCor** |
| **Aaltonen et al., 2020(87)** | **1995-2007** | **Finland** | **FinnTwin12 cohort**  | **LTPA** | **Selfreport** | **CAT** | **Single Survey item** | **Frequency (5) exercise/sports in leisure per week (no …- .. every day)** | **1944** | **1893** | **1995** | **17,6** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **1983-1987** | **Finland** | **Finnwin12 cohort -High parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **804** | **786** | **822** | **17,6** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **1983-1987** | **Finland** | **Finnwin12 cohort -Low parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **958** | **944** | **972** | **17,6** | **ACE/TwinCor** |
| **LTPA/VEB Self report, above age 18**  |
| **Aaltonen et al., 2013(75)** | **1992-1997** | **Finland** | **FinnTwin16 cohort** | **VEB** | **Selfreport** | **CAT** | **Single Survey item** | **Categories (3): inactive < 1x wk; moderate 1-3x wk; very active, > 4x wk** | **2318** | **2105** | **2531** | **18,6** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **1993-1997** | **Finland** | **Finnwin16 cohort -High parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **723** | **673** | **773** | **18,6** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **1993-1997** | **Finland** | **Finnwin16 cohort -Low parental EA** | **VEB** | **Selfreport** | **CON** | **Single Survey item** | **Weekly frequency of ModVig sports/exercise activities in leisure time** | **1389** | **1305** | **1473** | **18,6** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - High parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Interview items**  | **Weekly METhours across all sports/exercise activities > 3 MET**  | **410** | **331** | **489** | **18,8** | **ACE/TwinCor** |
| **Huppertz et al., 2017(66)** | **2000-2016** | **Netherlands** | **Young NTR - Low parental EA** | **VEB** | **Selfreport** | **CON** | **Multiple Interview items**  | **Weekly METhours across all sports/exercise activities > 3 MET**  | **542** | **376** | **708** | **18,8** | **ACE/TwinCor** |
| **Huppertz et al.,2016(58)** | **2000-2016** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CAT** | **Multiple Interview items**  | **Categories (3) based on METh/wk low <5; middle >5 & <20; high >20**  | **1030** | **745** | **1315** | **18,8** | **ACE/TwinCor** |
| **Hur et al., 2021(67)** | **2002-2020** | **South Korea** | **South Korean Twin Registry (SKTR)** | **VEB** | **Selfreport** | **CAT** | **Multiple Survey items**  | **Weekly frequency of vigorous exercise (categories: 0 = no .. 3 = 5 x or more)** | **911** | **704** | **1118** | **19,1** | **ACE/TwinCor** |
| **Stubbe et al., 2005(88)** | **1991-2000** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **576** | **495** | **657** | **19,5** | **ACE/TwinCor** |
| **Schutte et al., 2019(73)** | **2019** | **Netherlands** | **Young NTR** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly METhours across all exercise activities > 4 MET** | **186** | **180** | **192** | **19,7** | **ACE** |
| **Carlsson et al., 2006(59)** | **1972** | **Sweden** | **Swedish Twin Registry middle cohort** | **LTPA** | **Selfreport** | **CAT** | **Single Survey item** | **Categories (3): LTPA past year: low ("almost never"); moderate ("quite a lot") ; high ("very much")** | **6681** | **6244** | **7118** | **21,0** | **ACE** |
| **Vink et al., 2011(81)** | **1991-2002** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **1458** | **2916** | **2916** | **21,0** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1975-2004** | **Finland** | **FTC (born<1958) & FinnTwin16 cohort** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **5162** | **5162** | **5162** | **21,7** | **ACE/TwinCor** |
| **Mustelin et al., 2012(20)** | **1997-2007** | **Finland** | **FinnTwin12 cohort**  | **LTPA** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **The Leisure time Index is a composite of 4 Likert type items (from 1 to 5) on non-exercise related LTPA** | **576** | **525** | **627** | **22,4** | **ACE/TwinCor** |
| **Mustelin et al., 2012(20)** | **1997-2007** | **Finland** | **FinnTwin12 cohort**  | **VEB** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **The Sports Participation Index is a composite score based on the two most frequently played sports** | **576** | **525** | **627** | **22,4** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1992-1998** | **Norway** | **Norwegian Twin Registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **3995** | **3995** | **3995** | **23,0** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1995-2002** | **Denmark** | **Danish Twin Registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **5269** | **5269** | **5269** | **23,7** | **ACE/TwinCor** |
| **Aaltonen et al., 2020(87)** | **1995-2007** | **Finland** | **FinnTwin12 cohort**  | **LTPA** | **Selfreport** | **CAT** | **Single Survey item** | **Frequency (5) exercise/sports in leisure per week (no …- .. every day)** | **1333** | **1156** | **1510** | **24,2** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1973-2003** | **Sweden** | **Swedish Twin Registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **6205** | **6205** | **6205** | **24,3** | **ACE/TwinCor** |
| **Aaltonen et al., 2013** | **1998-2003** | **Finland** | **FinnTwin16 cohort** | **VEB** | **Selfreport** | **CAT** | **Single Survey item** | **Categories (3): inactive < 1x wk; moderate 1-3x wk; very active, > 4x wk** | **1964** | **1786** | **2142** | **24,5** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1992-1998** | **Norway** | **Norwegian Twin Registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **3995** |  |  | **24,5** | **ACE** |
| **Vink et al., 2011(81)** | **1992-2001** | **UK** | **TwinsUK registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **503** |  | **1005** | **26,0** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1990** | **Australia** | **QIMR Twin Registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **1022** | **1022** | **1022** | **26,7** | **ACE/TwinCor** |
| **Eriksson et al. , 2006(17)** | **1998** | **Sweden** | **Swedish Young Male Twins Study** | **LTPA** | **Selfreport** | **CAT** | **Single Survey item** | **Categories (3): LTPA past year: low ("almost never"); moderate ("quite a lot") ; high ("very much")** | **1022** | **2044** |  | **27,0** | **ACE/TwinCor** |
| **van der Zee et al., 2020(38)** | **1991-2014** | **Netherlands** | **Adult + Young NTR** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items**  | **Weekly METhours spent on all sports/exercise activities** | **8018** | **6065** | **9971** | **27,0** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1991-2002** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **2916** |  |  | **27,0** | **ACE** |
| **Mustelin et al., 2011(19)** | **1990-1999** | **Finland** | **FinnTwin16 cohort** | **LTPA** | **Selfreport** | **CAT** | **Baecke Questionnaire**  | **The Leisure time Index is a composite of 4 Likert type items (from 1 to 5) on non-exercise related LTPA** | **151** | **151** | **151** | **27,4** | **ACE/TwinCor** |
| **Mustelin et al., 2011(19)** | **1990-1999** | **Finland** | **FinnTwin16 cohort** | **VEB** | **Selfreport** | **CAT** | **Baecke Questionnaire** | **The Sports Participation Index is a composite score based on the two most frequently played sports** | **151** | **151** | **151** | **27,4** | **ACE/TwinCor** |
| **Carlsson et al., 2006(59)** | **1972** | **Sweden** | **Swedish Twin Registry middle cohort** | **LTPA** | **Selfreport** | **CAT** | **Single Survey item** | **Categories (3): LTPA past year: low ("almost never"); moderate ("quite a lot") ; high ("very much")** | **13362** | **12488** | **14236** | **28,5** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1975-2004** | **Finland** | **FTC (born<1958) & FinnTwin16 cohort** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **10324** |  |  | **29,5** | **ACE** |
| **Aaltonen et al., 2010(51)** | **1975-1981** | **Finland** | **Finnish Twin Cohort (born< 1958)**  | **LTPA** | **Selfreport** | **CON** | **Multiple Survey items 1975** | **Sum of intensity (MET) × duration × frequency across all LTPA as the average METh/d** | **6778** | **6236** | **7320** | **29,6** | **ACE/TwinCor** |
| **de Moor et al.,2007 (90)** | **2002** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **CAT** | **Multiple Survey items** | **Categories (3): no exercise, regular light to moderate, vigorous:> 2x week > 60 min > 6 METs** | **3061** | **2153** | **3969** | **30,5** | **ACE/TwinCor** |
| **Huppertz et al., 2014(72)** | **2014** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly METhours across all exercise activities > 4 MET** | **1273** | **783** | **1763** | **30,5** | **ACE/TwinCor** |
| **Eriksson et al. , 2006(17)** | **2002** | **Sweden** | **Swedish Young Male Twins Study** | **LTPA** | **Selfreport** | **CAT** | **Baecke Questionnaire** | **The Leisure time Index is a composite of 4 Likert type items (from 1 to 5) on non-exercise related LTPA** | **584** | **1168** |  | **31,0** | **ACE/TwinCor** |
| **Eriksson et al. , 2006(17)** | **2002** | **Sweden** | **Swedish Young Male Twins Study** | **LTPA** | **Selfreport** | **CAT** | **Single Survey item** | **Categories (3): LTPA past year: low ("almost never"); moderate ("quite a lot") ; high ("very much")** | **591** | **1182** |  | **31,0** | **ACE/TwinCor** |
| **Eriksson et al. , 2006(17)** | **2002** | **Sweden** | **Swedish Young Male Twins Study** | **VEB** | **Selfreport** | **CAT** | **Baecke Questionnaire** | **The Sports Participation Index is a composite score based on the two most frequently played sports** | **578** | **1156** |  | **31,0** | **ACE/TwinCor** |
| **de Moor et al., 2012(29)** | **1991-2008** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **5221** |  |  | **34,0** | **ACE** |
| **de Moor et al., 2012(29)** | **1991-2008** | **Netherlands** | **Adult NTR** | **LTPA** | **Selfreport** | **CAT** | **Single Survey item** | **Frequency (3) of LTPA leading to sweating: <1 week, >= 1 week, >= 3 week**  | **5221** |  |  | **34,0** | **ACE** |
| **de Moor et al., 2012(29)** | **1991-2008** | **Netherlands** | **Adult NTR** | **LTPA** | **Selfreport** | **CAT** | **Single Survey item** | **Frequency (6) of LTPA for at least 20 min: Never,< 1x mth, ~1x mth, ~2–3x mth, ~1-2x wk, >= 3 x wk** | **5221** |  |  | **34,0** | **ACE** |
| **Vink et al., 2011(81)** | **1991-2002** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **1458** | **1458** | **1458** | **34,0** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1995-2002** | **Denmark** | **Danish Twin Registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **10538** |  |  | **34,0** | **ACE** |
| **Vink et al., 2011(81)** | **1973-2003** | **Sweden** | **Swedish Twin Registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **12409** |  |  | **34,5** | **ACE** |
| **Kujala et al., 2002(15)** | **1975-1981** | **Finland** | **Finnish Twin Cohort (born< 1982)**  | **LTPA** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO active in leisure time at >2 METhours per day**  | **4758** | **3544** | **7102** | **35,0** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1975-2004** | **Finland** | **FTC (born<1958) & FinnTwin16 cohort** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **5162** | **5162** | **5162** | **35,3** | **ACE/TwinCor** |
| **Aaltonen et al., 2010(51)** | **1975-1981** | **Finland** | **Finnish Twin Cohort (born< 1958)**  | **LTPA** | **Selfreport** | **CON** | **Multiple Survey items 1981** | **Sum of intensity (MET) × duration × frequency across all LTPA as the average METh/d** | **6911** | **6358** | **7464** | **35,6** | **ACE/TwinCor** |
| **Heller et al., 1988(91)** | **1988** | **Australia** | **Twin Register NH&MTC - Sydney**  | **VEB** | **Selfreport** | **DI** | **Single Survey item** | **YES/NO Sports participation: had they been engaged in vigorous exercise in the past two weeks** | **200** | **128** | **272** | **36,0** | **ACE** |
| **Vink et al., 2011(81)** | **1990** | **Australia** | **QIMR Twin Registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **2043** |  |  | **36,5** | **ACE** |
| **Carlsson et al., 2006(59)** | **1972** | **Sweden** | **Swedish Twin Registry middle cohort** | **LTPA** | **Selfreport** | **CAT** | **Single Survey item** | **Categories (3): LTPA past year: low ("almost never"); moderate ("quite a lot") ; high ("very much")** | **6681** | **6244** | **7118** | **37,0** | **ACE** |
| **Johnson et al., 2020(28)** | **1997-2000** | **Denmark** | **GEMINAKAR**  | **VEB** | **Selfreport** | **CON** | **Multiple Survey items** | **Daily EE on activities intended as exercise (walking, cycling, and sports)** | **625** | **731** | **776** | **38,0** | **TwinCor** |
| **Vink et al., 2011(81)** | **1995-2002** | **Denmark** | **Danish Twin Registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **5269** | **5269** | **5269** | **39,3** | **ACE/TwinCor** |
| **de Moor et al., 2011(37)** | **1997-2004** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **1908** | **1774** | **2042** | **39,9** | **ACE/TwinCor** |
| **Karvinen et al., 2015(92)** | **2015** | **Finland** | **Finnish Twin Cohort (born< 1958)** | **LTPA** | **Selfreport** | **CON** | **Multiple Survey items 1975,81,90** | **Sum of METhs/day across 1975, 1981,1990.** | **3935** | **3935** | **3935** | **40,0** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1992-2001** | **UK** | **TwinsUK registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **1005** |  |  | **40,0** | **ACE** |
| **Vink et al., 2011(81)** | **1973-2003** | **Sweden** | **Swedish Twin Registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **6205** | **6205** | **6205** | **40,7** | **ACE/TwinCor** |
| **Lauderdale et al., 1997(79)** | **1990** | **USA** | **Vietnam Era Twin Registry (males)**  | **VEB** | **Selfreport** | **DI** | **Single Survey item** | **YES/NO play other strenuous sports (basketball, soccer, etc.)** | **1536** | **3072** |  | **41,0** | **ACE/TwinCor** |
| **Lauderdale et al., 1997(79)** | **1990** | **USA** | **Vietnam Era Twin Registry (males)**  | **VEB** | **Selfreport** | **DI** | **Single Survey item** | **YES/NO regular jogging or running at least 10 miles per week in at least the last 3 months** | **1536** | **3072** |  | **41,0** | **ACE/TwinCor** |
| **Lauderdale et al., 1997(79)** | **1990** | **USA** | **Vietnam Era Twin Registry (males)**  | **VEB** | **Selfreport** | **DI** | **Single Survey item** | **YES/NO ride a bicycle at least 50 miles per week** | **1536** | **3072** |  | **41,0** | **ACE/TwinCor** |
| **Lauderdale et al., 1997(79)** | **1990** | **USA** | **Vietnam Era Twin Registry (males)**  | **VEB** | **Selfreport** | **DI** | **Single Survey item** | **YES/NO strenuous racquet sports (singles tennis, paddle ball, etc.) at least 5 hours per week** | **1536** | **3072** |  | **41,0** | **ACE/TwinCor** |
| **Lauderdale et al., 1997(79)** | **1990** | **USA** | **Vietnam Era Twin Registry (males)**  | **VEB** | **Selfreport** | **DI** | **Single Survey item** | **YES/NO swim at least 2 miles per week** | **1536** | **3072** |  | **41,0** | **ACE/TwinCor** |
| **McCaffery et al., 2009(60)** | **1990** | **USA** | **Vietnam Era Twin Registry (males)**  | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO vigorous exercise participation (examples given) over the past 3 monts** | **3590** | **7180** |  | **41,1** | **ACE** |
| **Vink et al., 2011(81)** | **1990** | **Australia** | **QIMR Twin Registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **1022** | **1022** | **1022** | **41,3** | **ACE/TwinCor** |
| **de Geus et al., 2003(70)** | **2003** | **Netherlands** | **Adult NTR** | **VEB** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly METhours across all sports/exercise activities > 4 MET**  | **208** | **202** | **214** | **44,0** | **ACE/TwinCor** |
| **Vink et al., 2011(81)** | **1992-2001** | **UK** | **TwinsUK registry** | **VEB** | **Selfreport** | **DI** | **Multiple Survey items** | **YES/NO regular exercise participation at >4 METs & => 60 min/wk**  | **469** |  | **938** | **44,0** | **ACE/TwinCor** |
| **Kaprio et al., 1981(52)** | **1975** | **Finland** | **Finnish Twin Cohort (born< 1958)**  | **LTPA** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly intensity\*min score based on min per session, # of sessions per wk, intensity**  | **754** | **1508** |  | **45,0** | **ACE/TwinCor** |
| **Simonen et al., 2004(68)** | **2004** | **Finland** | **Twin Spine Study (subset FTC<1958)** | **LTPA** | **Selfreport** | **CON** | **Multiple Interview items**  | **Recalled weekly hours spent in any LTPA during adulthood (age 18 to age at interview)**  | **300** | **600** |  | **45,0** | **ACE/TwinCor** |
| **Waller et al. , 2018(25)** | **1975-1990** | **Finland** | **Finnish Twin Cohort (born<1958)**  | **LTPA** | **Selfreport** | **CAT** | **Multiple Interview items**  | **Tertiles of mean LTPA METhours/day scores form 1975, 1981, 1990 (METf)** | **186** | **171** | **200** | **48,3** | **ACE/TwinCor** |
| **Kaprio et al., 1981(52)** | **1975** | **Finland** | **Finnish Twin Cohort (born< 1958)**  | **LTPA** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly intensity\*min score based on min per session, # of sessions per wk, intensity**  | **437** | **874** |  | **55,0** | **ACE/TwinCor** |
| **Frederiksen&Christensen, 2003(93)** | **1998** | **Denmark** | **Middle Aged Danish Twins (MADT)**  | **VEB** | **Selfreport** | **DI** | **Single Interview item** | **YES/NO leisure time sports participation (e.g. jogging, gym, swimming, tennis, badminton, etc)** | **1258** | **1288** | **1232** | **56,0** | **ACE/TwinCor** |
| **Kaprio et al., 1981(52)** | **1981** | **Finland** | **Finnish Twin Cohort (born< 1958)**  | **LTPA** | **Selfreport** | **CON** | **Multiple Survey items** | **Weekly intensity\*min score based on min per session, # of sessions per wk, intensity**  | **331** | **662** |  | **65,0** | **ACE/TwinCor** |

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