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Adolescents' associations between travel behaviour and environmental impact: A qualitative study based on the Norm-Activation Model

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A B S T R A C T

The negative environmental impact of car-dependent daily transport is well known. Young people of today are the potential drivers of the future and their mode choice will influence the environment for many years. This study explores the associations drawn between daily transport and environmental impact among 15-year-old Danish adolescents. We conducted 50 in-depth interviews and analysed them using a data-driven inductive thematic approach. We interpret differences in pro-environmental awareness and engagement on the background of the Norm-Activation Model (Schwartz, 1977). Based on their personal norm and the denial of consequences and responsibility of own behaviour, we identified five sub-groups of adolescents called Environmentalists, Pragmatics, Indifferent, De-emphasisers, and Deniers. Results indicate a need for measures to increase adolescents' awareness and acceptance of daily transport as a relevant issue in relation to sustainability. Such measures should include tangible feedback in a daily context while taking different coping strategies with regard to climate change into account.

1. Introduction

The fundamental societal value of transport-related mobility is generally recognised (e.g. Banister et al., 2012). However, developing a transport system that meets needs at the individual as well as at the societal level, while minimising the negative side effects related to CO_2 emissions (e.g. Chapman, 2007; European Commission, 2011; Stanley et al., 2011), congestion (e.g. David and Foucart, 2014; De Palma and Lindsey, 2011; Hysing et al., 2014), and public health (e.g. Bauman et al., 2011; Sælensminde, 2004; Wegman et al., 2012) remains a major challenge. This challenge cannot be met with technological improvements alone but also requires the change of individual travel behaviour. Reducing private car use is a key issue here, but as indicated by Tranter and Sharpe (2012) there is a need for more efficient ways to motivate potential future drivers to choose environmentally friendly modes. The adolescents of today are the potential drivers of the future. They constitute a target group of key relevance regarding long-term efforts to reduce the negative environmental impact of daily transport, and are therefore the focus of this study.

Adolescents are in a life phase of change towards adult life, including for example increased independent mode choice, independent living and educational choices, and therefore face a window of receptiveness that can influence their future behaviour in the direction of sustainable transport (Underwood et al., 2014; Verplanken et al., 2008). The importance of laying the foundations of sustainable transport behaviour during adolescence is further supported by studies indicating that values supporting car-based mode choices are adopted early in life (Collin-Lange, 2014) and that adults' mode choices are influenced by past experiences and socialisation (Haustein et al., 2009). When people have established their (car) identity, threats to this identity can be a barrier to behaviour change (Murtagh et al., 2014).

With regard to adolescents, the majority of studies of sustainable mobility focus on recent changes in travel behaviour (e.g. Kuhnimhof et al., 2011) or intentions regarding future travel behaviour (e.g. Line et al., 2012; Sigurðardóttir et al., 2013). A stagnation or reduction in kilometres driven per-capita has been reported in some European countries (Kuhnimhof et al., 2013) along with reduced licensing among youth (Delbosc and Currie, 2013; Hjorthol, 2016). Similarly, reduced car travel of young people, in particular males, has been observed in the United States along with delayed licensing (Coogan et al., 2017). Contradictory trends have also been identified, including increased car use as passenger among children in Denmark, Finland, Great Britain, and Norway (Fyhri et al., 2011), as well as strong intentions to obtain a licence and own a car among pre-licensed adolescents (Sigurðardóttir et al., 2014; Sigurðardóttir et al., 2013). Thus, despite a possible car peak, particularly in the younger generation (e.g. Frändberg and Vilhelmson, 2011; Kuhnimhof et al., 2012; Newmann and Kenworthy, 2011), there is still a significant potential to reduce future transport-

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related CO_2 emissions.

Generally, adolescents' awareness and their appraisal of threats to the environment is high (OECD, 2009) and not limited to local issues (Busse and Menzel, 2014). However, their awareness of environmental problems is only slightly associated with their own everyday behaviour (e.g. Davison et al., 2003; Toth et al., 2013); the problems are perceived as something "out there" rather than an issue they can relate to (Loughland et al., 2003). Yet, in a German study including children and adolescents, changes in mobility behaviour (esp. reduced car use) was the most often considered activity against climate change (Klöckner et al., 2010a).

Based on these contradictory results, we look into the associations drawn between daily transport and environmental impact among 15-year-old Danish adolescents, taking into account differences with regard to gender and residential location. As in the adult population, a gender difference regarding environmental attitudes and behaviours has been identified among youth (e.g. Loughland et al., 2002, 2003; OECD, 2009; Tuncer et al., 2005; Uitto et al., 2011). Young women are more likely to see the environment as an integrated part of their lives, ascribe themselves more responsibility towards action, and are more pessimistic about possibilities for change in the future. By contrast, young men have greater knowledge about environmental issues, feel less responsible and are more optimistic regarding sustainability in the future. The pattern that women express more concern and men have more knowledge has been found in a couple of studies (see Gifford and Nilsson, 2014). However, a recent study with focus on transport and climate change neither found a gender difference with regard to knowledge on transport-related CO_2 emissions nor with regard to concern for climate change (Waygood and Avineri, 2016). In addition, the study revealed that both genders are aware of the link between mode choice and CO_2 emissions but lack more specific knowledge, such as the influence of vehicle occupancy rate on the amount of emissions.

With regard to residential location, conflicting results have been found in terms of living in rural versus urban areas (see Gifford and Nilsson, 2014). However, adults living in cities appear more concerned with climate change and sustainability than people living in rural areas, particularly with regard to transport-related issues such as air pollution (e.g. Berenguer et al., 2005). This is in line with the assumption that proximity to problem sites results in higher levels of environmental concern (Gifford and Nilsson, 2014).

When focussing on young people and residential location, only minor differences between rural and urban residents have been identified. Uitto et al. (2011) found that rural residents aged around 15 years show less interest in environmental issues than their counterparts in more densely populated areas. Bogner and Wiseman (1997) found neither a difference in environmental behaviour nor in environmental attitudes between 11 and 16-year-old rural versus (sub-) urban residents. However, they found a higher discrepancy in rural pupils' verbal and actual environmental commitment; rural pupils behaved more environmentally friendly than verbally expressed.

A useful framework to explain when and why environmental awareness results in concrete action has been provided by the Norm-Activation Model (NAM; Schwartz, 1977; Schwartz and Howard, 1981) and its application to travel mode choice (e.g. Bamberg et al., 2007; Klöckner and Matthies, 2004). We chose this model as a theoretical framework of our study as our data clearly relate to central processes described in the model, such as the denial of consequences and responsibilities.

According to the NAM, the first step towards engagement in a prosocial behaviour is the awareness of a need (AN). If a person is not aware that car use is harmful for the environment, moral norms will not be activated. Knowledge is thus a precondition for the activation of a norm-based decision process. Individuals must further be aware of the consequences (AC) of their own behaviour (e.g., the positive or negative environmental impact of their transport choices) and feel responsible for the consequences of not acting prosocially (ascription of responsibility, AR).

In addition, people must identify particular actions to relieve the problem (outcome efficacy; OE). Steg and Groot (2010) have broadened the concept of OE to perceiving the ability to control the problem. In case of large-scale problems, such as reducing transport-related emissions, OE strongly depends on the expectations that others will also act pro-socially (Steg and Groot, 2010). Finally, people must perceive the ability to act prosocially (e.g. use environmentally transport modes), which refers to the construct of perceived behavioural control (PBC) of the Theory of Planned Behaviour (Ajzen, 1991). In case of children and adolescents, parental rules and choices may restrict PBC.

Given that preconditions with regard to AN, AC, AR, OE, and PBC are fulfilled, individuals' personal norms (PN) will be activated. PN is defined as the intrinsic feeling of moral obligation to behave in accordance with the person's individual value system (Schwartz, 1977), for example, to feel obliged not to use the car as it harms the environment. In addition to PN, social norms (SN) are also considered in the NAM, representing the expectations of significant others. NAM regards PN as the central predictor of behaviour.

However, the activation of PN does not automatically lead to moral behaviour. For individuals who are aware of the negative impacts of car use, the evaluation of personal costs, such as reduced convenience or time, may weigh higher than feelings of guilt or shame when not acting in accordance with PN or SN, respectively. A strategy to avoid negative feelings can be the denial of the harmful consequences of car use (AC) or the denial of the personal responsibility for the negative consequences (AR), for example by stating that it is the responsibility of the car industry or politicians to reduce the car emissions. Thereby the situation will be re-defined, so that the person no longer feels obliged to follow the moral norm (PN). In studies on how children, adolescents and adults cope with climate change, de-emphasising the threat and denial of guilt have been identified as coping strategies that are related to a lower degree of environmental efficacy, lower engagement in pro-environmental behaviours (Ojala, 2012; 2013), and reduced action knowledge (Klöckner et al., 2010a), which is in line with the assumptions of the NAM.

We use the NAM as a framework for the interpretation of our results. In the discussion, we focus on the identification of targeted interventions to support environmentally friendly transport behaviours at early stages of independent mode choice. When suggesting interventions, we make use of Bamberg's Stage Model of Self-Regulated Behavioural Change (Bamberg, 2013, 2014), which integrates central constructs and assumptions of the NAM and TPB into the Transtheoretical Model (Prochaska and DiClemente, 1983). Bamberg's model differentiates four stages of behavioural change (predecisional, preactional, actional, postactional) and stresses the need to develop interventions that adequately address the needs of persons in a specific stage.

2. Methodology

2.1. Procedure and participants

We used in-depth interviews as the method of data collection. The 50 interviews took place in June and July 2011 at the interviewees' location of convenience. We sampled the participants among 891 15-year-old adolescents who participated in a national online survey on travel behaviour (see Sigurðardóttir et al., 2013). Statistics Denmark recruited participants for the survey as a representative sample, and as part of the survey, participants gave their consent to participate in future studies. For the present study, sampling of participants was random but based on two criteria: 1) equal number of males and females, 2) representation of different residential areas. Six participants lived in Copenhagen, the capital of Denmark, 30 lived in smaller cities (10,000–100,000 inhabitants), and 14 lived in rural areas (< 10,000 inhabitants).

None of the participants had a driving licence yet, as the licensing