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Childhood and Current Socioeconomic Position in Relation to Leisure-Time Physical Activity Among Young Adults in Austria

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Yvonne Schagerl BSc BA

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Vorwort

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Abstract

This master's thesis examines the associations between childhood and current socioeconomic position (SEP) and leisure-time physical activity (LTPA) among young adults aged 18–30 years in Austria. Guided by a life-course perspective and the Social-Ecological Model, it investigates whether childhood household SEP is associated with meeting aerobic physical activity recommendations and whether this association remains after accounting for current SEP.

The study is based on a quantitative cross-sectional online survey. The primary outcome was meeting the aerobic recommendation of at least 150 minutes of leisure-time physical activity per week. Childhood and current SEP were measured using educational, financial, and subjective social status indicators. Associations were analysed using fully adjusted logistic regression and attenuation analyses.

No statistically precise independent associations between SEP indicators and meeting recommendations were observed in the fully adjusted models. Although some point estimates, particularly for childhood household financial situation, suggested positive patterns, confidence intervals were wide. Attenuation analyses indicated some overlap between childhood and current SEP, especially for parental education, but these findings remained exploratory.

The results suggest that socioeconomic patterning of LTPA in young adulthood may be complex and difficult to detect precisely in cross-sectional data. Nevertheless, the findings remain consistent with life-course and socio-ecological perspectives and underline the importance of continued monitoring of socioeconomic inequalities in physical activity.

Keywords: socioeconomic position, childhood socioeconomic position, leisure-time physical activity, young adults, Austria, life-course perspective

Kurzfassung

Diese Masterarbeit untersucht den Zusammenhang zwischen der sozioökonomischen Position (SEP) in der Kindheit und im jungen Erwachsenenalter und der Freizeitkörperaktivität junger Erwachsener in Österreich. Die Arbeit ist theoretisch in einer Life-Course-Perspektive und im Social-Ecological Model verankert. Dabei wurde untersucht, ob die soziale Stellung der Eltern mit dem Erreichen der Empfehlung von mindestens 150 Minuten aeroben Freizeitsport pro Woche zusammenhängt und ob dieser Zusammenhang auch nach Berücksichtigung der aktuellen sozialen Lage der Familie bestehen bleibt.

Die empirische Untersuchung basiert auf einer quantitativen Online-Querschnittsbefragung. Die kindliche und aktuelle SEP wurde über Bildungs-, Finanz- und subjektive Statusindikatoren erfasst. Die Auswertung erfolgte mittels multipler logistischer Regressionen und Attenuationsanalysen.

In den voll adjustierten Modellen zeigten sich keine statistisch präzisen unabhängigen Zusammenhänge zwischen den SEP-Indikatoren und dem Erreichen der Aktivitätsempfehlung. Einzelne Ergebniswerte, insbesondere für die finanzielle Situation in der Kindheit, deuteten zwar auf mögliche positive Zusammenhänge hin, die Konfidenzintervalle waren jedoch breit. Die Attenuationsanalysen sprachen für eine teilweise Überschneidung zwischen kindlicher und aktueller SEP, vor allem bei der elterlichen Bildung, diese Befunde sind jedoch explorativ.

Insgesamt sprechen die Ergebnisse dafür, dass soziale Muster in der Freizeitkörperaktivität im jungen Erwachsenenalter komplex und in Querschnittsdaten schwer präzise zu erfassen sind. Gleichzeitig sind die Befunde mit lebensverlaufsbezogenen und sozialökologischen Ansätzen kompatibel und unterstreichen die Bedeutung einer weiteren Erforschung sozialer Ungleichheiten im Hinblick auf körperliche Aktivität.

Schlüsselwörter: sozioökonomische Position, kindliche sozioökonomische Position, Freizeitkörperaktivität, junge Erwachsene, Österreich, Lebensverlaufsperspektive

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List of abbreviations

BCS70 – 1970 British Cohort Study

BELINDA – BELINDA study (HELENA follow-up)

BEST – Behaviors, Emotions, Situations, Thinking (framework)

BMC – BioMed Central

BMJ – British Medical Journal

CI – Confidence Interval

DALYs – Disability-Adjusted Life Years

DEDIPAC – DEterminants of DIet and Physical ACtivity (Knowledge Hub)

EB – Eurobarometer

EHIS – European Health Interview Survey

EHIS-2 – European Health Interview Survey, 2nd wave

ELSA-Brasil – Brazilian Longitudinal Study of Adult Health

EU – European Union

EUROTHINE – EUROTHINE project

GBD – Global Burden of Disease

GDP – Gross Domestic Product

HDHL – A Healthy Diet for a Healthy Life

HEPA – Health-Enhancing Physical Activity

HELENA – Healthy Lifestyle in Europe by Nutrition in Adolescence

IDEFICS – Identification and prevention of Dietary- and lifestyle-induced health EFfects In Children and infantS

IPAQ – International Physical Activity Questionnaire

IPEN – International Physical Activity and Environment Network

IQR – Interquartile Range

JAMA – Journal of the American Medical Association

JPI – Joint Programming Initiative

LTPA – Leisure-Time Physical Activity

MVPA – Moderate-to-Vigorous PA

NCDs – Non-Communicable Diseases

OECD – Organisation for Economic Co-operation and Development

OR – Odds Ratio

PA – Physical Activity

PA-EPI – Physical Activity Environment Policy Index

PEN – Policy Evaluation Network

SEM – Social-Ecological Model

SEP – Socioeconomic Position

SMD – Standardized Mean Difference

SPSS – Statistical Package for the Social Sciences

UK – United Kingdom

WHO – World Health Organization

1. Introduction

The idea that movement is fundamental to life has long been reflected in philosophical thought and still holds meaning in modern public health research. Movement is not only a metaphor for vitality but a measurable determinant of different health outcomes. Although we believe that healthy behaviours are each person's own decision, different patterns of physical activity are embedded in social structures and shaped by distinct conditions that can vary from person to person.

Regular physical activity (PA) is a key component of health throughout life. In adults, the 2020 WHO guideline evidence synthesis links PA to lower all-cause and cardiovascular disease mortality, a lower incidence of hypertension, type 2 diabetes and site-specific cancers. PA is also linked to better mental health, brain health, quality of sleep, and reduced symptoms of anxiety and depression. There is also evidence of possible improvements in adiposity (Bull et al., 2020). Based on this evidence, the World Health Organization (WHO) suggests that adults engage in 150–300 minutes of moderate-intensity or 75–150 minutes of vigorous-intensity aerobic PA per week (or an activity equivalent to this amount) and perform muscle-strengthening activities on at least two days per week (World Health, 2026).

Insufficient PA has been linked to a higher risk of developing major non-communicable diseases (NCDs) and premature mortality and disability in terms of population health. Within the Global Burden of Disease (GBD) framework, low physical activity (PA) is consistently identified as an important modifiable risk factor within the wider risk-factor landscape through global comparative risk assessments (Murray et al., 2020)

Even though there are clear guidelines and long-standing public health messaging, a lot of people are still not active. According to recent pooled surveillance, this may be increasing. According to the WHO's 2022 Global Status Report on Physical Activity, around 27% of adults do not meet the advised levels of physical activity. (World Health, 2022).

A recent study of 507 survey respondents revealed that roughly 31.3% of adults worldwide (approximately 1.8 billion people) were not active enough in 2022. This shows a significant increase compared to previous years (Strain et al., 2024).

Within the European Union (EU), monitoring data similarly point to substantial gaps in population activity. The 2022 Special Eurobarometer on Sport and Physical Activity reports that 45% of Europeans never exercise or play sport, while 38% do so at least once a week (European Commission & Culture, 2022). Eurostat indicators based on the European Health Interview Survey (EHIS) show that health-enhancing aerobic activity outside work is socially

patterned: in 2019, 42.4% of adults with tertiary education reached at least 150 minutes/week, compared with around 20.5% among those with low educational attainment (Eurostat, 2026). Beyond these gradients in behaviour, burden-of-disease estimates underline the relevance for health systems: for the EU in 2019, GBD-based summaries attribute substantial numbers of deaths and disability-adjusted life years (DALYs) to low PA (Commission, 2025).

Young adulthood is a particularly important life stage in this context. The transition from late adolescence into the twenties is characterised by marked changes in daily structure and social roles leaving school, entering higher education or vocational training, starting employment, and forming independent households. Evidence synthesis shows that PA often declines across this transition. A systematic review and meta-analysis covering ages 13–30 years found overall decreases in PA from adolescence into early adulthood (Corder et al., 2019).

Changes in PA are also linked to concrete life events: a scoping review including 107 studies (covering 72 events/transitions) found decreases in PA particularly for cohabitation, marriage, pregnancy and evolving parenthood and for major school-to-work/education transitions. Retirement was generally linked to increases in PA, although longer-term trajectories suggested a subsequent decline; divorce showed no consistent change and several other events showed no clear trend. (Gropper et al., 2020). Socioeconomic inequalities in PA are already visible in this age group and are strongly domain specific. Across European adult studies, higher socioeconomic position (SEP) is generally associated with more leisure-time physical activity (LTPA), whereas lower SEP groups more often accumulate occupational PA; patterns for total PA and active transport are less consistent. (Beenackers et al., 2012)

These domain-specific patterns are particularly relevant for young adults who are simultaneously establishing their educational and labour-market positions. Resource constraints, time scarcity, differential access to facilities, neighbourhood safety, and the affordability of organized sports may shape LTPA more strongly than other activity domains. Consequently, focusing explicitly on LTPA provides a behaviourally and policy-relevant lens through which to view inequalities because leisure-time activity is typically more discretionary and sensitive to structural constraints and enabling environments.

This thesis is grounded in the European life-course context and focuses specifically on young adults (ages 18–30) living in Austria. Focusing on leisure-time physical activity, the present study examines how socioeconomic conditions across the life course, particularly childhood household SEP and current SEP, relate to LTPA in young adulthood. By differentiating between

early-life and current socioeconomic circumstances, this study aims to clarify whether childhood disadvantage is associated with LTPA beyond current conditions and whether current SEP is independently linked to LTPA when considering childhood origins.

1.1. State of research and problem definition

Regular physical activity is essential for physical and mental health, yet a substantial proportion of adults worldwide and in the European Union remain inactive, with marked social and gender differences (WHO, 2016; GBD, 2020; Hallal et al., 2012; European Commission, 2022; European Commission & Culture, 2022; Eurostat, 2022). European reviews show clear socioeconomic gradients in domain-specific activity: higher socioeconomic groups are more likely to be active in their leisure time, while lower socioeconomic groups more often accumulate occupational activity, with less consistent patterns for transport and total activity (Beenackers et al., 2012; Demarest et al., 2014). Umbrella reviews from the DEDIPAC Knowledge Hub conclude that, across the life course, there is convincing evidence for social inequalities in adult leisure-time physical activity but weaker and heterogeneous findings in children and adolescents, partly due to cross-sectional designs and heterogeneous measures of both socioeconomic position and physical activity (O'Donoghue et al., 2018; Carlin et al., 2017).

From a life-course perspective, longitudinal cohort studies suggest that physical activity behaviours track from childhood into adulthood, with moderate to high stability and some fluctuation around key transitions such as leaving school or entering the labour market (Telama et al., 2014). Systematic reviews provide growing evidence that socioeconomic conditions earlier in life are related to physical activity in adulthood: lower childhood socioeconomic position is repeatedly associated with lower participation in leisure-time physical activity in later life, although associations are generally weak to moderate and often attenuate but not always disappear after adjustment for adult socioeconomic position (Elhakeem et al., 2015; Juneau et al., 2015)

Most of this work focuses on adult or midlife populations, combines broad age ranges, and is rarely tailored to young adults in the EU or to harmonised, domain-specific measures of leisure-time physical activity.

At the same time, European initiatives such as DEDIPAC and JPI HDHL emphasise harmonised measurement, life-course perspectives and attention to vulnerable groups, but also highlight persistent gaps in standardised, EU-wide data on physical activity, socioeconomic position and their determinants (Lakerveld et al., 2014; Brug et al., 2017; Whiting et al., 2021).

Against this background, there is a need for studies that focus specifically on young adults in Austria, distinguish leisure-time physical activity from other domains, and examine how childhood household socioeconomic position relates to leisure-time physical activity in young adulthood and to what extent this association is explained by current socioeconomic circumstances. This thesis addresses these gaps by applying a life-course and socio-ecological perspective to leisure-time physical activity among young adults aged 18–30 years in Austria.

1.2. Research objective and research questions

The overall objective of this thesis is to investigate how childhood household socioeconomic position is associated with leisure-time physical activity among young adults (18–30 years) living in Austria and to assess whether current socioeconomic circumstances show an independent association with LTPA when childhood SEP is considered.

Main research question

How is childhood household socioeconomic position associated with leisure-time physical activity among young adults (18–30 years) in Austria?

Sub-question

Does childhood household socioeconomic position remain associated with leisure-time physical activity after accounting for current socioeconomic position (e.g., education, employment status, current financial situation)?

Based on the conceptual model developed in Chapter 2, this thesis tests the following hypotheses:

H1: Higher childhood socioeconomic position is positively related to higher leisure-time physical activity in young adulthood, adjusting for current SEP and covariates.

H2: Higher current socioeconomic position shows a positive association with higher leisure-time physical activity, adjusting for childhood SEP and covariates.

Prior studies have shown that psychosocial factors, such as motivation and self-efficacy, and perceived environmental opportunities, such as access to recreational facilities and walkability, are linked to physical activity and may explain socioeconomic differences in leisure-time physical activity. (Bauman et al., 2012; Angela Carlin et al., 2017; Filippidis & Laverty, 2016; S. Hajna et al., 2015)

However, the present study focuses on the direct associations of childhood and current socioeconomic position with LTPA in young adults in Austria.

1.3. Expected contribution to research and practice

This thesis contributes to the evidence on social inequalities in physical activity by focusing on young adults (18-30 years) living in Austria and by applying a life-course perspective on socioeconomic position. Rather than relying on a single snapshot of socioeconomic circumstances, the study distinguishes between childhood household socioeconomic position and current socioeconomic position and examines how each is associated with leisure-time physical activity (LTPA). By estimating these associations simultaneously and adjusting for key covariates, the thesis provides evidence on whether childhood socioeconomic conditions show an association with LTPA beyond current socioeconomic circumstances and whether current socioeconomic position is independently associated with LTPA.

The findings are expected to inform the design and targeting of health promotion efforts aimed at reducing socioeconomic gradients in leisure-time physical activity among young adults in Austria. Identifying socioeconomic patterns in LTPA may help to better target prevention strategies and to inform life-course-oriented approaches that support equitable opportunities for being physically active.

1.4. Structure of the thesis

This master's thesis comprises a theoretical and an empirical part. Following the introduction, which outlines the research background, the problem statement and the research objectives, **Chapter 2** provides the theoretical framework. It reviews European research on physical activity and health-conscious behavior among young adults, synthesizing determinants across individual, social, environmental, and structural levels, and positioning the study within a social-ecological, life-course perspective. Major European initiatives relevant to measurement harmonization and surveillance are introduced to ground the variable selection and hypotheses. **Chapter 3** describes the methodology of the empirical study, a cross-sectional online survey among young adults aged 18–30 living in Austria, including measures, recruitment, data collection, and the statistical analysis plan. **Chapter 4** presents the survey results (sample characteristics, descriptive patterns, and multivariable regression models testing the associations between childhood SEP, current SEP, and LTPA, including attenuation analyses). Lastly, **Chapter 5** discusses the empirical findings in the context of the existing literature, derives conclusions for health promotion and policy aimed at young adults in the EU especially in Austria and outlines theoretical as well as practical implications. The conclusion synthesizes

the main insights, reflects on limitations, and provides recommendations for future research and for the design of multi-level interventions.

2. Literature review and theoretical framework

2.1. Physical activity and health behaviour among young adults in the EU

Key determinants of health across the life course include a healthy diet, sufficient physical activity, and excessive sitting time (Lakerveld et al., 2014). In keeping with a life-course and multi-level perspective, the determinants of physical activity are understood as the interaction of biological, psychological, social, economic, and environmental influences within systems settings (Lakerveld et al., 2014).

At the same time, heterogeneous measures and fragmented datasets have historically limited comparability and scalability of findings on physical activity and sedentary behaviour across Europe underscoring the need for shared infrastructures and standardization (Brug et al., 2017) In this regard, the DEDIPAC Knowledge Hub, the first action of the JPI A Healthy Diet for a Healthy Life, was launched in December 2013. Its purpose is to align and coordinate research on the determinants of diet and physical activity across Europe.(Brug et al., 2017) (Lakerveld et al., 2014) DEDIPAC is divided into three sections, each of which is connected to the others. (1) Assessment and Harmonization of Methods for Research, Surveillance, Monitoring, and Evaluation; (2) Determinants Across the lifespan and in Vulnerable Groups; and (3) Evaluation and Benchmarking of Interventions and Policies.(Lakerveld et al., 2014)

Building on these pillars, DEDIPAC produced state-of-the-art evidence syntheses, secondary data pooling/harmonisation, and open-access toolboxes for researchers and policymakers, while also identifying persistent gaps such as inconsistent measures and the paucity of standardised, EU-wide data (Brug et al., 2017) In light of these considerations, this thesis pursues an approach that is consistent with DEDIPAC's coordinated, life course and system-based perspective. The aim is to link established findings with current data and enable a more precise targeting and evaluation of interventions.

The longitudinal Finnish cohort analysed by Telama et al. (2014) demonstrates that participation in physical activity (PA) from early childhood through youth into adulthood shows clear tracking over time. The 27-year Young Finns Study revealed that PA stability coefficients were moderate to high during youth and became high in adulthood after adjustment for measurement error. Physical activity in early life predicted adult PA both directly and

indirectly. For example, mother-rated activity at ages three to six was associated with self-reported PA in adulthood through activity levels in later childhood, adolescence, and young adulthood. Stability was lower during major developmental transitions, particularly from childhood to adolescence and from adolescence to adulthood, indicating that activity patterns may fluctuate when life circumstances change. Reports showed that tracking coefficients were underestimated. Simplex models that corrected for measurement error showed stronger relationships. This suggests that the true stability of PA behavior is higher than raw correlations imply. Sex differences were also observed, with tracking generally stronger in males than females across the measurement waves (Telama et al., 2014).

In addition to longitudinal tracking across a life span (Telama et al., 2014), studies examined the data regarding socioeconomic inequalities in different settings of PA in the EU. A Europe-wide review of 131 studies was conducted. The largest share of studies came from Scandinavia (n = 47). Leisure-time PA was the most frequently examined outcome (n = 112). Patterns were domain specific. Higher socioeconomic position (SEP) was more often linked to greater leisure-time PA. There were 68% positive associations for total leisure time. There were 76% positive associations for vigorous leisure time. Occupational PA was more prevalent in lower-SEP groups. In these groups, there were 63% negative associations. In contrast, the findings for total PA and active transport were inconsistent (40% and 38% positive associations, respectively). Regional and indicator-specific differences existed, but they were not pronounced (Beenackers et al., 2012).

At the neighbourhood level, European evidence shows that built-environment features support everyday movement. A systematic review and meta-analysis found that adults living in high-walkability areas accumulate +766 steps/day compared with low-walkability settings, highlighting the role of street connectivity, land-use mix and residential density in routine activity (Samantha Hajna et al., 2015). This increment corresponds to roughly 8% of the commonly cited 10,000-steps/day benchmark (Samantha Hajna et al., 2015). Notably, four of the six included studies were conducted in Europe (Belgium, Czech Republic, Scotland), underscoring a substantive European evidence base (Samantha Hajna et al., 2015).
Furthermore, an international study that looked at several European cities, found a link between objectively measured urban-form attributes (residential density, intersection density, land-use mix, and public-transport access) and objectively measured physical activity.
Building on this, the 14-city IPEN analysis reported that net residential density, intersection density, public-transport stop density and park counts were each positively and linearly

associated with accelerometer-measured MVPA; adults in the most activity-supportive neighborhoods achieved 68–89 additional minutes/week about 45–59% of the 150-min guideline with effects generalizable across cities and no evidence of thresholds (Sallis et al., 2016).

For younger adults who rely on university campuses and compact urban areas, these findings support the idea of combining motivational elements with environmental structures that encourage activity (e.g. walkable routes to university or work).

Beyond individual studies, European umbrella reviews provide an overarching synthesis of evidence on physical-activity determinants and highlight remaining uncertainties. The DEDIPAC life-course umbrella review of physical environment determinants synthesized 28 systematic reviews and three meta-analyses of 67 environmental characteristics. The review found relatively consistent associations for a limited set of correlates, such as home and outdoor space, school-based physical activity programs, pedestrian and cyclist safety infrastructure. Research on the socioeconomic influences of physical activity shows that the associations between socioeconomic position and physical activity vary throughout the lifespan. There is convincing evidence of social gradients in adult leisure-time and occupational activity, but the findings are far weaker and more inconsistent in children and adolescents. (O'Donoghue et al., 2018).

From a surveillance and policy standpoint, EU monitoring shows both progress and persistent gaps. An update on health-enhancing physical activity (HEPA) surveillance and policy across Member States (2015–2018) documents advances in multi-sector strategies and indicators, but uneven implementation across transport and environment sectors and variability in equity monitoring (Whiting et al., 2021).Using the 23-indicator HEPA monitoring framework adopted by the Council of the EU, the authors report that by 2018 all Member States had implemented at least 10 indicators, but only one had fully implemented the entire set and improvements were concentrated in 19 indicators compared with 2015. The implementation advanced most clearly in the health and sport sectors, while marked between-country heterogeneity and weaker engagement of transport and urban-planning sectors suggest that many opportunities to support physical activity at scale remain underused (Whiting et al., 2021).

Population-level snapshots reinforce these gaps. The 2022 Special Eurobarometer on sport and physical activity reports that 45% of Europeans never exercise or play sport, while 38% do so at least once a week, a pattern that has remained broadly stable since 2017 but represents a six-percentage-point increase in inactivity compared with 2009. Inactivity is particularly common among older adults, those with lower education and those who report financial difficulties,

pointing to persistent and socially patterned disparities in opportunities for physical activity across the EU (European Commission & Culture, 2022).

2.2. Multilevel determinants of physical activity

Building on the European evidence summarised in Section 2.1, this section organises determinants of physical activity among young adults within a socio-ecological perspective. Prior systematic and umbrella reviews show that socioeconomic position, social support, built environments and policy contexts are all linked to physical activity, albeit with domain-specific and sometimes heterogeneous associations (Beenackers et al., 2012; Brug et al., 2017; S. Hajna et al., 2015; O'Donoghue et al., 2018) In line with this work, the following subsections distinguish individual, social, environmental and structural determinants that are particularly relevant for leisure-time physical activity in young adults and for the life-course perspective adopted in this thesis.

2.2.1. Individual and social determinants

At the individual level, psychological factors such as self-efficacy, intention, enjoyment and perceived barriers are repeatedly described as important influences on physical activity. The DEDIPAC umbrella review on psychological determinants synthesised evidence from 20 reviews and indicates that self-efficacy is one of the most consistent positive correlates of physical activity in children and adolescents, while intention and knowledge of physical activity benefits show probable positive associations and lack of motivation tends to be negatively related to activity (Cortis et al., 2017). A worldwide overview in The Lancet, which summarizes the correlates and determinants of physical activity, reports that age, sex, health status, self-efficacy, and motivation are among the most consistent individual-level factors. Generally, older age, female sex, and poorer health are associated with lower levels of activity. (Bauman et al., 2012). In a Spanish study of young adults between 18 and 30 years, higher education, better self-rated health and being male were related to more physical activity, whereas smoking and long working hours were linked with lower activity, and meeting the physical activity recommendations was more likely among those with favourable health and sociodemographic profiles (Garcia-Fernandez et al., 2019). Another umbrella review on biological determinants by DEDIPAC, which synthesized 19 reviews, found that younger age, male gender, better health status, and improved physical fitness levels were the most consistently positively associated with physical activity. Normal birth weight was also positively associated with physical activity in adults, with a high level of evidence. (Aleksovska et al., 2019).

At the social level, research consistently points to social support as a central influence on physical activity. A narrative review of reviews on young people, framed within a socio ecological perspective, reports that parental support, including encouragement, transportation and co participation, as well as support and co participation from friends, are positively associated with physical activity (Martins et al., 2017). For students in higher education, a systematic review of 25 studies found a generally positive association between social support specific to physical activity for example, family or friends encouraging or joining in exercise and students' physical activity levels, although the relative importance of different sources of support remained unclear due to heterogeneous measurement approaches. (Van Luchene & Delens, 2021). Findings from older adults in Europe show that higher levels of overall social support are associated with higher self-reported physical activity, and that perceived general health partly mediates this relationship, suggesting that strengthening social networks and wellbeing may be an important component of physical activity promotion in later life (Lieber et al., 2024).

2.2.2. Environmental determinants

Based on the available evidence, it appears that features of the built environment can either support or constrain everyday movement. The DEDIPAC umbrella review on physical environmental determinants, which synthesised 28 systematic reviews and three meta analyses across the life course, reports relatively consistent positive associations between physical activity and access to recreational facilities, availability of equipment, home and garden space, and basic pedestrian and cycling infrastructure, while findings for many other neighbourhood attributes remain mixed and are often based on cross sectional studies (A. Carlin et al., 2017) A systematic literature review of built environment interventions reported that improvements to pedestrian and cycling infrastructure, parks, and neighbourhood aesthetics were generally linked to higher physical activity and active transportation levels among residents. (Smith et al., 2017). The authors also noted that only a minority of studies explicitly examined differential effects by socioeconomic position, but the limited available evidence suggests that environmental improvements may sometimes benefit more advantaged groups disproportionately, raising important questions about equity in built environment interventions (Smith et al., 2017). European work from the IDEFICS study introduced the concept of a 'moveability index' that extends traditional walkability measures by incorporating the density of playgrounds, sports facilities and other recreational spaces in addition to street connectivity and residential density (Buck et al., 2015). In this German study region, the moveability index showed small but significant associations with children's reported physical activity, suggesting

that everyday opportunities for play and recreation in the residential environment may support more active lifestyles from an early age (Buck et al., 2015).

2.2.3. Structural and socioeconomic determinants

At the structural level, socioeconomic conditions shape who has the time, resources and opportunities to be physically active and in which domains activity occurs.

The DEDIPAC umbrella review on socioeconomic determinants synthesised 19 systematic reviews and came to similar conclusions at the life course level. For adults, there is convincing evidence that higher socioeconomic status is positively associated with leisure time physical activity and negatively associated with occupational activity, while for preschool children, school aged children and adolescents no consistent associations with socioeconomic status or parental socioeconomic status were found (O'Donoghue et al., 2018).

Overall, the authors judge the evidence on socioeconomic determinants of physical activity to be "probable at best", mainly because many primary studies are cross sectional and use heterogeneous measures of both socioeconomic status and physical activity, and they call for more domain specific longitudinal studies with clearer measurement (O'Donoghue et al., 2018).

The DEDIPAC umbrella review of policy determinants examined 14 systematic reviews, which covered 27 potential policy levers. The review found that spending more time outdoors during childhood and having shorter working hours as an adult were the most consistently linked to higher physical activity. Promising yet low-certainty evidence was found regarding community and street-scale urban planning and land use policies, as well as school and workplace interventions (Puggina et al., 2018). No policy determinant reached a convincing level of evidence and only a few were graded as having probable evidence, largely because of heterogeneous definitions, weak study designs and a shortage of rigorous evaluations (Puggina et al., 2018).

Recent national analyses illustrate how these structural and socioeconomic gradients persist in contemporary Europe. Using data from the Spanish European Health Interview Surveys 2014 and 2020, (Maestre-Miquel et al., 2024) show that among adults with overweight or obesity the proportion reporting no physical activity did not change over time, while the percentages who reported walking for at least ten minutes a day and doing sport on at least two days per week increased. In descriptive analyses across weight categories, adults with normal weight were more likely to report leisure-time physical activity, walking at least ten minutes on two or more days per week and practicing sport at least twice a week than those with overweight or obesity (Maestre-Miquel et al., 2024). In multivariable multinomial regression models with normal weight as the reference category, adults who reported no leisure-time physical activity, not

walking ten minutes at least two days per week or not doing sport at least two days per week had higher odds of obesity and to a lesser extent overweight, than their more active counterparts. Furthermore, lower educational level was also associated with higher odds of both overweight and obesity compared with higher education (Maestre-Miquel et al., 2024).

These findings are consistent with the broader DEDIPAC evidence on socioeconomic inequalities in leisure time activity and underscore the rationale for examining both childhood and current socioeconomic position when analysing leisure time physical activity in young adults.

2.3. Measurement of socioeconomic position and leisure-time physical activity

In health research, socioeconomic position (SEP) is understood as a multidimensional construct. It reflects access to material and social resources rather than a single uniform "status" variable. Common indicators are educational attainment, income and occupational class. They capture different aspects of social stratification such as knowledge-related resources, material living conditions and work-related prestige or control (Bruna Galobardes et al., 2007; B. Galobardes et al., 2006) (B. Galobardes et al., 2006) provide a glossary of SEP indicators and describe what each aims to measure, how it is assessed and which strengths and limitations it has. (Braveman et al., 2005) argue that there is no single "best" SEP measure. Instead, researchers should choose indicators that fit the hypothesised pathways for a specific health outcome and be explicit about which dimension of SEP they capture. Besides these more "objective" indicators, subjective social status has gained importance. The MacArthur Scale of Subjective Social Status asks people to place themselves on a social ladder that represents their perceived position in society or their community. This single item has shown acceptable reliability and is thought to summarise how individuals integrate different socioeconomic experiences into an overall sense of rank (Adler et al., 2000; Giatti et al., 2012).

For life-course analyses, researchers often add information on parental education and occupation and on financial strain, for example difficulty making ends meet or covering unexpected expenses. These indicators help to capture childhood SEP and material constraints that may influence later health behaviours (B. Galobardes et al., 2007). Physical activity (PA) can be measured with self-report instruments or with devices. Each approach has specific strengths and weaknesses. In large population surveys, self-report questionnaires are still the most common method. They typically inquire about how frequently and for how long individuals engage in physical activity in various domains, such as leisure time, transportation, work, and household tasks. One of the best-known tools is the International Physical Activity

Questionnaire (IPAQ). In a 12-country study, the IPAQ demonstrated good test-retest reliability.(Craig et al., 2003). Systematic reviews that compare self-reported and device-based activity show that self-report can both overestimate and underestimate actual activity. The choice of method influences the estimated prevalence of physical activity and the observed associations with health outcomes (Prince et al., 2008). In this thesis, leisure-time physical activity is captured using domain-specific self-report items that focus on sports and exercise in free time and exclude work, transport and household activities.

2.4. The social-ecological model as a guiding framework

Building on these measurement choices, the Social-Ecological Model (SEM) provides the conceptual framework for understanding how multiple layers of influence shape health behaviour. In its traditional approach to health advocacy, the ecological model distinguishes between five levels: intrapersonal, interpersonal, organizational, community, and public policy. It asserts that effective interventions should target not only individuals, but also the social and institutional contexts that influence behaviour (McLeroy et al., 1988). This idea was later built upon by ecological models, which emphasised that behaviour is influenced by individual, social, physical and policy environments, with interventions addressing several of these levels simultaneously being most likely to have a significant and sustainable impact (Sallis et al., 2008). In the field of physical activity, ecological approaches explicitly link individual factors with social and environmental contexts. (Bauman et al., 2012) summarise the evidence on the correlates and determinants of physical activity, showing that most research has focused on individual-level characteristics such as age, sex, health status, self-efficacy, and motivation. Ecological models highlight the importance of social, environmental, and policy-level influences. (Sallis et al., 2006) present an ecological model of 'active living' which identifies potential environmental and policy influences across four areas: recreation, transport, occupation and household. They argue that population-level increases in physical activity require coordinated action at the individual, social, physical, and policy levels.

The DEDIPAC Knowledge Hub adopted a systems and life-course perspective consistent with the SEM. Work on diet, physical activity and sedentary behaviour was organised into three main areas: measurement and harmonisation, determinants within particular life stages and at-risk groups, and evaluation and benchmarking of interventions and policies. (Brug et al., 2017; Lakerveld et al., 2014). In this thesis, the SEM is used as a guiding framework to organise determinants of leisure-time physical activity among young adults into individual, social, environmental and structural levels. It also informs the hypotheses and analyses on how childhood and current socioeconomic position may interact with these levels.

2.5. European research and policy frameworks on physical activity

As outlined in Section 2.1, the Joint Programming Initiative 'A Healthy Diet for a Healthy Life' (JPI HDHL) and its first Knowledge Hub, the Determinants of Diet and Physical Activity (DEDIPAC), were established to improve the alignment of research on diet, physical fitness and inactivity across Europe. (Brug et al., 2017; Lakerveld et al., 2014). Rather than funding isolated projects alone, JPI HDHL sought to support shared approaches to measurement, data pooling and policy evaluation. Within this framework, DEDIPAC brought together partners from multiple European countries to improve conceptual models, refine indicators and reduce the fragmentation of data that has long hampered cross-national comparisons.

Based on the socio-ecological and life-course perspectives outlined above, DEDIPAC organised its work into three interconnected themes: (1) harmonising methods and surveillance systems, (2) mapping the determinants of diet, levels of physical activity, and patterns of sedentary behaviour across the life course and in vulnerable groups, and (3) evaluating and benchmarking interventions and policies. (Lakerveld et al., 2014). As mentioned before, Brug et al. (2017) summarise these efforts and highlight that DEDIPAC generated inventories of existing surveillance systems, evidence syntheses and a broader foundation for more standardised European monitoring in the future.

Several DEDIPAC umbrella reviews are directly relevant to this thesis because they integrate determinants across socio-ecological levels and clarify where the evidence is strongest. As discussed in Section 2.2, the umbrella review on physical environmental determinants identified 28 systematic reviews and three meta-analyses. It found some positive links between physical activity and certain environmental features, particularly in younger age groups. These features included backyard space, school facilities, and pedestrian or cyclist safety structures. (A. Carlin et al., 2017).

To translate this determinants-focused evidence into policy evaluation, the Policy Evaluation Network (PEN) was established as a subsequent JPI HDHL initiative. PEN was designed to strengthen the evaluation of public policies related to diet, physical activity and sedentary behaviour using comparable indicators and a system-based analytical framework (Kamphuis et al., 2022) PEN uses tools such as the Physical Activity Environment Policy Index (PA-EPI) to evaluate government policies and actions, and to identify structural and policy-level determinants that create supportive physical activity settings. (Woods et al., 2022). For this thesis, PEN provides a conceptual bridge between structural conditions and behavioural outcomes and highlights how macro-level determinants can be assessed across countries.

The European Union has established a monitoring framework for health-enhancing physical activity (HEPA). This is based on the 2013 Council Recommendation on boosting PA across sectors. The framework comprises 23 indicators covering areas such as national coordination, urban planning, transport, education, workplaces and older adults. (Whiting et al., 2021). Analyses of implementation between 2015 and 2018 indicate overall progress across Member States, although progress varied across sectors and countries (Whiting et al., 2021).

In sum, DEDIPAC, PEN and the EU-level HEPA monitoring framework jointly constitute a comprehensive European research and policy infrastructure that: (a) provides harmonised, life-course- and equity-oriented evidence on determinants of physical activity; (b) offers validated measurement approaches and conceptual tools for behavioural, environmental and policy-level variables; and (c) situates this research within a real-world policy and surveillance context from which inequalities in leisure-time physical activity among young adults can be meaningfully investigated.

2.6. Life-course perspective on socioeconomic position and physical activity

Physical activity is not a static trait but a behaviour that evolves over time in response to changing social roles, environments and resources. Longitudinal studies, as briefly noted in Section 2.1, indicate that activity patterns established in childhood and adolescence track to some extent into adulthood, but also show substantial change around key life transitions (e.g. leaving school, entering employment, forming a family). At the same time, life-course epidemiology emphasises that socioeconomic position (SEP) in childhood and adulthood and movements between them can shape health behaviours through both early-life influences and cumulative exposure to advantage or disadvantage. This section therefore first summarises evidence on the persistence and change of physical activity across the life span (Section 2.6.1) and then introduces life-course models that conceptualise how socioeconomic conditions at different stages may influence leisure-time physical activity in young adulthood (Section 2.6.2).

2.6.1. Patterns of persistence and behavioural tracking across the lifespan

Longitudinal evidence suggests that physical activity (PA) tracks at low-to-moderate levels from childhood into adulthood. As already discussed earlier, cohort studies from Finland and other European settings show that more active children and adolescents tend to remain relatively more active later in life, but correlation coefficients are typically low to moderate rather than high, and tracking is often somewhat stronger in males than in females (Telama, 2009; Telama et al., 2014). Certain studies have documented marginally more robust stability

estimates subsequent to the rectification of measurement error (Telama, 2009; Telama et al., 2014).

More recent syntheses have focused on the shift from adolescence to young adulthood. Corder et al. (2019) conducted a systematic review and meta-analysis of longitudinal cohorts, which found a consistent decline in mean PA between the ages of 13 and 30 years. Pooled accelerometer and self-report data indicated that PA decreases substantially across this period, with very few studies reporting any average increase.

Hayes et al. (2019) examined the tracking of PA and sedentary behaviour from adolescence to early adulthood (ages 16–30) and concluded that tracking coefficients generally fall within the low-to-moderate range. Active adolescents are more likely to remain active than their less active peers, although substantial movement between activity categories occurs over time. The review also reported that tracking tended to be stronger for vigorous-intensity PA and in males, although results varied across studies. The authors note that physical activity tends to remain fairly consistent from adolescence through to early adulthood. The limited number of studies on sedentary behaviour makes it difficult to determine how sedentary time changes during this period, indicating a clear need for further research.

Life events and transitions appear to be important drivers of these changes. In a scoping review, Gropper et al. (2020) examined 107 studies covering 72 distinct life events and transitions, summarising the findings into ten categories. They reported that beginning to cohabit, getting married, becoming pregnant, becoming a parent, and transitioning from kindergarten to primary school, from primary to secondary school, and from high school to college or the working world were primarily associated with decreases in PA, whereas retirement was generally associated with increases in PA, though some studies showed a later decline. Divorce showed no consistent association with PA. For several other events (e.g. changes in working conditions, job loss, moving home, bereavement, and illness diagnosis), no clear trend could be identified. (Gropper et al., 2020).

Recent longitudinal, device-based studies in European cohorts confirm that average physical activity declines from adolescence to young adulthood while masking substantial heterogeneity: overall trends are downward, but some adolescents maintain high activity, others remain persistently inactive and others show clear increases or decreases over time (Aira et al., 2021; Vanhelst et al., 2023)

Aira et al. (2021) used longitudinal cluster analysis of moderate-to-vigorous physical activity to identify five distinct patterns in a Finnish cohort followed with accelerometers from ages 15 to 19 years: inactivity maintainers, activity maintainers, two groups of decliners (from moderate

to low activity and from high to moderate activity), and increasers. They showed that changes in sports club participation and active commuting were systematically related to these trajectories, with dropout from and maintenance or adoption of these domains differentiating inactive from active patterns (Aira et al., 2021). In the HELENA follow-up (BELINDA) study, Vanhelst et al. (2023) followed a subsample of European adolescents for about ten years with accelerometery and reported that sedentary time, light and moderate activity increased, whereas vigorous activity and weekday moderate-to-vigorous activity decreased, with a markedly stronger decline in vigorous and overall moderate-to-vigorous activity among males; the authors interpret this transition as a critical period for the shaping of lifestyle-related physical activity habits.

Beyond individual studies, new quantitative syntheses confirm that long-term tracking of PA is generally unreliable. A systematic review and meta-analysis by García-Hermoso et al. (2025) reported a pooled tracking correlation of approximately $r = 0.14$ for PA and sport participation from childhood/adolescence into adulthood, with somewhat higher tracking between adjacent life stages (e.g. late adolescence to young adulthood) than across longer follow-up intervals. These findings are consistent with earlier narrative reviews e.g. (Telama, 2009) and underline that while early activity patterns matter, PA remains a malleable behaviour throughout the life course. Building on this, the authors showed that tracking was similarly low across sexes and baseline age groups, with slightly stronger stability for organised sports participation ($r \approx 0.26$) than for overall PA and a small decline in tracking coefficients with increasing follow-up duration, reinforcing the view that sustained support for active lifestyles is needed beyond childhood and adolescence.

For the present thesis, this body of research supports two key assumptions. First, PA in childhood and adolescence exerts some influence on activity in young adulthood, which justifies adopting a life-course perspective when analysing socioeconomic inequalities in leisure-time PA. Second, young adulthood (18–30 years) is a period of pronounced change, during which earlier habits intersect with new constraints and opportunities related to education, work and family life, making it a critical window for both the consolidation and modification of activity patterns.

2.6.2. Life-course models (critical periods, accumulation, social mobility)

Life-course epidemiology provides a conceptual framework for understanding how exposures at different stages of life combine to shape adult health and behaviour. Classic models distinguish between critical or sensitive period models, accumulation models and social mobility or pathway models (Ben-Shlomo et al., 2016; Kuh et al., 2003). Critical period models

posit that exposures during specific developmental windows such as early childhood or adolescence have long-lasting effects that are only partially modifiable by later experiences. Accumulation models emphasise that the duration and intensity of exposure to advantageous or disadvantageous conditions across several stages of life is important, so that risks or resources "add up" over time. Social mobility models, finally, focus on changes in socioeconomic position between childhood and adulthood and examine whether upward or downward mobility alters risk patterns compared with stable high or stable low SEP. Building on this typology, (Ben-Shlomo et al., 2016; Kuh et al., 2003) argue that these models are not mutually exclusive and define life-course epidemiology as the study of how socially patterned physical and psychosocial exposures from gestation through adulthood, operating via both critical periods and chains of risk, shape later-life disease risk and health inequalities.

A review of the life-course approach in social epidemiology by Cable (2014) highlights how theoretical pathways involving early-life SEP, educational and occupational trajectories and adult material resources can be operationalised and tested in empirical studies and emphasises the need for longitudinal data with repeated measures and theoretically guided indicators of SEP to disentangle these pathways. Niedzwiedz et al. (2012) illustrate this empirically in a systematic review of life-course SEP and adult quality of life: they compare latent/critical period, accumulation and social mobility models and show that evidence often supports more than one model, with an overall association between life-course SEP and adult quality of life but mixed support for specific models, including some indication of latent effects among women and comparatively limited evidence for accumulation and pathway models (Niedzwiedz et al., 2012).

In the field of PA, life-course models have been used to examine how socioeconomic conditions at different ages relate to adult activity. As previously discussed, an analysis of data from the 1970 British Cohort Study compared critical period and accumulation models linking social class at several ages (0, 5, 10, 30 and 34 years) to PA at age 34. The findings favoured an accumulation-of-risk model with additive effects, in which social disadvantage at multiple time points contributed independently to lower leisure-time and transport-related PA in adulthood; using structural equation modelling, the study showed that an accumulation-of-risk model with additive effects best explained PA in all three domains (leisure, work and transport), with social class at each age from birth to 34 years exerting direct effects on adult PA over and above later SEP (Juneau et al., 2014). Similarly, Elhakeem et al. (2015) reported in a systematic review that lower childhood SEP was generally associated with less frequent adult leisure-time PA, and that adjustment for adult SEP attenuated but did not eliminate this association, suggesting

both early-life programming and mediation via adult circumstances; the authors also highlighted considerable heterogeneity between studies, with clearer associations in women and UK cohorts, and called for prospective SEP measures and more detailed LTPA assessment to clarify underlying pathways. (Elhakeem et al., 2015) A further review by Elhakeem et al. (2017) on intergenerational social mobility and adult leisure-time PA found that individuals with stable high SEP across generations tended to have the highest prevalence of leisure-time PA, those with stable low SEP the lowest. Groups that were either upwardly or downwardly mobile generally had intermediate levels of patterns that were consistent with both the accumulation and social mobility models. They concluded that exposure to a higher SEP throughout childhood and adulthood is linked to higher levels of LTPA in later life. Therefore, policies that reduce socioeconomic disparities could potentially increase activity levels (Elhakeem et al., 2017).

More recent work has applied life-course modelling strategies to other determinants of PA. For example, Tsoli et al. (2024) used sensitive period and accumulation models to examine social participation over the life course and device-measured PA in midlife in the 1970 British Cohort Study. They found that cumulative social participation from adolescence to midlife was strongly associated with higher step counts and more moderate-to-vigorous PA, supporting an accumulation model. Participation in later adulthood also showed some evidence consistent with a sensitive-period effect. Based on accelerometer data from 3,646 cohort members with valid measurements, medium and high social participation between ages 16 and 42 were associated with higher daily steps and MVPA at age 46, with particularly pronounced differences for MVPA (Tsoli et al., 2024). Such findings underscore that life-course models can be applied flexibly to behavioural outcomes and that different mechanisms critical timing, accumulation and mobility may operate simultaneously.

For the present thesis, these life-course models provide the conceptual rationale for examining childhood household SEP and current SEP simultaneously in relation to leisure-time PA among young adults in Austria. They underpin hypotheses that (a) more advantaged childhood SEP is associated with higher leisure-time PA in young adulthood, (b) current SEP partly mediates this association through accumulated advantages or disadvantages, and (c) patterns may differ between young adults experiencing stable high SEP, stable low SEP or upward/downward socioeconomic mobility. Integrating these models with the socio-ecological framework outlined in Section 2.4 allows the analysis to address not only whether socioeconomic inequalities in leisure-time PA exist, but also how they may emerge across the life course.

2.7. Digital and policy-level interventions to reduce inequalities in physical activity

University students and early-career adults are easily reached through digital channels, many recent trials in university settings have tested app-, web- or platform-based interventions. A recent systematic review and meta-analysis of 31 randomised controlled trials (RCTs) involving university students revealed that physical activity initiatives resulted in statistically significant increases in total physical activity (PA), moderate-to-vigorous PA (MVPA) and weekly step counts by the time the intervention had concluded. For MVPA, researchers described the effect sizes as approaching large and the gains in total PA were maintained at the follow-up stage up to 12 months. Still, the strength of inference is limited due to heterogeneity and variable study quality. (Yuan et al., 2024). This broader evidence is complemented by a meta-analysis and systematic review. It focused specifically on digital health interventions. These interventions had objectively measured outcomes in college students. The review reported significant increases in steps. The SMD was approximately 0.64. However, there were no clear effects on light PA, MVPA physical activity, or sedentary time. (Bi et al., 2024). In their analysis of eight RCTs (n = 569), Bi et al. (2024) found that digital health interventions significantly increased step counts (SMD 0.64) but showed no meaningful between-group differences in light or moderate-to-vigorous PA or sedentary time.

According to Samantha Hajna et al. (2015) adults who live in highly walkable neighborhoods take an average of 760 more steps per day than those who live in areas with low walkability.These findings suggest that active-transport policies, publicly accessible sports facilities, and walkable, safe neighborhoods and campuses are key targets for reducing PA inequalities in young adulthood.(Samantha Hajna et al., 2015)

Alongside structural changes and digital touchpoints also remain notable for young adults. Among first-year university students, experiences with the web-based platform My Viva Plan suggest that such e-health tools for mindfulness, diet and physical activity are only used inconsistently over time. Qualitative interviews following a 12-week intervention revealed that students identified various factors influencing engagement. Included factors were emotional aspects, such as stress and motivation, situational constraints like time limitations, personal and financial circumstances, cognitive elements like self-perceptions and the desire for customized student-specific solutions. To help nutrition professionals address these barriers when implementing similar digital interventions in young adults, the authors propose the BEST (Behaviors, Emotions, Situations, Thinking) framework. (Lieffers et al., 2021)

2.8. Socioeconomic and cultural disparities in physical activity among young adults

Across Europe, patterns of physical behaviour are already evident by the time people reach early adulthood. Analysis of Eurobarometer data on adults aged 18–64 shows that nearly one-third of EU residents are physically inactive. There is significant variation across countries and clear social gradients: those with lower education, financial strain or unemployment are less likely to meet WHO recommendations, even after adjusting for age and sex. (Gerovasili et al., 2015). More recent work using Eurobarometer 2017 confirms that around 36% of adults in the EU are inactive and that insufficient activity clusters in women, people with lower education and those reporting difficulty paying bills, suggesting that economic insecurity and constrained resources continue to shape everyday movement opportunities. Although most of these analyses span the full working-age range, stratified models indicate that the same social patterning is already present among younger adults. (Nikitara et al., 2021).

Several cross-European studies specifically document socioeconomic inequalities in LTPA. Using health survey data from 15 European countries, results show that low LTPA is consistently more common in adults with lower educational attainment; prevalence-rate ratios for “low” versus “high” education reach about 1.5 in men and 1.4 in women, with no country where lower-educated groups are more active in their leisure time (Demarest et al., 2013). Complementary analyses from the EUROTHINE project show that education remains a robust predictor of LTPA after controlling for occupational class, employment status, marital status and urbanisation, suggesting that education captures enduring advantages in health literacy, access to facilities and social norms around sport (Mäkinen et al., 2012). For Germany and the EU average, EHIS-2 data further demonstrate that low leisure-time activity and other behavioural risk factors cluster among adults with low education, with relative indices of inequality pointing to substantially higher risks of being under the 150-minute-per-week threshold in less educated groups (Finger et al., 2019).

Life-course evidence suggests that these inequalities do not arise solely from current circumstances. A Finnish study based on the Health 2000 survey of 18–29-year-olds found that lower parental education was associated with physical inactivity during leisure time in early adulthood. This effect was partially mediated by the respondent’s own education. Furthermore, specific childhood adversities (notably bullying at school) were independently associated with physical inactivity after adjusting for adult SEP. (Kestilä et al., 2015). Together with systematic reviews linking disadvantaged childhood socioeconomic position to lower adult LTPA in predominantly European cohorts, this supports a cumulative model in which material

constraints, school experiences and early socialisation into sport or active transport shape trajectories into young adulthood and in which current study or work conditions can either reinforce or partially compensate earlier disadvantage (Kestilä et al., 2015).

Cultural context can add another layer of disparity. Regional analyses of health-enhancing physical activity across 196 European regions identify four clusters ranging from "extra-healthy" to "unhealthy" regions, with a clear north–south and west–east gradient: regions with higher GDP, greater tertiary education and more intense social internet use tend to fall into higher-activity clusters, while many southern and some eastern regions cluster in the low-activity group (Lera-Lopez & Marco, 2021). Country-level and regional studies in Germany similarly show that sport participation and vigorous activity are less common among people with lower income or education and among those with a migrant background, indicating that ethnic-cultural position intersects with socioeconomic resources in structuring access to organised sport and active leisure (Abu-Omar et al., 2021). However, perceived opportunity structures in the local environment also matter. Eurobarometer analyses reveal that adults who agree that their neighbourhood offers "many opportunities to be physically active" accumulate substantially more walking, moderate and vigorous activity per week and are more likely to meet guidelines, even after adjustment for education, financial difficulty and region (Filippidis & Laverty, 2016).

For young adults in EU countries, these results suggest that the amount of physical activity undertaken in one's free time is influenced by (i) the socioeconomic resources accumulated since childhood, (ii) one's current educational and occupational situation, and (iii) the regional and cultural environments in which one lives and studies. Recent analyses by the OECD and WHO argue that insufficient physical activity remains a major driver of non-communicable diseases in Europe, and highlight the fact that existing policies to promote physical activity benefit certain social groups more than others (OECD/WHO, 2023). In considering this issue, it is clear that more research is needed that focuses specifically on young adults aged 18–30 years in Austria. This research should distinguish leisure-time physical activity from other domains and incorporate both childhood and current socioeconomic position. Additionally, it should examine how psychosocial resources and perceived opportunities influence the translation of behavioral intentions into regular physical activity.

2.9. Conceptual model and hypotheses for the present study

Building on the previous sections, this thesis takes a life-course and social-ecological perspective on SEP and LTPA in young adulthood.

The central assumption is that physical activity patterns do not emerge in isolation at age 18 or 25, but are the result of accumulated experiences, resources and constraints that begin in childhood and continue to develop as young people move into tertiary education, vocational training or early employment. Life-course epidemiology emphasises that socially patterned exposures across different stages of life can shape later health behaviours through critical or sensitive periods, accumulation processes, and pathways linked to mobility and changing resources (Ben-Shlomo et al., 2016; Cable, 2014; Kuh et al., 2003).

Longitudinal evidence indicates that physical activity shows modest (low-to-moderate) tracking from childhood and adolescence into adulthood, while substantial change is common particularly around transitions such as leaving school, entering tertiary education or vocational training, and starting employment (Corder et al., 2019; García-Hermoso et al., 2025; Gropper et al., 2020; Hayes et al., 2019; Telama, 2009; Telama et al., 2014). At the same time, European evidence consistently documents domain-specific socioeconomic gradients, with higher socioeconomic groups being more active in leisure time, whereas lower socioeconomic groups more often accumulate occupational activity; inequalities appear especially persistent for LTPA (Beenackers et al., 2012; Angela Carlin et al., 2017; Demarest et al., 2013; O'Donoghue et al., 2018).

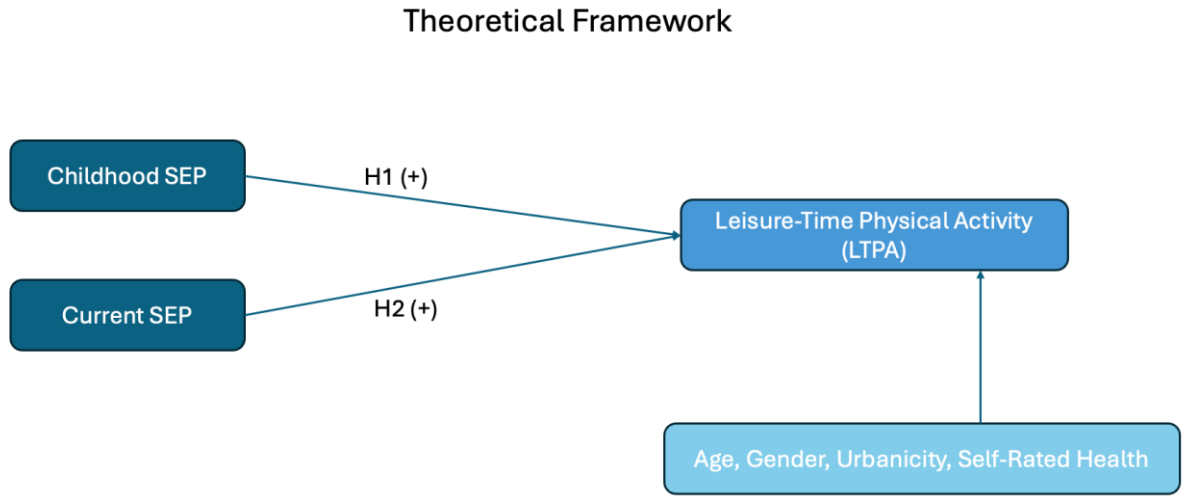
In line with these perspectives, SEP is conceptualised along two temporal dimensions. Childhood SEP reflects the material and social conditions in which respondents grew up (e.g., parental education, parental occupation, and the perceived financial situation of the household). These early-life conditions may influence opportunities for sport and movement during childhood and adolescence such as access to organised activities, facilities, and transport as well as norms and expectations conveyed within the family and social environment. Evidence from life-course research on LTPA suggests that disadvantaged childhood SEP is generally associated with lower LTPA in adulthood, and that adjustment for adult SEP often attenuates but does not necessarily eliminate this association (Elhakeem et al., 2015; Elhakeem et al., 2017; Juneau et al., 2015).

Current SEP captures respondents' present socioeconomic circumstances in young adulthood (e.g., educational attainment, employment status, and perceived financial strain), which structure time budgets, daily routines, and the affordability and feasibility of leisure-time sport and exercise. SEP is treated as a multidimensional construct, and the selection of indicators is guided by the hypothesised pathways linking socioeconomic resources to health behaviour (Braveman et al., 2005; Bruna Galobardes et al., 2007; Bruna Galobardes et al., 2006). In addition, subjective social status is measured using the MacArthur ladder approach, which is

widely used to capture perceived rank integrating socioeconomic experiences (Adler et al., 2000; Giatti et al., 2012).

Childhood SEP and current SEP are assumed to be related but not perfectly aligned, reflecting the possibility of upward or downward mobility. Some young adults may have grown up in more disadvantaged households but have attained higher education or more secure circumstances, whereas others may experience financial strain despite an advantaged background. This implies that early disadvantage may be partly offset by later gains, while economic pressures in young adulthood may hinder the maintenance of an active lifestyle (Elhakeem et al., 2017). Consistent with the Social-Ecological Model, SEP is embedded in a wider set of influences operating at individual, social, environmental, and policy levels (Bauman et al., 2012; McLeroy et al., 1988; Sallis et al., 2006; Sallis et al., 2008). These broader determinants provide context for understanding how socioeconomic resources may translate into behavioural opportunities and constraints.

Figure 1. Theoretical framework (H1–H2) linking childhood SEP and current SEP to leisure-time physical activity (LTPA), adjusted for age, gender, urbanicity, and self-rated health (Austria; 18–30 years).



Note. SEP = socioeconomic position; LTPA = leisure-time physical activity. Controls include age, gender, urbanicity, and self-rated health. Own illustration.

Figure 1 summarises these assumed relationships. The framework focuses on two socioeconomic exposures childhood SEP and current SEP and their direct associations with LTPA in young adulthood. Childhood SEP captures early-life socioeconomic conditions, while current SEP reflects participants' contemporary socioeconomic circumstances. LTPA is the primary outcome.

Based on this framework, the present study formulates the following hypotheses:

H1 (Direct association of childhood SEP and LTPA)
Higher childhood socioeconomic position is positively related to higher leisure-time physical activity in young adulthood, adjusting for current SEP and covariates.

H2 (Direct association of current SEP and LTPA)
Higher current socioeconomic position shows a positive association with higher leisure-time physical activity, adjusting for childhood SEP and covariates.

These hypotheses guide the empirical analyses in the subsequent chapters by translating the life-course perspective into testable associations between childhood SEP, current SEP and leisure-time physical activity.

3. Methodology

3.1. Research design and analytical approach

This study is grounded in a quantitative, post-positivist research approach, which assumes that health behaviours and their social determinants can be examined through systematic observation and statistical analysis. SEP and LTPA are conceptualised as measurable constructs whose associations can be tested using regression-based models. The Social-Ecological Model and a life-course perspective guided the operationalisation of SEP by distinguishing retrospective childhood household SEP from current SEP in young adulthood.
A cross-sectional online survey was used to examine the associations between childhood household socioeconomic position, current socioeconomic position, and leisure-time physical activity among young adults aged 18–30 years living in Austria. Data were collected anonymously using a short, self-administered online questionnaire. The questionnaire was designed to take approximately three to five minutes to complete in order to minimize participant workload and increase completion rates.

3.2. Study context and sample

Eligible participants were individuals who (1) were aged 18–30 years and (2) currently lived in Austria. Eligibility was assessed at the beginning of the survey through an age question and a residence check. Participants who did not meet the criteria were screened out and the survey ended. Participation was voluntary and respondents could discontinue the survey at any time.

A non-probability sampling approach based on convenience was used. To reach young adults in Austria, participants were recruited through multiple channels, including social media posts, messaging apps, group chats, student networks, sports and leisure communities, and personal contacts. Recruitment was supplemented by snowball sharing, whereby participants were encouraged to forward the survey link to peers meeting the eligibility criteria. No incentives were offered. Given the recruitment strategy and expected sample size, results are interpreted as exploratory and not statistically representative of all young adults in Austria. The survey was planned to be open from beginning of February to mid-February 2026. Given the expected sample size (approximately $N \approx 60$), analyses were planned to keep models as concise as feasible and to prioritise effect sizes and confidence intervals over statistical significance.

3.3. Data collection procedure

Data were collected using the SoSciSurvey online platform hosted on the University of Vienna server. The survey link led to an information and consent page. After providing consent, participants completed eligibility checks. The questionnaire could be completed on a smartphone or computer. No directly identifying information (e.g., name, email address) was collected. Data were stored and handled in line with applicable data protection requirements for anonymous survey research.

3.4. Survey instrument and questionnaire structure

The questionnaire comprised five sections: (A) consent and eligibility, (B) LTPA (outcome), (C) childhood SEP, (D) current SEP and (E) covariates. Definitions of leisure-time physical activity and MVPA were provided to standardize interpretation. To ensure feasibility and straightforward analysis in a modest sample, key constructs were assessed using single-item measures and primarily ordinal response scales. The full questionnaire from the SoSciSurvey platform is provided in the Appendix. For documentation purposes, screenshots of the survey pages are provided.

3.4.1. Outcome: leisure-time physical activity

LTPA was assessed as weekly leisure-time MVPA using a 7-category ordinal scale (Item B1), ranging from 0 minutes/week to ≥450 minutes/week. In addition, participants reported how many days per week they typically engaged in leisure-time MVPA (Item B2; 0–7 days, with the highest category “6–7 days”).

Primary operationalisation for hypothesis testing:

The primary outcome used for regression analyses was meeting aerobic physical activity recommendations (≥150 minutes/week; binary). Participants were classified as meeting recommendations if they reported ≥150 minutes/week (B1 category ≥5).

Secondary operationalisations:

The original 7-category MVPA scale (B1) was summarised descriptively to present the distribution of activity levels in the sample. In addition, B1 categories were transformed into approximate minutes/week using fixed midpoints (0, 15, 52, 112, 225, 375, and a fixed value for ≥450) to allow descriptive interpretation of average activity levels.

3.4.2. Childhood household socioeconomic position

Childhood SEP referred to the period when participants were approximately 10–12 years old and was measured using three indicators:

- Parental education (C1): highest education completed by either parent/main caregiver (categorical/ordinal).
- Childhood household financial situation (C2): perceived ability to make ends meet during childhood (7-point ordinal scale).
- Subjective social status in childhood (C3): 7-step ladder rating of perceived family position (7-point ordinal scale).

Childhood SEP indicators were analysed individually.

3.4.3. Current socioeconomic position

Current SEP was assessed using:

- Current main activity (D1): e.g., student, employed (categorical).
- Highest education completed (D2): ordinal categorical education level.
- Current financial situation (D3): perceived ability to make ends meet (7-point ordinal scale).
- Subjective social status now (D4): 7-step ladder rating of current perceived position (7-point ordinal scale).

3.4.4. Covariates and missing data

Covariates included age (in years, within the eligible range 18–30), gender, urbanicity of current residence, and self-rated health. Self-rated health was assessed using a single statement ("I consider my overall health to be good") rated on a 7-point agreement scale.

"Prefer not to say" and "don't know" responses were treated as missing. Missingness was described and regression analyses were conducted using complete-case data.

3.5. Data analysis strategy

This study adopts a quantitative, post-positivist approach and examines statistically observable associations between SEP and LTPA. A life-course perspective informed the separate operationalisation of retrospective childhood household SEP and current SEP in young adulthood, while the Social-Ecological Model served as a conceptual guide for selecting core covariates (age, gender, urbanicity, self-rated health) rather than for modelling multi-level mechanisms.

Analyses were conducted to describe patterns of LTPA and to examine associations of childhood and current SEP with physical activity outcomes. In addition, Spearman rank-order correlations were calculated to examine bivariate associations between childhood and current SEP indicators and weekly leisure-time MVPA, given the ordinal scaling of the variables. Descriptive statistics were given as counts and percentages for categorical variables, and as medians with interquartile ranges for ordinal or skewed variables. Interpretation prioritised effect sizes with 95% confidence intervals.

The primary outcome was meeting aerobic physical activity recommendations (≥150 minutes per week; yes/no). The binary indicator was derived directly from the ordinal weekly MVPA category (B1), with categories ≥150 minutes/week (category ≥5) classified as meeting recommendations. In addition, the original 7-category LTPA response scale was summarised descriptively to show the distribution of activity levels in the sample (secondary descriptive outcome). As the primary outcome was operationalised dichotomously, regression results are interpreted as differences in the odds (likelihood) of meeting recommendations.

3.5.1. Main regression models (testing H1 and H2)

Binary logistic regression models were estimated to examine independent associations of childhood and current SEP with meeting aerobic recommendations. Childhood SEP indicators and current SEP indicators were entered simultaneously to estimate their independent associations with meeting recommendations. All models were adjusted for age, gender, urbanicity, and self-rated health. Results are presented as odds ratios (OR) with 95% confidence intervals.

Model 1 included childhood SEP indicators and covariates. Model 2 additionally included current SEP indicators to examine their contribution to the association between childhood SEP and physical activity.

3.5.2. Attenuation analysis

To assess to what extent the childhood SEP–LTPA association was attenuated after considering current SEP, nested models were estimated:

Model 1: childhood SEP + covariates

Model 2: childhood SEP + current SEP + covariates

Attenuation was quantified as the percentage change in the childhood SEP log-odds coefficient between Model 1 and Model 2. This attenuation analysis was interpreted descriptively and not as evidence of causal mediation.

3.6. Assessment of the measurement and structural model

As the study relies on observed single-item indicators rather than latent constructs, no confirmatory factor analysis was conducted. Measurement adequacy was evaluated through inspection of item distributions and correlation patterns.

The structural model was operationalised using binary logistic regression. Model fit and explanatory contribution were assessed by comparing nested models and examining changes in coefficients across specifications.

3.7. Common method bias, robustness checks and ethical considerations

As all variables were collected via self-report in a single online survey, the possibility of common method bias was taken into account. To assess this, Harman's single-factor test was performed using an unrotated principal component analysis that included all the self-report variables. This procedure enables us to examine whether a single factor accounts for the majority of the covariance among the measures.

In addition, robustness checks were performed by estimating alternative model specifications and assessing the stability of coefficients across nested models. These analyses aimed to evaluate whether the observed associations were sensitive to model adjustments.

The study was based on an anonymous online questionnaire that was considered to bear little risk for participants. The survey was voluntary and informed consent was given before it was completed. The respondents were made aware of the purpose of the study, the voluntary nature of their participation and their right to withdraw at any time. The collection of personally identifiable information was not a part of the process. The survey was implemented using the University of Vienna’s SoSciSurvey infrastructure, and data handling complied with applicable data protection requirements.

3.8. Methodological strengths and limitations

Strengths include a concise, low-burden survey instrument suitable for online recruitment, the explicit separation of childhood and current SEP consistent with a life-course perspective, and a domain-specific focus on leisure-time physical activity. The modelling strategy allows estimation of associations of childhood and current SEP with physical activity outcomes while adjusting for relevant covariates.

Limitations include convenience sampling and potential selection bias, which restrict generalisability. The cross-sectional design precludes causal inference. Measures were self-reported and may be affected by reporting bias; childhood SEP indicators rely on retrospective recall and may be subject to recall error. The primary outcome (meeting aerobic recommendations, ≥150 min/week) was derived from categorical self-report responses using midpoint assumptions, which may introduce misclassification and measurement error. Finally, although psychosocial, social, and environmental correlates are discussed in the literature review, they were not measured in the survey; therefore, the study focuses on direct associations rather than testing multilevel pathways or mechanisms.

4. Results from the survey component

4.1. Participant flow and analytic sample

A total of N = 61 survey records were exported from SoSciSurvey. After applying the predefined eligibility criteria (consent, currently living in Austria, completed survey, and age 18–30 years), the final analytic sample comprised n = 42 participants.

“Prefer not to say” and “not answered” responses (coded as missing in the dataset) were treated as missing and excluded via listwise deletion in regression models. MVPA days/week were stored as an 8-level code corresponding to 0–7 days and were therefore recoded as (code − 1) for analysis.

The online survey was conducted with SoSci Survey (Leiner, 2026), the data was collected between 06.02.2026 and 10.02.2026 at https://sosci.univie.ac.at/sep-ltpa-2026/. The software for conducting the online survey was provided free of charge by the SoSci Survey GmbH. The SoSci Survey GmbH had no influence on the content of the study.

Table 1. Participant flow

Step	n
Exported records	61
In Austria (yes)	55
Completed survey (FINISHED = 1)	48
Eligible analytic sample (Austria + completed + age 18–30 + consent)	**42**

4.2. Sample characteristics

In the eligible analytic sample (n = 42), 45.2% (19/42) met aerobic physical activity recommendations (≥150 min/week) based on the weekly leisure-time MVPA category. Median age was 26 years (IQR 25–28). The median weekly leisure-time MVPA category was 4 (IQR 4–5), corresponding to 75–149 min/week at the median and spanning into the 150–299 min/week category at the upper quartile. Participants reported a median of 3 leisure-time MVPA days/week (IQR 2–4). Self-rated health was high overall (median 6, IQR 5–6 on a 7-point scale).

Table 2. Sample Characteristics; (Eligible analytic sample, n=42)

Characteristic	Value
Meeting aerobic recommendations (≥150 min/week), n (%)	**19 (45.2%)**
Age (years), median (IQR)	**26 (25–28)**
Weekly leisure-time MVPA category (2–7), median (IQR)	**4 (4–5)**
MVPA days/week (0–7), median (IQR)	**3 (2–4)**
Self-rated health (1–7), median (IQR)	**6 (5–6)**
Gender, n (%)	
– Woman	**23 (54.8%)**
– Man	**18 (42.9%)**
– Prefer not to say	**1 (2.4%)**
Urbanicity, n (%)	
– Large city	**34 (81.0%)**
– Suburbs	**3 (7.1%)**

– Town/small city	**3 (7.1%)**
– Village/rural area	**2 (4.8%)**

Note. Weekly leisure-time MVPA was measured on a 7-category scale; in this sample, observed categories ranged from 2 to 7. Meeting recommendations was defined as MVPA category ≥5 (≥150 min/week). Own calculations.

4.3. Descriptive findings

This section presents the descriptive findings for the main study variables. It first summarises weekly leisure-time physical activity, then describes the distribution of childhood and current socioeconomic position indicators and finally reports the correlation analysis between the SEP measures.

4.3.1. Weekly leisure-time physical activity

Table 3 presents the distribution of weekly leisure-time MVPA in the analytic sample. As *Table 3* shows, the distribution of weekly leisure-time MVPA was clustered around the mid-range categories. The largest proportion reported 75–149 min/week, followed by 150–299 min/week.

Table 3. Weekly leisure-time MVPA categories (n=42)

Category (weekly MVPA)	n	%
1–29 min/week (cat 2)	3	7.1
30–74 min/week (cat 3)	5	11.9
75–149 min/week (cat 4)	15	35.7
150–299 min/week (cat 5)	13	31.0
300–449 min/week (cat 6)	4	9.5
≥450 min/week (cat 7)	2	4.8

Note: Own calculations.

4.3.2. Childhood and current socioeconomic position

Table 4 summarises the childhood and current socioeconomic position (SEP) indicators using median and interquartile range (IQR), reflecting the ordinal scaling of these single-item measures. Overall, median values suggested moderately favourable SEP, particularly for perceived financial situation in childhood (median 6, IQR 5–6.75) and current financial situation (median 5, IQR 4–6). Subjective social status was slightly higher in childhood (median 5, IQR 4–6) than at present (median 4, IQR 4–5).

To provide a more transparent view of the underlying response patterns beyond central tendency, Table 5 reports full category distributions for each SEP indicator as n and valid %. Distributions were generally skewed toward higher SEP categories, especially for childhood financial situation, where most participants selected categories 5–7. Missingness was low overall and limited primarily to parental education and highest education completed (valid n = 41 each), due to "prefer not to say / not answered" responses.

Table 4. Childhood and current SEP indicators

SEP indicator	n	Median (IQR)
Childhood SEP		
Parental education	41	**4 (3–5)**
Childhood household financial situation	42	**6 (5–6.75)**
Subjective social status in childhood (ladder)	42	**5 (4–6)**
Current SEP		
Highest education completed	41	**4 (3–5)**
Current financial situation	42	**5 (4–6)**
Subjective social status now (ladder)	42	**4 (4–5)**

Note. Valid n excludes missing responses ("prefer not to say" / "not answered"). Own calculations.

Table 5. Distribution of childhood and current SEP indicators

Indicator	Category code	n	Valid %
Parental education (C002)	1	2	4.9
	2	4	9.8
	3	11	26.8
	4	7	17.1
	5	17	41.5
Childhood household financial situation (C003)	1	0	0.0
	2	2	4.8
	3	1	2.4
	4	4	9.5

	5	7	16.7
	6	17	40.5
	7	11	26.2
Subjective social status in childhood (ladder) (C004)	1	0	0.0
	2	1	2.4
	3	2	4.8
	4	10	23.8
	5	16	38.1
	6	10	23.8
	7	3	7.1
Highest education completed (D002)	1	0	0.0
	2	1	2.4
	3	11	26.8
	4	17	41.5
	5	12	29.3
Current financial situation (D003)	1	1	2.4
	2	1	2.4
	3	4	9.5
	4	10	23.8
	5	11	26.2
	6	13	31.0
	7	2	4.8
Subjective social status now (ladder) (D004)	1	0	0.0
	2	2	4.8
	3	7	16.7
	4	13	31.0
	5	15	35.7
	6	4	9.5
	7	1	2.4

Note. “Valid %” excludes missing responses (“prefer not to say” / “not answered”). For C002 and D002, valid n = 41; for all other indicators, valid n = 42. Category labels corresponding to codes are provided in the questionnaire/codebook. Own calculations.

Across all SEP indicators, responses clustered in the upper categories, indicating favourable socioeconomic conditions in this sample. The clearest trend was a bias toward higher values for childhood household financial situation, while subjective social status ratings were more evenly distributed.

4.3.3. Correlation analysis

To further examine associations between childhood and current SEP indicators and weekly leisure-time MVPA, Spearman rank-order correlations were calculated (*Table 6*). Correlations among SEP indicators were generally weak to moderate in magnitude. Within childhood SEP, childhood financial situation and subjective social status showed a moderate positive correlation ($\rho = .400$, $p = .009$), while parental education was moderately associated with childhood financial situation ($\rho = .338$, $p = .030$). Within current SEP, education and current financial situation were moderately correlated ($\rho = .543$, $p < .001$), as were current financial situation and current subjective social status ($\rho = .485$, $p = .001$).

Cross-domain correlations between childhood and current SEP indicators were generally small, suggesting that these dimensions represent related but distinct constructs. Correlations between SEP indicators and weekly MVPA were weak ($|\rho| \leq .272$). No correlation exceeded conventional thresholds for multicollinearity ($|\rho| < .70$), supporting the simultaneous inclusion of SEP indicators in the regression models. The correlation matrix is presented in Table 6.

Table 6. Spearman correlations among SEP indicators and weekly MVPA

Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. Parental education (C002)	1						
2. Childhood financial situation (C003)	.34*	1					
3. Childhood subjective status (C004)	.25	.40**	1				
4. Education completed (D002)	.02	.21	−.07	1			
5. Current financial situation (D003)	−.02	.14	.02	.54***	1		
6. Current subjective status (D004)	−.14	−.10	.05	.28	.49**	1	
7. Weekly MVPA (B002)	.22	.27	.05	.15	.03	−.14	1

Note. Spearman's rho. Own calculations.

*p < .05, **p < .01, ***p < .001.

4.4. Common method bias assessment

To evaluate the possibility of bias arising from the use of a single method, Harman's single-factor test was conducted using an unrotated principal component analysis that included all the self-report variables. The first component accounted for 24.0% of the total variance, which is well below the commonly applied 50% threshold. This indicates that no dominant single-factor structure was present and suggests that common method bias is unlikely to substantially distort the observed associations.

4.5. Structural model results

The structural model examined the association between childhood and current SEP and meeting the aerobic physical activity recommendation of at least 150 minutes per week. As specified in chapter *3. Methodology*, the binary outcome (meeting the recommendations, yes or no) was analysed using binary logistic regression. Childhood SEP indicators (parental education, childhood household financial situation and subjective social status during childhood) and current SEP indicators (highest level of education achieved, current financial situation and current subjective social status) were entered into the model to estimate their independent effects. All models were adjusted for age (years), gender, urbanicity and self-rated health. Results are reported as odds ratios (OR) with 95% confidence intervals (CI), with interpretation prioritising effect sizes and precision rather than statistical significance.

4.5.1. Fully adjusted model

Figure 2 presents the fully adjusted model based on complete cases (n = 39). Overall, estimates were imprecise, reflected in relatively wide confidence intervals, which is consistent with the modest sample size and the inclusion of multiple correlated SEP indicators. None of the SEP indicators demonstrated a clearly independent association with meeting recommendations in the fully adjusted model. However, the largest positive point estimate among SEP indicators was observed for childhood household financial situation (OR 2.07, 95% CI 0.73–5.88), suggesting higher odds of meeting recommendations with more favourable perceived childhood finances, albeit with substantial uncertainty. For current SEP, subjective social status now showed an inverse point estimate (OR 0.61, 95% CI 0.23–1.57), while current financial situation and current education showed point estimates close to the null. Among covariates, age showed a positive point estimate (OR 1.51 per year, 95% CI 0.83–2.75), whereas the gender contrast (male vs woman) and urbanicity showed no clear association, each with wide confidence intervals.

These associations are visualised in *Figure 2,* highlighting the overall imprecision of estimates and the direction of associations across childhood and current SEP indicators.

Taken together, these findings suggest that within this exploratory convenience sample associations between SEP and meeting aerobic recommendations were not estimated with high precision once childhood and current SEP indicators were modelled simultaneously.

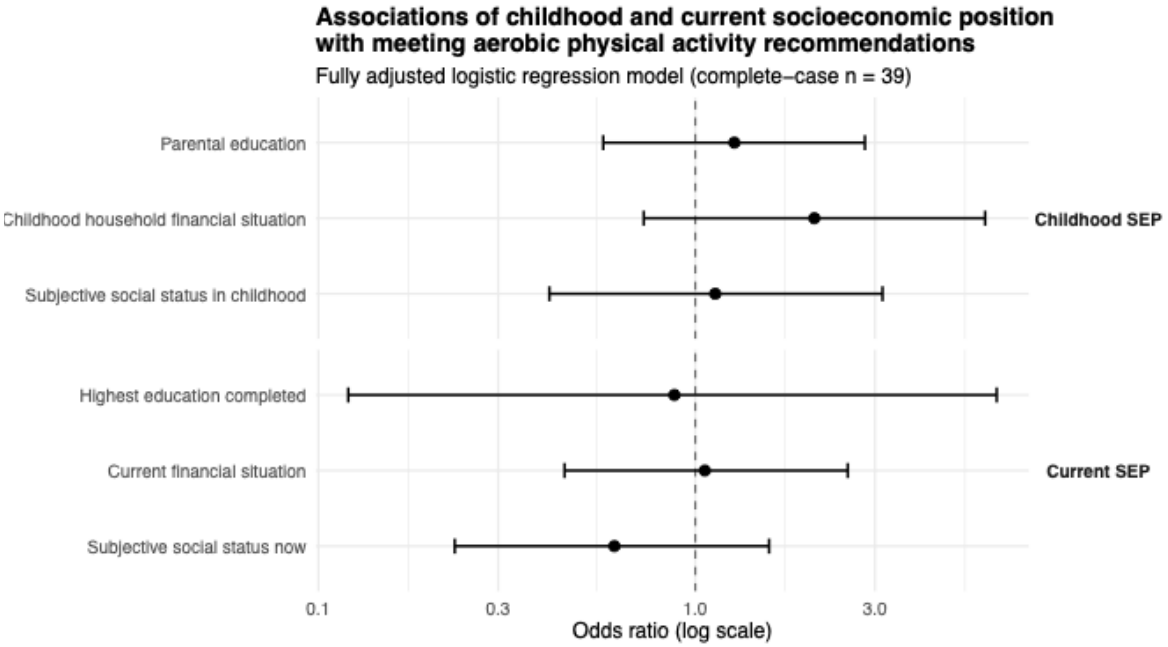


Figure 2. Associations of childhood and current socioeconomic position with meeting aerobic physical activity recommendations.

Note. Own illustration.

Forest plot showing odds ratios (OR) and 95% confidence intervals from the fully adjusted logistic regression model (complete-case n=39). The outcome was meeting aerobic recommendations (≥150 min/week). SEP indicators were entered simultaneously, and models were adjusted for age, gender, urbanicity, and self-rated health. ORs represent a one-category increase on the respective ordinal scales; the vertical line indicates OR=1.

Table 7. Fully adjusted logistic regression predicting meeting aerobic recommendations (≥150 min/week), complete-case sample (n = 39)

Predictor (per 1-unit increase)	**OR**	**95% CI**
Childhood SEP		
Parental education	1.27	0.57–2.82
Childhood household financial situation	2.07	0.73–5.88

Subjective social status in childhood (ladder)	1.13	0.41–3.14
Current SEP		
Highest education completed	0.88	0.12–6.31
Current financial situation	1.06	0.45–2.54
Subjective social status now (ladder)	0.61	0.23–1.57
Covariates		
Age (years)	1.51	0.83–2.75
Gender (male vs woman)	0.68	0.10–4.47
Urbanicity (per category)	1.11	0.35–3.54
Self-rated health (per point)	1.33	0.53–3.35

Note. The fully adjusted model includes childhood and current SEP indicators simultaneously and therefore reflects associations conditional on the other SEP indicators and covariates, rather than total (unadjusted) associations. Own calculations.

4.5.2. Findings in Relation to Hypotheses H1 and H2

Regarding hypotheses H1 and H2, the fully adjusted logistic regression model did not provide clear evidence of statistically significant independent associations between socioeconomic position and meeting the recommended level of aerobic leisure-time physical activity. The first hypothesis, which suggested that a higher childhood socioeconomic status would be linked to following recommendations after accounting for current SEP and other factors, was not clearly supported in the final model. Though some point estimates, particularly those relating to childhood household financial situation, remained consistent with the hypothesised pattern, the corresponding confidence intervals were broad and encompassed the null value. Likewise, hypothesis 2, which proposed that a higher current socioeconomic position would be positively associated with meeting the recommendations after adjusting for childhood SEP and covariates, was not supported by statistically precise independent effects. Overall, these findings suggest that any associations between childhood or current SEP and leisure-time physical activity in this sample were likely to be modest and could not be estimated with sufficient precision. In line with the exploratory nature of this study and its modest convenience sample, these results should therefore be interpreted as exploratory rather than confirmatory.

4.6. Attenuation analysis

To assess whether associations between childhood socioeconomic position (SEP) and meeting aerobic physical activity recommendations were attenuated after accounting for current SEP, nested logistic regression models were estimated for each childhood SEP indicator. Model 1 included the respective childhood SEP indicator and the covariates age, gender, urbanicity, and self-rated health. Model 2 additionally included the current SEP indicators highest education completed (D2), current financial situation (D3), and subjective social status now (D4). Attenuation (%) was quantified as the percentage change in the childhood SEP log-odds coefficient between Model 1 and Model 2, calculated as:

Attenuation (%) = 100 × (B_Model 1 − B_Model 2) / B_Model 1.

Table 8 summarises the results. Parental education showed a 25.8% attenuation after inclusion of current SEP (OR Model 1 = 1.83; OR Model 2 = 1.57), suggesting partial overlap between childhood and adult socioeconomic conditions in relation to meeting recommendations. In contrast, childhood household financial situation showed virtually no attenuation (−0.8%; OR 2.68 → 2.70), and subjective social status in childhood showed a slight increase in the coefficient after adjustment (−10.7%; OR 1.78 → 1.90).

Given the modest sample size and correlated SEP indicators, these patterns should be interpreted cautiously and considered exploratory rather than indicative of causal pathways.

Table 8. Attenuation of childhood SEP associations after adjustment for current SEP

Childhood SEP indicator	Model 1 n	OR (Model 1)	Model 2 n	OR (Model 2)	Attenuation (%)
Parental education	40	1.83	39	1.57	**25.8%**
Childhood financial situation	41	2.68	40	2.70	**−0.8%**
Childhood subjective social status	41	1.78	40	1.90	**−10.7%**

Note. Attenuation percentages are based on the log-odds coefficients (B) and rounded to one decimal place. Own calculations.

5. Discussion

5.1. Summary of main findings

Guided by a life-course perspective and informed by the Social-Ecological Model, this study examined the associations between childhood and current SEP and LTPA among young adults in Austria. The primary outcome was meeting the aerobic physical activity recommendation of at least 150 minutes per week.

The fully adjusted logistic regression model revealed no clearly independent associations between SEP indicators and meeting aerobic recommendations. Though some point estimates indicated potentially meaningful trends, the wide confidence intervals included the null value. The largest positive point estimate among the SEP indicators was observed for childhood household financial situation, indicating higher odds of meeting the recommendations with more favorable perceived childhood finances, though there was substantial statistical uncertainty.

Bivariate correlations among SEP indicators were generally weak to moderate, supporting the conceptual distinction between childhood and current SEP while also indicating partial overlap between some indicators. Correlations between SEP indicators and weekly leisure-time MVPA were small, consistent with the multivariable regression results.

Attenuation analyses suggested that the association for parental education decreased after adjusting for current SEP, indicating some overlap between childhood and current socioeconomic conditions. In contrast, the coefficient for childhood household financial situation increased slightly after the inclusion of current SEP, whereas the coefficient for childhood subjective social status showed little evidence of attenuation. Due to the modest sample size and correlated SEP indicators, these attenuation patterns should be interpreted cautiously.

When considered as a whole, the results indicate that in this exploratory convenience sample of young adults in Austria, socioeconomic gradients in leisure-time physical activity were not estimated with high precision once childhood and current SEP indicators were modeled simultaneously.

5.2. Interpretation of findings considering previous research

The present findings should be considered in light of the substantial European evidence base documenting socioeconomic inequalities in LTPA. As in previous studies, cross-national analyses indicate that adults with lower levels of education and financial difficulties are less likely to reach the advised level of physical activity. (Demarest et al., 2013; Finger et al., 2019).

Additionally, domain-specific reviews show that a higher SEP is positively associated with LTPA, whereas lower SEP groups more often accumulate occupational physical activity (Beenackers et al., 2012).
Unlike these well-established gradients, the present study did not identify clear, independent associations between childhood or current SEP indicators and meeting aerobic recommendations when multiple SEP dimensions were entered into the model simultaneously. While some point estimates indicated meaningful trends, particularly regarding childhood household financial situation, wide confidence intervals suggest substantial statistical uncertainty. Rather than contradicting prior evidence, this pattern likely reflects methodological and contextual factors specific to the present sample.

First, simultaneously modelling several correlated SEP indicators may partially account for the attenuation of effects. Previous large-scale studies often focus on single SEP measures. Examples include education only. The current analysis entered parental education, childhood financial situation, subjective childhood status, current education, current financial situation, and current subjective status into one model. This approach provides a more stringent test of independent associations given the weak to moderate correlations observed between several SEP indicators, but it may diminish statistical precision in small samples.

Secondly, the relatively homogeneous and predominantly favorable SEP distribution in this convenience sample likely constrained variability. As shown descriptively, responses clustered in upper categories. This was particularly true for childhood financial situation. Limited variance in exposure variables reduces the ability to detect gradients, even if they exist in the broader population. Large European datasets, such as the European Health Interview Survey (EHIS)-2, include wider socioeconomic dispersion and therefore yield more stable inequality estimates (Finger et al., 2019).

Third, it is important to consider the life-course dimension. According to longitudinal research, physical activity moderately tracks from childhood into adulthood, though substantial changes occur around key life transitions (Telama et al., 2014). Systematic reviews also suggest that a lower childhood SEP is linked to less leisure-time physical activity in adulthood, though these links are typically modest and frequently diminish after adjustment for adult SEP (Elhakeem et al., 2015; Juneau et al., 2015). In the current study, analyses of attenuation suggested that parental education and current SEP were somewhat related, while childhood financial situation

showed little evidence of attenuation after adjustment for current SEP. Though exploratory, this pattern aligns with life-course literature indicating that early socioeconomic conditions influence later activity directly and indirectly through adult socioeconomic pathways.

Furthermore, umbrella reviews from the DEDIPAC program suggest that evidence for socioeconomic inequalities in adult LTPA is compelling. However, these reviews also highlight that the overall evidence base is restricted by the prevalence of cross-sectional designs and by the use of heterogeneous measures of both socioeconomic status and physical activity (O'Donoghue et al., 2018). The current findings, which are defined by small bivariate correlations and imprecise multivariable estimates, align with a broader pattern of modest but methodologically sensitive associations. This pattern does not suggest an absence of social patterning.

Notably, the age group studied here (18–30 years old) is characterized by educational mobility, entry into the labor market, and changing living arrangements, representing a transitional life stage. Research indicates that physical activity patterns fluctuate during these transitions (Corder et al., 2019; Gropper et al., 2020; Telama et al., 2014).In this age range, current SEP may reflect ongoing formation rather than a consolidated social position. This could weaken the association between socioeconomic indicators and current leisure-time behavior. Hence, the absence of clear independent gradients in this young sample should not be interpreted as evidence that socioeconomic inequalities are irrelevant in early adulthood. Rather, it is indicative of complexity, measurement sensitivity, and contextual variability.
Broader European literature suggests that socioeconomic inequalities in leisure-time physical activity may exist. Nonetheless, their magnitude in young adulthood is likely modest and highly sensitive to measurement, sampling, and analytic specification. Due to the exploratory nature and limited precision of the current study, there is a need for larger, harmonized investigations that focus specifically on young adults.

5.3. Theoretical implications

The findings of this study can be interpreted within the socio-ecological and life-course frameworks that structured the theoretical foundation of this thesis. While no clear independent associations were observed between childhood or current SEP and meeting aerobic recommendations in the fully adjusted models, the results still provide relevant theoretical insights.

5.3.1. Implications for the social-ecological model

According to the socio-ecological model, physical activity is influenced by factors operating at personal, interpersonal, environmental and structural levels.(Bauman et al., 2012). In this context, socioeconomic status primarily functions as a structural determinant that influences access to material resources, educational opportunities, neighborhood environments, and socially patterned norms regarding sports and leisure activities. The moderate and imprecise correlations found in this analysis may reflect that leisure-time physical activity in young adulthood is not solely determined by socioeconomic circumstances but rather emerges from a combination of interacting influences. During transitional life stages, such as early adulthood, time constraints, mobility, academic demands, and entry into the labor market may obscure or dilute socioeconomic gradients that become more apparent later in adulthood.

Rather than undermining socio-ecological theory, the findings highlight the challenge of identifying structural influences in a cross-sectional study. Socioeconomic conditions may indirectly influence leisure-time physical activity through pathways such as health literacy, perceived competence, social support, neighborhood opportunities, and access to organized sports. While these mechanisms were conceptually important to the theoretical framework of this thesis, they were not directly measured in the survey. Thus, the limited independent effects observed in the multivariable models suggest the multifactorial and context-dependent nature of leisure-time physical activity more than the absence of structural influence. This idea aligns with evidence from an umbrella review showing that the relationship between socioeconomic status and physical activity varies throughout the lifespan and is sensitive to study design, domain definition, and measurement choices (O'Donoghue et al., 2018).

5.3.2. Implications for the life-course perspective

The life-course perspective provides a temporal dimension to this interpretation. Longitudinal evidence indicates that physical activity changes moderately from childhood and adolescence into adulthood and also shifts around significant life transitions, such as leaving school, beginning postsecondary education, or starting a job (Corder et al., 2019; Gropper et al., 2020; Hayes et al., 2019; Telama et al., 2014). Reviews further indicate that a disadvantaged SEP in childhood is generally associated with lower leisure-time physical activity in adulthood, though these associations are usually modest and often disappear after adjusting for adult SEP (Elhakeem et al., 2015). Additionally, life-course research indicates that socioeconomic disadvantage accumulated across multiple stages of life may contribute to lower adult physical activity, which supports pathway and cumulative-risk interpretations (Juneau et al., 2015). The

attenuation patterns observed in this study, particularly for parental education, are consistent with this literature. Meanwhile, the limited attenuation of childhood financial situation after adjusting for current SEP suggests that early material conditions may have longer-term influences not fully captured by adult educational or financial indicators. Due to the exploratory nature of the analysis, this pattern should be interpreted cautiously; however, it remains compatible with life-course models in which early disadvantage directly and indirectly shapes later behavior through adult socioeconomic pathways.

Theoretically, early adulthood is important because it represents a phase of ongoing socioeconomic development rather than stable stratification. Educational trajectories may be incomplete, employment situations may be provisional, and social environments may be rapidly changing. Under these conditions, socioeconomic indicators may capture dynamic processes rather than consolidated advantages or disadvantages. Cross-sectional associations measured at this stage therefore mirror a moving target, which may partly clarify why structural gradients were challenging to estimate exactly in the current sample. These findings align with the life-course framework adopted in this thesis and the broader literature on behavioral instability during the transition from adolescence to adulthood.

The empirical results therefore support the continued relevance of the theoretical models underlying this study. The results suggest that socioeconomic influences on leisure-time physical activity are embedded in broader structural and developmental processes. The extent to which these influences are statistically visible depends on more than just their existence; timing, measurement, and analytic specification also play a role.

5.4. Practical implications for health promotion and policy

While the current results did not show significant independent socioeconomic differences, they do highlight the ongoing significance of monitoring inequalities in leisure-time physical activity during young adulthood. European evidence consistently shows that lower education and other markers of disadvantage are associated with lower participation in leisure-time physical activity. Domain-specific reviews indicate that socioeconomic patterning differs across leisure-time, occupational, and transport-related activity. Modest associations remain relevant for public health because small socioeconomic differences in activity behavior can affect large population groups and accumulate over time (Beenackers et al., 2012; Finger et al., 2019).

The results support health promotion practices that combine behavioral support with environmental changes in the settings where young adults live, study, and work. Socioecological frameworks emphasize that physical activity is shaped not only by motivation and individual capability but also by social and environmental opportunity structures (Bauman et al., 2012). Supporting this, review evidence shows that access to recreational facilities and basic pedestrian and cyclist infrastructure are among the environmental characteristics most consistently associated with physical activity. In addition, activity-supportive neighborhoods are linked to higher levels of objectively measured moderate-to-vigorous physical activity (A. Carlin et al., 2017; Sallis et al., 2016). For young adults, this means that interventions may be more effective when they combine individual components, such as motivation, social support, and flexible programming, with structural supports, such as affordable sports facilities, walkable routes, cycling infrastructure, and safe public spaces. Equity should remain a central consideration because built-environment improvements do not automatically benefit all social groups equally (Smith et al., 2017).

The findings at EU and national policy levels show how important it is to have harmonized and domain-specific monitoring of both socioeconomic position and physical activity. European research initiatives such as DEDIPAC were explicitly designed to improve conceptual models. They were also designed to harmonize indicators. Another goal was to strengthen cross-country comparability of surveillance and evaluation (Brug et al., 2017; Lakerveld et al., 2014). The EU HEPA monitoring framework shows that surveillance across sectors is feasible but also reveals uneven implementation, particularly in the transport and urban planning domains, which are highly relevant to activity-friendly environments (Whiting et al., 2021).

According to a life-course perspective, strategies to promote physical activity should not exclusively focus on the current adult circumstances. Evidence from young adults suggests that parental education and childhood adversity can result in a lack of physical activity outside of work or school, even when accounting for adult socioeconomic status. This emphasises the significance of early socialisation, material opportunities and educational pathways. (Kestilä et al., 2015). In practical terms, policies aiming to reduce inequalities in leisure-time physical activity must consider current access to environments that support physical activity and the long-term influence of early socioeconomic conditions on behavioral trajectories.

5.5. Addressing the research questions and hypotheses

The empirical findings are related directly to the research questions and hypotheses of this thesis in this section.

Main research question: How is childhood household socioeconomic position (SEP) associated with leisure-time physical activity (LTPA) among young adults (18–30 years) in Austria?

In the fully adjusted models, childhood household SEP indicators did not show statistically precise independent associations with meeting aerobic physical activity recommendations (≥150 min/week). Although some point estimates suggested potentially meaningful positive directions, particularly for childhood household financial situation, confidence intervals were wide and included the null value. These findings indicate that any association between childhood SEP and LTPA in this sample was likely modest and could not be estimated with sufficient precision.

Sub-question: Does childhood household SEP remain associated with leisure-time physical activity after accounting for current SEP?

After adjustment for current SEP indicators and covariates, childhood SEP indicators did not emerge as robust independent predictors of meeting aerobic recommendations. The attenuation analysis nevertheless suggested some degree of overlap between childhood and current socioeconomic conditions. In particular, the association for parental education was more clearly reduced after inclusion of current SEP, whereas childhood household financial situation showed little evidence of attenuation in this dataset. Given the modest sample size and the correlations between SEP indicators, these patterns should be interpreted as exploratory and descriptive rather than as definitive evidence of distinct life-course pathways.

Hypothesis testing: H1 and H2

The empirical results did not clearly support either hypothesis in terms of statistically precise independent effects. H1, which proposed that a higher SEP in childhood would be positively associated with meeting aerobic recommendations after adjusting for current SEP and covariates, was not supported based on the fully adjusted models. That said, the direction of some estimates remained compatible with the hypothesized pattern. Likewise, H2, which proposed that higher current SEP would be positively associated with meeting recommendations after adjusting for childhood SEP and covariates, was not supported. In this young adult convenience sample, socioeconomic gradients in meeting aerobic recommendations could not be estimated with sufficient precision to draw strong conclusions. This finding may be because early adulthood is a transitional life stage during which socioeconomic trajectories are still developing. This makes it more difficult to detect cross-sectional associations between structural SEP indicators and leisure-time physical activity. To

further clarify whether indirect mechanisms or longer-term life-course processes underlie these associations, larger longitudinal studies are needed.

6. Conclusion

This master's thesis explored the relationship between socioeconomic position (SEP) in childhood and adulthood and leisure-time physical activity (LTPA) among 18-30-year-olds in Austria. Taking a life-course perspective and applying the Social-Ecological Model, the study investigated whether a person's SEP in childhood is associated with meeting aerobic physical activity recommendations in young adulthood, and whether this association remains when current socioeconomic circumstances are taken into account. After conducting attenuation analyses and applying fully adjusted logistic regression models, no statistically significant independent associations were identified between the SEP indicators and meeting the recommendation of at least 150 minutes of leisure-time physical activity per week. Neither childhood SEP nor current SEP emerged as a robust independent predictor in the fully adjusted models. However, some point estimates, particularly for childhood household financial situation, suggested potentially meaningful positive trends, although these were accompanied by wide confidence intervals and should therefore be interpreted with caution.

While the findings do not indicate that socioeconomic factors are unimportant for LTPA, they suggest that such associations were difficult to estimate precisely in this exploratory sample. Regarding the research questions, the results suggest that any relationship between SEP and LTPA in young adulthood is likely to be limited and dependent on context. The attenuation analyses suggested some overlap between childhood and current SEP, particularly with regard to parental education. This finding supports the idea that socioeconomic conditions throughout life are related but not identical. Overall, these findings are consistent with the theoretical framework of the thesis, which posits that childhood and current SEP are distinct yet interconnected dimensions of social stratification that exert their effects through longer-term developmental and structural pathways. These results are particularly pertinent in young adulthood, as this is a transitional life stage during which education, employment, financial independence and daily routines are typically still developing. In this context, LTPA may reflect a complex interplay of past resources, present constraints, and immediate opportunities. Therefore, the absence of statistically precise gradients in this study does not contradict the life-course perspective but may instead mirror the complexity and variability of socioeconomic influences during this life stage.

Nevertheless, the study makes an important contribution to the literature by specifically focusing on young adults in Austria, distinguishing between childhood and current SEP, and examining leisure-time physical activity as a domain-specific outcome. This is of consequence because earlier studies have shown that the socioeconomic pattern varies depending on whether the physical activity is leisure-time, occupational or transport-related. Therefore, the results offer context-specific insights into the literature on social inequalities in physical activity, emphasising the importance of domain-specific and life-course sensitive research.

Theoretically, the results support the usefulness of combining a Life-Course perspective with the Social Ecological Model. While early socioeconomic conditions may not have exhibited clear independent effects in fully adjusted models, they could still influence health behaviour through indirect channels such as educational pathways, family socialisation, financial access, neighbourhood conditions, social support, and opportunities for sport and recreation. Although the study could not directly test all of these pathways, its findings are consistent with such a multilevel understanding of behaviour.

Despite the lack of statistically precise independent effects, the practical implications of the study remain relevant. Public health strategies aimed at promoting physical activity among young adults should not rely solely on messages encouraging behavioural change but should also address the wider conditions that make leisure-time physical activity feasible, affordable and socially supported. This includes providing access to safe public spaces, creating walkable and bike-friendly environments, offering affordable sports facilities, providing flexible exercise opportunities and fostering supportive study and work settings. Socioeconomic differences in leisure-time physical activity, even if they are modest, may contribute to broader health inequalities over time. In this context, the thesis supports continued investment in structural and setting-based approaches, as well as improved monitoring of socioeconomic inequalities in physical activity.

Several methodological constraints should be considered, including the modest convenience sample, the cross-sectional design, and the use of retrospective and self-reported measures. To provide a clearer picture of life-course pathways, improve the precision of effect estimates and better capture the mechanisms by which socioeconomic conditions influence physical activity behaviour, future research should prioritise larger, longitudinal and multilevel approaches.

Overall, this study provides exploratory, yet theoretically grounded, evidence on the relationship between SEP and LTPA in young adulthood. It emphasises the difficulty of estimating socioeconomic gradients during transitional life stages, as well as the ongoing importance of investigating structural inequalities in health-related behaviour. Rather than

answering the question, this study helps to refine it: socioeconomic inequalities in leisure-time physical activity among young adults may exist in ways that are more complex and context-sensitive than can be captured by simple cross-sectional gradient models. Continued life-course-oriented, multilevel and equity-sensitive research is vital in order to better understand and reduce inequalities in physical activity.

7. References

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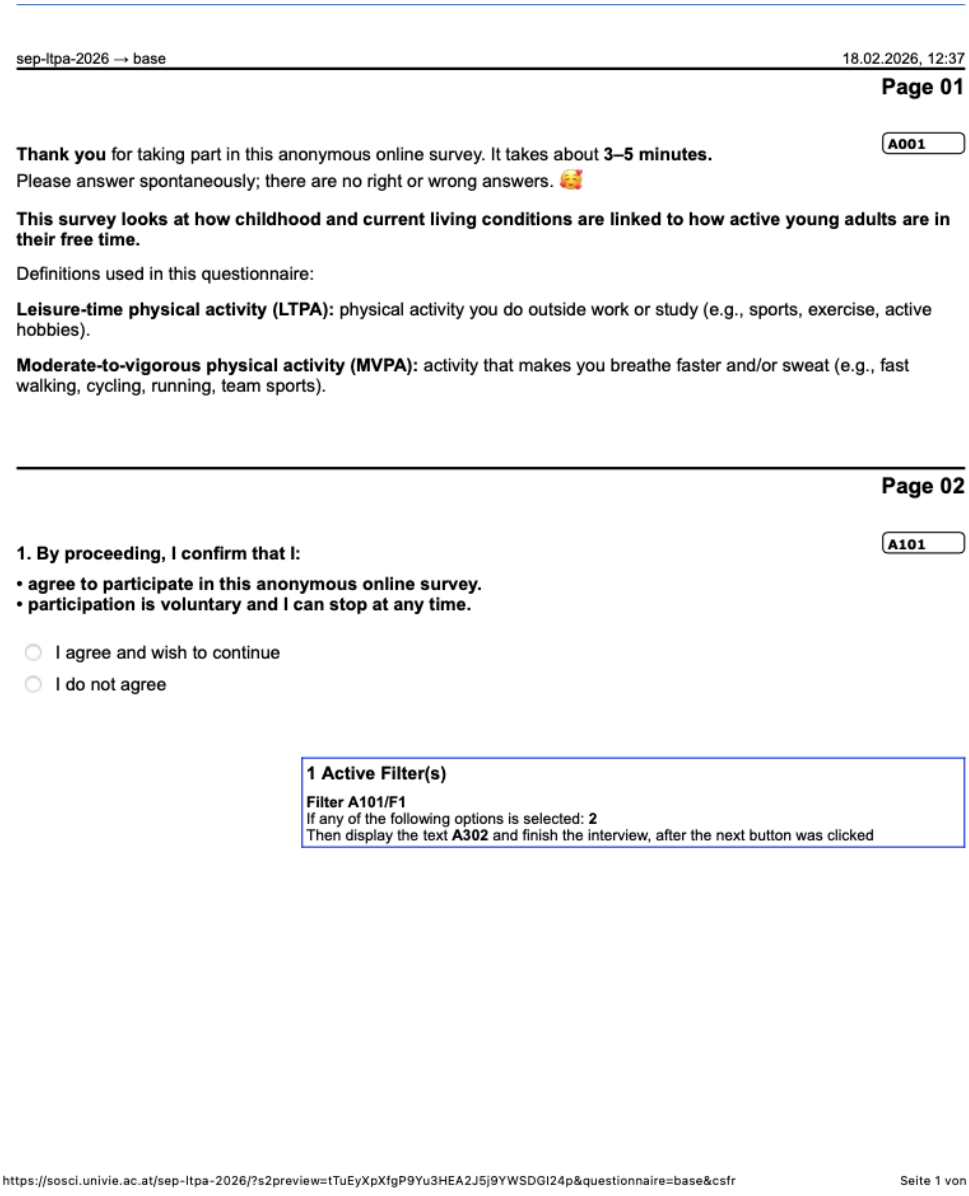
Appendix

SoSci Survey

The survey instrument used in this study was implemented using the SoSciSurvey platform. The questionnaire consisted of five sections: (A) consent and eligibility, (B) leisure-time physical activity, (C) childhood socioeconomic position, (D) current socioeconomic position, and (E) covariates.



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Page 01

A001

Thank you for taking part in this anonymous online survey. It takes about **3–5 minutes.**
Please answer spontaneously; there are no right or wrong answers. 🥰

This survey looks at how childhood and current living conditions are linked to how active young adults are in their free time.

Definitions used in this questionnaire:

Leisure-time physical activity (LTPA): physical activity you do outside work or study (e.g., sports, exercise, active hobbies).

Moderate-to-vigorous physical activity (MVPA): activity that makes you breathe faster and/or sweat (e.g., fast walking, cycling, running, team sports).

Page 02

A101

1. By proceeding, I confirm that I:

• agree to participate in this anonymous online survey.
• participation is voluntary and I can stop at any time.

○ I agree and wish to continue
○ I do not agree

1 Active Filter(s)

Filter A101/F1
If any of the following options is selected: **2**
Then display the text **A302** and finish the interview, after the next button was clicked

https://sosci.univie.ac.at/sep-ltpa-2026/?s2preview=tTuEyXpXfgP9Yu3HEA2J5j9YWSDGI24p&questionnaire=base&csfr Seite 1 von 6

Figure 3. Consent and introduction page of the survey

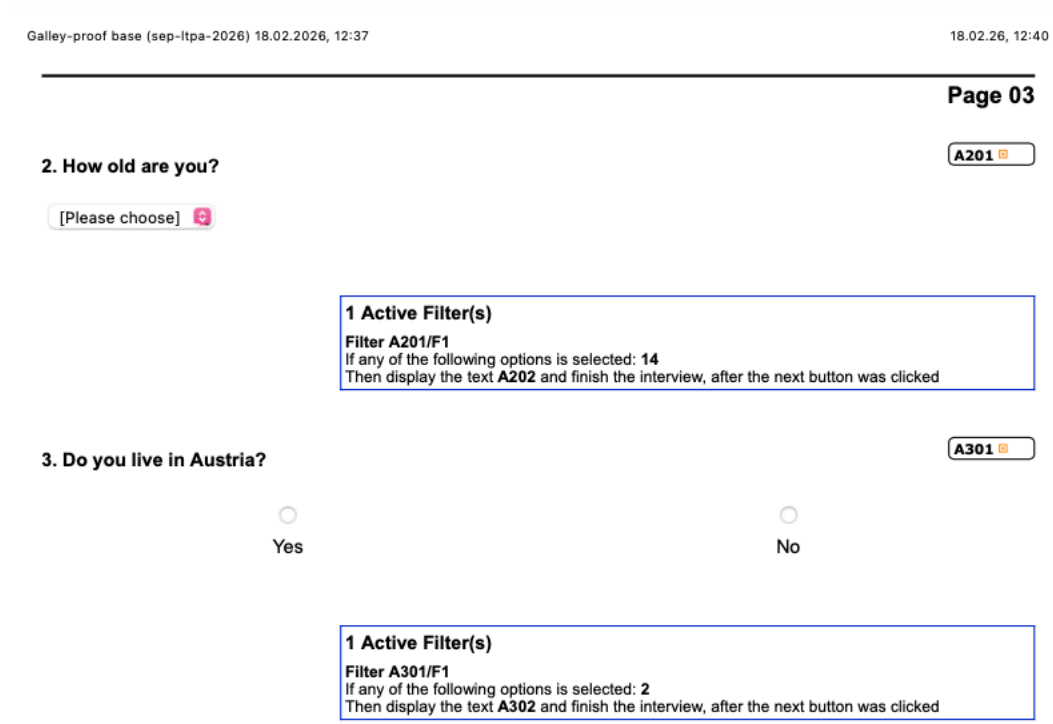

Figure 4. Eligibility questions of survey

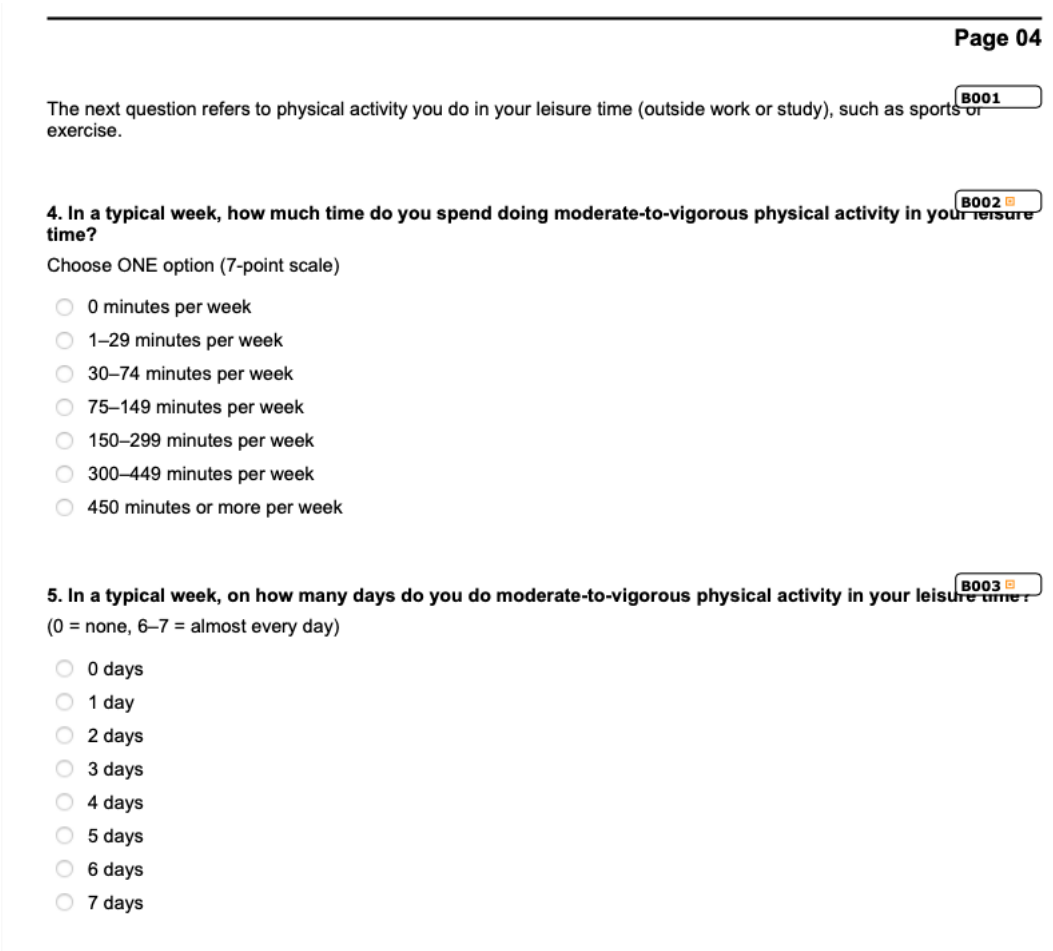

Figure 5. Leisure-time physical activity questions

Page 05

C001

Think about your childhood when you were around 10–12 years old.

C002

6. What was the highest level of education completed by either parent / main caregiver?

[Please choose]

C003

7. How would you describe your household's financial situation when you were growing up?

Choose ONE option:

Very difficult to make ends meet	Difficult	Somewhat difficult	Manageable	Fairly comfortable	Comfortable	Very comfortable	Prefer not to say
○	○	○	○	○	○	○	○

C004

8. Imagine a 7-step ladder representing social standing (1 = lowest, 7 = highest).
When you were 10–12 years old, where would you place your family compared with other families in Austria?

Choose ONE option

1	2	3	4	5	6	7	Prefer not to say
○	○	○	○	○	○	○	○

Figure 6.Childhood socioeconomic position items

Page 06

D001

9. Which best describes your current main activity?

[Please choose]

D002

10. What is the highest level of education you have completed?

[Please choose]

D003

11. How would you describe your current financial situation?

Choose ONE option:

- ○ Very difficult to make ends meet
- ○ Difficult
- ○ Somewhat difficult
- ○ Manageable
- ○ Fairly comfortable
- ○ Comfortable
- ○ Very comfortable
- ○ Prefer not to say

D004

12. Think of a 7-step ladder showing people's position in Austria by income, education, and job.
On which step would you place yourself?

Choose ONE option:

1	2	3	4	5	6	7
○	○	○	○	○	○	○

Figure 7. Current socioeconomic position items

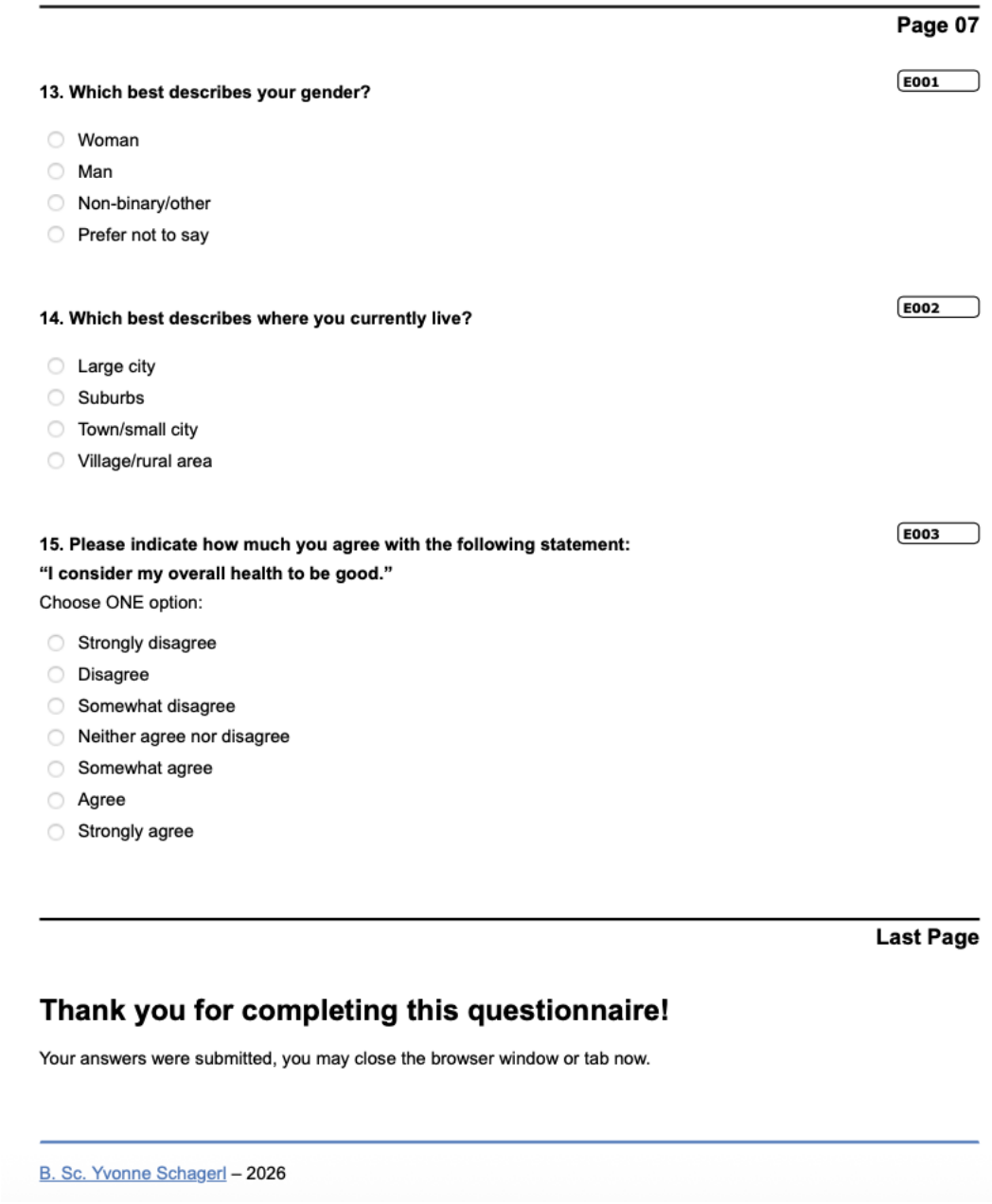

Figure 8. Covariates and closing page of survey

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AI Disclosure

Generative AI tools and DeepL were used to support minor language revisions during the final editing stage of this thesis. Their use was limited to grammar correction, stylistic smoothing, and improvement of clarity in individual sentences. No AI tools were used to generate research ideas, analyse data, interpret findings, or write substantial parts of the thesis. All content, arguments, structure, and final wording remain the sole responsibility of the author.