



# Experiences of Everyday Travel

Through the Lens of a Child

Jessica Westman

Faculty of Arts and Social Sciences

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Psychology

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*“Information’s pretty thin stuff unless mixed with experience”*

Clarence Day



*Licentiate thesis: Experiences of Everyday Travel - Through the Lens of a Child*

Jessica Westman, Department of Social and Psychological Studies, Karlstad University, Sweden.

**ABSTRACT**

The purpose of this thesis was to investigate how children experience their everyday travel. More specifically how do certain travel characteristics influence children's current mood, experiences of their everyday travel, and their cognitive performance. The thesis consists of two papers (Papers I and II). In Paper I, 237 children (116 girls) in grade 4 (aged 10), in the city of Staffanstorp in Sweden, recorded all their journeys in a diary during one school week, along with reports of their travel mode, their current mood while travelling (ranging from very sad to very happy and from very tired to very alert), their activities on arrival, and their experiences regarding those activities. In Paper II, a sample of 344 children (165 girls) between the ages of 10 and 15 was taken at five public schools in Värmland County, Sweden. The children rated their current mood, filled out the Satisfaction with Travel Scale (capturing the travel experience), reported details about their journeys, and took a word-fluency test.

The findings show that children's immediate affective experiences (current mood) vary with how they travel and where they go, and that there is a difference between boys' and girls' experiences. Children who travel by car experience the lowest degree of quality and activation, something which is also maintained throughout the school day (as the case with activation). Social activities during travel add to higher degree of quality and excitement, while solitary activities bring more stress. The findings further show that using a smartphone or doing a combination of activities during the journey results in better cognitive performance, as do longer traveling times. It is concluded that where and how children travel, what they do when traveling, and for how long they travel all affect children's travel experiences, mood, and/or cognitive performance. This thesis sheds light on a neglected research area – which is the experiences of travel – through the lens of a child.

**Keywords:** Children's travel experience, current mood, travel mode, activities during travel, cognitive performance

*Licentiatuppsats: Upplevelser av dagliga resor – ur ett barnperspektiv*

Jessica Westman, Institutionen för sociala och psykologiska studier, Karlstads universitet, Sverige.

## SAMMANFATTNING

Det övergripande syftet med licentiatuppsatsen var att studera barns upplevelser av sina vardagsresor. Mer specifikt studerades hur resans egenskaper påverkade barnens upplevelser, humör och kognitiv prestation. Uppsatsen innehåller två artiklar. I Artikel I deltog 206 barn (varav 101 flickor) från årskurs 4 i Staffanstorp, Skåne. Barnen förde resdagbok över alla resor de gjorde under en vecka. I dagboken beskrev de vart de reste, vilka färdmedel de använt, deras humör under resan (som skattades som ledsen-glad och trött-pigg), vilka aktiviteter de ägnat sig åt vid slutdestinationen samt deras upplevelser av dessa aktiviteter. I Artikel II deltog 344 barn (varav 165 flickor) från årskurs 4, 6 och 8 i Värmland. Istället för resdagbok redovisade barnen sitt humör, hur nöjda de var med resan, resedetaljer samt gjorde ett ordflödestest direkt vid ankomst i skolan.

Resultaten visar att barns humör då de reser varierar beroende på hur de reser (färdmedel) och vart de reser (destination). En skillnad observerades också mellan flickor och pojkar och mellan olika årskurser. Barn som reser med bil till skolan är minst nöjda (upplevde en lägre grad av kvalitet) och på sämre humör (är känslomässigt mindre aktiva) vilket också håller i sig under skoldagen. Att ägna sig åt sociala aktiviteter (konversera med vänner och familj) under resan bidrar till en högre upplevd kvalitet och mer uppmärksamhet medan barn som ägnat sig åt aktiviteter utan sällskap upplever en högre grad av stress. Resultaten visar också att barn som använder sin smartphone eller kombinerar olika aktiviteter under resan presterar bättre på det kognitiva testet. Även en längre restid bidrar till bättre prestation.

Till skillnad från en stor del av tidigare forskning kring resor har uppsatsen ett barnperspektiv och fyller därmed ett kunskapsgap som identifierats. Resultatet visar att vart barnen reser, hur de reser och vad de gör under resan påverkar reseupplevelsen, humöret och kognitiv prestation.

Nyckelord: Barns reseupplevelse, humör, färdmedel, aktiviteter under resan, kognitiv prestation

This thesis is based on the following two papers, which will be referred to in the text using Roman numerals:

- I. Westman, J., Johansson, M., Olsson, L. E., Mårtensson, F., & Friman, M. (2013). Children's affective experience of everyday travel. *Journal of Transport Geography*, 29, 95–102.
  
- II. Westman, J., Olsson, L. E., Gärling, T., & Friman, M. (2015). Children's Travel to School: Satisfaction, Current Mood, and Cognitive Performance (in review). *Transportation*.



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There are so many fantastic colleagues I would like to thank and mention individually - but I rest assured that you all know you are absolutely awesome.

**Finally, and most importantly,** none of this would have been possible without the love of my family. I am deeply grateful to my husband who has been a constant source of love, support, patience, and strength throughout this process. My deepest gratitude to my beautiful children who put everything in perspective and give life the most beautiful meaning. Thank you ❤️

*“Dogs are our link to paradise. They don't know evil or jealousy or discontent.  
To sit with a dog on a hillside on a glorious afternoon is to be back in Eden,  
where doing nothing was not boring—it was peace”*

Milan Kundera

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## 1. INTRODUCTION

### *1.1 Background*

What evidence is there that everyday travel impacts children? We know that a journey affects mood, satisfaction (sometimes referred to as experience), and cognitive performance in adults but how about children? To date, the majority of research on children's daily journeys appears to focus on an increased reliance on cars and the impact of this on the environment and physical health (Davison, Werder, & Lawson, 2008; McDonald, 2008; Merom, Tudor-Locke, Bauman, & Rissel, 2006). Research investigates what may either hinder or enable active travels (cycle and walk) through looking at objective factors such as travel mode choice, safety and environment, and physical health. Children's experiences of travel have largely been excluded and the role of transport itself as a place and its effect on emotions rather than just a way of moving from one place to another has similarly received little attention (Jones, Steinback, Roberts, Goodman, & Green, 2012; Westman, Johansson, Olsson, Mårtensson, & Friman, 2013). Widening the research area to include children's experiences of their daily journeys to the existing mapping of children's travel, will bring further knowledge of the impact of travel. This knowledge will also enable suitable succeeding improvements that may play a significant role in children's future travel behavior (Van-Ristell, Enoch, Quddus, & Hardy, 2013).

This thesis aims to investigate children's experiences of travel – through the lens of a child. By including children's first-hand experiences of travel, we provide important evidence of how children are affected. This thesis will first present how children's journeys have changed over the recent decades. It will then highlight current research areas regarding children and every-day travel, and the implications for health and the environment. The review of research into children's travel reveals a research gap regarding children's travel; their experiences of travel have been greatly neglected. The two empirical articles in this thesis present evidence that daily travel impacts mood, the travel experience, and cognitive performance, and thus explore an important but overlooked research area.

### *1.2 Changes in children's daily journeys*

Children's travel patterns have changed considerably over recent decades. The total distance travelled by the overall population is increasing, but the distances travelled by children are increasing even faster (Mackett, 2002). This change cannot only be seen in terms of distance

and quantity, but also in terms of choice of travel mode (McDonald, 2007). In 2013, the Swedish Transport Administration presented a report showing that the use of active modes of getting to school (i.e. cycling and walking) has declined. In 2012, 24 % of all schoolchildren in Sweden were driven to school in cars, an increase compared with only three years previously, when the corresponding number was 21% (see Figure 1). In the USA, in 2009, over 45 % of all schoolchildren were driven to school in cars, an increase on previous years (McDonald, Brown, Marchetti, & Pedroso, 2011).

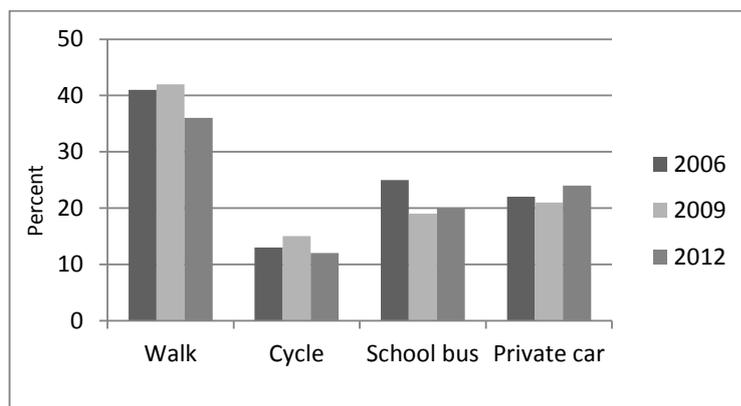


Figure 1. Children’s travel mode to school during November-March 2012 (Swedish Transport Administration, 2013).

Though children in the Scandinavian countries still have a relatively high level of travel independency (Chillon, Ortega, Ruiz, Veidebaum, Oja, Mäestu, & Sjöström, 2010; Fyhri & Hjortol, 2009; Fyhri, Hjorthol, Mackett, Norgaard Fotel, & Kyttä, 2011; Horelli, 2001; Johansson, 2006; Kyttä, 2004) the decline in the use of active modes seems to be a general issue in Western countries, where the preference for the car outstrips other alternatives (Mackett, 2013; McDonald, 2007).

Children also travel farther distances today, both generally and to school in particular since in many countries, the choice of school, regardless of geographic location, is made on an individual basis (Andersson, Malmberg, & Östh, 2012; Goldring & Hausman, 1999; Wilms, 2002). Long distances to school create a major environmental barrier to active travel and require long-term, multilevel interventions and changes (i.e., the building of schools near residential areas, safer roads, pavement shoulders) in order to enable non-motorized transportation (Lee, Zhu, Yoon, & Warni, 2013).

However, the increasing level of car use to and from school goes beyond the increases in distance; parents drive their children to school regardless of distance (Ewing, Schoerer, & Greene, 2007; Lee et al., 2013). The decreasing levels of walking and cycling among Scandinavian children have been explained, on the societal level, by changes in parents' (particularly mothers') employment rates, which increase household time constraints and thus car use. Other factors increasing family car use are parents' perceptions of the risk to children when outdoors, children's participation in organized activities, and the availability of cellphones, giving increased access to parents' transport services (Fyhri et al., 2011). Among the characteristics of the child, age has a strong influence on mode choice. Older children (> 11) are more likely to use an active mode and the school bus, and less likely to be escorted by their parents (McDonald, 2005). Gender also affects mode choice whereby boys are more likely to travel actively than girls, but public transport appears to be used equally (McMillan, 2006). Other studies show that boys from the ages of six to eleven are more likely than girls to travel to school alone or with a friend (Hillman, Adams, & Whitelegg, 1990; McDonald, 2005).

Regarding parental and household characteristics, the children of well-educated parents are less likely to walk or cycle (McMillan 2003). Children from households with a higher income, or with higher car-ownership, are more likely to travel to school by car (DiGuiseppi, Roberts, & Li, 1998; Vovsha & Petersen, 2005). Environmental factors affect travel mode choice in that the presence of cycle lanes, the location of speed bumps near schools, and sidewalk coverage all increase children's use of active modes to school (McMillan, 2003; Yarlagaadda & Srinivasan, 2007). Also, children living in high density areas are more likely to use non-motorized modes and less likely to travel on the school bus (McDonald 2005). The school journey is the most frequent journey children make and these changes in travel mode entail notable implications for household travel patterns and should be considered an important part of transport research (Morris, Wang, & Lilja, 2001). Research has recently started looking into how these changes in travel patterns impact the environment and children's physical health; the coming sections will investigate some of these implications.

### *1.3 Implications for children's daily journeys*

Increased car travel has received a massive focus in the research literature due to its strong relationship with physical health (safety issues included), with recent research also pointing to

implications regarding children's academic performance (Martinez-Gomez et al., 2011; Trudeau & Shepard, 2008). Thus, two research areas that will be highlighted in the coming sections are the relationship between daily travel and physical health and cognitive performance. The third research area that will be investigated in this thesis has received scant interest – children's experiences of travel. Why it has received such limited attention is bewildering, since it has been studied rather extensively in adults and shown to impact several factors (Ettema, Friman, Gärling, Olsson, & Fujii, 2012; Friman, Edvardsson, & Gärling, 2001; Olsson, Gärling, Ettema, Friman, & Satoshi, 2013). The aim of presenting these three research areas is to summarize current research into children's travel, but also to reveal that there is a research gap regarding children's travel. To gain a greater understanding of how a journey affects children, research needs to focus on both objective (e.g. safety, the environment, and travel mode) and subjective factors (e.g. the experiences).

### *1.3.1 Travel and physical health*

Children's increasing car travel has a negative effect both on the environment and on their physical health by adding to a sedentary lifestyle and obesity. This negative pattern has increased awareness of what may either hinder or encourage the use of active travel (Frank, Schmid, Sallis, Chapman, & Saelens, 2005; Kerr, Frank, Sallis, & Chapman, 2007; Panter, Desousa, & Ogilvie, 2013; de Vries, Hopman Rock, Bakker, Hirasing, & van Mechelen, 2010). Children frequently driven to school by car are left with fewer opportunities for physical activity, which might have a negative long-term effect on their health (McMillan, 2007). Studies of children's independent mobility show that the ones who cycle or walk to school are more physically active and have better cardiovascular fitness than those who travel by car (Cooper, Page, Foster, & Qahwaju, 2003; Davison et al., 2008). In addition, studies of adults also show that the use of public transportation provides health benefits. Adult public commuters engage in physical activity during their active travel to and from the bus or train stop (Besser & Dannerberg, 2005; Weinstein & Schimek, 2005). Public transport commuters walk 30 % more than car commuters, on an average day (Wener & Evans, 2007), which may also apply to children (Merom, Tudor-Locke, Bauman, & Rissel, 2006). Physical activity is inversely related to being overweight and the decline in active travel to school further adds to the physical inactivity (Builung, Mitra, & Faulkner, 2009; Lubans, Boreham, Kelly, & Foster, 2011; McDonald, 2007; Van Der Ploeg, Merom, Corpuz, & Bauman, 2008). There is a reported gender difference whereby boys who travel to school by car have a lower overall

level of physical activity than boys who travel using an active mode - a difference not detected in girls. However, both boys and girls who walk to school are significantly more active in the morning than those who travel by car (Cooper et al., 2003). Overall, children engage less in frequent physical activity and obesity is becoming a wide-spread disease (Lubans et al., 2011). Although active and independent commuting to school will not solve this dilemma, it will contribute toward children's overall activity levels (Boarnet, Day, Andersson, McMillan, & Alfonzo, 2005; Cooper et al., 2003; McMillan, 2007; Metcalf, Voss, Jeffrey, Perkins, & Wilkin, 2004).

Increased car traffic around schools affects air quality, which is linked to adverse cardiorespiratory effects, including an increased prevalence of asthma (McConnell et al., 2010). With increasing traffic volumes around schools, walking and cycling have become more hazardous. This leads to a vicious circle of more car use, leading to increased road danger and even more car use which consequently results in poor air quality; children commuting by other modes are then left at a hazardous disadvantage (Gunay & Seymour, 2002). Consequently, three elements in particular have been studied in relation to the school journey: i.e. distance to school, street layout, and how to control vehicular traffic around school areas (Carver, Panter, Jones, & van Sluijs, 2014; McMillan, 2007; Mendoza, Watson, Baranowski, Nicklas, Uscanga, & Hanfling, 2011). To encourage active commuting, federal and state governments have allocated funding in order to increase safety around schools and on school roads by introducing safe-routes-to-school programs and walking school buses (Buckley, Lowry, Brown, & Barton, 2013; McDonald, Steiner, Lee, Smith, Zhu, & Yang, 2014). These programs aim to improve traffic safety and assure parents that their children will arrive at school on time and be supervised by an adult during the entire journey (Mendoza et al., 2011). Both programs have the potential to improve children's safety, with the rate of pedestrian injuries decreasing by 44% for children and adolescents (DiMaggio & Li, 2013). Children's safety on their way to/from and at school strongly influences parents' decisions regarding travel mode choice (Dellinger & Staunton, 2002; Martin & Carlson, 2005).

Children's daily journeys have implications for their physical health, with research focusing on environmental factors, safety issues, and the increasingly sedentary lifestyle due to increasing car travel. In the next section, the focus will be on whether or not a journey similarly impacts children's academic performance.

### *1.3.2 Travel and cognitive performance*

Cognitive performance is our ability to acquire and utilize knowledge. This process is dependent on the complex brain-based skills that we utilize during every action without realizing it. Cognitive performance can be measured using a wide range of tests, all depending on what we aim to measure (i.e. problem-solving, perception, reasoning, and working memory). Children's academic performance continues to be a focus of research; over the last decade, there has been a noticeable academic decline in mathematics, reading skills, and science, as measured in annual National Tests (OECD, 2012). This may, on some level, be related to children's school journeys. This hypothesis is supported by Martinez-Gomez et al., (2011) who found that girls who actively commute to school have approximately 4% better grades than girls who travel by motorized transport, indicating that during youth, physical activity has a beneficial influence on cognitive performance (Trudeau & Shepard, 2008). Physical activity helps reduce stress (Nabkasorn et al., 2005), which may provide an additional explanation for the link between active commuting and cognitive performance: It could be the non-stressful experience of a journey that helps boost performance. Stress is strongly associated with adverse effects on performance when doing cognitive tasks (see Eysenck, 1992, for a review).

Studies of adults show that commute-induced stress due to car travel has a negative impact on work-related decisions such as evaluative judgments (Van Roy, 2008). Thus, passive travel modes and negative travel experiences may lead to lower performance levels and active travel modes and positive travel experiences to higher performance levels, with the school journey thus possibly being one factor contributing toward academic decline. There are, however, some contradictory findings regarding active commuting and cognitive performance whereby one study found no relationship between active commuting and student achievement (Van Dijk, De Groot, Van Acker, Savelberg, & Kirschner, 2014). They did find a gender difference whereby girls in grade nine (aged 15-16) scored better on an attention test, indicating that the result might be moderated either by gender or by the fact that executive functioning is affected by active commuting (Van Dijk et al., 2014). However, literature reviews conclude that physical activity positively affects cognitive functioning, and ultimately academic results (Burkhalter & Hillman, 2011; Donnelly & Lambourne, 2011; Stea & Torstveit, 2014).

All in all, previous research provides inconclusive evidence of a positive longitudinal relationship between physical activity and academic performance; however, there is a strong belief that the relationship exists and research in this area is ongoing (Singh, Uijtdeuwillingen, Twisk, van Mechelen, & Chinapaw, 2012).

### *1.3.3 Travel and experience*

An experience can be a specific moment of personally encountering, observing, and/or undergoing something. It may additionally be described as the totality of the cognitions given by perception – which is all that is perceived, understood, and remembered (Nambisan & Watt, 2008). By studying a person's experience of a particular thing, the experience unfolds and we can reflect on why and how it is perceived in that particular manner. This process gives us valuable insights and tools for making appropriate changes in order to improve the experience.

Research that touches upon children's experiences of travel has focused on independent travel and socializing (Hillman, 1990; Mackett, Lucas, Paskins, & Turbin, 2005; Rissotto & Tonucci, 2002; Tranter & Pawson, 2001). The decrease in active travel may lead to a loss of independence; Ward (1978) argues that, without the opportunity to experience the outdoor environment on their own, children might not develop basic and essential social skills. When children are allowed, and able, to move around independently, they learn to socialize with others in spontaneous situations, thus acquiring a sense of community and familiarity which helps to build confidence and self-esteem through increased independence and responsibility (Hillman, 1990). Children's independent and active journeys contribute toward exploring their local environment, with positive effects on cognitive and behavioral development (i.e. spatial abilities, curiosity, independence, confidence) (Fusco, Moola, Faulkner, Builung, & Richichi, 2011; Mackett et al., 2005; Rissotto & Tonucci, 2002; Tranter & Pawson, 2001). Using public transport and the school bus similarly encourages independent travel since this allows children to move from one place to another without adult interference. The journey to school by bus can thus be viewed as a site for valued socialization (Jones et al., 2012). Ramanathan, O'Brien, Faulkner, & Stone (2014) found that children who use active modes feel a greater amount of positive emotions, e.g. happiness, excitement, or relaxation, than those who use passive motorized transport who are more likely to experience negative emotions like feeling rushed or tired. Without being able to travel actively and independently

children may additionally feel estranged from nature due to their little experience of it (Miller, 2005). Traveling to school is an important part of children's social experience; meeting and talking to friends is the most important positive factor when walking to school. The most negative factor as regards to not liking the car journey is not getting the opportunity to meet friends and the factor children value most about traveling by bus to school is the chance to interact with friends and having a greater sense of independence. Children who are able to walk to different destinations through the day display independence, happiness, and positive social aspects of wellbeing (Romero, 2015). Unfortunately, children who exclusively travel by car are deprived of the conspicuous beneficial effects of active and independent travel.

#### *1.4 Summary and conclusions*

Children's physical health is affected by their day-to-day travel. Recently, research has also found that travel may affect cognitive performance. These results are consistent with research conducted on adults and it is assumed that the experience of a journey impacts children as well. The child's experience of day-to-day travel is an emergent focus in research but research that does focus on the relationship between emotions and travel usually obtains the results through parental data and/or has not investigated experiences of different travel modes. Parental perspectives on children's travel, or on a particular mode, are important but there is a lack of research investigating children's experiences through the lens of the child. How children perceive their day-to-day travel could lay the foundations for the travel habits of an entire generation and should be studied using appropriate measurements. Similar to studies of adults' travel experiences, this thesis fastens on scientific theories that capture travelers' affective and cognitive experiences. These two dimensions have shown themselves to be important to our understanding of adults' experiences of their day-to-day travel (Ettema et al., 2012; Olsson et al., 2013; Friman et al., 2001) and they are likely to apply to children's experiences too.

## 2. THEORETICAL BACKGROUND

### 2.1 Introduction

Structuring affect helps us organize our understanding and measurement of the affective domain. However, the possibility of theorizing and classifying a complete assessment of affective qualities is challenging since there is an array of different theories and models that try to do so (Russell, 2003). Emotions, core affect, affect, mood, and current mood are only some of the concepts by which affective qualities are explained. What many of the different theoretical models have in common is that they identify two key concepts — activation and pleasure (referred to as valence). In this thesis, activation and valence, together with quality, form the fundament upon which the theory is based, with affect being referred to as an umbrella concept to which emotions, mood, core affect (and all other emotionally charged events) belong. This thesis' theoretical framework originates from Russell's theories on affect (Russell, 1980) and Oliver's theory on quality (Oliver, 1993; Oliver, 1997); these concepts will be briefly explained in the next section on the basis of Russell's (1980) conceptualization of affect.

### 2.2 Affective dimension

At the center of emotion, mood, or any other emotionally charged event are states that are experienced in terms of simply feeling good or bad (valence), or energized or enervated (activation). These states are called *core affects* and influence our reflexes, cognition, perception, and behavior (Russell, 2003). Core affect is defined as a single feeling present at any given point in time, with its duration, intensity, and relation to motivation, thoughts, and behavior being treated as empirical issues (Yik, Russell, & Steiger, 2011). Core affects are colored by internal and external stimuli, but we have no access to these connections. Thus, core affects are the simplest, raw non-reflective feelings evident in our moods and emotions (Russell, 2003). Russell and Feldman Barrett (1999) describe the circumplex model of affect as being representative of core affects, mood, and different emotional episodes, and these can be plotted on the model according to their levels of activation and valence.

Mood may be described simply by using the definition that a person is sometimes in a particular mood and sometimes not (whereas that person always has core affect) (Yik et al., 2011). Mood is a prolonged core affect and not necessarily directed at a particular object. For

example, an anxious mood implies core affects of unpleasant arousal that persist for a long(er) period, resulting in worried thoughts, cautious behavior etc. In contrast, emotions are salient only when an object is presented. For example, if a bear approaches us in the woods, we may feel startled, scared, or anxious. Emotions (just as mood and core affects) are related to the dimensions of valence and activation (Russell, 1999).

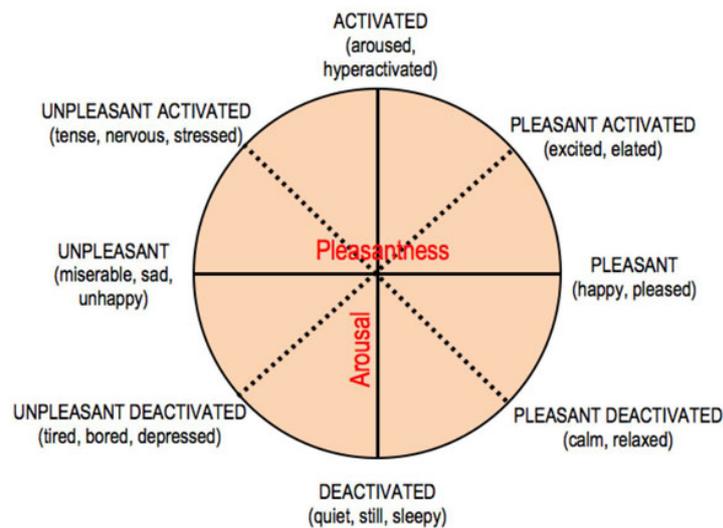


Figure 1. The circumplex model of affect (adapted from Yik, Russell, Feldman Barrett, 1999).

In Russell’s circumplex model of affect (1980), the two affective components valence and activation form one horizontal and one vertical dimension (see Figure 1), capturing the momentary affective state (e.g. the current mood). Much of the information contained in self reports regarding affective states can be summarized with these two dimensions (Russell, Weiss, & Mendelsohn, 1989); valence and activation are sufficient and necessary when it comes to measuring current mood (Russell & Feldman Barrett, 1999). Mood descriptions, emotions, and core affects can thus be similarly plotted on the circumplex model depending on their levels of activation and valence (Russell & Feldman Barrett 1999). Eight affect categories tend to be arranged around the model, consisting of the adjectives *excitement*, *pleasure*, *contentment*, *sleepiness*, *depression*, *misery*, *distress*, and *arousal*. These affect categories form secondary axes at 45 degrees, corresponding to excitement-depression and contentment-distress (Russell, 1980) (see Figure 1). Using this rotation, the intermediate dimensions of *positive activation - negative deactivation* (referred to as PAND), and *positive deactivation-negative activation* (referred to as PDNA) are captured (see Figure 1).

When looking at affect in a travel context, research has found that driving is experienced as relatively arousing, public commuting is unpleasant and not arousing, and cycling and walking are most pleasant and arousing. Stress and boredom seem to be particularly contributing to affective reactions in a travel setting (Gatersleben & Uzzell, 2007). Sources of pleasure for public transport users include reading, listening to music, interacting with other people, or looking at the passing scenery. Pedestrians evaluate their walking trips using factors such as crowdedness, air quality, the presence of trees and flowers, and the type of pavement. Other factors that are linked with affective assessments include cleanliness, privacy, safety, convenience, and scenery (Stradling, Anable, & Carreno, 2007). Some of these assessments also entail cognitive judgements and it has been established that measurements of *both* cognitive and affective experiences need to be conducted in order to capture the travel experience. In the next section, a summary of the cognitive experience will be presented.

### *2.3 Quality dimension*

Quality can be defined in terms of how good or bad something is or by estimating the characteristics or features of that something. More specifically, cognitive evaluative responses (referred to as quality) are thoughts regarding an object which are often conceptualized as associations between the object and its various attributes (Oliver 1993, 1997). For instance, a person will ascribe an object with positive or negative attributes depending on previous experiences (Fishbein & Ajzen, 1975). Quality evaluations can be based on the outcome of a service and include evaluations of both the object and the service delivery process (Parasuraman, Zeithaml, & Berry, 1985).

A travel elicits cognitive evaluative responses which are referred to as quality evaluations or judgements. Research into travel quality often examines factors linked to reliability. Delays, the behavior of other drivers, and congestion highly impact the perception of reliability and subsequent quality judgements (Gatersleben & Uzzell, 2007). Established factors relating to the quality of public transportation include (again) reliability, frequency, travel time, cost, and punctuality (Fellsson & Friman, 2008; Hensher, Stopher, & Bullock, 2003; Tyrinopoulos & Aifadopoulou, 2008), comfort, cleanliness (Eboli & Mazzulla 2007; Swanson, Ampt, & Jones, 1997), and safety issues (Smith & Clarke, 2000; Fellsson & Friman, 2008). However,

very little research has included children's perceptions of quality, making research into people's travel experiences insufficient. Children's quality judgments are just as important as adults' and should be incorporated into transport research.

### 3. CONCEPTUAL FRAMEWORK AND RESEARCH OBJECTIVE

As presented in the preceding sections, several factors are important when it comes to understanding a person's travel experience, and how the travel experience impacts a person. Research done on adults shows a relationship between travel characteristics, mood, travel experiences, and cognitive performance. As previously highlighted, for children, research into travel and its consequences is incomplete. Based on previous research, Figure 2 illustrates the established and potential relationships between travel, travel experiences, mood, and performance through the lens of the child. It also illustrates the relationships that will be tested in Paper I and II. Relationships with dashed lines are potential relationships not yet studied empirically; these are of the greatest interest in this thesis. However, the established relationships (marked with solid lines) also receive attention since previous studies provide somewhat inconclusive evidence.

The research objective of Paper I is to evaluate whether or not children's moods, while travelling, vary with travel mode and destination. This relationship has been established through studies on adults; however, no studies have been conducted on children. These relationships are thus marked with dashed lines in the figure below. The research objective of Paper II is to investigate whether or not children's travel experiences and current mood vary with travel mode, travel time, and activities when traveling. As can be seen in Figure 2, only two of these relationships have been established in previous studies. There is, however, an established relationship between active mode and cognitive performance; however, whether or not activities and travel time affect academic performance is not yet known. Neither is it known, similarly, whether or not travel characteristics and activities affect experiences and current mood.

Obviously, other theoretical perspectives may be used to investigate how a journey affects a child depending on the research aim (i.e. environmental factors, physical health, city planning, parental influence, travel mode choice etc.), and could be added to the model at a later stage.

However, these factors are beyond the scope of the present thesis. The next section will describe in detail the two empirical studies, and how the relationships within the conceptual framework have been tested.

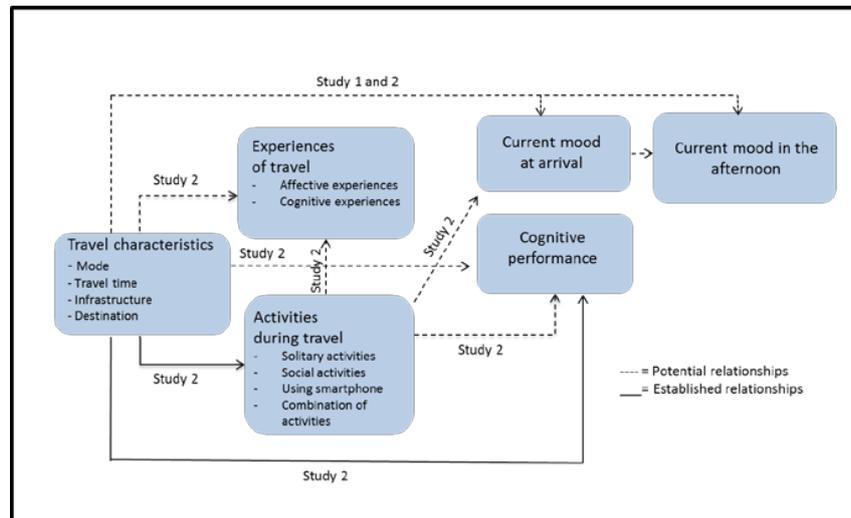


Figure 2. Potential and established effects of travel on children

#### 4. SUMMARY OF EMPIRICAL STUDIES

##### 4.1 Overview

The primary aim of Paper I is to evaluate whether or not children’s affective experiences (as measured by their current mood) while travelling vary with travel mode and destination. The aim of Paper II is to investigate whether or not the attributes of school journeys impact children’s experiences of traveling to school, their current mood, and their cognitive performance. We also investigate whether or not the variables vary with age (Paper II) and gender (Papers I and II).

Paper I included children in grade 4 (aged 10) from the city of Staffanstorps, Sweden, and a travel diary reporting day-to-day travel details and current mood formed the basis of the study. In Paper II, a larger sample covering different geographical areas was included and the focus was solely on school journeys. Children in grades 4 (aged 10), 6 (aged 12), and 8 (aged 14) were included, as well as an additional travel mode (the school bus). The aim was to

capture the entire travel experience and thus the Satisfaction with Travel Scale, adapted for children (STS-C), was included.

#### *4.2 Paper 1: Children's affective experience of every-day travel.*

The aim is to evaluate whether or not children's affective experiences of day-to-day travel vary with travel mode and destination. We investigate children's reported valence (unpleasantness–pleasantness) and activation (deactivation–activation) while travelling to different destinations and whether or not their experiences have any spillover effects regarding how they perceive activities at their destinations. All children in grade four (aged 10) (N=258) in the municipality of Staffanstorp were approached in the autumn of 2009. Two hundred and thirty-seven children (49 % girls) returned their travel diaries, which formed the basis for the analyses.

Every morning for one week during September, the children received an activity diary sheet and colored pencils. The children reported all their trips and travel modes, drew their travel routes on an aerial photo, and reported their current mood. Each destination they traveled to was reported in an opened-ended question, followed by a description of which travel mode had been used. Their immediate affective experiences (current mood) during the trip were reported by means of the written statement: “While I was traveling, I felt”, whereby he or she indicated his or her experienced valence and activation using two five-graded scales of mood icons. The children reported more journeys to school than to any other destination. Cycling was the most frequently used mode (approximately 45 % of journeys), with girls and boys using different modes and traveling to their various destinations at approximately the same extent.

The results showed that the average valence and activation was significantly lower while traveling to school than to other destinations. The level of activation during a school day was significantly lower for those who had traveled by car than those who had cycled to school. Girls experienced less activation than boys both on their way to school and during the school day, even more so when they had traveled by car. No gender difference was detected with regard to valence.

It is concluded that children's immediate affective experiences vary with how they travel and where they go and that there is a difference between boys' and girls' experiences. Traveling to school is a routine and highly-scheduled journey which seems to impact children's current mood. It is also concluded that this particular destination needs further attention, together with more extensive investigations of the travel experience by including the STS, which is designed to capture both the cognitive and affective experiences of travel, and to measure experiences gained during any type of travel without focusing on a particular travel mode (Friman et al., 2013). A larger sample of children from different geographical regions, and with the school bus as an additional travel mode, was included.

#### *4.3 Paper II: Children's travel to school: satisfaction, current mood, and cognitive performance.*

Research done on adults shows that activities, travel time, and travel mode all affect the travel experience (Ettema et al., 2012; Mokhtarian & Salomon, 2001; Olsson et al., 2013; Wachs, 1993; Young & Morris, 1981); we wanted to investigate whether this would similarly apply to children. We evaluated children's experiences of their travel to school using the STS, adapted for children (STS-C), and using measurements of their current mood. The aim was to investigate whether or not children's experience with travel and their current mood vary with travel mode, travel time, and activities during travel. Earlier research shows that travel mode affects children's grades (Martinez-Gomez et al., 2011), and that commute-induced stress negatively impacts work-related decisions (Van Roy, 2008). Thus, the travel experience may similarly affect school performance.

Children in years four, six, and eight (aged 10, 12, and 14) at five schools in Värmland County were included in the study. Data was collected between December 2012 and March 2013, with 344 children (165 girls) forming the basis of the analyses. The questionnaire consisted of questions about background information (i.e., age, gender, grade, and school), characteristics of the journey (i.e., travel mode, travel time, and travel companion), and what activities had been engaged in during the journey. Measurements of the current mood were made, and children's affective and cognitive experiences of the journey were captured using the STS-C. Directly after filling out the questionnaire, a word-fluency test was given to the children in order to measure their cognitive performance. The Thurstone Word Fluency Test (TWFT) is a widely-used neuropsychological instrument aimed at capturing a person's

psychomotor speed, attention/concentration, executive functioning, and memory (Cohen & Stanczak, 2000; Ruff, Light, Parker, & Levin, 1997; Sergeant, Geurts, & Oosterlaann 2002; Tallberg, Ivachova, Jones, Tinghag, & Östberg, 2008). The phonological word fluency test measures a person's ability to produce as many words as possible in a particular category (fruits, animals etc.), or any noun that starts with a certain letter, all within a specific time period (usually one minute) (Borkowski, Benton & Spreen, 1967; Spreen & Strauss, 1998). In order to successfully conduct a word fluency test, the participant is required to fully concentrate and to focus on the task in front of him/her (Pekkala, 2004). This validated test is easily given, with no special equipment needed, and takes very little time to carry out (Kempler, Ting, Dick, Taussig & Davis, 1998; Tallberg et al., 2008).

The results showed that travel by school bus or active mode was experienced as being of greater quality than travel by car. Children who engaged in social activities when traveling reported greater quality than those using their cellphones or engaging in solitary activities. Moreover, social activities elicited greater excitement than any other activity. Being passive resulted in a higher level of stress than doing any other type of activity, and shorter journeys were experienced as being of greater quality. Thus, satisfaction (the travel experience) with travel varies with travel mode, travel activities, and travel time. Current mood was affected by travel time in the sense that a longer journey elicited a lower level of activation. Age impacts both valence and activation during the mornings and afternoons. Activities and travel time also affect performance. Cognitive performance increased with longer travel times, as did cellphone usage and engaging in a combination of activities. It is concluded that a journey impacts children's travel experience, mood, and performance.

## 5. DISCUSSION

Where and how children travel, what they do when traveling, and for how long they travel all affect children's travel experience, mood, and/or cognitive performance. These novel findings bring further knowledge of the impact of a journey; the following sections will discuss the main results.

The findings differ somewhat between Paper I and II, but both show that car travel negatively affects children. In Paper I, children who had traveled to school by car experienced the lowest level of activation during their school day. In Paper II, we found that car travel elicited the lowest level of experienced quality. By means of active commuting, children's physical activity level increases, affecting the level of psychological activation, which is also maintained throughout the school day. The physical activity associated with active commuting to and from both schools and bus stops seems to positively affect cognitive evaluations, whereas car travel has the opposite effect. When children independently and actively travel, they ascribe the mode with a greater quality and the journey seems to be experienced as simply "better". Traveling by school bus, or in active mode, usually facilitates desirable social interactions with schoolmates, in turn increasing the level of quality and activation during the school day (as is the case with the active mode in Paper I).

That travel mode did not affect the level of activation in Paper II is surprising. Could the season have affected activation, in the sense that the morning darkness in Paper II made the children feel less alert even when actively travelling? In Paper I, data collection took place in September when the weather is still rather nice and bright, whereas Paper II took place in the middle of winter, when the sun does not rise before school has started. Darkness does negatively affect children's level of alertness (Swedo et al., 1995), which may help explain these distinct findings. This nascent subject shows itself to be diverse and complex and would gain from further investigation.

All in all, the findings point to the negative effects of car travel on mood and travel experience. Car travel is an environmentally-unsustainable travel mode which impairs children's physical activity, social interaction, and possibilities of exploring their local environment (Cooper et al., 2003; O'Brien, 2000; Roth et al., 2012). Active travel and the school bus ought to be regarded as the first choice for children's journeys.

If we learn which travel activities affect children, we will then be able to encourage them to engage in whatever increases their travel experience, mood, and cognitive performance. Paper II supports research done on adults whereby activities affect how travel is experienced. Social activities during travel add to higher level of both quality and excitement, whereas solitary activities add more to stress levels. Traveling by school bus and active mode offers a natural space for children to engage in social activities that increase excitement and reduce stress. Social support is unquestionably a strong mediator of psychological health, and interactions between people protect against stress (Cobb, 1976). Car journeys often occur with the accompaniment of parents and siblings, which may be less appreciated than traveling with friends.

The use of smartphone, or doing a combination of activities, results in improved cognitive performance. We argue that, by doing certain activities, children awaken and feel more mentally alert, something which consequently affects their performance. The use of ICTs (e.g. playing interactive games) is strongly related both to multiple dimensions of creativity (Jackson et al., 2012) and to visual-spatial skills (Green & Bavelier, 2006, 2007) which could help explain our findings on smartphone use and improved cognitive performance. Also, shifting one's attention, through combinations of activities (or cellphone use), may be an indicator of cognitive flexibility, which is linked to certain measurements of intelligence (Colzato et al., 2006; Les & Les, 2008). Although the effects found in this study are relatively small, and not entirely easy to explain, they certainly raise questions and provoke thought regarding new ways of appreciating travel whereby activities may be of more importance than was previously assumed.

Jain & Lyons (2008) claim that travel time can be viewed as a gift for network participation, whereby the traveler gains something from the experience of travel. Longer travel times provide opportunities to engage in activities and social interactions, resulting in beneficial effects on both the experience and performance. Although a longer journey resulted in less quality and excitement, the children still produced significantly more words. Trying to disentangle these results, we propose that it may be the activities per se that are of importance to the travel experience and cognitive performance, more so than the actual traveling time. With longer traveling times come more opportunities to engage in activities that positively affect one's performance and experience. The notion that traveling time can be a gift surely

offers some interesting possibilities as regards travel behavior and how to travel (Jain & Lyons, 2008).

In conclusion, the results show many similarities with findings concerning adults. We have shown that traveling by car negatively affects children's current mood and travel experiences, and longer traveling times negatively affect children's travel experiences. Social activities have the opposite effect on experienced quality and being passive makes children feel more stressed. In addition, we also find that current mood is affected by travel mode and traveling time. Cognitive performance is affected by travel time and activities done while traveling. Being active during the journey seems to be advantageous in many respects and should be encouraged. Perhaps this notion is particularly important to children who travel by car and who do not have the opportunity to spontaneously engage in social activities with friends, something which is important for the travel experience. Parents can thus encourage their children to engage in in-car activities which can highlight the fun aspects of their journeys to school.

This thesis has established relationships which have previously been uncertain and which are thus presented with dashed lines in the conceptual framework. The findings present an understanding of how a child is affected by his/her day-to-day travel. However, some of the findings show a stronger relationship than others; for example, the relationship between the travel experience and cognitive performance remains somewhat uncertain, and would benefit from further investigation.

Research into children's travel experiences may have previously been hindered by the lack of well-validated instruments and research into children is often avoided due to ethical and methodological inconveniences (Punch, 2002). The findings in this thesis suggest that children understand and are capable of making affective and cognitive judgments about their travel. The results also indicate that children reflect upon their travel situation, that they can relate to their emotions regarding their travel experiences, and that they are able to transfer them to the questionnaire. The STS-C appears to work well on children; they understand and are able and willing to answer the questions. This is, however, the first time that the STS-C has been used and further research in order to validate the instrument is advisable.

The way in which researchers perceive the status of children influences how children are understood (Punch, 2002). I strongly believe that children should be heard and taken seriously in any procedure that affects them. Children also have the right to be consulted and allowed to challenge decisions made on their behalf (Morrow & Richards, 1996). Today, policies (school choice, logistics, environmental planning, etc.) are made without a solid understanding of the key factors influencing children's travel. Our results show that a child is affected by his/her day-to-day travel, and reflects on it, something which must be taken into account when planning infrastructure. Parents should be made aware of the effects of travel on their children. Without this understanding, there may be a lack of motivation to bring about changes in travel behavior.

This thesis sheds light on the nascent subject of how children experience their travel. We now know that the school journey is not only a way of getting from home to school and vice versa – it also elicits emotions that may linger. Children should be encouraged to actively travel to school and parents need to be made aware of the influence of car travel on their children. Not only would this have a beneficial effect on the environment, and create healthy travel patterns for our children, it would also enhance the travel experience, current mood, and possibly boost cognitive performance. The results also indicate that the STS-C is a comprehensive instrument for measuring children's travel experiences, showing us that children reflect on their travel and that they make cognitive and affective judgments.

## 6. FUTURE RESEARCH AND LIMITATIONS

In our pursuit of fully understanding children's travel experiences, the randomization of travel mode, travel time, and engagement in activities would be advisable. In doing so, internal validity would be better established. Future research would need to either capitalize on natural experiments or try to set up randomized ones. It would, for instance, be possible to conduct an experimental study when a new school bus service is started. One limitation of the studies is the fact that current mood (Paper I) and satisfaction with travel (Paper II) are measured retrospectively. It would be possible to make observations and measurements during actual journeys, at least on public school buses. Also, base line measurements of current mood would rule out the possibility of the already awake, alert, and happy children scoring significantly higher upon arrival at school. Additionally, since the STS-C has never been used before, it would be advisable to conduct a psychometric analysis of this instrument.

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## Experiences of Everyday Travel

The purpose of this licentiate thesis is to examine how children experience their everyday travel. More specifically, do travel mode, travel time, and travel activities influence children's experiences of their everyday travel, how they feel, and how they perform at school. In Paper 1 we investigate whether children's moods, while travelling, vary with travel mode and destination. In Paper 2 we investigate whether children's experiences of travel and current mood vary with travel mode, traveling time, and activities during travel. We also investigate whether the travel experience affects cognitive performance. The overall findings of the two studies suggest that where and how children travel, what they do when traveling, and for how long they travel all affect children's travel experiences, moods, and cognitive performance. These novel findings bring important knowledge of the impact of a journey. Children are the next generation of traveler; how they experience their day-to-day travel may contribute toward their future travel behavior and influence how societies travel in the future.

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