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Community Mobility

What are people with autism spectrum disorders' viewpoints on public transport and driving in Australia?

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Bachelor thesis

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Keywords: Autism, Participation, Transportation, Usability

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Abstract

To be able to transport oneself within the community is important for engagement in meaningful occupations outside of one's home, and for participating in the society. People with disabilities may have limited transportation options, due to their lack of cognitive and physical abilities. The most common barrier for people with autism spectrum disorder (ASD) is unpredictable factors that occur when driving and using public transport. However, few studies have measured the viewpoints of people with ASD related to the usability of public transport and driving. Therefore, the aim of the present study was to identify viewpoints on possible barriers and facilitators with regards to the usability of driving and public transport for people with ASD. Q-methodology was used to identify the viewpoints. A total of 31 persons participated in the study that was conducted in Melbourne, VIC and Perth WA, in Australia. Three viewpoints were identified with regards to driving and two with regards to public transport. In driving, the viewpoints were: "Confident in driving", "Confident in using public transport" and "Confident in being passengers". In public transport the viewpoints were: "Using public transport adds to quality of life" and "The ability to transport oneself in the community is important". Regarding driving it appeared that driving in itself could act as a barrier for those without a driver's licence. Regardless of whether it was driving or through public transport, the ability to transport oneself was regarded as positive and it added to quality of life, a sense of freedom and to participation in the community. No distinct barriers to using public transport were identified and therefore this method of transportation appeared to be a facilitator for community participation

Keywords: Autism, Participation, Transportation, Usability

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Community Mobility

Vad har personer inom autismspektrum för perspektiv på kollektivtrafik och bilkörning i Australien?

Olov Falkmer

Jessica Siljehav

Abstrakt

Att transportera sig i samhället är ett sätt att vara delaktig i meningsfulla aktiviteter utanför hemmet och således att vara delaktig i samhället. För personer med funktionsnedsättningar kan det vara svårt att använda olika transportmedel på grund av begränsade kognitiva eller fysiska förmågor. Den vanligaste svårigheten för människor inom autismspektrum är oförutsedda händelser som kan uppstå vid både bilkörning och i användandet av kollektivtrafik. Idag finns det få studier om bilkörning och kollektivtrafik som har genomförts där personer inom autismspektrums synpunkter undersökts. Denna studie syftar till att undersöka deras synpunkter på möjliga barriärer och facilitatorer för bilkörning och användande av kollektivtrafik. Q-metodologi har använts för att samla in dessa synpunkter. Totalt deltog 31 män och kvinnor från Perth, Western Australia och Melbourne, Victoria i Australien. Utifrån de insamlade synpunkterna identifierades tre perspektiv inom bilkörning och två inom kollektivtrafik. Inom bilkörning var perspektiven ”Trygg i att köra bil”, ”Trygg i att använda kollektivtrafik” och ”Trygg i att vara passagerare”. Inom kollektivtrafik var perspektiven ”Användningen av kollektivtrafik ökar känslan av livskvalité” och ”Förmågan att kunna transportera sig i samhället är viktigt”. Inga direkta barriärer urskildes från resultaten inom lokaltrafik men inom bilkörning framkom det att idén att köra bil sågs som en barriär för personer som inte hade erfarenheter av bilkörning. Att ha möjligheten att transportera sig oavsett färdmedel gav ökad livskvalité, känsla av frihet och känsla av att vara delaktig i samhället.

Nyckelord: Autism, Delaktighet, Transport, Användbarhet

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Background

Introduction

Transportation is required in order to be involved in a large number of occupations within the community. Leisure, work and social activities are often performed at different locations and the ability to transport oneself is a prerequisite for performing these occupations (Carlsson, 2004; Conley, 2007; Lemaire & Mallik, 2008; Stock, Davies, Wehmeyer & Lachapelle, 2011). People with disabilities may find it difficult to use different types of transportation, due to the physical and cognitive demands. This may limit the person's ability to use transportation and thereby to be involved in the community and to live a fulfilling life. Verdonschot, Witte, Reichrath, Buntix and Curfs (2009) highlight the fact that insufficient transportation is often a barrier for community participation for people with cognitive disabilities. Unpredictable factors, such as irregularity of public transport, lack of information, delays and economic factors (e.g., ticket prices) are perceived as negatively affecting accessibility and thus ultimately the usability of the public transport system. One group of transport system users that may be more affected than others because of these factors is people with autism spectrum disorders (ASD).

The most common issues experienced within the realm of transportation by adults with intellectual disabilities are related to cognitive functions, such as difficulties with perception, processing information and a decreased problem solving ability in the event of unpredictable changes. These difficulties can result in feelings of anxiety related to transportation in the community (Currie, 2010; Geller & Greenberg, 2009; Mengue-Topio, Courbois, Farran & Sockeel, 2011; Parsons, Leonard & Mitchell, 2006). As driving is often not an option for those with intellectual disabilities (Risser, Iwarsson & Ståhl, 2012), public transport is a suitable and cost effective form of transportation, since it does not rely on the person being able to drive or be transported by friends or family members (Bylund, Wretstrand, Falkmer, Lövgren & Petzall, 2007; Davies, Stock, Holloway & Wehmeyer, 2010; Stock et al., 2011). However, the use of public transport is limited.

The current number of adults with ASD in Australia is around 153,000; the prevalence rate of ASD is around 1% of the population in Australia, as well as in most Western countries (Brugha et al., 2011; Posada, Primo, Ferrari & Martín-Arribas, 2007). This figure is expected to rise substantially over the next decade (Brugha et al., 2011). Approximately 5,130,000 journeys are made each year by people diagnosed with ASD, which can be broken down to less than 100 journeys with public transport per person per year in VIC and WA. Given the idea of full independent community participation for those with ASD who cannot utilise driving as their preferred mode of transport, this figure is alarmingly low. There is, however, limited knowledge regarding their viewpoints on transportation and the facilitators and barriers that different forms of transportation poses for adults and adolescents with ASDs' community participation (Hendricks & Wehman, 2009; Huang, Kao, Curry & Durbin, 2012).

Autism spectrum disorder

ASD is a neurobiological and congenital condition that has implications in social interactions, communication and behaviour (Levy, Mandel & Schultz, 2009). People with ASD can have difficulties with developing friendship or engaging in cooperative occupations with others. Their difficulty in social interaction is due to the lack of understanding of social rules and others' motivation, which can be referred to as lack of, or at least difficulties with, "Theory of Mind" (Kristiansen, 2000). This theory explains the ability of a person to create ideas of others' motivation and that another person may have different thoughts and values than one's own. These values form the "filters" through which the other person views the world (Levy et al., 2009). Despite this difficulty, people with ASD still have an urge to interact socially, since the human is a social being (Kielhofner, 2008; Kristiansen, 2000).

ASD also results in difficulties with language development, which causes limitations in understanding verbal and non-verbal communication, such as facial expressions and body language. This impairment in communication may result in isolation and can increase barriers between people with ASD and others (Levy et al., 2009). People with ASD often have interests in activities that are beyond the "normal interests", which may be a further limitation in social interactions (Levy et al., 2009). Besides

limitations with communication, social interaction and restricted and repetitive behaviours, they may also have limitations in motor skills and sensory processing (Levy et al., 2009). Audible, visual or tactile sensory stimuli, are interpreted differently in comparison to people without ASD, and can have an impact on participation in occupations outside of one's home (Lang, Mahoney, El Zein, Dalaune & Amidon, 2011).

Community Participation

Participation is defined as *involvement in a life situation* (WHO, 2001, p.10). This definition is broad and comprises four domains; domestic life, interpersonal life, major life areas and community, civic and social life. The definition of Community civic and social life is: “...*engaging in all aspects of community social life, such as engaging in charitable organizations, service clubs or professional social organizations.*” (WHO, 2001, p.168). Community participation is a concept related to a person having the opportunity to participate in occupations within their community. It is a broad term that relates to community-based occupations that are relevant to the persons' sense of belonging to the community (Balandin, 2011). This involves leisure and social activities within the community (WHO, 2001). Participating in community life is not necessarily a part of one's life goals, although it can be seen as an important part of reaching life goals (Verdonschot, Witte, Reichrath, Buntix & Curfs, 2008). Community participation is seen as a part of living a long, healthy life (Davies, Stock, Holloway & Wehmeyer, 2010).

In order to engage people with ASD in the community, it is important to implement different types of support (Kristiansen, 2000). For people with ASD, assistance in and modification of, everyday life situations may greatly improve participation in their communities. Assistive technology can have a positive impact on mobility, usability and communication. Technical solutions can be helpful for individuals, in order to reach higher levels of independence and engagement in different contexts, i.e., different occupational settings (Verdonschot et al., 2009). Social support is of great importance for promoting community participation. It is also necessary to enhance the usability of different types of transportation for all members of society to enable community participation (Unsworth, 2012).

Community Mobility

Community mobility supports participation and is defined as “...*moving self in the community and using public or private transportation.*” (American Occupational Therapy Association, 2002, p.620). Public transport is an essential resource within the community with the aim to increase participation among all community members (Stock et al., 2011). People with communication impairments, e.g., people with ASD, are commonly not satisfied with their community participation and social life. As little as 12% of their leisure activities are performed with peers (Verdonschot et al., 2008). Therefore, it is important to promote and enable various forms of community participation for people with cognitive disabilities. This further emphasises the need for community mobility for people with ASD, in order to reach and maintain a satisfying social life through community participation.

A significant amount of time of everyday life consists of transportation to and from different occupational settings, such as going shopping, going to restaurants or travelling to one’s workplace. These occupations are often performed with staff or family members for people with intellectual and or cognitive disabilities e.g., ASD (Verdonschot et al., 2008). Activities that were reported as most problematic to handle independently for people with ASD were the ones that required high levels of autonomy and a capacity of being mobile. Hence, people with ASD may perceive travelling within their community as problematic (Unsworth, 2012).

According to the Model of Human Occupation (Kielhofner, 2008), a person’s unique capabilities, subjective experiences and physical and cognitive abilities are, when performing occupations, interacting with the environment, i.e., in the present study persons with ASD transporting themselves in the community. The aspects of the environment in relation to the person’s objective and subjective traits form the environmental impact. In cases where the ability to be mobile in the community is hindered, this impact can disable the person from engaging in meaningful occupations, since subjective experiences and physical and cognitive functions interact with the environment. It is in this interaction our ability for occupational performance is formed (Kielhofner, 2008).

Kielhofner (2008) states that the environment is the context in which occupations

occur. The different domains, e.g., social and cultural features, affect the occupational life and engagement of people. Environmental resources, and the consequences these have on the person, either enable or disable the person's occupations and participation. An occupational setting comprises of all the factors, e.g., objects, spaces and social groups that form the context that allows occupations to be performed in a way that feels meaningful to the person (Kielhofner, 2008). Therefore, it is of importance that the person can be mobile within the community, in order to participate in different meaningful occupations taking place in different occupational settings.

The need for usability in transportation

According to the Model Of Human Occupation, transportation between different occupational settings is a big part of everyday life, e.g., taking the bus to the mall and later taking the metro to a café (Kielhofner, 2008). Therefore, the usability of transportation is of utmost importance for our community participation.

Different circumstances, objects, spaces and social networks are factors that impact on people's abilities and preferences for participation. This is related to the perceived usability of transportation, services and mentioned aspects, e.g., familiar spaces that people interact with in the community. A definition of usability is the subjective relationship between person, environment and occupation (Iwarsson & Ståhl, 2003). This means that a person with a disability should have the same opportunity to engage in desirable occupations within the given environment, as everybody else. Usability is a subjective aspect of a person finding something useful, user-friendly and desirable to perform (Iwarsson & Ståhl, 2003). Available research suggests that people with ASD rely on friends and family to meet their transportation needs (Falkmer, Anund, Sörenson & Falkmer, 2004). Furthermore, the available research has been based on the opinions of those providing the transportation and not on people with ASD (Broderick, Reeve, Cox & Cox, 2012).

Since knowledge is scarce regarding the transportation preferences for people with ASD, as well as what other factors may limit or facilitate this groups use of driving and public transportation to access the community (Broderick et al., 2012), further research on people with ASD's viewpoints within the field of transportation is important. These viewpoints can be used to guide interventions targeting

transportation needs of people with ASD, in order to promote usability and community mobility and thereby community participation.

The aim of the study

The aim of the present study was to identify viewpoints on possible barriers and facilitators with regards to the usability of driving and public transport for people with ASD.

Method

Design and Setting

Q methodology (Corr, 2001) was used for the present study. The data collection was conducted in Melbourne, VIC and Perth, WA, Australia. Both are major metropolitan areas where public transport is used to a large extent. Melbourne has a metro, trams, trains and busses and Perth has busses and trains as part of the public transport systems. Both cities public transport systems use electronic paying methods. Melbourne has Myki and Perth has Smartrider. In Australia, a person can drive from the age of 16 with a learner's permit.

Participants

The inclusion criteria was that participant's were living in Melbourne or Perth metropolitan or rural areas, had a diagnosis of high functioning Autism Spectrum Disorder or Asperger's syndrome and were aged 17 to 64 years old without cognitive co-morbidities and/or visual impairments. It should be noted that possession of a valid driver's licence was not an inclusion criterion.

The participants were recruited using convenience and snowball sampling (Cohen, Manion & Morrison, 2007). Consequently, recruitment was based on networking, advertising (on-line and through flyers) and using existing connections with organisations and research centres. In total, 31 participants were recruited from the Melbourne metropolitan area and Bendigo and the Perth metropolitan area (19 from Melbourne, 1 from Bendigo 11 and from Perth).

The sample was heterogeneous regarding gender, age and possession of a valid driver's licence and consisted of 5 women and 26 men, with a mean age of 23 years,

ranging from 17- 55 years. Nine of the participants possessed a driver's licence, six possessed a learner's permit and 16 did not have a driver's licence or learner's permit. The total sample did not represent the wider target population, which is not necessary, since Q-methodology does not aim to generalize the results to a wider population (Corr, 2006).

Q-methodology

The purpose of using Q methodology is to identify ranges of viewpoints of a target group within a specific context (Corr, 2006). The method provides data that can be used to study subjective viewpoints on certain topics. Q methodology does not include open-ended questions or verbal face-to-face conversation. Instead, this paper-based method is used to find and analyse participant's operant subjectivity (Corr, 2006). The researcher provides participants with a context by developing a concourse (statements and a grid). The participants sort the statements that have been developed by the researchers onto the grid. This is done according to their subjective viewpoints, i.e., to what extent they agree or disagree with the statements.

The data generates a profound understanding of individuals; it examines people's thoughts and attitudes (Corr, 2006). There are no right or wrong answers, opinions are not proof, but the different viewpoints that emerge will act to supposedly identify barriers and facilitators regarding driving and use of public transport. These viewpoints are then statistically analysed, through an exploratory factor analysis (Corr, 2006).

Data collection

By collecting data from relevant literature on facilitators and barriers regarding community mobility through public transport and driving, and on adults with ASD, two concourses, i.e., Q-sorts, were developed for the present study. One concourse led to the formulation of 59 statements regarding public transport and the other concourse led to the formulation of 59 statements regarding driving (Appendix 1). In collaboration with researchers at Curtin University, Perth (WA) initial drafts of the statements were developed. The statements were piloted in Lund, Sweden and in Perth, WA to test if they were understandable, relevant and not contradictory. The selected participants in the pilot group consisted of both English and Swedish native speakers. Six of the included participants were laymen (four females and two males)

familiar with driving and using public transport, 2 were professional experts in the field and one was a female with ASD. Based on the outcome of these trials the statements were refined until consensus was reached among the researchers upon the most relevant topics being covered. The statements cover most aspects of the topic and were confirmed as understandable by the participants in the pilot trials.

When using Q methodology, the researcher provides the participants with the different statements that they sort onto the constructed grid (Figure 1). The grid was a piece of laminated A2 paper and the statements were laminated notes that each fitted into one single space on the grid. The grid serves as an ordinal scale (Corr, 2001), ranging from two extreme values (strongly disagree to strongly agree). The number of participants in Q-studies should preferably match the number of statements in the concourse (Brown, 1980).

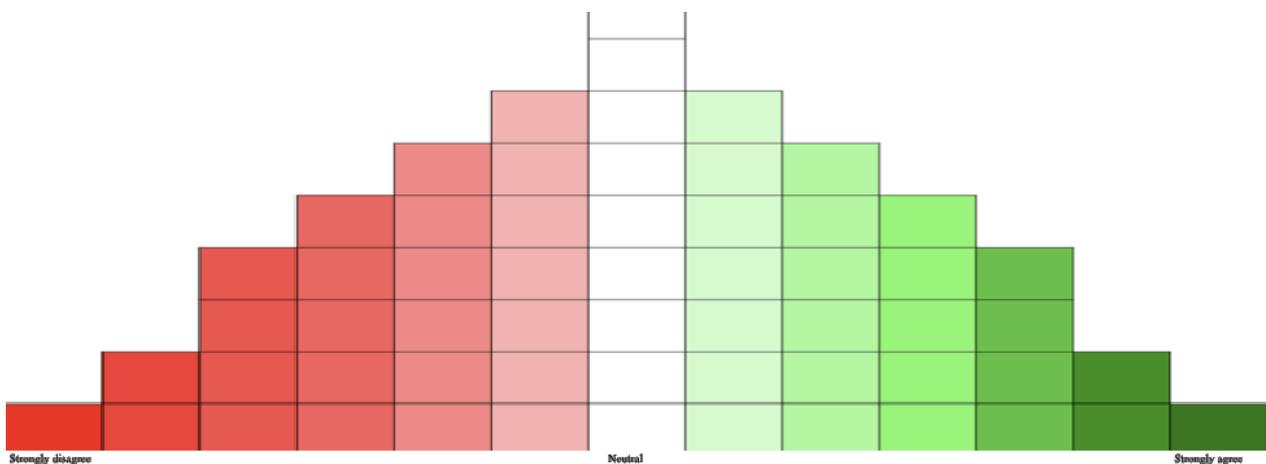


Figure 1. The Q sorting grid. To the right the label is “Strongly agree”, in the middle “Neutral”, and to the left “Strongly disagree”. “Strongly agree” is considered to be valued as +6, “Neutral” as 0 and “Strongly disagree” as -6 in the data analyses. The positions are colour coded to further clarify the ordinal range of the scale.

Procedures

The authors were introduced to, and co-operated with Olga Tennison Autism Research Centre (OTARC), at La Trobe University, Melbourne (VIC) through contacts at Curtin University, Perth (WA). The authors were invited to be a part of a collaborative research project and contributed to the data collection in VIC. OTARC provided a list of potential participants and further guidance in recruiting, such as suggesting Autism related organisations to contact. The authors attended conventions, talked to colleagues, friends and used the World Wide Web to find participants. The recruitment process involved sending out information letters (Appendix 2) as well as calling and emailing potential participants and organisations (Amaze, Aspect, ASSN VIC and Metroaccess). Recruitment in Perth was performed similarly by researchers at Curtin University. Participants were recruited via e-mail to service providers (e.g., Therapy Focus and autism-specific charities), by using flyers and contacting organisations (e.g. Autism Association of WA).

Each participant met with one of the authors or one of the researchers in Perth while both of the Q-sorts were performed. The data collection in Melbourne was carried out at OTARC, the Kevin Heinze Garden Centre in Melbourne or at the participants' home. Each Q-sort was introduced by giving verbal and visual information from a predesigned script (Appendix 3) about what was going to happen and how a Q-sort is carried out. The participants then received one of the two decks of statements as well as a list of the statements to provide them with an overview. All people that accepted to participate in the study completed both Q-sorts. After asking whether the participants agreed to have the procedure timed, they were told to start whenever they were ready. Half of the participants started with sorting the statements regarding public transport and the other half started with the statements regarding driving. The participants were encouraged to start by sorting the statements into three piles, agree, disagree and in-between (neutral), in order to make the sorting easier. While sorting the participants were allowed to ask questions and the few questions that came up were related to definitions, e.g., "...*how often is often?*". After they had sorted the statements, the participants were asked if they were satisfied with their sorting and if they had any further questions. The second sorting was in general quicker than the first, regardless of whether it was about driving or public transport, and generally

without any questions. The duration of the two Q-sorts combined ranged from 13– 87 minutes, with a mean time of 34 minutes (SD= 8.53).

Data analysis

The data were transferred and analysed using the statistical program for Q methodology, viz.: PQMethod, available online¹ (Corr, 2001). Each participant's sort was entered into the programme and an exploratory factor analysis with varimax rotation was performed to find correlations between the participants sorting, thus generating the final viewpoints (Corr, 2006). Factor analysis is a multivariate statistical method used to explain correlations between variables that have been identified as having similar underlying factors. It is a multidimensional measurement, which can function as a determination of the number and nature of identified underlying factors. By grouping these factor the researcher can sort, and break down a large number of variables into relevant factors (Cohen et al., 2007).

Factor analysis was used to design a matrix that shows the correlations between each variable with the other variables. Strong correlations between groups of variables and weak correlations with other groups were of interest. The sorts that were analysed were grouped into factors depending on their correlations with other sorts, i.e. if the participants had similar viewpoints (Corr, 2006). By deriving the factors, only the ones with an eigenvalue greater than 1 were kept. In order to determine exactly how many factors to retain, i.e., the number of viewpoints, for driving and public transport, that were generated from the factor analysis, a scree plot was constructed (Normann & Streiner, 2003). By transforming the results from the factor analysis into viewpoints, the authors analysed and named the viewpoints depending on statement ratings (factor loadings) that were significant for the different viewpoints (Corr, 2006). By comparing and contrasting the positioning of the statements within each factor, identification of the viewpoint labels that best described the patterns of the statements in any given factor was completed. By analysing the similarities and differences between the emerged factors, i.e., the different ranking of the statements on the grid, the authors interpreted the result, thus gaining an understanding of the different viewpoints and their meaning (Corr, 2006). This understanding of the labelled viewpoints was used to describe and discuss the barriers and facilitators for

¹ <http://www.lrz.de/~schmolck/qmethod/>

using public transport and driving for people with ASD. The critical α -value was set to .05.

Relevant factors

Eight factors (viewpoints) with an eigenvalue > 1 were extracted for driving and seven factors (viewpoints) with an eigenvalue > 1 were extracted for public transport. However, all factors were not statistically important and the eigenvalues of the different factors indicated their importance for the results (Field, 2000). A scree plot, displaying the factors along the X-axis and the eigenvalues along the Y-axis was constructed to decide which factors were representative and thus meaningful to keep and which to discard (Figures 2 and 3).

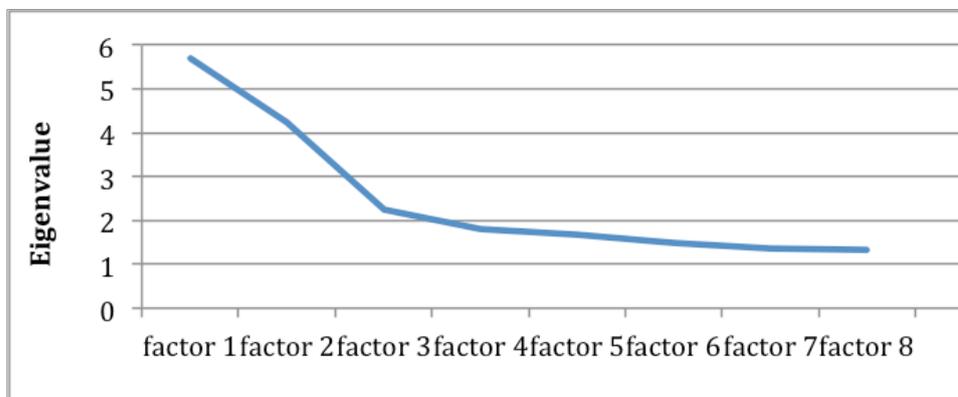


Figure 2. Scree plot for driving

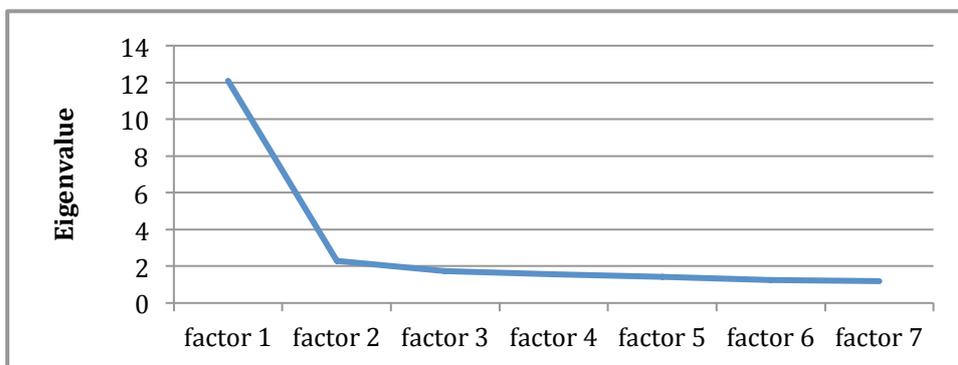


Figure 3. Scree plot for public transport

The factors above and on the inflexion of the scree plot, i.e., the ones with greater eigenvalue than the others were kept (Field, 2000). This resulted in three factors for driving and two factors for public transport.

However, an inspection of the scree plots makes it obvious that some factors with an eigenvalue > 1 were discarded. Field (2000) points out that decisions on which factors to keep should not solely be based on the scree plots. When analysing the factors, the authors discarded the ones where the differences were too small or trivial compared with other factors, in order to grasp and explain significantly different viewpoints (Field, 2000). The authors kept only the factors that had at least two defining sorts connected to them, i.e., sorts that loaded significantly to one factor (calculated by PQMethod software) (Watts & Stenner, 2012). These factors did not explain all of the difference in the data, however, they accounted for significant viewpoints that emerged from several participants' operant subjectivity of the topic. The emerging factors were analysed and named after defining sorts and distinguishing statements in each viewpoint. The names of the viewpoints and the meaning ascribed to them emerged through an analysis of attitudes towards the statements and experiences of the persons sharing the viewpoints. The participants' ages, to what extent they had a valid driver's licence, a learner's permit and how often the participants used public transport were accounted for when analysing the results.

Ethical consideration

The study was approved at La Trobe University, Melbourne, VIC (ethical approval number HR61/2012) and at Curtin University, Perth, WA, (ethical approval number 4261). All participants gave their informed consent to participate.

The results are presented on a group level, i.e., no individual result and no identifiable data are published. All data have been used confidentially and the collected material was stored digitally on password protected hard drives.

Results

Three viewpoints were identified in driving, representing a total of 32 % of the variance in the Q-sorts and two viewpoints were identified in public transport, representing a total of 29% of the variance in the Q-sorts. The identified viewpoints in driving were "Confident in driving" (17 %), "Confident in using public transport" (9%) and "Confident in being passengers" (6%). The identified viewpoints in public transport were "Using public transport adds to quality of life" (14%) and "The ability to be mobile in the community is important" (15%). Different rankings of the statements in each viewpoint (factor arrays) are found in tables 1, 2 and 3.

Table 1. Factor arrays for the viewpoints on driving including ranking and normalized factor scores (Z-scores)

Driving Statements	Viewpoints		
	1 Ranking (Z-score)	2 Ranking (Z-score)	3 Ranking (Z-score)
1. I prefer to take part in activities that are important to me outside of my home rather than in my home	0 (0.29)	3 (1.15)	0 (0.00)
2. I prefer to take part in leisure activities outside of my home (e.g. hobbies, sports, exercise, social groups or clubs, movies etc.) rather than in my home	1 (0.55)	3 (1.14)	1 (0.32)
3. I prefer to do chores (like food shopping, medical/other appointments, or banking) outside of my home, rather than online or over the phone	1 (0.46)	2 (0.67)	4 (1.45)
4. I prefer to take part in social activities (e.g. spending time with friends and relatives etc.) outside of my home rather than in my home	2 (0.85)	5 (1.65)	-3 (-0.95)
5. I prefer to do activities outside of my home without help from someone	2 (0.82)	-5 (-1.81)	-4 (-1.64)
6. I prefer someone to join me when travelling outside of my home	1 (0.34)	-2 (-0.69)	-1 (-0.51)
7. I don't feel comfortable when leaving my home	-4 (-1.46)	-6 (-2.28)	2 (0.57)
8. I feel secure when I travel outside of my home	4 (1.41)	2 (0.66)	-3 (-1.01)
9. Being able to travel by myself is important for my independence	6 (2.11)	4 (1.42)	2 (0.88)
10. Driving is important for my sense of freedom	5 (1.46)	-5 (-2.10)	3 (1.01)
11. I am satisfied with my participation in activities outside of my home	4 (1.34)	-1 (-0.46)	4 (1.39)
12. Taking part in activities outside of my home adds to my quality of life	2 (0.87)	5 (1.51)	3 (0.95)
13. I usually travel alone when I drive	2 (0.93)	0 (0.00)	-5 (-1.76)
14. I have someone to ask for help about driving somewhere new if I need to	0 (-0.06)	1 (0.23)	0 (-0.07)
15. It is important for me to be able to transport myself by car	2 (0.75)	-4 (-1.64)	-1 (-0.25)
16. I drive myself to work	1 (0.49)	1 (0.49)	-3 (-0.94)
17. I drive as a part of my job	0 (-0.24)	0 (0.00)	-5 (-1.71)
18. Driving helps me to participate in more activities outside of my home	3 (1.24)	-1 (-0.30)	1 (0.44)
19. Driving adds to my quality of life due to my ability to transport myself	4 (1.43)	-4 (-1.62)	-2 (-0.75)
20. Learning to drive is difficult	-2 (-0.72)	4 (1.48)	-1 (-0.19)
21. My parents (or another family member) will teach/have taught me to drive	3 (0.98)	1 (0.30)	1 (0.19)
22. It is too expensive to drive (e.g. maintenance, petrol, driving lessons, buying a car)	-1 (-0.64)	2 (0.75)	3 (1.07)
23. I would prefer professional driving lessons/I had professional driving lessons	5 (1.68)	1 (0.33)	-6 (-1.95)
24. Professional driving lessons are too expensive	-2 (-0.78)	0 (0.16)	3 (1.00)
25. I am afraid of hill starts in case I hit the car behind mine	-4 (-1.43)	-3 (-1.17)	2 (0.63)
26. I would prefer driving my own car rather than using public transport	1 (0.71)	-4 (-1.60)	-1 (-0.56)
27. I would prefer to take public transport (e.g. bus, train) rather than drive	-1 (-0.43)	6 (1.96)	-2 (-0.82)
28. I would prefer to take a taxi rather than driving myself when I can afford it	-6 (-1.78)	-1 (-0.44)	0 (0.14)
29. I would prefer to travel by car with friends or family rather than driving myself	0 (-0.13)	1 (0.28)	3 (1.07)
30. Where possible, I prefer to transport myself by walking	1 (0.68)	3 (1.20)	-2 (-0.75)
31. Where possible, I prefer to transport myself by bicycle	-1 (-0.66)	-1 (-0.22)	-3 (-0.88)
32. I sometimes do not drive because it is too complicated (e.g. need to use freeways, directions are too complicated etc.)	-2 (-0.97)	-1 (-0.32)	0 (-0.01)
33. I am afraid that I may have an accident when I drive	-4 (-1.31)	2 (0.81)	-1 (-0.13)
34. I am afraid that I will not notice pedestrians when I drive	-1 (-0.67)	3 (0.91)	6 (2.27)
35. I am afraid that I will not notice when the car in front of me brakes	-2 (-0.76)	-3 (-0.81)	2 (0.63)
36. I am afraid of hitting something when I reverse	-1 (-0.67)	0 (-0.13)	5 (1.88)
37. I am afraid of changing lanes in case I hit another car	-3 (-1.02)	0 (0.14)	1 (0.39)
38. I am afraid of merging (when two lanes merge into one)	-3 (-1.08)	-2 (-0.63)	0 (-0.07)
39. I feel anxious or worried about driving	-3 (-1.13)	3 (1.15)	0 (0.13)
40. I prefer to drive short distances rather than long distances	0 (0.24)	-2 (-0.68)	2 (0.82)
41. I like driving to new places	3 (1.16)	-3 (-0.80)	5 (1.95)
42. I like driving at night time	3 (1.23)	0 (-0.14)	0 (0.00)
43. I like driving when it is raining	1 (0.47)	0 (0.14)	2 (0.51)
44. Cyclists riding on the road are distracting	0 (-0.09)	-3 (-0.80)	1 (0.19)
45. I prefer to be alone in the car so I can concentrate	-1 (-0.30)	-2 (-0.64)	-3 (-1.20)
46. I am distracted by noisy passengers while I am driving	0 (-0.07)	2 (0.79)	-1 (-0.31)
47. I prefer to drive without the radio or music playing	-2 (-0.69)	4 (1.29)	-4 (-1.26)
48. I am afraid of driving when there is sun glare through the windscreen	-1 (-0.53)	1 (0.30)	-4 (-1.32)
49. I am afraid that I may not see a red light and will drive through it	-5 (-1.74)	-3 (-0.99)	0 (0.18)
50. I am afraid that I may miss other information when I am reading a street or traffic sign	-3 (-1.01)	-2 (-0.68)	0 (0.06)
51. I prefer to drive on roads with less traffic	4 (1.24)	-1 (-0.32)	1 (0.31)
52. I am afraid of hitting something when I park the car	-2 (-0.99)	1 (0.45)	4 (1.76)
53. I like driving within the inner city	0 (-0.21)	-2 (-0.65)	-2 (0.82)
54. It is difficult to know how close to drive to cars in front of me	-4 (-1.21)	0 (0.07)	-4 (-1.64)
55. I am afraid that I may forget or not adhere to the road rules	-5 (-1.64)	2 (0.82)	4 (1.14)
56. I like using roundabouts	2 (0.78)	-1 (-0.32)	1 (0.25)
57. Busy intersections without traffic lights make me anxious	0 (-0.16)	4 (1.50)	-2 (0.69)
58. I am unsure about when to give way to other cars	-3 (-1.02)	0 (-0.10)	-1 (-0.63)
59. I like driving on the freeway	3 (1.07)	-4 (-1.36)	-2 (-0.76)

Table 2. Factor Arrays for the viewpoint on public transport including ranking and normalized factor scores (Z-scores)

Public Transport Statements	Viewpoint	
	1 Ranking (Z-score)	2 Ranking (Z-score)
1. I prefer to perform activities that are important to me outside of my home rather than in my home	0 (0.16)	1 (0.57)
2. I prefer to participate in leisure activities outside of my home (e.g. hobbies, sports, exercise, social groups or clubs, movies etc.) rather than in my home	-1 (-0.24)	4 (1.20)
3. I prefer to do chores (like food shopping, medical/other appointments, or banking) that I outside of my home rather than online or over the phone	0 (0.15)	0 (0.40)
4. I prefer to participate in social activities (e.g. spending time with friends and relatives etc.) outside of my home rather than in my home	-2 (-0.59)	4 (1.41)
5. I prefer to perform activities outside of my home without help from someone	-1 (-0.32)	1 (0.64)
6. I prefer someone to join me when travelling outside of my home	-1 (-0.24)	1 (0.52)
7. I usually travel alone when using public transport	1 (0.31)	1 (0.42)
8. I have someone to ask for help about travelling on public transport if I need to	1 (0.51)	0 (0.22)
9. I don't feel comfortable when leaving my home	-3 (-1.08)	-3 (-1.27)
10. I feel secure when I travel outside of my home	-1 (-0.45)	1 (0.58)
11. It is important for me to be able to transport myself outside of my home without using a car	4 (1.34)	5 (1.54)
12. Being able to travel by myself is important for my independence	4 (1.34)	3 (1.09)
13. I would prefer driving a car rather than using public transport	-1 (-0.41)	-2 (-0.61)
14. I would prefer to take public transport (e.g. bus, train) rather than drive	5 (1.73)	0 (-0.07)
15. I prefer to take a taxi rather than public transport when I can afford it	-5 (-1.84)	-1 (-0.59)
16. I prefer to travel by car with friends or family rather than take public transport	2 (0.64)	1 (0.43)
17. Where possible, I prefer to transport myself by walking	3 (1.10)	-4 (-1.30)
18. Where possible, I prefer to transport myself by bicycle	-3 (-1.10)	-5 (-1.75)
19. I am satisfied with my participation in activities outside of my home	1 (0.30)	3 (1.05)
20. Public transport helps me to participate in more activities outside of my home	1 (0.60)	1 (0.62)
21. I find local public transport convenient for me	3 (1.23)	3 (1.19)
22. I find local public transport comfortable to use	2 (0.71)	4 (1.23)
23. I feel safe using public transport outside of peak times	-2 (-0.63)	4 (1.38)
24. The nearest bus stop or train station is too far from where I want to go	-3 (-1.11)	-1 (-0.53)
25. The nearest bus stop or train station is too far from where I live	-4 (-1.29)	0 (-0.27)
26. I find that the bus or train timetable is difficult to understand	-5 (-1.59)	-1 (-0.38)
27. I find it difficult to know when I should get off the bus or train	1 (0.56)	-2 (-0.71)
28. I do not travel by public transport because it is too complicated (e.g. have to change bus or train too many times, too much walking etc.)	-4 (-1.14)	-2 (-0.84)
29. Using public transport adds to my quality of life due to my ability to transport myself	6 (1.78)	0 (0.41)
30. Taking part in activities outside of my home adds to my quality of life	3 (1.19)	2 (0.94)
31. I am frightened of using public transport (e.g. trains, buses)	-2 (-0.97)	-4 (-1.53)
32. I have never used public transport	-6 (-2.84)	-6 (-1.86)
33. I seldom use public transport	-4 (-1.57)	-3 (-1.10)
34. I often use public transport	5 (1.58)	2 (0.79)
35. I would like to use public transport more than I currently do	1 (0.55)	2 (0.68)
36. My friends/family/aide help me to use public transport	0 (-0.15)	5 (1.42)
37. It is important to me that the buses/trains run on time	2 (0.87)	-3 (-1.22)
38. It is important to me that there is someone able to assist me with any problems I may have (e.g. bus driver, transit officer)	3 (1.09)	2 (0.71)
39. I don't travel at peak transport times when the bus or train is full of people	2 (0.68)	-1 (-0.45)
40. I find the financial cost of public transport reasonable	2 (0.90)	0 (0.38)
41. I would use public transport more often if it was cheaper	3 (0.96)	3 (1.12)
42. Public transport is not convenient for me on public holidays or weekends	0 (0.04)	2 (0.83)
43. I have difficulties when purchasing tickets for public transport	-1 (-0.51)	-3 (-1.08)
44. I dislike the smell inside trains and/or buses	0 (-0.11)	0 (-0.38)
45. I dislike the noise inside trains and/or buses	0 (0.17)	-4 (-1.33)
46. I dislike the smell of bus stations and/or train stations	-2 (-0.76)	0 (-0.09)

Table 3. Continuing from previous page

47. I dislike the noise at bus stations and/or train stations	-1 (-0.43)	-2 (-0.67)
48. I find the signs confusing at bus stations and/or train stations	-3 (-1.01)	-1 (-0.57)
49. It is difficult to press the buzzer on the bus at the right time so it stops at the correct stop	-4 (-1.31)	-2 (-0.74)
50. Learning a new route using public transport is difficult for me	2 (0.68)	0 (-0.23)
51. I feel comfortable asking for help if I need to	0 (0.13)	3 (1.02)
52. I dislike being touched by other people on public transport	4 (1.26)	-1 (-0.59)
53. Using a Smartrider/Myki makes my journey easier	4 (1.26)	6 (2.14)
54. I find the colours and patterns on the buses and trains overwhelming	-2 (-0.80)	-2 (-0.79)
55. I dislike the noise of the doors and brakes on the bus	0 (0.01)	-5 (-1.86)
56. I dislike the texture of the seats on public transport	-2 (-0.62)	-4 (-1.50)
57. The announcement on the train for each station is helpful for me	1 (0.49)	2 (0.87)
58. I find the train line map inside the train confusing	0 (-0.17)	-1 (-0.58)
59. I find the sign at the bus stop difficult to understand	3 (-1.02)	-3 (-0.88)

Driving

Viewpoint 1, “Confident in driving”

This viewpoint’s highest ranking statements were *Being able to travel by myself is important for my independence* (+6), *Driving is important for my sense of freedom* (+5) and *I would prefer professional driving lessons/I had professional driving lessons* (+5). The lowest ranking statements were *I would prefer to take a taxi rather than driving myself when I can afford it* (-6), *I am afraid that I may not see a red light and will drive through it* (-5) and *I am afraid that I may forget or not adhere to the rules* (-5). Statements that were regarded as neutral were e.g., *I drive as a part of my work* (0), *I have someone to ask for help about driving somewhere new if I need to* (0), *I am distracted by noisy passengers while I am driving* (0) and *Busy intersections without traffic lights make me anxious* (0). Distinguishing statements for viewpoint 1 were e.g., *I like driving at night time* (+3), *I like driving on the freeway* (+3) and *My parents (or another family member) will teach/have taught me to drive* (+3).

These results indicated that the participants felt safe and confident when driving, based on the scoring patterns of the statements. External factors surrounding the experience of driving that might be considered distracting or stressful were of no relevance to the persons sharing this viewpoint. The use of private driving lessons was regarded as positive and it seems that the persons sharing this viewpoint had been taught to drive by family members as well. Six of the eight persons had a driver’s licence and two had a learner’s permit. High-ranking statements that were

distinguishing for this viewpoint were related to driving during night time and on freeways. None of the persons drove to, or in their work. Thus, driving seemed to be a bigger part of their leisure and social activities than their productive activities. The age of the persons sharing this viewpoint ranged from 21-27 years.

Viewpoint 2, "Confident in using public transport"

This viewpoint's highest ranking statements were *I would prefer to take public transport rather than drive (+6)*, *Taking part in activities outside of my home adds to my quality of life (+5)* and *I prefer to take part in social activities outside of my home rather than in my home (+5)*. The lowest ranking statements were *I don't feel comfortable when leaving my home (-6)*, *I prefer to do activities outside of my home without help from someone (-5)* and *Driving is important for my sense of freedom (-5)*. Six of the statements that were regarded as neutral were related to specific task and/or situations regarding driving, e.g. *I am afraid of hitting something when I reverse (0)*. Three of the distinguishing statements for this viewpoint were *I like driving to new places (-3)*, *It is important for me to be able to transport myself by car (-4)* and *driving is important for my sense of freedom (-5)*.

Persons sharing this viewpoint considered mobility important for their participation outside of their home. Participation outside of their home was considered as adding to their quality of life. Mobility did not appear to be dependant on driving, and public transport seemed to be the preferred method of transportation. Persons sharing this viewpoint did not appear to have any negative associations with being assisted in performing occupations outside of their home. None of the three persons sharing this viewpoint had a driver's licence or learner's permit. The ages ranged from 20-21 years.

Viewpoint 3, "Confident in being passengers"

This viewpoint's highest ranking statements were *I am afraid that I will not notice pedestrians when I drive (+6)*, *I am afraid of hitting something when I reverse (+5)* and *I like driving to new places (+5)*. The lowest ranking statements were *I would prefer professional driving lessons/I had professional driving lessons (-6)*, *I drive as a part of my job (-5)* and *I usually travel alone when I drive (-5)*. Statements that were regarded as neutral were e.g., *I prefer to take part in activities that are important to me outside of my home rather than in my home (0)*, *I would prefer to take a taxi*

rather than driving myself when I can afford it (0) and I feel anxious or worried about driving (0). Statements that were distinguishing for this viewpoint were I am afraid that I will not notice pedestrians when I drive (+6) and I don't feel comfortable when leaving my home (+2).

Persons sharing this viewpoint seemed to find the idea of driving filled with risks related to external factors. The individuals did not prefer private driving lessons to being taught to drive by family members. Persons sharing this viewpoint were the only ones that were not comfortable leaving their home. There were two persons sharing this viewpoint, they were aged 19 and 20 and neither of them had a driver's licence or a learner's permit.

Differences and similarities between the viewpoints on driving

Persons within "Confident in driving" (1) and "Confident in using public transport" (2) considered mobility as important for their participation outside of their home. Those who shared viewpoint 1 had driving as their preferred method of transportation and those who shared viewpoint 2 preferred using public transport. Those in "Confident in being passengers" (3) did not prefer to drive. However, they seemed to enjoy being driven as a means of transportation. Persons sharing the third viewpoint were the only ones that did not seem to cherish performing occupations outside of their home, but they were satisfied with their current level of participation. In viewpoint 1 driving was not considered hazardous, and driving was a part of, or a means to, performing social and leisure activities. Those sharing viewpoint 2 felt somewhat more anxious about driving/learning to drive. Persons sharing this viewpoint valued performing occupations outside of their home and driving was not considered as meaningful as it was in viewpoint 1. Public transport was sufficient for satisfying their need for mobility. Persons sharing viewpoint 3 were the only ones that considered external factors of driving as hazards. Furthermore, they found that the cost around driving was too high.

Public Transport

Viewpoint 1, "Using public transport adds to quality of life"

This viewpoint's highest ranking statements were *Using public transport adds to my quality of life due to my ability to transport myself (+6)*, *I often use public transport (+5)* and *I would prefer to take public transport rather than drive (+5)*. The lowest

ranking statements were *I have never used public transport (-6)*, *I find that the bus or train timetable is difficult to understand (-5)* *I prefer to take a taxi rather than public transport when I can afford it (-5)*. Statements that were regarded as neutral were e.g., *I prefer to perform activities that are important to me outside of my home rather than in my home (0)* *I dislike the noise inside trains and/or buses (0)* and *Public transport is not convenient for me on public holidays or weekends (0)*. There was one distinguished statement; *I would prefer to take public transport rather than drive (+5)*.

This viewpoint showed that there was a consensus that the usability of the public transport was high. It was often used and done so independently. Public transport appeared to be convenient and information concerning it seemed to be comprehensible. Public transport was considered more important than driving and it was also a positive factor for their quality of life. In this viewpoint, the usability of public transport was not related to external factors or the variety of how many service users that were using public transport at the time. There were four persons sharing this viewpoint, they were aged from 18 to 24. One person had a driver's licence.

Viewpoint 2, "The ability to be mobile in the community is important"

This viewpoint's highest ranking statements were *Using a Smartrider/Myki makes my journey easier (+6)*, *It is important for me to be able to transport myself outside of my home without using a car (+5)* and *My friends/family/aide help me to use public transport (+5)*. The lowest ranking statements were *I have never used public transport (-6)*, *Were possible, I prefer to transport myself by bicycle (-5)* and *I dislike the noise of the doors and brakes on the bus (-5)*. Statements that were regarded as neutral were e.g., *Using public transport adds to my quality of life due to my ability to transport myself (0)* and *I would prefer to take public transport rather than drive (0)*. There was one distinguishing statement, *it is important for me that busses/trains run on time (-3)*.

This viewpoint showed that means other than a car were important for transportation and technical solutions for paying fees seemed to simplify travelling with public transport. Public transport was not considered to add to their quality of life. However, it was important for the persons sharing this viewpoint to be able to be mobile in the

community. There were four people sharing this viewpoint, they were aged from 17 to 21. One person had a driver's licence and one had an expired learner's permit.

Differences and similarities between the viewpoints on public transport

In "Public transport adds to quality of life" (1) public transport were considered as a positive part of their quality of life. Public transport was the preferred method of transportation and the persons sharing this viewpoint did not seem to have any problems with external factors of using public transport. In "The ability to be mobile in the community is important" (2) public transport was seen more as a means to reach a goal than an actual goal, in contrast to the former viewpoint. Viewpoint 2 considered technical solutions and being assisted from e.g., family members as a positive factor, whereas the authors could not find any need for assistance within the first viewpoint. Both of the viewpoints considered community mobility as important, but only the persons sharing viewpoint 1 saw public transport as an important part of community mobility.

The defining sorts from driving were not transferrable to the viewpoints on public transport. This means that the authors could not see any relationship between the viewpoints on driving and the viewpoints on public transport.

Discussion

The present study shows that for these participants, the level of feeling safe and secure while transporting oneself was high in all viewpoints. This could be seen as an including factor for community participation. How much time a person spends in an environment or in a specific place in that environment can increase their feeling of safety and security (Kielhofner, 2008). If that place is in a community setting, e.g., bus stops or a seat in the metro, the familiarity and value of that place could be perceived as part of a positive environment and a factor for community mobility. Consequently, feeling unsafe in a community setting can be a negative factor for community mobility (Christiansen & Townsend, 2010). Persons sharing viewpoint "Confident in using public transport" and "Confident in being passengers" in driving may not be familiar with the environments connected to driving as a driver, which might have had an impact on their view of the value of the occupation. The usability of public transport appeared to be regarded as high within all of the viewpoints and

contrary to prior research (Unsworth, 2012) the participants did not perceive any difficulties with transportation in the community. Consequently, it could be seen as an enabler for community mobility. Driving was a useable method of transportation and added to the sense of freedom for those that drove. However, it was not considered as a prerequisite for community mobility. This finding might be due to the idea of driving and learning how to drive appeared to be more of a barrier than driving itself. Since driving was not considered desirable to perform and did not add to being mobile in the community, people that did not drive might not have perceived this occupation as meaningful. Furthermore, the unfamiliarity of the environment might have led to it not being perceived as usable (Iwarsson & Ståhl, 2003).

The present study shows that being able to transport oneself is a contributing factor for participation, due to the fact that it enables the participants to reach places where desirable occupations, relevant to their life situation, are performed. The feeling of satisfaction has an intrinsic value and is connected to occupations being performed. Transportation is important for reaching occupational settings (Kielhofner, 2008), but might not give satisfaction in itself. Verdonschot et al. (2008) mentions that people with communicative impairments are commonly not satisfied with their community participation. However, in both topics (driving and public transport), community mobility added to quality of life. Regarding the satisfaction on level of participation, persons within all viewpoints were satisfied and persons sharing “Confident in being passengers” did not particularly prefer to perform occupations outside of their home. This does not mean that they were unsatisfied with their level of participation, although one can argue that the persons sharing this viewpoint were less positive towards public transport, and they might have been accustomed to being assisted and performing occupations within their home.

Driving

Based on the results, the authors found that the participants sharing “Confident in driving” had no difficulties regarding driving and it could be seen as a positive factor for their quality of life. They did not drive as part of their jobs and thus, driving could be considered as a meaningful occupation or as a means for reaching occupational settings of value for the participants’ community participation. The two viewpoints that were less positive towards driving a car, either as a means to participate in the

community, or as a pure means of transportation, did not rate driving itself as problematic. Michon (1985) has established three levels of operation when performing the occupation driving. These levels are the strategical, tactical and operational. The levels are based on motor skills and cognitive understanding and interpretation of the situation one is in. The strategical level of driving was not a problem per se. Instead, the statements involving risks on the tactical level e.g., pedestrians or adhering to traffic rules were rated fairly high, thus it seemed to be a barrier for driving. On the strategical level, a calculation of risks and benefits of driving is made to determine if driving is the optimal way to be mobile and participate in the community. The decision not to drive might be due to the notion that public transport is easier and more convenient and involves less risk. All participants had the sense that they could mechanically manoeuvre the car, i.e., the operational level of driving did not seem to be a difficulty. None of the participants sharing the two viewpoints that rated driving as non-important had a driver's licence/learner's permit. If driving education incorporated social learning theories, i.e., strengthening their self-efficacy and providing information that is relatable and is incorporable with their skills, the possibility of retaining the desirable behaviours that are needed for driving is more likely to occur (Wilcock, 2006). This way, the strategical level, i.e., the benefits of driving might be clearer to the target group.

Environmental factors or external factors seemed to be what was focused on as distracting by those without a driver's licence or learner's permit. This implies that less experience of driving situations and their expectations on driving might be bleaker than the ones with positive experience. One's self-efficacy is based on expected results of the occupation (Kielhofner, 2008) and the ones without experience may not fully comprehend the benefits of the occupation driving. According to the results, these benefits were for example a sense of freedom, independence and quality of life. This finding might be due to the fact that some of the participants found learning to drive hard, and therefore expected driving to be hard, as well. The "non-drivers" rated their level of participation as satisfying and thus, the necessity of driving, as a mean for community mobility was only considered important for the participants that were "drivers". The necessity of driving might have been connected to the habitual life of the driving participants. This means that driving has been incorporated into their occupational life, either as a means for efficient transportation

or as a valued occupation. Either way, being able to drive and doing so might be internalized in their role identification. They might simply consider themselves as drivers (Kielhofner, 2008).

In two of the three identified viewpoints in driving, participants mentioned that they felt anxious about driving, but those who shared the viewpoint “Confident in driving” did not feel anxious. Anxiety related to transportation has been reported as a problem for people with ASD (Currie, 2010; Geller & Greenberg 2009, Mengue-Topio et al., 2011; Parsons et al., 2006). However, the present study shows that there is more to it than just the ASD diagnosis. The level of anxiety appears to be less if the person has been able to obtain a driver’s licence. Instead, these results imply that anxiety might be connected to the idea of driving and barriers for learning to drive, rather than actually driving.

There were no identified difficulties with, or lack of skills, within any of the levels of operation of driving for the target group who had a driver’s licence or learner’s permit. However, one viewpoint showed that there was a feeling of anxiety towards driving. The anxiety was around external factors and the viewpoint did not rate tasks within driving as difficult to perform. This could be related to the person’s perceived process skills in understanding and adapting to different situations that might occur in the occupation driving and that the skill set of the person did not match the demands of the occupation (Kielhofner, 2008). The perceived discrepancy between the person’s skills and the demand from the occupation or environment might pose a risk for not being willing to try to perform the occupation driving. The anxiety seemed to stem from higher levels of operations, i.e., external, unpredictable factors in the environment, making the demands of driving higher. The notion of not being able to perform the occupation might lead to the occupation not being perceived as meaningful and user-friendly.

For those who had a driver’s licence or learner’s permit, the occupation driving had a positive value and was perceived as meaningful and added to their ability to transport themselves independently in the community. The perceived value of an occupation depends on the dynamic relationship with the environment it occurs in and the social groups it is performed with (Kielhofner, 2008). If the relationship is perceived as positive, the occupation can be seen as positive and meaningful. This implies that

driving was not perceived as a barrier for participation. On the contrary, driving appeared to be a valued form of transportation and a facilitator for participating outside of their home and for providing a sense of freedom for those who had a driver's licence. Furthermore, the results showed that the participants viewed private driving lessons as a facilitator for learning how to drive.

The cost of driving was considered a barrier among those sharing viewpoint "Confident in using public transport" and "Confident in being passengers" in driving. However, the individuals that already had a driver's licence or were active drivers did not consider the cost of driving as high. This further emphasises that the idea and notion of driving and anticipations about it might act as a barrier rather than the actual occupation of driving.

Public Transport

Public transport provided opportunities to engage in social and leisure activities that were performed outside of one's home. Verdonschot et al. (2009) mentions that unpredictable factors (such as delays) in public transport could have a negative effect on the usability, thus forming a barrier for people with cognitive disabilities in being mobile in the community. However, unpredictable factors did not act as a barrier for using public transport according to the viewpoints. Assistive technology, such as Smartrider/Myki, was considered to be a supporting factor in using public transport. Smartrider and Myki were considered understandable and usable in terms of occupational therapy theory (Kielhofner, 2008; Christiansen & Townsend, 2010); as the participants' skills and interpretation of how usable the object were matched the demands of the actions performed with the Smartrider/Myki.

In the viewpoint "Using public transport adds to quality of life", public transport was often used. The use of public transport was on a routine base, thus using public transport could be seen as part of the participants' habitual life. Familiarity (experience and repetition) of a task and/or environment is a factor for feeling safe and secure (Christiansen & Townsend, 2010). This could influence people with ASD to take part in occupations outside of their home. The will, or the drive, to engage in occupations is influenced by volition. One's volition is a reflection on what a person experiences and what they find meaningful to do, due to their performance capacity, needs, habits and expectations. Habitual life is related to volition and by using public

transport efficiently and independently the participants have incorporated the use of public transport into effective habits that have a positive effect on the participant's occupational performance (Kielhofner, 2008). The use of public transport was seen as a way of reaching well-being and community participation, based on the person's motivation and the familiarity of using public transport.

Methodological discussion

Q-methodology has the ability to measure attitudes on a certain topic in a profound way, since the participants have to weigh the different statements against each other and discriminate between them. If the authors were to use a questionnaire with a Likert scale there would have been a risk that the participants may have frequently chosen the "middle alternative" or that the result would have been based on whether the participants agreed with or disagreed with the authors' predetermined concourse. By using Q-methodology, the authors could identify *what* the participants agreed with and disagreed with regarding the topic rather than *if* they agreed or disagreed. The face validity of Q-methodology was established by the fact that the participants understood the statements and that they seemed applicable to their particular situations. By developing the statements based on previous knowledge and piloting the study the face validity was further increased. Even if participants did not have experiences of driving they had an idea of what driving meant and were instructed to decide on how they felt about the statement. The authors allowed the participants to ask questions regarding interpretation of the statements during the sorts, and provided the same information to all of the participants.

This is the first time that Q-methodology has been used within this population and topic. The lack of prior research could have acted as a limitation for establishing the statements in the concourses and performing the Q-sorts. However, the present study is one of the first where the target group's opinions are what the results are focused on, and the established face validity suggests sufficient face validity.

The Q-methodology provides a foundation for further in-depth studies on people with ASD and their viewpoints on driving and public transport. The results from a Q-study

might be used as material for surveys aimed to reach a broader population (Corr, 2006).

A limitation for the Q methodology is the time required for each participant. Depending on instructions and explanations, this process can be time consuming. However, having a script that explained the procedure on how to sort the statements minimized this time-consuming process. The scripts also helped the authors to use the English language in a correct way. If the participants found the process tiring there was a risk that they could have sorted the statements without reflecting on them, in order to get it done quicker (Corr, 2006). However, the authors did not perceive any fatigue among the participants and in general the participants seemed to be motivated and interested when sorting the statements.

The sampling methods for recruiting participants could have had the consequence that motivated participants that were already mobile in the community decided to take part in the study and potential participants that were not satisfied with their level of participation and mobility in the community were not addressed. Therefore, some unreported viewpoints on the usability of public transport and driving might be present among people with ASD. Therefore it is important to not generalize these viewpoints as the only viewpoints for people with ASD concerning driving and public transport (Corr, 2006).

Due to the fact that the authors had to value the meanings of the different viewpoints and kept some while discarding others, it is of importance to highlight that not all data were presented in the result or in the analysis. The authors chose which to keep from predefined requisites that were suitable for the method (Corr, 2006; Watts & Stenner, 2012). The authors had an active and a subjective role in interpreting the viewpoints, thus valuing them. The interpretations of the viewpoints were subjective and influenced by the authors' understanding of the importance of meaningful occupations. The results were viewed through an occupational therapist lens, which might have influenced what information was considered important. In order to maintain objectivity the authors tried to look at the findings through different perspectives and not let their frames of references influence them into making presumptions about the results based on opinions. The process of analysing the results

was done according to Q-method standards (Corr, 2006; Watts & Stenner, 2012).

The number of participants in the present study was low and they were somewhat similar in age, mainly male and few had a driver's licence/learner's permit. In Q-methodology it is recommended that the number of participants match the number of statements (Brown, 1980). This was not the case for the present study. If there would have been more participants the study might have generated more contrasting viewpoints, thus pointing out more concrete barriers and facilitators.

Conclusions

Public transport and driving were facilitators to community participation and those who used public transport or drove found the usability high within each transport system.

External factors regarding driving, such as unpredictable changes in the environment might be a barrier for obtaining a driver's licence and feeling confident when driving. This might be due to that processing and interpreting the different situations when driving might be considered difficult. However, participants with a driver's licence did not view this as a barrier. The idea and notion of driving might act as barrier for driving. People with ASD might not get the needed support in the form of an education suited to their abilities, which is needed for learning to drive. This might act as a barrier for their mobility in the community. The participants that did not rate driving as a necessity for their participation might not need to drive. However, persons sharing "Confident in driving" stated that driving adds to their quality of life and sense of freedom. Driving might be considered a facilitator for community mobility and in the long run as a facilitator for quality of life.

Regarding public transport, there were no obvious barriers identified. However, the technical solutions and friends and family acting as a facilitators was important for community mobility and a facilitator for their quality of life. The idea that unpredictable factors could have a negative impact on their view of the usability of public transport was not found. Instead, public transport was seen as a usable method to transport oneself.

The results of the present study emphasise that public transport is a crucial part of being mobile in the community. Thus, there is a need to research and evaluate how public transport is being perceived by the target group in settings other than Melbourne and Perth. The authors emphasise the need for similar studies in Sweden, where the target group's opinions are the ones that interventions are being based on.

Clinical implications

In order to fully understand how usable transportation methods are for people with ASD, there is a need to build a knowledge base on people with ASD's thoughts on obtaining a driver's license. This is important, in order for occupational therapists to be able to work in a client-centered manner. Why is it that those who had a driver's licence did not experience any difficulties regarding driving, but those without a driver's licence did? This information would be useful for occupational therapists in developing interventions aimed towards advocating people in obtain a driver's licence. This would allow occupational therapists to direct interventions towards problem areas instead of providing general support. As a result, support for people with ASD might be more efficient and might aid them to live independent and to be satisfied with their community participation.

Occupational therapists could collaborate with driving schools to design a specialised education for people with ASD on learning how to drive. In order for education to be effective, the level of teaching needs to be suitable for the participants. That means that there is a need to analyse special needs, strengths and limitations within the target group. This might give the target group an opportunity to use driving as a facilitator for community mobility.

It is also important to analyse needs regarding public transport. Involvement and collaboration with key stakeholders in highlighting that people with ASD might have special needs or preferences' regarding public transport is of importance. The present study emphasises that public transport needs to be usable for all members of society. ASD can be seen as somewhat of an invisible disability (Sicile-Kira, 2004) and thus,

this group might be neglected when public transport systems are designed. The present study shows that technical solutions that are perceived as usable are of utter importance. In order to make them usable, it is important to involve people from the target group in evaluating them. Occupational therapy's axiom that the interaction between a person, the environment and the occupation is essential for performing a meaningful occupation could be of use in this process in order to motivate the need for usability and community participation.

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Appendix

Appendix 1

Statements: Public Transport

1. I prefer to perform activities that are important to me outside of my home rather than in my home
2. I prefer to participate in leisure activities outside of my home (e.g. hobbies, sports, exercise, social groups or clubs, movies etc.) rather than in my home
3. I prefer to do chores (like food shopping, medical/other appointments, or banking) outside of my home rather than online or over the phone
4. I prefer to participate in social activities (e.g. spending time with friends and relatives etc.) outside of my home rather than in my home
5. I prefer to perform activities outside of my home without help from someone
6. I prefer someone to join me when travelling outside of my home
7. I usually travel alone when using public transport
8. I have someone to ask for help about travelling on public transport if I need to
9. I don't feel comfortable when leaving my home
10. I feel secure when I travel outside of my home
11. It is important for me to be able to transport myself outside of my home without using a car
12. Being able to travel by myself is important for my independence
13. I would prefer driving a car rather than using public transport
14. I would prefer to take public transport (e.g. bus, train) rather than drive
15. I prefer to take a taxi rather than public transport when I can afford it
16. I prefer to travel by car with friends or family rather than take public transport
17. Where possible, I prefer to transport myself by walking
18. Where possible, I prefer to transport myself by bicycle
19. I am satisfied with my participation in activities outside of my home
20. Public transport helps me to participate in more activities outside of my home
21. I find local public transport convenient for me
22. I find local public transport comfortable to use
23. I feel safe using public transport outside of peak times
24. The nearest bus stop or train station is too far from where I want to go
25. The nearest bus stop or train station is too far from where I live
26. I find that the bus or train timetable is difficult to understand
27. I find it difficult to know when I should get off the bus or train
28. I do not travel by public transport because it is too complicated (e.g. have to change bus or train too many times, too much walking etc.)
29. Using public transport adds to my quality of life due to my ability to transport myself
30. Taking part in activities outside of my home adds to my quality of life
31. I am frightened of using public transport (e.g. trains, buses)
32. I have never used public transport
33. I seldom use public transport
34. I often use public transport
35. I would like to use public transport more than I currently do
36. My friends/family/aide help me to use public transport
37. It is important to me that the buses/trains run on time
38. It is important to me that there is someone able to assist me with any problems I may have (e.g. bus driver, transit officer)

39. I don't travel at peak transport times when the bus or train is full of people
40. I find the financial cost of public transport reasonable
41. I would use public transport more often if it was cheaper
42. Public transport is not convenient for me on public holidays or weekends
43. I have difficulties when purchasing tickets for public transport
44. I dislike the smell inside trains and/or buses
45. I dislike the noise inside trains and/or buses
46. I dislike the smell of bus stations and/or train stations
47. I dislike the noise at bus stations and/or train stations
48. I find the signs confusing at bus stations and/or train stations
49. It is difficult to press the buzzer on the bus at the right time so it stops at the correct stop
50. Learning a new route using public transport is difficult for me
51. I feel comfortable asking for help if I need to
52. I dislike being touched by other people on public transport
53. Using a Smartrider/Myki makes my journey easier
54. I find the colours and patterns on the buses and trains overwhelming
55. I dislike the noise of the doors and brakes on the bus
56. I dislike the texture of the seats on public transport
57. The announcement on the train for each station is helpful for me
58. I find the train line map inside the train confusing
59. I find the sign at the bus stop difficult to understand

Statements: Driving

1. I prefer to take part in activities that are important to me outside of my home rather than in my home
2. I prefer to take part in leisure activities outside of my home (e.g. hobbies, sports, exercise, social groups or clubs, movies etc.) rather than in my home
3. I prefer to do chores (like food shopping, medical/other appointments, or banking) outside of my home, rather than online or over the phone
4. I prefer to take part in social activities (e.g. spending time with friends and relatives etc.) outside of my home rather than in my home
5. I prefer to do activities outside of my home without help from someone
6. I prefer someone to join me when travelling outside of my home
7. I don't feel comfortable when leaving my home
8. I feel secure when I travel outside of my home
9. Being able to travel by myself is important for my independence
10. Driving is important for my sense of freedom
11. I am satisfied with my participation in activities outside of my home
12. Taking part in activities outside of my home adds to my quality of life
13. I usually travel alone when I drive
14. I have someone to ask for help about driving somewhere new if I need to
15. It is important for me to be able to transport myself by car
16. I drive myself to work
17. I drive as a part of my job
18. Driving helps me to participate in more activities outside of my home
19. Driving adds to my quality of life due to my ability to transport myself
20. Learning to drive is difficult
21. My parents (or another family member) will teach/have taught me to drive
22. It is too expensive to drive (e.g. maintenance, petrol, driving lessons, buying a car)
23. I would prefer professional driving lessons/I had professional driving lessons

24. Professional driving lessons are too expensive
25. I am afraid of hill starts in case I hit the car behind mine
26. I would prefer driving my own car rather than using public transport
27. I would prefer to take public transport (e.g. bus, train) rather than drive
28. I would prefer to take a taxi rather than driving myself when I can afford it
29. I would prefer to travel by car with friends or family rather than driving myself
30. Where possible, I prefer to transport myself by walking
31. Where possible, I prefer to transport myself by bicycle
32. I sometimes do not drive because it is too complicated (e.g. need to use freeways, directions are too complicated etc.)
33. I am afraid that I may have an accident when I drive
34. I am afraid that I will not notice pedestrians when I drive
35. I am afraid that I will not notice when the car in front of me brakes
36. I am afraid of hitting something when I reverse
37. I am afraid of changing lanes in case I hit another car
38. I am afraid of merging (when two lanes merge into one)
39. I feel anxious or worried about driving
40. I prefer to drive short distances rather than long distances
41. I like driving to new places
42. I like driving at night time
43. I like driving when it is raining
44. Cyclists riding on the road are distracting
45. I prefer to be alone in the car so I can concentrate
46. I am distracted by noisy passengers while I am driving
47. I prefer to drive without the radio or music playing
48. I am afraid of driving when there is sun glare through the windscreen
49. I am afraid that I may not see a red light and will drive through it
50. I am afraid that I may miss other information when I am reading a street or traffic sign
51. I prefer to drive on roads with less traffic
52. I am afraid of hitting something when I park the car
53. I like driving within the inner city
54. It is difficult to know how close to drive to cars in front of me
55. I am afraid that I may forget or not adhere to the road rules
56. I like using roundabouts
57. Busy intersections without traffic lights make me anxious
58. I am unsure about when to give way to other cars
59. I like driving on the freeway

Appendix 2



La Trobe University
School of Occupational Therapy

Participant Information Sheet

Community Mobility

What are people with Autism Spectrum Disorders' viewpoints on public transport and driving?

What is the study about?

Community mobility is important for participating in leisure or social activities or work in the community. To do this, using public transport or being able to drive is commonly used. We would like to find out more about driving and using public transport for people with ASD.

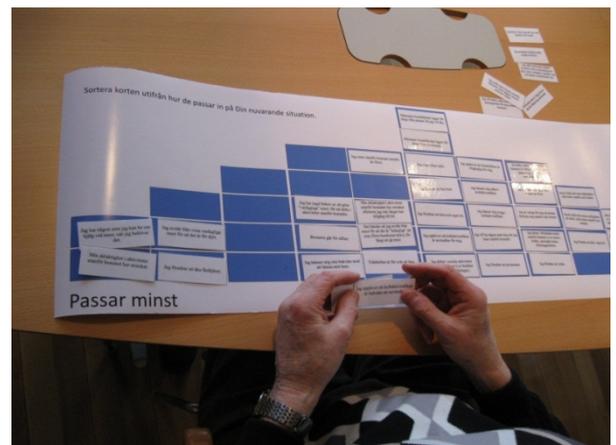
What do you like to do in the community? Do you prefer to drive, catch the bus or train, or walk to where you need to go? Are there things that make it hard to drive or catch public transport?

Finding out the answers to these kinds of questions may assist in making it easier to drive or use public transport.

What will I be asked to do?

If you decide to participate, you will be invited to meet with us once, for about 45 minutes at a place that is convenient for you (for example, your home or La Trobe University).

You will be given two sets of cards with statements written on them. The statements will be related to driving and public transport. You will be asked to sort the cards onto a grid, like the one in the picture, according to how relevant the statements are to your life. It is about finding out your opinions on the topics, so there are no right or wrong answers.



Are there any risks?

There are no known risks involved in the study. Participation is completely voluntary. You will be able to withdraw at any time without having to provide a reason.

Confidentiality

All data will be stored and used confidentially. Results or responses will be reported as a group, and your name or personal details will not be linked to your answers. The data gathered will be published as scientific articles, as Honours, PhD theses and BSc Theses, and presented at relevant conferences.

Further information

If you consent to being involved in our study, we will contact you in the near future. You will be able to find out more information about the study, and we will organise a time and place that suits you. To assist with the study, we may need to access your medical files to confirm your diagnosis of ASD.

If you have any questions regarding anything in this information sheet, please feel free to contact us by telephone or by email:

Olov Falkmer: telephone (04238 20 743), email oafalkmer@students.latrobe.edu.au

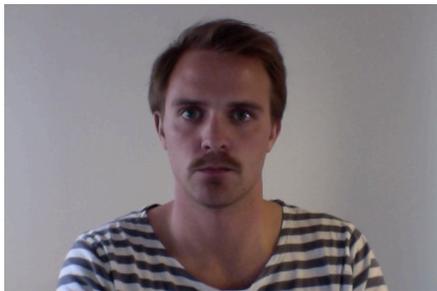
Jessica Siljehav: telephone (04700 32 337), email jsiljehav@students.latrobe.edu.au

Or, you can contact Professor Cheryl Dissanayake at OTARC, telephone (03 9479 1162) or by email: C.dissanayake@latrobe.edu.au

Thank you for your time and consideration.

Kind regards,

Olov Falkmer & Jessica Siljehav



OT Students
School of Occupational Therapy
Lunds University



Responsible for this study:
Cheryl Dissanayake
Associate Professor, Reader
School of Psychological Science OTARC
Faculty of Health Science
La Trobe University

Personal Consent to Participate

Community Mobility

What are people with Autism Spectrum Disorders' viewpoints on public transport and driving?

- I agree to participate in the study as outlined to me.
- I have been informed of, and understand, the purpose of the study.
- I have been given an opportunity to ask questions.
- I understand that there are no known risks involved in the study.
- I understand that participation is voluntary, and that I can withdraw at any time without consequence.
- I have been informed that all personal information will be kept confidential, and any identifiable information will not be used in published material.
- Yes, I agree to allow access to my medical record where the diagnosis of Asperger syndrome/autism is confirmed.
- No, I do not wish to participate in the research.

Name:

E-mail address:

Telephone numbers Daytime: _____ Evening: _____

Mobile number: _____

Signature: _____

Date: _____

Appendix 3

Q-Sort Procedure: Script

Thank you for agreeing to participate today. Today you will be completing what is called a “Q-sort”, so we can find out more about your views on driving and public transport. As was explained in the information sheet, all you will be doing is sorting some cards onto this grid, from strongly disagree to strongly agree. The cards have statements printed on them. The first set is about driving. When you have finished sorting the first set of statements, we will have a short break. Then I will give you the second set of statements to sort.

Now I’ll explain how to use the grid, which is like a scale going from strongly disagree (point from one end of the grid to the other), to strongly agree. The middle column is neutral, or in between (point).

This is the column (point to +6/+5 in a circular fashion) where you place the statements that you strongly agree with.

This is the column (point to -6/-5 in a circular fashion) where you place the statements that you strongly disagree with.

The middle column is where you place the statements that you neither agree nor disagree with, or that you feel neutral about. If a statement does not apply to you, place it in this column.

All columns have the same rating from top to bottom, for example, all of the statements you place in this column (point to 0) will have the same rating of neutral. All of the statements you place in this column (point to -4) will have the same rating. So, it doesn’t matter if you place the statement here (point to top) or here (point to bottom), it will be the same.

As this is not a test, there are no right or wrong answers.

If you are not sure where to place a statement, put it where you think it fits best.

Take your time, and if you don’t understand any of the statements, tell me and I can try to explain it for you.

Here is the list of the statements if you would like to read them before sorting. If you would like, you can start by placing the statements in piles first, for example, agree, disagree, or in between. Remember that you can move the statements around if you like, and you can check over the finished grid at the end.

Do you have any questions?

Additional notes

Perform member checking if required on the first few statements placed on the grid.

Never	I do not use public transport at all.
Seldom	I use public transport approximately 1-51 times per year.
Often	I use public transport once a week or more.