**Who travels for travel's sake?: Profiling undirected travelers and their (built) environments**

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**Abstract**

Undirected travel (UT; travel for its own sake) is systematically overlooked in transport research and planning, despite its strong connection to well-being. This study examines differences to directed travel, traveler profiles, built environment influences, and how these factors shape UT behavior using the 2023 ODiN dataset (53,049 respondents; 181,717 trips) through a proportional odds model. Findings suggest that UT is longer in duration but shorter in distance, taken overwhelmingly on foot, and has more temporal variability. Younger adults, males, non-Western migrants, and larger households, particularly with young children, are more likely, while employed and university-educated individuals are less likely, to engage in UT. Higher entropy and population, cycling, and service density are associated with UT participation. This highlights the unique nature of UT and underscores the need to reimagine transport planning frameworks to include UT, emphasizing its potential to enhance well-being and support sustainable mobility goals.

**Keywords**

Travel behavior; Built environment; Positive utility of travel; Travel for its own sake; Sustainable mobility

**Introduction**

Undirected travel (UT), or travel undertaken for its own sake, has been largely overlooked in travel behavior research despite its growing recognition (Hook et al., 2022). Studies using travel diaries or mobile phone data often discard UT or 'round trips' due to their lack of a definable destination, ignoring trips that may account for 10–30% of non-work travel (Cao et al., 2009). This oversight underestimates UT's prevalence and leaves policymakers with incomplete data focused only on directed travel.

UT holds intrinsic value, providing benefits like physical activity, mental well-being, and stress relief (Hook et al., 2021; Singleton, 2017). While travel behavior research often treats travel as a necessary cost to reach a destination, UT, such as walking to clear one's head or cycling for enjoyment, offers positive utility through the act of traveling itself. Ignoring these trips risks excluding strategies that enhance well-being by improving the travel experience.

The influence of the built environment on UT remains underexplored. Research shows that urban form, accessibility, and infrastructure shape travel behaviors, yet their role in facilitating UT is unclear. With most UT occurring via active modes (Hook et al., 2022), understanding its relationship with the built environment is vital for promoting healthier, more enjoyable travel options.

This study uses 2023 ODiN (Onderweg in Nederland; On the way in The Netherlands) data to address these gaps, aiming to: (1) differentiate UT from directed travel in terms of trip characteristics, (2) identify profiles of individuals based on UT engagement, and (3) examine built environment features that

facilitate or inhibit UT. By analyzing UT at a large scale, an approach which is thus far missing in academic literature, this research seeks to provide a fuller understanding of travel behavior and how the built environment supports travel for its own sake. It emphasizes reimagining transport planning to value the positive utility of travel, enabling policies that enhance well-being, sustainability, and quality of life.

**Data and methods**

The ODiN 2023 dataset provides a detailed, nationally representative view of travel behavior in the Netherlands, including trip characteristics (frequency, purpose, mode of transport, distance, duration, and time of day) and demographic data (age, gender, income, household composition, education, migration background, car ownership, and social participation). After data processing, 53,049 respondents and 181,717 trips were used in this analysis, capturing self-reported socioeconomic variations, modal choices, and travel trends, reflecting the Dutch emphasis on cycling and public transport.

Trip purposes were categorized into 13 types, including work (15.34%), business visit in working atmosphere (1.27%), professional (2.02%), pick up and drop off (6.85%), collection and delivery of goods (3.23%), education or courses (6.37%), shopping or grocery shopping (22.05%), visits or staying over (9.77%), touring or hiking (9.56%), sports or hobbies (9.46%), other leisure activities (9.14%), services or personal care (3.26%), and other (1.68%). UT was classified as 'touring or hiking', which was described as generally recreational travel where the goal is often the travel itself. Respondents were divided into highly engaged (multiple UT trips/day, N=3,195), moderately engaged (one UT trip/day, N=9,260), and directed travelers (no UT trips, N=40,594). Table 1 provides sociodemographic characteristics of these groups.

Neighborhood built environment variables influencing UT include population density (residents/km²), cycling density (cycling lanes/road length), land use diversity (entropy measure), public transit density (PT stops/km²), service density (services within a 15-minute cycling distance), and percentage of green space can also be found in Table 1. These metrics assess how spatial and infrastructural attributes shape UT behaviors.

Table 1: Socioeconomic and residential neighborhood built environment characteristics of highly and moderately engaged undirected travelers, directed travelers, and the sample in full.

| | | DT (N= 40594) UT = 0 | Moderate UT (N= 9260) UT = 1 | High UT (N= 3195) UT = 2 | Full Sample (N=53049) |
|---|---|---|---|---|---|
| Socioeconomic Variables | | | | | |
| Age | <=18 | 16.5 | 8.03 | 3.32 | 14.23 |
| | <18<=40 | 31.55 | 25.64 | 19.69 | 29.8 |
| | <40<=64 | 31.61 | 33.59 | 47.86 | 32.93 |
| | >=65 | 20.35 | 32.74 | 29.14 | 23.04 |
| Gender | Male | 51.5 | 48.28 | 47.57 | 50.7 |
| | Female | 48.5 | 51.72 | 52.43 | 49.3 |

| | | | | | |
|---|---|---|---|---|---|
| Income | First to Third decile | 20.39 | 22.48 | 18.06 | 20.62 |
| | Fourth to Seventh decile | 38.67 | 38.43 | 38.31 | 38.61 |
| | Eighth to Tenth decile | 40.93 | 39.08 | 43.63 | 40.77 |
| Household size | 1 | 17.11 | 17.28 | 17.09 | 17.14 |
| | 2 | 34.19 | 44.3 | 46.07 | 36.67 |
| | 3 | 15.01 | 13.5 | 14.59 | 14.72 |
| | >=4 | 33.69 | 24.92 | 22.25 | 31.47 |
| Education | No university | 59.55 | 57.49 | 53.93 | 58.85 |
| | University | 40.45 | 42.51 | 46.07 | 41.15 |
| Migrant background | Dutch | 74.62 | 77.68 | 84.23 | 75.73 |
| | Western | 8.03 | 8.33 | 6.7 | 8 |
| | Non-Western | 17.36 | 14 | 9.08 | 16.27 |
| Car ownership | 0 | 15.03 | 14.95 | 10.17 | 14.73 |
| | 1 | 47.21 | 51.37 | 49.51 | 48.08 |
| | >=2 | 37.75 | 33.68 | 40.31 | 37.2 |
| Children under 6 years old | 0 | 93.49 | 93.68 | 96.59 | 93.71 |
| | 1 | 6.51 | 6.32 | 3.41 | 6.29 |
| Social participation | Working 12 to 30 hours/week | 12.64 | 12.89 | 13.96 | 12.77 |
| | Working 30+ hours/week | 40.09 | 33.49 | 38.06 | 38.82 |
| | Homemaker | 2.46 | 4.06 | 3.13 | 2.78 |
| | Schoolchild/student | 21.13 | 11.12 | 5.01 | 18.41 |
| | Unemployed | 0.96 | 1.46 | 1.69 | 1.09 |
| | Incapacitated | 1.83 | 3.14 | 5.6 | 2.29 |
| | Retired/early retirement | 17.54 | 29.37 | 26.73 | 20.16 |
| | Other | 3.33 | 4.46 | 5.82 | 3.68 |

Neighborhood Built Environment Variables

| | | DT mean | Moderate UT mean | High UT mean | Full sample mean |
|---|---|---|---|---|---|
| Population density | 1000 per km2 | 3.682 | 3.442 | 2.839 | 3.589 |
| Cycling density | Length of cycling lanes (km) over the length of the road (km) | 0.331 | 0.316 | 0.306 | 0.327 |
| Land use diversity | Entropy | 0.578 | 0.578 | 0.582 | 0.578 |
| PT density | Number of public transit stop per km2 | 7.401 | 6.955 | 6.135 | 7.247 |
| Total service density | Services within 15-minute cycling distance | 3.189 | 3.05 | 2.345 | 3.114 |
| %Green space | Percent green space over all land uses | 0.081 | 0.078 | 0.080 | 0.081 |

To analyze the factors influencing UT, a proportional odds model (POM) was employed, allowing for the examination of an ordinal outcome variable with three levels: (0) No UT, (1) Single UT, and (2) Multiple UT. The model included the socioeconomic and built environment variables seen in Table 1, and no multicollinearity was detected among variables. A partial proportional odds approach was used to accommodate variables that violated the proportional odds assumption, enabling flexible estimation at two thresholds:

- (1) No UT versus Single/Multiple UT
- (2) No/Single UT versus Multiple UT

Log-transformed continuous variables and odds ratios (ORs) were used to enhance interpretability, with ORs indicating the likelihood of being in a higher UT category. Model fit was assessed using residual deviance and log-likelihood, ensuring robust insights into the determinants of UT behavior.

**Results**

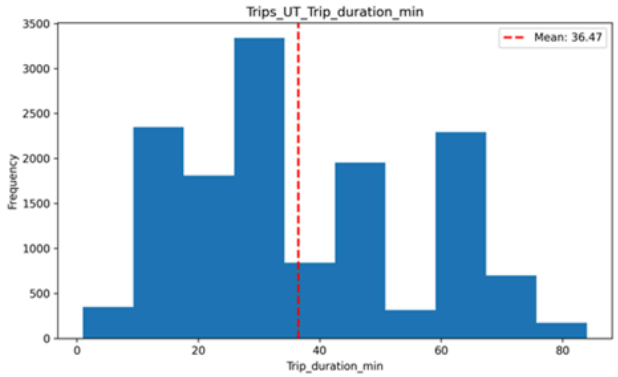
First, undirected and directed trip characteristics of duration, distance, mode, and departure hour are discussed (Figure 1). UT trips averaged 36.47 minutes, substantially longer than directed trips (19.13 minutes), but were shorter in distance (5.86 km vs. 7.52 km). UT was predominantly on foot, with some by bicycle or car, while directed trips were mainly by car, followed by cycling, walking, public transport, and other modes. These patterns align with prior research on UT.

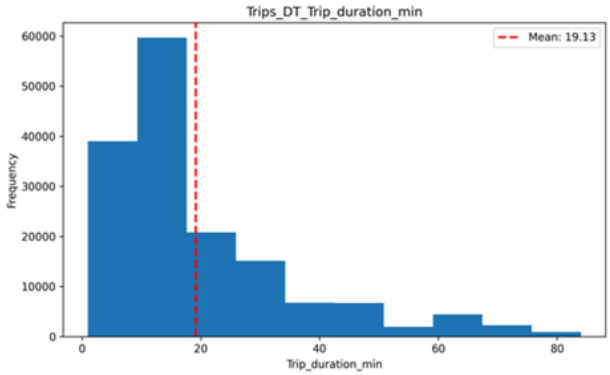
Regarding the departure hour of trips, directed trips have expected peaks around 8:00 and between 14:00-17:00 reflecting ‘rush hour’ peaks. On the other hand, UT peaks are less uniform, with peaks at 10:00, 13:00-14:00, 19:00, and 22:00. This could reflect specific patterns and motivations relating to UT behavior. For instance, trips taken at 10:00 might reflect a mid-morning routine or break to engage in light activity after the day has begun. Trips taken between 13:00-14:00 could reflect lunchtime leisure, indicating that this may be an opportune period for light activity, perhaps serving as a midday reset. Trips taken around 19:00 could correspond to post-dinner or end-of-day leisure activities, with this timeframe aligning with the desire to relax or unwind after structured daytime activities. Trips taken around 22:00 may indicate reflective or solitary travel to unwind, as these trips are likely taken in less crowded or quieter periods of the day.

## Undirected Trips

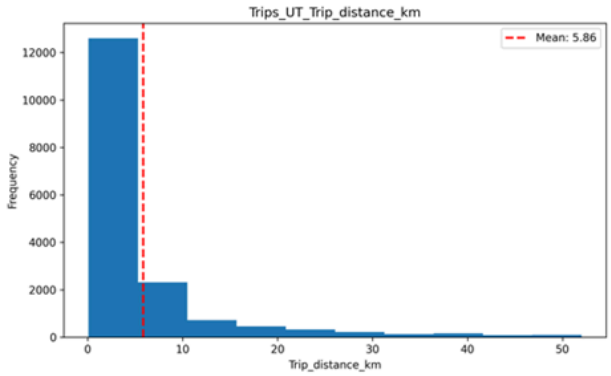
## Directed Trips

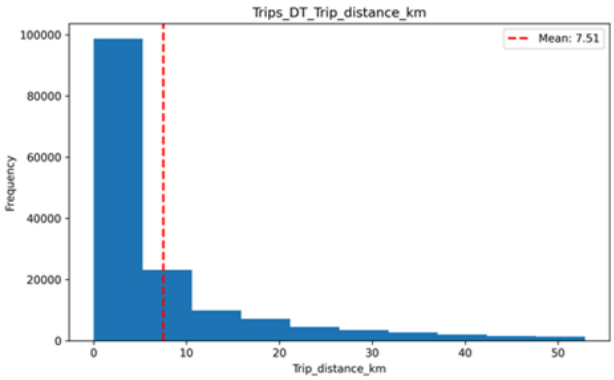
### Duration



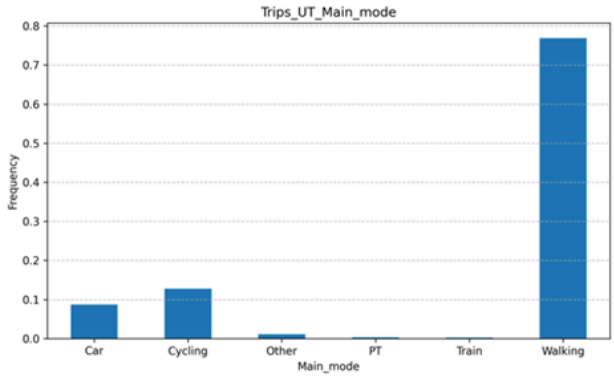



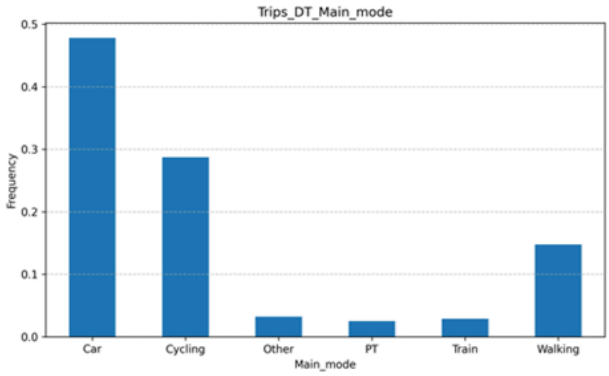

### Distance



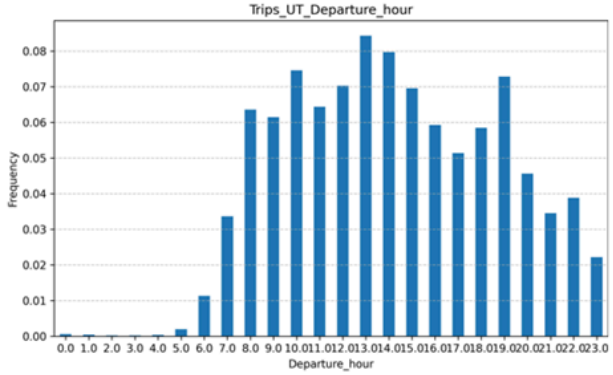




### Mode




### Departure Hour



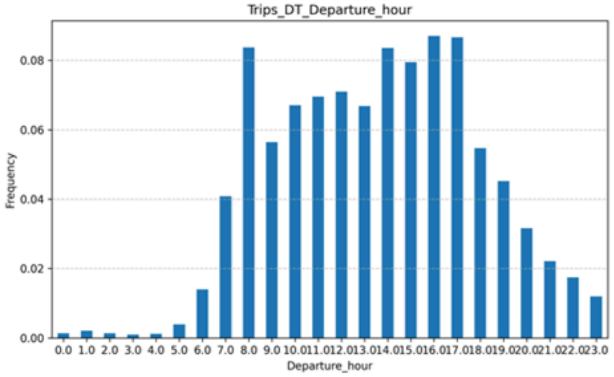



*Figure 1: Duration, distance, departure hour, and mode of all undirected and directed trips*

Next, results from the POM are presented in Table 2. Regarding socioeconomic characteristics, age was found to play a prominent role in participation in UT, with younger individuals more likely to take these trips. Participation in UT decreases significantly with age, particularly in the multiple UT category. Individuals aged 18–40 have 37% lower odds of engaging in UT and 60% lower odds of multiple UT participation compared to younger individuals. These odds drop further for those aged 41–64 (55% and 78%, respectively), while individuals aged 65+ show slightly less pronounced reductions (45% and 58%). This indicates that younger populations are more likely to engage in UT, particularly for multiple trips, likely due to lifestyle or mobility patterns. Gender also has a notable influence, with women exhibiting 10% lower odds of participating in UT at all and in multiple UT trips compared to men. Additionally, university-educated individuals have an 8% lower likelihood of making undirected trips, and a 12% lower likelihood of taking multiple UT trips, which may reflect a focus on time efficiency or alternative leisure activities. Income level influences UT participation as well. Middle-income individuals have 6% higher odds of engaging in UT compared to other income levels, possibly reflecting greater leisure capacity compared to lower-income groups and fewer time constraints than high-income groups. Further, non-Western migrants have 24% higher odds of being in a UT category and 62% higher odds of being in the multiple UT group, potentially reflecting differences in cultural or social influences, though this conflicts with the descriptive analysis of variable changes over the different UT groups. Finally, employment status was found to be relevant as part-time workers (15% lower odds) and full-time workers (46% lower odds) are less likely to participate in UT, with the latter also having significantly reduced odds (47%) of multiple UT trips. This reflects time constraints associated with work commitments.

Household composition is another important factor, with smaller households (2- or 3-person) showing lower odds of engaging in UT (26% and 9% lower, respectively), while larger households (4-person) show 26% higher odds of multiple UT participation. Larger households may involve more family-oriented outdoor or leisure activities, increasing their engagement in multiple UT trips. Particularly, households with children under 6 have 11% lower odds of engaging in UT but 33% higher odds of participating in multiple UT trips. Car ownership reduces the likelihood of multiple UT trips. Households with one car show 19% lower odds, and those with two or more cars show 28% lower odds of engaging in multiple UT trips, suggesting that reliance on private vehicles may discourage frequent leisure-oriented travel.

The built environment also plays a role in shaping UT travel behavior. Higher population density increases participation in UT by 8% and in multiple UT trips by 15%, indicating that denser urban areas may support undirected travel through closer proximity to amenities and greater walkability. Areas with more cycling infrastructure (16% higher odds) and greater land use diversity (15% higher odds) are associated with increased UT participation, suggesting that these features encourage recreational and discretionary travel. A higher density of services within cycling distance is linked to a 13% increase in the odds of participating in multiple UT trips. On the other hand, higher public transit density is associated with 6% lower odds of engaging in multiple UT trips, which may indicate a preference for structured, destination-oriented travel in transit-heavy areas. Paradoxically, higher greenery is associated with 44%

lower odds of engaging in multiple UT trips. This could reflect that green spaces may attract longer, less frequent leisure trips rather than multiple shorter trips.

Table 2: Results of the Proportional Odds Model analyzing factors influencing UT participation for those taking single and multiple UT trips compared to those taking no UT, and for those taking no or single UT trips compared to those taking multiple UT trips.

| | Single/Multiple UT vs. No UT | | Multiple UT vs. Single/No UT | |
|---|---|---|---|---|
| Variable | OR | Significance | OR | Significance |
| <18<=40 | 0.626 | *** | 0.398 | *** |
| <40<=64 | 0.446 | *** | 0.216 | *** |
| >=65 | 0.547 | *** | 0.420 | *** |
| Female | 0.903 | *** | 0.903 | ** |
| Income 4-7 Decile | 1.058 | . | 0.963 | |
| Household size = 2 | 0.841 | *** | 0.959 | |
| Household size = 3 | 0.912 | * | 1.033 | |
| Household size = 4+ | 0.997 | | 1.259 | *** |
| University educated | 0.922 | *** | 0.882 | ** |
| Migrant background non-Western | 1.239 | *** | 1.620 | *** |
| Own 1 car | 0.992 | | 0.806 | ** |
| Own 2+ cars | 1.016 | | 0.716 | *** |
| Children under 6 years old | 0.893 | * | 1.334 | ** |
| Working 12 to 30 hours/week | 0.848 | *** | 0.900 | . |
| Working 30+ hours per week | 0.537 | *** | 0.528 | *** |
| Population density | 1.084 | * | 1.150 | * |
| Cycling density | 1.155 | . | 1.022 | |
| Entropy | 1.154 | . | 1.185 | |
| PT density | 0.993 | | 0.938 | . |
| Service density | 1.001 | | 1.133 | ** |
| %Green space | 0.968 | | 0.564 | * |

Note: *** for $p \leq 0.001$;** for $p \leq 0.01$;* for $p \leq 0.05$; . for $p \leq 0.1$.

**Discussion and conclusion**

This research aims to define how UT differs from directed travel in terms of trip characteristics, including duration, distance, mode, and time of day, identify profiles of individuals based on their engagement in UT, and examine the built environment characteristics that facilitate or inhibit UT. Substantial differences were found between UT and directed travel characteristics, with undirected trips being undertaken for longer durations and shorter distances, overwhelmingly on foot, and with more varied temporal

patterns. The difference in peak times for UT indicates that traditional transport planning may not accommodate these trips, and is therefore something for planners to consider when making decisions about infrastructure design, public space accessibility, and service provision during non-peak hours to better support recreational and discretionary travel.

Socioeconomic factors significantly shape UT behavior. Younger individuals are more likely to engage in UT, especially multiple trips per day, potentially reflecting lifestyle priorities such as leisure and physical activity. Women and university-educated individuals are slightly less likely to participate in UT, possibly due to social roles, safety concerns, or alternative leisure preferences. Non-Western migrants are more likely to engage in UT, potentially influenced by cultural, economic, or social norms favoring outdoor activities, while employment status limits UT participation potentially due to time constraints.

Household characteristics and mobility also influence UT. Larger households, particularly those with young children, are more likely to engage in multiple UT trips, while vehicle ownership reduces the likelihood of frequent UT, emphasizing the role of active modes like walking and cycling.

Built environment features such as higher population density, cycling infrastructure, land use diversity, and service density encourage UT, while higher public transit density and greenery are associated with fewer multiple UT trips, possibly due to their alignment with longer, less frequent leisure travel.

These findings emphasize the importance of understanding UT as a distinct behavior shaped by socioeconomic factors, individual preferences, and nuanced interactions with the built environment. The results align with the broader goal of this research that aims to highlight the positive utility of travel and its contributions to well-being. By identifying barriers and facilitators of UT, policymakers can design urban environments that support this form of mobility, such as creating safe, accessible spaces for recreational travel or addressing cultural and financial barriers to participation. Recognizing the distinctiveness of UT can also inform future research and planning models, ensuring that this behavior is included in datasets and decision-making processes. Incorporating these insights into transport and urban planning frameworks supports a more holistic approach to mobility, one that prioritizes well-being and satisfaction alongside efficiency, ultimately aligning with the broader goals of sustainable and equitable urban development.

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