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A comparative analysis of determinants, characteristics, and experiences of four daily trip types

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ABSTRACT

The positive utility of travel (unrelated to the destination) and travel satisfaction have been discussed in travel literature, but a research gap exists in comparing if and how travel benefits might differ among commuting, shopping, leisure, and undirected trips (those without a destination, undertaken for the purpose of the trip itself). By specifying the varying benefits of each trip type (or determining whether there is a variation), the positive utility of travel can be better understood, potentially identifying strategies for improving travel satisfaction and, in turn, subjective well-being. This paper considers these four trip types (commuting, shopping, leisure, and undirected) by evaluating differences in beneficial aspects of travel (improving physical health, improving mental well-being, enjoying scenery, and social contact), travel satisfaction, and characteristics (mode, distance, duration, frequency) among 1122 daily travel trips using survey data (n = 332) from Flanders, Belgium. Results indicate that, 1. though taken least often, undirected trips are the most important to physical activity, 2. undirected and leisure trips are most associated with positive utility of travel, and 3. trips to a leisure destination are the most satisfying. This investigation offers information regarding how experienced utility might differ when considering the context of the destination, and how satisfaction with different trips might relate to overall well-being.

1. Introduction

It has been clearly established in travel behavior literature that there are benefits to daily travel that are gained from the travel itself (e.g. Mokhtarian et al., 2015a,b; Singleton, 2017). For example, active travelers benefit from exercise, someone traveling by train might enjoy socializing or watching people, or someone driving might value the time along the way to clear their head before they arrive at their destinations. While positive utility might be a growing theme in travel behavior literature due to its relationship to travel satisfaction and, subsequently, potential to improve subjective well-being (Ettema et al., 2010), there is not yet a full understanding of whether specific benefits are associated with specific trip types. For instance, instead of utility or benefits being related generally to all travel, does the positive utility of travel differ between commuting, shopping, leisure, and undirected trips (those taken for their own sake; Mokhtarian and Salomon, 2001)? Might some individuals associate their commutes with clearing their head, their shopping trips with physical activity, their leisure trips with socializing, and their undirected trips with fresh air and sunlight? While a main benefit certainly is reaching a trip's destination – at least for derived trips – strong secondary benefits might influence travel behavior. Investigating if trip types are associated with specific benefits might offer a more robust understanding of mobility patterns, which could in turn offer opportunities for improving travel satisfaction and subjective well-being.

Investigating positive utility and satisfaction among different trip purposes is important because different circumstances, such as whether a trip is discretionary (trips to leisure destinations) or has no destination

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(undirected trips, or trips taken for the purpose of the trip itself), for instance, might have different implications. For example, commuters might find that catching up on a project during their commute is a good reason to take the train, but this secondary benefit of travel is unlikely to exist on a leisure trip. On the other hand, chatting with a friend on the way to a museum might be a secondary benefit of the leisure trip, but someone commuting might want to take a nap instead of chat. Each trip type might have different associated beneficial aspects, and this might impact travel satisfaction. By researching differences among trip types, a better appreciation of daily travel in different situations can be gained and satisfaction with these trips can be improved upon. Without a full picture of the ways in which individuals move through their environments and the implications of daily mobility on personal well-being, the impacts of planning or success of mobility policy, for instance, cannot be accurately assessed. Further, as mobility norms adjust after the COVID-19 pandemic, to combat climate change, or alongside advancements in technology, an opportunity to reimagine mobility that accommodates (or better yet, enhances) the beneficial aspects of travel associated with specific trip types arises. For example, trips may become more discretionary with a rise in tele-activity (e.g. telework, e-shopping, telehealth), local trips may become more active for urban residents as a response to policy promoting environmental values (e.g. sustainable urban mobility plans, low-emission zones), or technological advancement (e.g. autonomous vehicles, drone deliveries) may change activity-participation for commuters and shoppers. These mobility evolutions are rapid, and infrastructure to support them could be designed with specific beneficial aspects of travel in mind if planners understand what travelers gain from different types of trips (in addition to reaching destinations).

Positive travel utility and satisfaction associated with the commute has been relatively well-researched in travel behavior literature due to its high priority as a daily activity, and therefore its implications for overall well-being and happiness. For example, the commute is often considered, 'the stress that doesn't pay' (Stutzer and Frey, 2008), and longer commutes are associated with low levels of satisfaction. These trips are frequently fixed in destination, to particular times of day, and to specific modes. The commute can take up a considerable part of the daily time budget and affect other life domains, such as job or leisure satisfaction, as well as mental health (Clark et al., 2020). The commute can also be beneficial for gratifying or productive time use, such as the opportunity to read a book, chat with a friend, prepare for the activity ahead, 'opt-out', or exercise (Redmond and Mokhtarian, 2001). In fact, though the majority wish their commute was shorter, many people would choose to commute instead of arriving instantaneously at their workplace, indicating that it indeed provides utility and is not necessarily *only* about reaching a destination (Russell and Mokhtarian, 2015). Actually, costs and benefits of commute duration might even out as longer commutes are associated with higher incomes, homeownership, and being married (Morris and Zhou, 2018). Information about the commute is beneficial for research aiming to understand daily mobility and how it can affect, for example, travel satisfaction, satisfaction with other life domains, and subjective well-being (Ettema et al., 2010).

While the commute is undeniably an important aspect of daily mobility, in comparison to commuting there is less research about the positive utility of travel and satisfaction associated with non-commuting trips. For example, Clark et al. (2020) investigate the effect of commuting on subjective well-being, Humagain and Singleton (2020) use the teleportation test to investigate the positive utility of the commute, Mokhtarian and Salomon (2001) investigate the positive utility of the commute by modeling ideal and desired commute time, and Sprumont et al. (2017) specifically link commuting satisfaction to travel utility. A recent survey of eleven EU member states showed that total daily distance traveled was, on average, comprised of 42.1 % commuting (and education-commuting) trips, 12.4 % shopping trips, and 22.2 % leisure (including undirected) trips, with the remaining 23.3 % falling into various other categories (Eurostat, 2021). Daily trips other than the commute clearly account for a substantial share of total trips, but information about their experienced utility and differences in satisfaction is limited. This study specifically focuses on three additional types of daily travel trips: shopping, leisure, and undirected trips. While these four categories are certainly not exhaustive of *every* daily trip type (e.g. medical or child-care related trips), this focus offers a range from more or less mandatory trips (commuting, shopping) to discretionary trips with a clear destination (leisure) and no destination (undirected). Exploring this gap in the literature is important to gaining a more intricate understanding of the potential benefits gained from participating in travel (other than reaching the destination) and the ways daily trips relate to travel satisfaction across various trip types, with special interest in leisure and undirected trips as they are understudied. The value of including trip characteristics in this investigation is, first, that distance, duration, mode, and frequency might be linked to satisfaction and positive utility, and second, that distinctions among these four trip types have not yet been empirically investigated within the same sample.

Subsequently, though research on leisure and undirected travel is limited, the travel behavior field has generally considered undirected travel to be a sub-category of leisure trips. It is important to empirically analyze these as different travel categories due to the implications of a trip having a destination or not (Hook et al., 2021c). In other words, leisure trips are trips to leisure destinations, while undirected trips are trips taken for their own sake with no destination, or with the destination ancillary to the travel. The lack of destination in undirected trips automatically implies that they might offer more freedom, whereas trips to leisure destinations (therefore relying on reaching a destination) are still subject to certain unavoidable circumstances or perhaps to time pressure. For example, someone traveling for leisure to meet a friend at a restaurant might encounter a stressful traffic situation if the meeting is scheduled during rush-hour or might not be able to use their bicycle (their preferred mode) to reach a destination too far to cycle. If they later take an undirected bicycle trip, they would not face this modal constraint and could take this trip during a time in a space with low traffic because undirected trips are *for the purpose of the travel*, and therefore at the discretion of the traveler (Mokhtarian and Salomon, 2001). Maybe whilst on the undirected trip, they find a particularly scenic path and change their route to enjoy it, meanwhile the leisure trip might not provide this extra time. On the other hand, perhaps the anticipation of meeting the friend at the restaurant provides so much joy that their satisfaction with this leisure trip is higher than their satisfaction with an undirected trip without a positive encounter. Alternatively, perhaps the undirected trip is stressful due to time pressure because other activities are planned directly afterward. In any case, including undirected trips within a categorization of leisure trips removes the opportunity to examine these distinctions, thereby conflating trip characteristics, beneficial aspects of travel, and satisfaction.

This research builds on an initial survey regarding travel behavior, and specifically undirected travel, during the early months of the COVID-19 lockdown (20 April – 4 May 2020). While differences between the pandemic and a normal situation must be considered, there was nonetheless valuable information gleaned regarding undirected travel and its importance as a form of daily travel from the first data collection in 2020. First, four general categories of beneficial aspects of undirected trips were found through factor analysis: improving physical health, improving mental well-being, enjoying scenery, and social contact (Hook et al., 2021b). Second, high levels of undirected travel satisfaction were found with a clear positive relationship to subjective well-being, and a clear relationship to physical activity (Hook et al., 2021c). Finally, results indicated that undirected trips compensated for a decrease in car trips due to the pandemic (Hook et al., 2021a). This research was followed up with a second survey with the intention to build on what was found about undirected travel as it is underrepresented in the travel behavior field, and important to the future of mobility, as well as investigate further travel motivations. Specifically,

there is a gap in the literature comparing satisfaction with and beneficial aspects of the act of participating in different trip types within the same sample, and comparing undirected trip characteristics to directed trip characteristics through empirical investigation.

The overall objective of this study is to compare four types of daily travel trips, commuting, shopping, leisure, and undirected, by focusing on two main research questions: 1. Differences in beneficial aspects of travel (other than reaching the destination) and 2. Differences in satisfaction with travel. Differences in trip characteristics in terms of frequency, mode, distance, and duration will also be provided as it is an opportunity to compare undirected trips to directed trips within the same sample. This will be accomplished using data from a survey (23 April – 6 May 2021) of 1122 trips taken by 322 residents of Flanders, Belgium while some governmental COVID-19 lockdown measures were still in place. In doing so, differences between mandatory and discretionary trips as well as trips with and without a destination can be explored. It is hypothesized that beneficial aspects of travel might be associated with discretionary trips, as well as higher satisfaction, though the activity at the destination of leisure trips might also be important to satisfaction. A literature review will first discuss what is known about the positive utility of travel other than participating in the activity at the destination (if applicable), satisfaction with travel, and distinctions in trip characteristics. Following, the four trip types are explored through Chi-squared tests and mean-comparison tests. A comparison of commuting, shopping, leisure, and undirected trips can offer valuable information about the beneficial aspects of travel other than reaching the destination, which trips contribute to travel satisfaction, and how undirected and directed trips differ in how, where, how often, and for how long they are taken. It is clear, both through literature before the pandemic regarding the positive utility of travel and from examples during the COVID-19 pandemic in which mobility was often used as a strategy to improve well-being (Hook et al., 2021b), that daily trips can – at least for most people – be more valuable than simply moving from point A to point B. Therefore, this research can provide an understanding of the specific value gained from certain trips, offering an opportunity to optimize these benefits and improve mobility by imagining it in new ways.

2. Literature review

This literature review will discuss what is known about the positive utility of travel, travel satisfaction, and differences in characteristics among the four trip types investigated in this study: commuting, shopping, leisure, and undirected. A final section will discuss the COVID-19 pandemic situation in Belgium to put into perspective how the findings might be applied to more 'normal' times with no travel restrictions (either governmental or out of personal caution).

2.1. Positive utility of travel

Psychological theories of motivation are highly relevant to travel behavior, as both intrinsic and extrinsic motivations can be found in the act of traveling (for review, see Mokhtarian et al., 2015a,b). Extrinsic motivations are external factors that drive someone to travel, such as the obligation to be present at the workplace, the necessity to purchase food to cook for dinner, or the expectation to arrive at a meeting with friends. Intrinsic motivations are internal factors of, for instance, enjoyment, interest, adventure, or independence (Ory and Mokhtarian, 2005; Salomon and Mokhtarian, 1998), driving someone to participate in traveling. The beneficial aspects of travel as explored in this paper are considered intrinsic motivations for travel, and are benefits derived from the trip itself (Singleton, 2017).

Two types of utility are normally discussed in travel behavior literature: decision utility and experienced utility (De Vos et al., 2016). Decision utility is the utility gained compared to the next best alternative (Kahneman et al., 1997), and experienced utility, alternatively, is the reward from an outcome, i.e. after the decision is made (Robson and Samuelson, 2011). The positive experienced utility of daily travel is well documented and considers both the benefits of travel itself and the benefits of activities during travel (Mokhtarian and Salomon, 2001). These benefits include advantages such as improving physical health (especially with active modes), activity-participation (e.g. reading a book, listening to music, or socializing), or relaxing before the next activity (De Vos et al., 2013; Jain and Lyons, 2008; Jakobsson, 2007; Le et al., 2020; Steg, 2005). For example, the commute has been found to be beneficial to think and prepare for activities ahead on the route to work, and to unwind or de-stress on the route home (Jain and Lyons, 2008), as well as positively linked to social comparison and self-presentation (Steg, 2005). Meanwhile, undirected trips have been found to be associated with removing negative feelings, enjoying scenery, and social contact (Hook et al., 2021b). The perceived positive utility of travel in turn can reflect positively on mood, experiences during travel, attitudes toward travel, satisfaction with travel, and well-being (Ettema et al., 2010).

2.2. Travel satisfaction

Positive utility is closely related to satisfaction with travel in that they are both elements related to subjective well-being (Ettema et al., 2010), though instead of focusing on what was gained from a trip, travel satisfaction is concerned with how the traveler felt during the trip and their evaluation of it. The Satisfaction with Travel Scale (STS; Ettema et al., 2011) measures affective responses and cognitive evaluations, and is often used as a standardized measurement scale in travel behavior literature to examine satisfaction with elements of daily travel trips such as mode, distance, duration, or destination. For example, active travelers most often report the highest levels of satisfaction regardless of trip destination (De Vos et al., 2016; St-Louis et al., 2014; Ye and Titheridge, 2017). Duration has been found to have a negative relationship to satisfaction with directed trips (Morris and Guerra, 2015), but a positive relationship to satisfaction with undirected trips (Hook et al., 2021c).

Alternatively, distance of leisure trips has been positively linked to satisfaction (De Vos et al., 2016), though positive effects of distance have also been found for all trip types combined (Mokhtarian et al., 2015a,b). Satisfaction with trip distance is also destination-dependent and might be more closely related to activities at the destination than the trip itself, though perhaps the relationship is bidirectional with more satisfying trips leading to more satisfying leisure activities (De Vos, 2019). Leisure trips have also been found to be more satisfying for active travelers, though not for public transit users (De Vos et al., 2016), and suburban residents (De Vos & Witlox, 2016). New research (Hook et al., 2021c) indicates that levels of undirected trip satisfaction might be higher than those found for leisure trips (including undirected trips), and for directed trips generally found in other studies. However, these assumptions come from a comparison of undirected travel satisfaction to levels of satisfaction with directed trips from various previous research studies instead of directly comparing satisfaction within the same sample, suggesting that more information regarding these intricacies will be a valuable addition to the travel behavior field. Further, to the best of the authors' knowledge, no studies thus far have considered undirected trips and trips with a leisure destination separately through comparison.

Satisfaction with the commute, on the other hand, has been frequently investigated in travel behavior literature due to the implications for satisfaction with other life domains, such as employment, free-time, or health (Clark et al., 2020). Though the lowest levels of satisfaction are typically related to the commute (Hook et al., 2021c) and it has been well-documented as an experience that can be stress-inducing (Stutzer and Frey, 2008), if given the option most people would still choose to have *some* commute time over instantaneously arriving at their workplace (Humagain and Singleton, 2020; Mokhtarian and Salomon, 2001; Russell and Mokhtarian, 2015). Whether this is attributed to the extra time to read on the train, the opportunity to

carpool and chat with a friend, or the physical activity while cycling to work, for example, it is clear that there is positive utility derived from commuting (Sprumont et al., 2017).

Further evidence has been found regarding the difference in 'travel-liking' among trip types. Travel-liking and travel satisfaction are not strictly the same concept – the former regards how much one likes to travel (Ory and Mokhtarian, 2005) and the latter regards components of emotion and evaluation (Ettema et al., 2011) – but they are similar in theme and can inform one another. Travel-liking has been found to be highest for leisure trips related to entertainment, socialization, and recreation, followed by leisure trips to eat a meal (Mokhtarian and Salomon, 2001; Ory and Mokhtarian, 2005). This result was consistent across both short- and long-distance trips. Travel-liking was also found to be higher for shopping trips than commuting trips (Mokhtarian and Salomon, 2001). The work of Mokhtarian and Salomon (2001) is a key point of departure for this paper as they investigated travel-liking among trip purposes within the same sample, and this work aims to build on their findings by including the investigation of travel satisfaction and the undirected trip purpose. Investigating travel satisfaction among the four trip types allows the relationship between travel-liking and travel satisfaction to be further explored in terms of emotion and evaluation, and specifically illuminates differences between undirected and derived leisure trips.

2.3. Trip characteristics

Household surveys and academic papers acknowledge characteristics of different trip purposes from all parts of the world across decades, therefore it is not possible to mention all findings in the scope of this literature review. Instead, this section aims to identify key differences in characteristics among the four trip types (commute, shopping, leisure, and undirected) that are relevant to the purpose of this paper (beneficial aspects of travel and satisfaction) and the sample surveyed. This section will also provide an overview of modal choice in terms of travel purpose by incorporating the findings from a Belgian national travel survey (Cornelis et al., 2012).

Differences in modal choice for the commute are not necessarily straightforward and might have more to do with ease of travel than destination (Dieleman et al., 2002; Frank and Pivo, 1994; Schwanen et al., 2004). A general desire to minimize the distance and duration of commuting has been found (Redmond and Mokhtarian, 2001), indicating that where possible, the modes that facilitate this are more likely to be chosen. For example, accessibility to highways has been found to encourage car use for commuting and accessibility to railway stations has been found to encourage public transport use (Cervero, 2002). Similarly, in places with greater densities and greater congestion, active and public transportation is often chosen over private cars (Dieleman et al., 2002; Frank and Pivo, 1994; Schwanen et al., 2004) in an effort to maximize convenient or fast commuting if possible. As individuals or jobs relocate to more suburban areas to avoid traffic congestion, the result has been found to be either less commuting or longer commuting distances (Schwanen et al., 2001). Income is another factor that might affect modal choice, though this can be confounded by factors such as density or mode accessibility. For Belgians (Cornelis et al., 2012), the commute is most commonly undertaken by car (61 %), followed by active modes (walking or cycling; 20 %), public transport (14 %), and various or other modes (5 %).

Shopping trips (e.g. to practical shops such as the supermarket or to specialty shops such as antique stores), on the other hand, are more straightforward in terms of modal choice and are generally undertaken by car (Carse et al., 2013; Frank and Pivo, 1994; Handy and Clifton, 2001), though in higher-density locations more active and public shopping trips can be found (Schwanen et al., 2004; Su et al., 2009). Shopping trips are often completed close-to-home (or perhaps chained with other types of trips), with the shortest distances travelled (Schwanen et al., 2001), but have specific mode-dependence based on the objects a shopper might purchase (Handy and Clifton, 2001) as well as a number of equity concerns (Clifton, 2004) that might not exist as strongly with commuting or leisure trips,[1] such as car accessibility, limited access to full grocery stores, or higher prices in less populated areas. Regarding demographic characteristics, being single, a childless couple, or in a lower-income category raises the likelihood of using public transportation for shopping trips (Schwanen et al., 2001). For Belgians (Cornelis et al., 2012), shopping trips are most commonly undertaken by car (64 %), followed by active modes (walking or cycling; 30 %) and public transport (6 %).

Leisure trips are often taken by both bicycles and public transportation, or potentially a combination of the two (Limtanakool, et al., 2006; Schwanen et al., 2001). However, there is also evidence that the quality of public transport might influence the decision to choose it over the bicycle (Dieleman et al., 2002; Schwanen et al., 2001). In contrast to commuting trips, accessibility of a railway station does not influence public transit use for leisure trips, which could indicate the more 'free' nature of the latter (Limtanakool et al., 2006). Regarding demographic characteristics, being single, a childless couple, and in a higher income category is associated with the use of public transportation for leisure trips (Schwanen et al., 2001). In terms of distance travelled, leisure trips account for the largest share per day other than commuting trips, reflecting motorized mode use (Schwanen et al., 2001). For Belgians (Cornelis et al., 2012), leisure trips are most commonly undertaken by car (66 %), followed by active modes (walking or cycling; 27 %), public transport (6 %), and various or other modes (1 %).

Until recently, undirected trips have often been considered a subcategory of leisure trips, but have unique characteristics due to their lack of destination (Hook et al., 2021b). Undirected trips were found to be undertaken more frequently, more often with active modes, and to be longer in duration than what has been found in previous literature regarding all types of directed trips (Hook et al., 2021c). Additionally, research during the COVID-19 pandemic on undirected trips shows that as individuals start teleworking, some of the reduction in commuting trips is compensated with undirected trips (Hook et al., 2021a). For Belgians (Cornelis et al., 2012), undirected trips are most commonly undertaken on foot (73 %), followed by car (19 %), public transport (4 %), cycling (3 %), and various or other modes (1 %). This research is among the first to consider undirected trips in a category separate from leisure trips, and the first to empirically analyze the differences between these two categories in terms of trip characteristics.

2.4. COVID-19 situation in Belgium

While during the period of data collection (23 April – 6 May 2021) there were still many governmental COVID-19 lockdown regulations in place, the 'Consultative Committee' decided on a reduction in a number of measures from the 26th of April (Belgian Federal Government, 2021) that might have impacted commuting, shopping, leisure, and undirected trips. Though telecommuting remained obligated in sectors where working from home was possible (Chini, 2021), the measures on shops (e.g. capacity, needing an appointment) and non-medical close-contact professions (e.g. barbers, beauticians) were removed. Simultaneously, the food and drink industry opened their terraces for a maximum of four people at each table. Additionally, individuals were allowed to meet outdoors in groups and outdoor activities of up to 50 people were allowed from May 2021. Though the measures on teleworking remained, the re-opening of contact professions, shops, and food and drink establishments meant a return of commuting for many unable to telework, as well as a return of shopping and leisure trips as these destinations were reopened.

As undirected travel trips compensated for a reduction in directed

[1] Though sometimes it is subjective whether a trip is considered shopping or leisure.

travel trips during the pandemic (Hook et al., 2021a), re-openings could indicate a reduction in undirected travel trips during the time of data collection. Though most governmental regulations have been removed at the time of writing, it is expected that some mobility habits formed during the pandemic will persist (van Wee and Witlox, 2021). For example, Winkler et al. (2021) found, comparing Pre-COVID, Lockdown, Post-Lockdown, and New Normal time periods, less participation in work and leisure activities during lockdown, post-lockdown, and new normal periods than before the pandemic. Shopping, on the other hand, exceeded pre-pandemic activities in both the post-lockdown and new normal time periods. Therefore, it is important to consider findings during the pandemic into the future.

Especially if mobility norms regarding travel behavior begin to adapt in a post-pandemic setting, to combat climate change, or to accommodate advances in technology, daily mobility is a crucial topic to understand because it is an important life domain with the ability to affect overall well-being and happiness with other aspects of life (Ettema et al., 2011). Investigating what individuals find beneficial about each specific travel category incorporates a holistic approach that can help to improve the ways in which future mobility is imagined and inform the success of policy or planning initiatives with respect to travel satisfaction and well-being. Therefore, this research will include three other categories of travel, i.e. undirected, leisure, and shopping trips, alongside the analysis of commuting trips to determine differences in beneficial aspects of travel, travel satisfaction, and trip characteristics. Valuable insights can be gained from understanding travel motivations and experiences at a more specific level, perhaps encouraging creative mobility initiatives that enhance the positive utility of travel in different trip contexts.

3. Data and methods

3.1. Sample recruitment

An initial survey (n = 1041) at the height of the Belgian COVID-19 lockdown (April-May 2020) targeted 47 municipalities in the Ghent and Antwerp regions (17 and 30 municipalities, respectively), examining undirected travel trips for their beneficial aspects and ability to compensate for daily travel and/or activities stopped due to governmental regulations (for more on this, see Hook et al., 2021a, b, c). At the time, the duration of lockdown could not be anticipated, therefore convenience sampling via each municipality's Facebook group (with collectively approximately 393,000 members) was employed. Two posts were made in each community group, and the survey was open and circulated between 20 April and 4 May 2020.

This research output analyses responses (n = 332) from a second follow-up survey that was distributed to the same participants one year later (23 April – 6 May 2021). The second survey, which took approximately-five minutes to complete, was distributed via email (with a maximum of two reminder emails) offering a raffle of four €25 vouchers to local supermarkets as compensation for participation. From the original survey, 687 participants provided email addresses to be contacted for follow-up questions and 332 (48.3 %) participants responded to the follow-up survey, providing information regarding trip characteristics, beneficial aspects of travel, and travel satisfaction for 1122 daily travel trips. Each respondent was asked to provide this information regarding their *most recent trip* for each category. For example, the question formulation for commuting trips was as follows (translated from Dutch), and repeated for shopping, leisure, and undirected trips (though the respondent could opt out if they had not recently completed a trip in a category). The specific response options are discussed in the 'Key variables' section below:

'Think about your most recent commuting trip:

Which mode was used?
How long was this trip (minutes)?
How far was this trip (kilometers)?
What feelings did you experience during this most recent commuting trip?
What were the important reasons for performing your most recent commuting trip (other than reaching the destination)?'.

Responses included 22.4 % commuting trips, 29.0 % shopping trips, 26.6 % leisure trips, and 22.1 % undirected trips. The analyses in this paper were completed at the trip level (N = 1122) and not at the level of respondent (n = 332), therefore one respondent likely reported multiple trips of different types.

3.2. Socio-demographics

Demographic characteristics (Table 1) included gender, age, employment status, households with children, and income for both the sample of this study and the Flemish region. This sample has a high rate of female response compared to the Flemish population (StatBel, 2020), therefore a weighted variable correcting for this unbalance in gender by dividing the desired percentage by the observed percentage (Kalton and Flores-Cervantes, 2003) was used for all statistical analyses. Population age demographics (StatBel, 2020) were well-represented, though the ≤ 25 category was slightly underrepresented and the 41–55 category was slightly overrepresented. The grouped age variable in Table 1 is used here for reference, though later in ANOVA mean comparison tests average age is provided. The employment rate (74.7 %) was representative of the Flemish population, as was the unemployment rate (2.8 %; StatBel, 2020). Though there are noted behavioral differences between those employed and studying, the pandemic encouraged (or even forced in some cases) those studying and working to do so online, justifying the decision to group these categories. Average monthly household income was higher than average, as average individual monthly net income in Flanders is €1677 (StatBel, 2020). Approximately-one third (33.8 %) of participants reported living with a child. Nearly-one fifth of participants (18.8 %) reported living in the city center, which was slightly under representative, while 37.1 % reported living in urban areas and 44.1 % reported living outside of urban areas (Pisman and Vanacker, 2021).

Other relevant demographic and household variables are noted here, though a comparison to the full Flemish population was not reliably available. Accessibility to cars and bicycles was high across the sample, as 90.5 % of participants had a driving license, 89.4 % of participants had access to a car (private or shared), and 93.3 % of participants had access to a bicycle (private or shared).

Table 1
Demographic characteristics for sample and Flanders population.

Characteristic		Sample	Flanders
		%	%
Female	74.2	50.3	
Age	≤25	8.5	15.8
	26–40	27.7	27.1
	41–55	34.5	28.9
	>55	29.3	28.2
Employment	Employed/ Studying	70	74.7
	Searching	7.9	2.8
	Not searching/ Retired	22.1	22.5
Living with Children < 18 Years		33.8	37
HH Income <€3500/Month	55.5	**Average individual income/Month**	€ 1677.0
Residential Location	City Center	18.8	24
	Urban	37.1	39
	Suburban/Rural	44.1	37

3.3. Key variables

3.3.1. Beneficial aspects of travel

Respondents were asked to rank the following four beneficial aspects of travel by their importance to each type of travel trip: improving physical health, improving mental well-being, enjoying scenery, and social contact (1 = least important, 4 = most important). These four aspects related to the positive utility of travel are derived from the results of a factor analysis of 24 motivation-related questions regarding appreciated aspects of travel such as 'enjoying sun', 'emptying head', 'social interaction', and 'movement and stretching'. For more information about this factor analysis, see Hook et al. (2021b). An adapted version of this four-factor solution was used in order to determine which positive aspects of travel respondents related to their commutes, shopping trips, leisure trips, and undirected trips, respectively. Table 2 shows the average ranking (range 1–4) with standard deviations for each positive aspect of travel per travel trip type.[2]

3.3.2. Satisfaction with travel scale

Responses to the 9-item Satisfaction with Travel Scale (STS; Ettema et al., 2011) provided a quantification of emotional and evaluation components of respondents most recent daily travel trip within each category (commute, shopping, leisure, undirected). Three categories (positive deactivation – negative activation, positive activation – negative deactivation, and cognitive evaluation) of 7-point Likert-scale questions were asked, including how bored/enthusiastic, fed up/engaged, tired/alert, stressed/calm, worried/confident, and hurried/relaxed respondents were during the trip, as well as whether the trip was the worst/best they could think of, whether the trip was low/high standard, and if the trip worked out/did not work out well. The 9-item scale was employed for each individual travel trip that was taken, therefore satisfaction with commute, shopping, leisure, and undirected trips was often variable per participant. Table 2 shows average (1–7) STS responses with standard deviations for each type of travel trip.

3.3.3. Trip characteristics

Respondents were asked to provide information regarding their most recent commuting (or school-commuting), shopping, leisure, and undirected daily trip. If a respondent did not participate in some of these trips, they skipped these specific trip-related questions and moved to the next portion of the survey. Commute trips were defined as movement from home to work (or home to school) and back. Shopping trips were defined as movements from home to a shop (e.g. supermarket or clothing shop) and back. Leisure trips were defined as those with a specific destination during free time, such as a trip to a museum, to visit with friends/family, to the seaside, or to a sports activity. Undirected trips were defined as those without a specific destination, such as going on a walk, cycle, jog, or joyride. Further information over these trips included the mode with which they were undertaken (walking, (electric) bicycle, car, bus/tram, train, jogging, moped/motorcycle, taxi, (electric) scooter, skateboard, roller/inline skates, other) and categorized for this analysis. Modes were split into active and non-active categories, as counts of most modes for some trip types were too small to be appropriate for statistical analysis. Trip frequency was reported for each type of trip, and available answers included never, once per month or less, two–three times per month, once per week, two–three times per week, four-seven times per week, and multiple times per day. This variable was categorized into a binary variable for analysis, as 45.2 % of trips were taken once per week or less, and 54.8 % were taken more than once per week. Finally, respondents answered with open-ended distance (kilometers) and duration (minutes) options. Upper distance and duration outliers were removed according to the three-sigma rule of thumb, excluding values outside of three standard deviations of the mean (Huber, 2018), as the open-ended format allowed participants to enter exceptionally high responses. Table 2 shows the percentage of respondents using active modes for each type of travel trip, as well as the average frequency (range of options 1–7), distance (range 0–100 km), and duration (range 0–180 min) with standard deviations of each type of travel trip.

[2] This method of data collection required individuals to rank the four beneficial aspects of travel or opt out without the option to, for instance, choose only one or two of the reasons, and therefore might have influenced the outcomes in some way.

3.4. Statistical methods

Chi-squared tests and ANOVA mean-comparison tests (Table 2) were performed to explore if and how trip characteristics, beneficial aspects of travel, satisfaction, and sociodemographic characteristics (gender, age, employment, and income) differed between the four trip types (commute, shopping, leisure, undirected). Post-hoc tests were performed with a Bonferroni correction for the Chi-squared test, using Tukey's method for ANOVA tests with assumed homogeneity of variance from significant Levene's tests, and the Dunnet-C method for those without (Levine and Stephan, 2015).

4. Results

This section will discuss the results of Chi-squared tests, ANOVA mean-comparison tests, and post-hoc tests. Regarding mode, undirected trips were overwhelmingly undertaken with active modes (85 %) and this was significantly different from all other trip types. Leisure trips were undertaken with active modes about half of the time (51 %), and this significantly differed from (in addition to undirected trips) the commute. Shopping trips were less often taken with active modes (44 %), but this was not significantly different from commuting and leisure trips. The commute was least often taken with active modes (38 %). This indicates that shopping and leisure trips might be more likely to be taken with a mix of modes, the commute is more often with a motorized mode, and undirected trips with active modes.

The most frequent types of trips were commuting (mean frequency (1–7) = 4.71), though not significantly more frequent than shopping (mean = 4.66) trips, followed by leisure (mean = 4.25) and undirected (mean = 3.73) trips. The largest group of respondents indicated performing commuting and shopping trips two to three times per week. This somewhat low level of commuting, given that a traditional work week is five days, could indicate that respondents may at least sometimes be telecommuting or were perhaps continuing to follow telecommuting governmental COVID-19 regulations. Leisure and undirected trips were completed on average once per week. This low frequency could reflect the more relaxed and flexible nature of these types of trips.

The longest durations were associated with undirected trips (mean = 59.33 min), followed by leisure (mean = 50.10 min), commuting (mean = 32.45 min), and then shopping (mean = 15.70 min) trips, but the longest distances were associated with leisure (mean = 22.97 km) and commuting trips (mean = 19.97 km), followed by undirected trips (mean = 10.94 km), and finally shopping trips (mean = 4.29 km). This indicates that shopping trips are made quickly and close to home, undirected trips, while still relatively close to home, are not quick trips that might be taken with slower modes, and individuals might be willing to travel longer distances and durations for leisure activities.

Improving physical health was most associated with undirected (mean (1–4) = 2.97) trips, and least associated with commuting (mean = 2.03) trips. Improving mental well-being did not significantly differ among the trip types. Enjoying scenery was associated with leisure (mean (1–4) = 2.49) and undirected (mean = 2.55) trips, though not with shopping (mean = 2.23) trips. Social contact was most associated with commuting (mean (1–4) = 2.78) trips, and least associated with undirected (mean = 1.75) trips. Leisure (mean (1–7) = 5.76) and undirected (mean = 5.66) trips were associated with higher levels of travel

Table 2
Chi-squared test (categorical variables) ANOVA mean-comparison (discrete/continuous variables) results across four trip types (1. commute, 2. shopping, 3. leisure, and 4. undirected) for trip characteristics (mode, frequency, duration, distance), beneficial aspects of travel, satisfaction, and sociodemographic characteristics.

			1. Commute		2. Shopping		3. Leisure		4. Undirected	
			N = 251 (22.4 %)		N = 325 (29.0 %)		N = 298 (26.6 %)		N = 248 (22.1 %)	
	Chi² Test		%Sig.Dif.		%Sig.Dif.		%Sig.Dif.		%Sig.Dif.	
Trip Characteristics	Active Mode		**0.38**^{3,4}		**0.44** ^{4}		**0.51**^{1,4}		**0.85**^{1,2,3}	
	ANOVA Test	[Range]	Mean$^{Sig. Dif.}$	St. Dev.	Mean$^{Sig. Dif.}$	St. Dev.	Mean$^{Sig. Dif.}$	St. Dev.	Mean$^{Sig. Dif.}$	St. Dev.
	Frequency	[1–7]	**4.71**^{3,4}	1.841	**4.66**^{3,4}	0.960	**4.25**^{1,2,4}	1.41	**3.73**^{1,2,3}	1.536
	Duration (Min)	[0–420]	**32.45**^{2,3,4}	28.379	**15.70**^{1,3,4}	14.677	**50.10**^{1,2,4}	42.992	**59.33**^{1,2,3}	40.409
	Distance (KM)	[0–336]	**19.97**^{2,4}	20.293	**4.29**^{1,3,4}	4.392	**22.97**^{2,4}	25.997	**10.94**^{1,2,3}	12.579
Travel Utility	Improving Physical Health	[1–4]	**2.03**^{2,3,4}	1.071	**2.38**^{1,4}	1.198	**2.50**^{1,4}	1.202	**2.97**^{1,2,3}	1.083
	Improving Mental Well-Being	[1–4]	**2.86**	0.786	**2.84**	0.799	**2.78**	0.829	**2.84**	0.861
	Enjoying Scenery	[1–4]	**2.35**	0.930	**2.23**^{3,4}	0.872	**2.49**^{2}	0.874	**2.55**^{2}	0.868
	Social Cohesion	[1–4]	**2.78**^{3,4}	1.242	**2.54**^{4}	1.163	**2.36**^{1,4}	1.269	**1.75**^{1,2,3}	1.077
Satisfaction	STS Scale	[1–7]	**4.86**^{3,4}	1.061	**4.76**^{3,4}	1.104	**5.76**^{1,2}	0.955	**5.66**^{1,2}	1.041
Socio-demographic Characteristics	Chi² Test		%Sig.Dif.		%Sig.Dif.		%Sig.Dif.		%Sig.Dif.	
	Female		**0.52**		**0.49**		**0.48**		**0.49**	
	Employed/ Studying		**0.77**^{2,3,4}		**0.61** ^{1}		**0.62** ^{1}		**0.63** ^{1}	
	HH Income >€3500/Month		**0.49**		**0.42**		**0.43**		**0.46**	
	ANOVA Test	[Range]	Mean$^{Sig. Dif.}$	St. Dev.	Mean$^{Sig. Dif.}$	St. Dev.	Mean$^{Sig. Dif.}$	St. Dev.	Mean$^{Sig. Dif.}$	St. Dev.
	Age	[16–75]	**43.02**^{2,3,4}	12.871	**47.96**^{1}	14.490	**47.78**^{1}	14.700	**46.53**^{1}	14.816

Note: Superscripts ^{1,2,3,4} denote that the average group score (or group N for mode) significantly differs (at $p < 0.05$) from the average scores of groups 1, 2, 3, 4 respectively, using Chi-squared tests and one-way ANOVAs with post-hoc multiple comparison analysis (Tukey's method if meeting the assumption of homogeneity of variance, Dunnet-C method if not meeting the assumption of homogeneity of variance).

satisfaction compared to commuting (mean = 4.86) and shopping (mean = 4.76) trips. This could indicate that satisfaction with these trips themselves is higher, though satisfaction with the activity at the destination might have more influence on trip satisfaction.

Results of the Chi-squared tests saw no significant differences in gender between groups. Those who were younger (average age of 43) were more likely to take commuting trips and those who were older (average ages between 46 and 48) were more likely to take shopping, leisure, and undirected trips. This could indicate that older, and potentially retired, populations might participate in more non-commuting travel during their free time. Unsurprisingly, more people reporting being employed or studying took commuting trips (77 %) than the other three groups (61 %, 62 %, and 63 %). No significant differences in income were seen between groups.

5. Discussion and conclusion

The main goal of this study is to provide more information regarding how different types of daily travel trips compare because, though the commute is well-understood, shopping, leisure, and especially undirected trips require further investigation. This study is the first to analyze differences in beneficial aspects of travel and satisfaction between these four trip types, offers information about the characteristics of undirected and directed trips within the same sample, and is the first to consider undirected trips in their own category outside of leisure trips in empirical investigation. Chi-squared tests and ANOVA mean-comparisons with post-hoc tests were used to evaluate 1122 trips taken by a sample of 332 Flemish residents.

Regarding beneficial aspects of travel, ultimately, it seems that trips to leisure destinations and undirected trips are more important to experienced utility than shopping and commuting trips. This could reflect the necessity of shopping and commuting trips, while making choices about physical and mental health and well-being, enjoying scenery, or social contact are more flexible when undertaking undirected or leisure trips. Improving physical activity was most associated with undirected trips, reflecting the tendency to take these trips with active modes. Enjoying scenery was most associated with undirected and leisure trips, perhaps indicating their more discretionary nature. Commuting was found on average to be most connected to social contact, indicating that some positive benefit is gained from interacting with colleagues. Improving mental well-being does not seem to be an important motivation for any kind of travel.

Regarding travel satisfaction, though previous literature has found quite high undirected trip satisfaction (much higher than what has been found for commuting, for example; Hook et al., 2021c) trips to leisure destinations were on average the most satisfying. They were followed by undirected trips, though they did not significantly differ. This could indicate that though undirected trips themselves are satisfying, leisure activities at a destination might also be important to satisfaction. As previous research (De Vos, 2019) has found that satisfaction with a leisure trip can affect satisfaction with the leisure activity at the destination, reciprocal effects of this relationship may also exist. Commuting and shopping trips were not satisfying, comparatively, perhaps highlighting that these trips are less flexible and undertaken out of necessity, and therefore not for the purpose of taking a trip or the purpose of satisfaction.

Regarding trip characteristics, undirected trips were the least frequent, but experienced the longest durations, and had the most association with active modes. Leisure trips were taken less frequently than commuting and shopping trips, but more often than undirected trips. They were also undertaken for longer durations and shorter distances than the commute. Commuting trips were undertaken most often for the longer distances and were associated with motorized modes. Shopping trips were also taken often, were the shortest in both distance and duration, and were associated with motorized modes.

Regarding socio-demographic characteristics, the average age of those providing information on shopping, leisure, and undirected trips was higher than those providing information on commuting trips. This could indicate that as individuals retire there might be a compensation effect of the commute toward other trip types. This type of compensatory travel behavior could nod toward the existence of a travel time budget, or a level of desired mobility (Mokhtarian and Salomon, 2001).

These findings indicate that, in agreement with previous literature (Hook et al., 2021b), undirected trips are most often taken with active modes, do not rely on the quickest route or mode, and occupy a substantial portion of time-use compared to other types of daily travel

because, though they are less frequently taken, they are undertaken for the longest durations. Findings further indicate that individuals might be willing to travel longer distances to reach leisure activities. Shopping trips were more likely to be completed as quickly as possible, close-to-home, and with motorized modes. This is unsurprising as these trips can require the movement of heavy and/or large items that might not be comfortable with active modes. Finally, results regarding trip characteristics indicate that commuters are willing to travel longer distances and are less likely to live close enough to their workplaces to access them with active modes.

The main limitations of this study were the high female response rate, which was accounted for with weighted models, and the possible consequences of the COVID-19 pandemic (van Wee and Witlox, 2021). Though the governmental regulations in Flanders during this survey collection were much more relaxed than at the height of the pandemic, there may still be residual affects regarding participants willingness to travel to public spaces. On the other hand, as many individuals used undirected travel as a form of compensation for a reduction in out-of-home activities due to the pandemic, the timing of the survey could have offered an opportunity to evaluate a larger share of these trips. Future research after the pandemic situation has ended is recommended in order to compare these findings to a more 'normal' situation. Post-pandemic it is likely that the share of commuting, shopping, and trips to leisure destinations will increase (e.g. Winkler et al. 2021) alongside the lifting of both governmental regulations and personal caution toward public space. This could result in a decrease of undirected trips, and the physical benefits that accompany them. Encouraging undirected trips could improve the positive utility of travel through, for example, street-level interventions that improve the infrastructure of walking or cycling paths, tactical experiments that offer activity-participation during active travel, or company policy rewarding individuals for participating in undirected trips during breaks.

Conversely, research during the pandemic indicates that individuals intend on continuing their travel habits post-pandemic (van Wee and Witlox, 2021), particularly regarding undirected travel (de Haas et al., 2020). Undirected trips certainly existed before the pandemic, and it is unlikely that they will disappear post-pandemic, but instead might become more common after their 'rediscovery' during lockdowns. The link between the positive utility of travel and undirected and leisure trips is not likely to disappear, nor is the link between high satisfaction and leisure trips. Industry and governmental partners can use this knowledge to enhance the positive benefits gained from these types of trips, and further challenge the 'mobility as disutility' narrative.

In sum, discretionary (undirected and leisure) trips were the most important to aspects of the positive utility of travel, though undirected trips were particularly important to improving physical health. Trips to leisure destinations were found to be the most satisfying possibly reflecting satisfaction with the activity at the destination. Additionally, due to their durations, undirected trips are perhaps more important to the total share of trips than has been recognized in previous literature. Substantial differences in trip characteristics between leisure and undirected trips argue for their consideration separately in future literature. This suggests that future research should not necessarily attribute utility to all travel alike, but instead consider the context of the trip and the personal motivations for different trip choices. As travel behavior norms adapt to, for instance, post-pandemic settings, environmental sustainability, or technological advancements, mobility can be reimagined to enhance the reasons for traveling associated with specific trip types, thereby potentially improving travel satisfaction and, in turn, overall well-being.

CRediT authorship contribution statement

Hannah Hook: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Visualization. **Jonas De Vos:** Conceptualization, Methodology, Writing – review & editing, Supervision, Project administration, Funding acquisition. **Veronique Van Acker:** Methodology, Data curation, Writing – review & editing, Supervision, Project administration, Funding acquisition. **Frank Witlox:** Resources, Writing – review & editing, Supervision, Project administration, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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