Towards happy and healthy travellers: A research agenda

Jonas De Vos

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Abstract

Well-being and health are two important elements contributing to people's quality of life. Although well-being and health have been analysed for many decades, an increased attention since the beginning of this century can be noticed, partly due to new ways of measuring people's subjective well-being and the rapid growth of obesity and obesity-related diseases. Over the past ten years studies have started analysing the link between travel and well-being, mainly focussing on aspects explaining people's satisfaction with travel. However, the role of travel satisfaction has not yet been fully explored, as it can also impact people's travel attitudes, travel behaviour and residential location choice. Previous studies on travel and health have mainly focussed on traffic safety, air pollution and recently also on physical activity. These studies have indicated that physical activity − and as a result overall health levels − are affected by people's residential neighbourhood and travel behaviour (e.g., mode choice). However, a clear picture on how physical activity, the built environment, attitudes and travel behaviour are linked to each other is missing. Furthermore, it is also possible that physical activity obtained by travel (e.g., by walking or cycling) can affect people's well-being and satisfaction with travel. In this paper, a research agenda aiming at a better understanding of the links between well-being, health and travel behaviour is presented. Three objectives can be distinguished: (i) the role of travel satisfaction in explaining travel behaviour, travel attitudes and residential location (choice), (ii) creating new insights into the link between travel and health, and (iii) linking well-being and health in a travel-behaviour context.

Keywords: Travel behaviour; Health; Well-being; Travel satisfaction; Physical activity

1. Background

Before providing a research agenda focussing on the links between travel behaviour, well-being and health, we first give an overview of existing studies on travel and well-being (Section 1.1), and travel and health (Section 1.2). Based on existing literature and research gaps we then – in Section 2 – present three avenues for future research.

1.1 Travel and well-being

For ages, the ‘pursuit of happiness’ has been acknowledged as an ultimate goal in people’s lives. However, happiness has long been considered as ‘unscientific’ and impossible to measure. Mainly since the 2000s, the situation has changed: measuring subjective well-being as expressed by individuals themselves is being used more and more across multiple disciplines. This research has also been picked up by governments throughout the world. Standard indices of a country’s prosperity, such as longevity and Gross Domestic Product are being accompanied by measures of well-being, such as

Gross National Happiness (e.g., Frey & Stutzer, 2010; Stiglitz et al., 2009). In Western countries, well-being and happiness have witnessed increased popularity over the past years, which can be demonstrated by an increased number of scientific articles, but also by a multitude of Internet discussion forums, newspaper articles, magazines and books on how to improve one's happiness.

In the past decade, studies have started analysing the relationship between travel and well-being. One of the most important elements related to this link is travel satisfaction (De Vos et al., 2013). Travel satisfaction comprises two dimensions; i.e., an affective dimension (referring to emotions experienced during a trip) and a cognitive dimension (referring to an evaluation of the trip) (Ettema et al., 2011). Travel satisfaction can be affected by certain trip characteristics. Numerous studies have indicated that trip duration and travel mode choice have an important impact on how satisfied people are with trips. With longer durations, travellers experience more negative emotions and will evaluate the quality and efficiency of the trip lower, while active travel results in higher levels of travel satisfaction compared to car users and especially public transport users (e.g., Mokhtarian et al., 2015; Morris & Guerra, 2015a, 2015b; Olsson et al., 2013; Singleton, 2018; Smith, 2017). Travel satisfaction can also be affected by travel-related attitudes and the built environment. Studies have indicated that positive attitudes towards a certain mode have a positive effect on travel satisfaction when using that mode (De Vos, 2018; St-Louis et al., 2014; Ye & Titheridge, 2017), just as residing in a neighbourhood facilitating the use of the preferred travel mode or trip length (in time and distance) will be beneficial for people's satisfaction with travel (De Vos et al., 2016; De Vos & Witlox, 2016).

Travel satisfaction, however, should not only be regarded as an outcome of travel characteristics, preferences and choices, but also as an important element explaining well-being (e.g., life satisfaction) and travel-related elements (e.g., mode choice, travel attitudes) (see De Vos & Witlox, 2017). Besides travel (commute trips in particular) occupying a considerable amount of time which people cannot spend on rewarding activities − therefore negatively affecting people's subjective well-being (e.g., Stutzer & Frey, 2008) − travel (satisfaction) seems to affect people's satisfaction with life in three ways (De Vos et al., 2013; Ettema et al., 2010; Lancée et al., 2017). First of all, negative/positive perceptions of trips (i.e., mood during − and retrospective evaluations of – trips) can have a direct impact on life satisfaction since experiencing positive emotions stimulates elements positively affecting life satisfaction (such as original thinking, fostering skills, and liking of self and others (Lyubomirsky et al., 2005)). Second, travel can indirectly affect people's well-being as it enables them to participate in rewarding out-of-home activities. As a result, low levels of accessibility − i.e., the ease of reaching destinations – could result in social exclusion (Preston & Rajé, 2007), negatively affecting well-being (Delbosc & Currie, 2011). Third, certain knock-on effects of travel (satisfaction) on other domains of people's lives are plausible. The (perceived) quality of trips can influence the way how individuals perform activities at destinations (e.g., Loong et al., 2017), but also how people value them. Bergstad et al. (2011) and De Vos (2017) have shown that travel satisfaction indirectly affects life satisfaction through satisfaction with activities at the destination of commute trips and leisure trips, respectively. On the other hand, people being satisfied with their life are more likely of perceiving their trips positively compared to people evaluating their life more negatively (De Vos, 2017). Furthermore, since decisions are often based on previous experiences, it is possible that people's mode choice is affected by satisfaction levels of previous trips of the same kind. Travel satisfaction might also influence travel-related attitudes (De Vos et al., 2018) or the residential location choice (as the built environment highly impacts people's way of travelling) (Cao & Ettema, 2014). However, the effects of travel satisfaction

on travel attitudes, travel mode choice and the residential location (choice) have not yet been analysed thoroughly.

1.2 Travel and health

Mainly in Western countries, overweight and obesity are becoming a major health problem. Since 1975, worldwide obesity has nearly tripled (WHO, 2010). This obesity is a major risk factor for cardiovascular diseases (which are the leading cause of death since 2012), diabetes, musculoskeletal disorders and some cancers. Obesity and overweight are mainly caused by a high intake of energy-dense foods that are high in fat, and low levels of physical activity due to the increasingly sedentary nature of many forms of work and ways of moving around. As a result, the WHO recommends that adults engage in at least 150 minutes of moderate physical activity per week, preventing weight gain, improving cardio-respiratory and muscular fitness and lowering the risk of negative health outcomes (WHO, 2010). However, some studies indicate that a longer duration of physical activity is needed to prevent weight gain and negative health effects (Lee et al., 2010; Moholdt et al., 2014).

Travel can impact people's health in three ways, i.e., through traffic safety, exposure to pollutants, and physical activity (Handy, 2014). Safety has long been the most important health concern in the transportation field. Although fatality rates have been declining in many high-income countries in response to road safety measures in the last five decades (speed limit enforcement, traffic calming, alcohol limits, driver's license examination, mandatory seat belt use, airbag-equipped vehicles, etc. (for a complete overview, see Elvik, 2003)), road traffic injury is still the ninth leading cause of death in the world. Worldwide, more than 1.25 million people die in traffic crashes each year, and between 20 and 50 million are injured (WHO, 2015). Traffic safety is affected by travel mode choice; walking and cycling are (on a per-kilometre basis) riskier than driving, although cycling seems far safer in countries with a considerable share of cyclists (e.g., the Netherlands), compared to countries with a limited amount of cycling (e.g., UK) (Pucher & Dijkstra, 2003). Since researchers have linked vehicle emissions to severe air pollution since the 1950s, the health impacts of pollutants from motorised travel has become an important public concern. Exposure to pollutants resulting from motor vehicle emission (such as carbon monoxide, nitrogen dioxide and particulate matter) have numerous negative health effects, such as respiratory diseases, eye and throat irritation, asthma, lung damage, high blood pressure, and even cancer. According to the WHO, outdoor air pollution – of which motorised vehicles are a major source – causes around 3 million deaths worldwide each year (WHO, 2016). Pedestrians and cyclists tend to have lower exposures to vehicle emissions because they are farther away from vehicles compared to people who are in them. However, due to physical exertion active travellers have higher inhalation rates resulting in similar health impacts of air pollution on active travellers compared to users of motorised vehicles (de Nazelle et al., 2011; Schepers et al., 2015). Besides air pollution, motor vehicles also negatively affect health through their contribution to water and noise pollution (Handy, 2014).

Finally, travel can affect health through the amount of physical activity it provides. As indicated before, overweight and obesity – highly affected by physical inactivity − are becoming a major health problem, possibly resulting in diseases such as cardiovascular diseases and diabetes. Choosing to walk or cycle can help people to achieve recommended levels of physical activity (Shaw et al., 2017). Public transport use is also often related with physical activity as many public transport users walk or cycle to and from public transport stops. Driving a car is a sedentary activity, resulting in an increased chance of obesity

or being overweight. Trip duration also affects travel-related physical activity and health. Longer durations of active travel are beneficial for people's health, while Frank et al. (2004) indicate that each additional hour of driving a car per day increases people's chances of being overweight by 6%. Martin et al. (2015) found that a switch from car use to active travel or public transport is associated with a significant reduction in body mass index (BMI), while an opposite switch is associated with a significant increase in BMI. Although some studies have already indicated that the residential location has an important impact on people's travel-related physical activity (Saelens et al., 2003; Sallis et al., 2004; Van Dyck et al., 2010), the effect of health and attitudes towards health on travel behaviour, travel-related physical activity and the residential location (choice) remains unknown. In terms of health, this research agenda will focus on physical activity, and not on traffic safety or exposure to pollutants.

2. A research agenda

Although studies (discussed in Sections 1.1 and 1.2) have already indicated that travel behaviour can affect both well-being and health – two key elements of people's quality of life – the complex relationships between (i) travel and well-being and (ii) travel and health have not yet fully been explored (e.g., De Vos et al., 2013; van Wee & Ettema, 2016). Furthermore, travel–well-being studies and travel–health studies have mainly occurred independent from each other. The research agenda presented in this paper is subdivided into three objectives. First of all, the link between travel behaviour, travel satisfaction and well-being needs further exploration. Although a considerable amount of studies have focussed on travel and well-being, effects from travel satisfaction on travel behaviour, attitudes and the residential location remain under-explored. Second, future studies need to focus on the link between travel behaviour and health. Although studies have indicated that the chosen travel mode and the built environment influence the frequency of physical activity, the links between health, residential location, attitudes, mode choice and physical activity are not yet analysed thoroughly. Finally, the interaction between health and well-being in a travel-related context needs to be examined more conceptually, since travel satisfaction and physical activity are both related with the residential location, travel behaviour and attitudes, but could also influence each other.

2.1 Objective 1: The role of travel satisfaction in explaining travel behaviour, travel attitudes and the residential location (choice)

Although a considerable amount of studies has – over the past ten years – indicated that travel satisfaction is related with long-term well-being and is affected by trip characteristics and attitudes, the role of travel satisfaction as explanatory variable of travel-related elements has not yet been analysed (De Vos & Witlox, 2017). Travel satisfaction might not only impact subjective well-being (e.g., life satisfaction), it could also influence travel attitudes, future travel behaviour and future residential location choices. Satisfying trips with a certain mode might increase the likelihood that this mode will be used for a future trip of the same kind. This might happen both directly and indirectly, through improved attitudes towards the used travel mode. On the other hand, unsatisfying trips with long durations might worsen people's stance towards travel in general (i.e., travel-liking attitudes) and might consequently increase people's tendency to travel short trips (as long as the built environment does not constrain short trips). Finally, travel satisfaction might also affect residential preferences. People disliking their daily travel patterns might also be dissatisfied with their residential area as the neighbourhood they live in – affecting many travel choices for a substantial amount of time − might prevent them to travel in a desired way. This low residential satisfaction might consequently result in

a tendency to relocate to a neighbourhood that stimulates people's desired way of travelling (e.g., by encouraging the use of a preferred travel mode). Although some studies have started analysing the (possible) effect of travel satisfaction on the residential location (choice), travel behaviour and attitudes (e.g., Cao and Ettema, 2014; De Vos et al., 2018), further research is needed. Figure 1, based on De Vos and Witlox (2017), gives an overview of the explored and under-explored links between travel satisfaction, well-being, the residential location, attitudes and travel behaviour.[1]

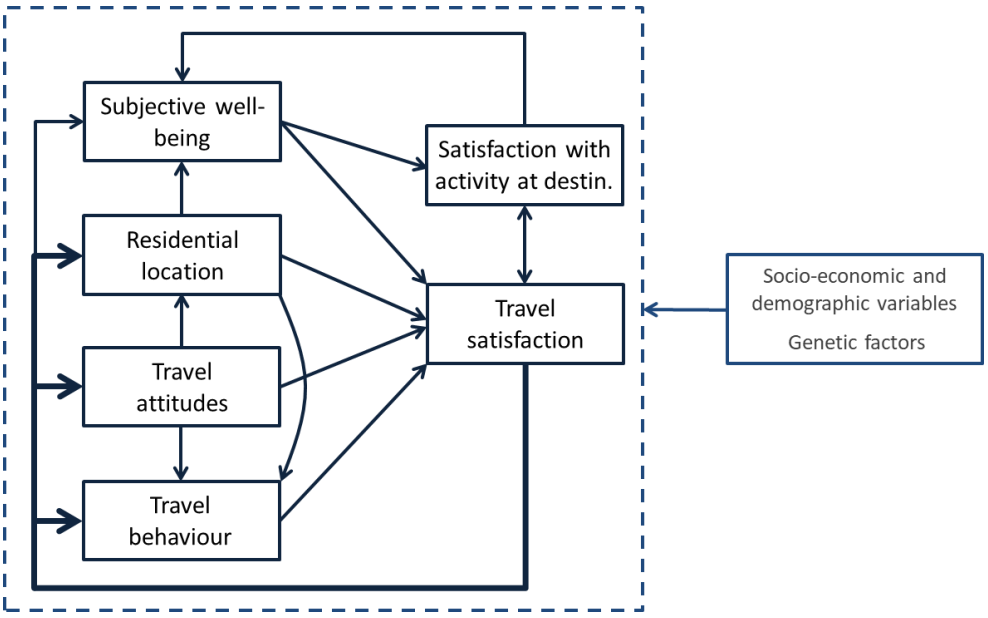

Figure 1: the role of travel satisfaction in a travel behaviour process (based on: De Vos & Witlox, 2017). Regular line arrows: links previously analysed; bold line arrows: links to be further analysed.

2.2 Objective 2: Creating new insights into the link between travel and health

Although most research on travel and health over the past decades has mainly been focussing on traffic safety and air pollution (exposure), studies since the beginning of this century have started analysing physical activity in a travel context. These studies have indicated that people living in a 'walkable' neighbourhood, i.e., a neighbourhood with a high density, a high diversity and good connectivity (e.g., a limited amount of T-intersections and dead-end streets), are more physically active, primarily due to more frequent walking and cycling (Saelens et al., 2003; Sallis et al., 2004; Van Dyck et al., 2010). In analogy with transport-related self-selection whereby travel preferences influence the residential location choice (e.g., car lovers preferring to live in low-density suburbs with good car accessibility), it is also possible that people valuing physical activity have a preference for living in a neighbourhood with a high 'walkability' (or 'bikeability'). Although Van Dyck et al. (2011) have started analysing this type of self-selection, it remains rather unclear how attitudes towards health impact travel behaviour (and mode choice in particular) and the residential location choice. It is also possible that travel-related

[1] Note that Figure 1 also represents effects from people's residential location on their travel behaviour (see, for instance, Ewing & Cervero, 2010), from travel attitudes on travel behaviour and the residential location choice (the latter effect representing self-selection effects (see, for instance, Cao et al., 2009)), and from people's residential location on their subjective well-being (Cao, 2016). Furthermore, socio-economic and demographic variables (age, gender, education level, etc.) and genetic factors are likely to influence the elements shown in Figure 1.

physical activity is related with other types of physical activity (van Wee & Ettema, 2016). On the one hand, people who frequently engage in activities with a lot of physical activity (e.g., sports activities, non-sedentary work activities) may be more inclined to walk or cycle (and vice versa) as they might have high fitness levels. On the other hand, travel-related physical activity might substitute other forms of physical activity. Although some studies have analysed certain links between the built environment, travel behaviour, and physical activity, a global picture of all possible links is still missing. Based on the conceptual models from De Vos and Witlox (2017) and van Wee and Ettema (2016) a new conceptual model can be created (Figure 2), showing the relationships − between health, physical activity, travel behaviour, attitudes and the residential location (choice) − that need further analysis. Similar to Figure 1, it is likely that all elements described above are affected by people's sociodemographic variables and genetic factors.

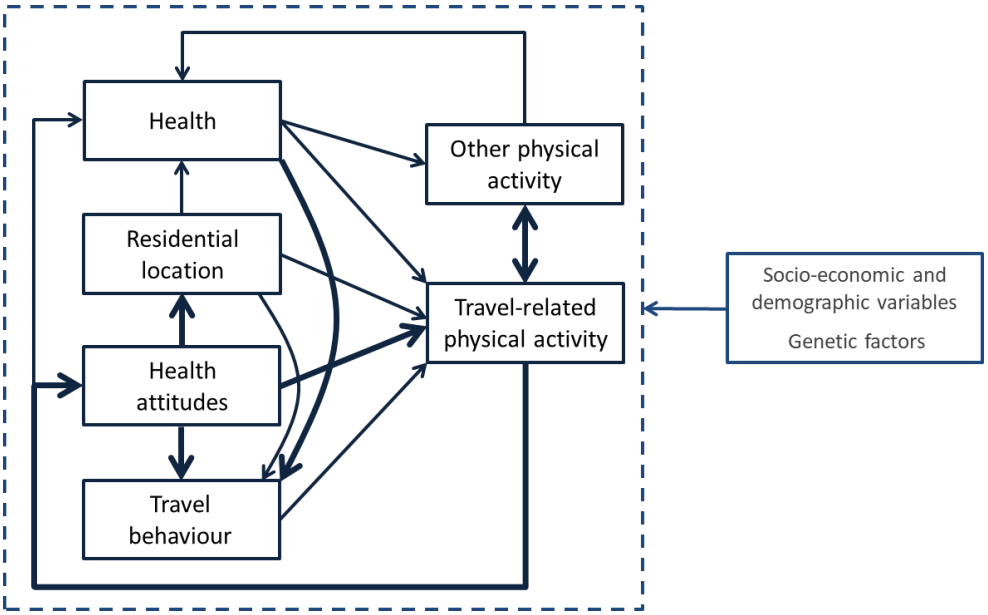

Figure 2: Hypothesised relationships between elements related with travel and health (based on: De Vos & Witlox, 2017; van Wee & Ettema, 2016). Regular line arrows: links previously analysed; bold line arrows: links to be further analysed.

2.3 Objective 3: Linking well-being and health in a travel-behaviour context

In order to get better insights into people's overall quality of life, it is important to link physical health and subjective well-being with each other. Figures 1 and 2 clearly indicate similarities in the way that well-being and health are related with travel. For instance, the residential location affects both well-being (Cao, 2016) and health (Giles-Corti et al., 2016) in direct and indirect ways; travel attitudes (mode-specific attitudes, travel-liking attitudes) and health attitudes can both affect the residential location choice and travel behaviour decisions (e.g., Cao et al., 2009; Van Dyck et al., 2011). Travel satisfaction and travel-related physical activity seem both affected by the residential location, attitudes and travel behaviour. Furthermore, health and well-being are also related with each other. Health is often regarded as an important determinant of life satisfaction (e.g., Diener et al., 1999). In this context, it is also possible that travel-related physical activity affects people's satisfaction with travel. The relatively high levels of travel satisfaction of cyclists and pedestrians (e.g., Morris & Guerra, 2015b; Olsson et al., 2013; Singleton, 2018; Smith, 2017) could be explained by the physical exercise active

travel provides. On the other hand, high levels of satisfaction with life and good mood are beneficial to one's physical health (Diener & Chan, 2011). The link between well-being and health in a travel-related context clearly needs further exploration.

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