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Universal design for people with psychosocial disabilities – The effect of COVID-19

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Abstract

We have examined how COVID-19 impacted travel behaviour for people with psychosocial disabilities, identified key barriers when using public transport, and examined how a broad understanding of universal design can be used to improve travel for people with psychosocial disabilities. During and after the pandemic, most informants travelled less and/or used their car more than before. Some stopped using public transport due to fear of contamination, while others found it easier to travel during the pandemic due to less crowding. Use of facial masks were perceived by some as an additional problem increasing anxiety, while others found it more problematic with fellow passengers not wearing masks. In general, findings support prior studies in terms of barriers related to crowding, lack of seamlessness, financial issues, problems with staff, lack of access in rural areas, and low knowledge of support systems. Additionally, lack of toilet facilities, negative experiences with other passengers, sensory overload, travel-induced fatigue, and problems related to planning are considered problematic. Station areas may pose a barrier for people with former drug addictions. Hence, universal design should include the social and organisation environments, in addition to physical design, in terms of making the transport system accessible to everyone.

Previous

Next

Keywords

Universal design; Accessibility; Mental health; Psychosocial disability; Transport; COVID-19; Transport barriers; Health; Welfare; Public transport; Disabilities; Disability; Impairments

JEL classification

I10; R0; I14

1. Introduction

Mobility is essential for allowing people to work outside of their homes and to participate in a whole range of social activities. Moreover, freedom of mobility – often taken for granted – is, in itself, an important aspect of the quality of life of citizens. Over the course of their lifetime, about 50% of the population experience a mental illness and between 20% and 25% of the population have a mental illness at any

given time (Nes & Clench-Aas, 2011). Planners, politicians and researchers have generally worked on adapting the transport system for people with physical disabilities, but there is still a substantial knowledge gap on how people with psychosocial disabilities perceive, use and experience the transport system (OECD/ITF, 2009; Brechan, 2006). Research on travel behaviour and mental health indicates that people with psychosocial disabilities travel less than others (Mackett, 2017). The Mental Health Action Group (2011) in the UK concluded that limited access to public transport leads to social isolation and worsening of symptoms, while high access is important for positive mental health. A UK study examining mental health and travel behaviour reported that 26% of the respondents with psychosocial disabilities were involuntarily unemployed. Whether this was because traveling was a challenge or because no jobs were available remains unclear; some of the employed respondents pointed out that, for them, it was necessary that they be allowed to work from home (Mackett, 2019). In Norway 35.3% of the 350,000 people who receive disability benefits do so because of mental illness and behavioural disorders (NAV, 2018). The World Health Organisation (WHO) has estimated that, by 2030, mental health problems will be the leading burden of disease (WHO, 2008). This underlines the importance of developing knowledge on transport's role in excluding people with psychosocial disabilities from social arenas and societal participation. On top of this, the COVID-19 pandemic might also affect people with psychosocial disabilities in terms of additional barriers.

This study investigates.

- How did COVID-19 impact travel behaviour for people with psychosocial disabilities and what were the implications for their participation in society?
- What are the main barriers for people with psychosocial disabilities when they use public transport?
- How can a broad understanding of universal design be used to improve travel for people with psychosocial disabilities?

Most existing studies on mental health and transport (Atkinson & Weigand, 2008; Bauman, 2004; Chng et al., 2016; Feng & Boyle, 2014; Hubicka et al., 2010; Martin et al., 2014; McDonald et al., 2014; Morris & Guerra, 2014; Nesbit et al., 2007; Oliver et al., 2015; Panayiotou et al., 2015; St Louis et al., 2014; Sentio Research Norge, 2017; Vaa, 2014; Yang, 2015) do not look at participation, travel behaviour and barriers related to using the transport system for people with psychosocial disabilities. Studies on physical disabilities, transport behaviour and participation show that people with physical disabilities have their travel needs met to a lesser extent than the general population (Nordbakke & Skollerud, 2016). To improve the transport system for people with physical disabilities, technical solutions, e.g., ramps, are often chosen, but these might not be useful for people with psychosocial impairments.

Universal design is defined as, *"the design of products, environments, programmes and services to be useable by all people, to the greatest extent possible, without the need for adaptation or specialised design. "Universal design" shall not exclude assistive devices for particular groups of persons with disabilities where this is needed"* (United Nations 2022).

Universal design of transport systems has focused mostly on people with visible disabilities (e.g., visual or mobility impairment), hence also focusing on physical design (Nielsen and Skollerud (2018)). Even in the Norwegian Equality and Anti-Discrimination Act (Lov om likestilling og forbud mot diskriminering, 2017), universal design is explicitly focused on the physical environment.

Nielsen et al. (2022) has done a literature review looking at what groups are represented in the universal design research in Norway (see Fig. 1). As we can see, only 6 studies out of a total of 27 include mental health, of which 3 are related to universal design and 3 are concerned about travel support at an individual level.

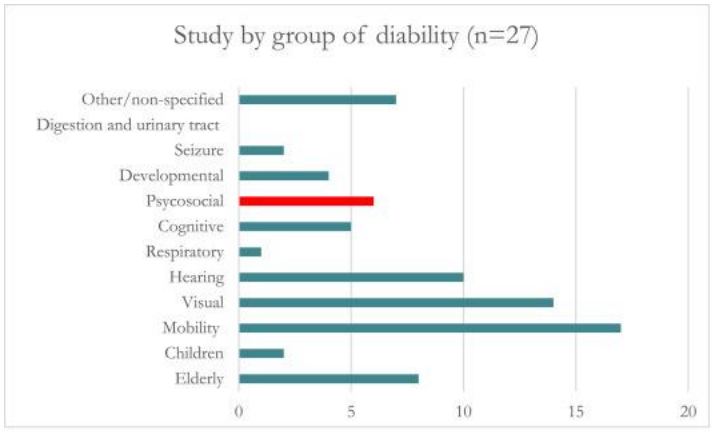

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Fig. 1. Number of Norwegian studies including different types of disabilities. Some studies include more than one disability; hence the study is counted one time for each disability it represents.

Studies are also limited at the international level (OECD/ITF, 2009). The few studies that exist on psychosocial disabilities and travel behaviour have found that most transport barriers are non-physical. They relate to costs, lack of understanding from service personnel, communication problems, crowded buses and trains, lack of access to public transport (particularly in rural areas), lack of reliability, information about cancellations and delays, stigma/discrimination, wayfinding, excessive sensory stimulation, difficulties purchasing tickets and sudden need of action in unknown environments (Mental Health Action Group, 2011; Nielsen & Skollerud, 2018; Mackett, 2019, Sentio Research Norge, 2017, Mackett, 2021, Mackett, 2021).

Penfold et al. (2008) identified three factors that are important to enhance the use of public transport by participants with psychosocial disabilities. First, the ability to both plan the trip and potentially incorporate it into a routine was important: planning was especially important with regards to new routes, longer trips or travel requiring connections. Problems related to connecting multiple legs of a trip and longer journeys were also identified in the Nielsen and Skollerud (2018) study. Planning in advance can, however, also be problematic, as the fear of being unwell on the day of travel can lead to anxiety (Mackett, 2019).

Second, safety and control were important factors with regards to participants' ability to travel; this included mode of travel, traveling with a companion, attitudes of service personnel, and the ability to avoid rush hour traffic. Several participants felt that having an invisible impairment made it more difficult to obtain assistance. Discrimination and lack of understanding has been found in several studies (Mackett, 2019; Mental Health Action Group, 2011; Nielsen & Skollerud, 2018).

Finally, affordability and financial concerns played a large part in determining participants' mobility: this was particularly related to the use of taxis, but also included participants' inability to drive their own cars. Financial barriers were also found in Nielsen and Skollerud (2018), Sentio Research (2017), Mackett (2019). Only Nielsen and Skollerud (2018) and Mackett (2021) look at policy interventions needed to make the transport system universally designed or accessible for people with psychosocial disabilities.

Based on the 'survey on living conditions for people with disabilities' (*Levekårsundersøkelsen for personer med nedsatt funksjonsevne* 2007) (N=1642), Bjerkan (2009) found that people with psychosocial disabilities struggle with public transport mo're than people with other types of disabilities. They also have lower social participation. Results from Sentio Research's (2017) study on challenges with public transport (n=3009) indicate that about 4.9% of the total sample struggle with transport *and* have a psychosocial or cognitive disability, whereas 6.6% struggle with transport *and* have a physical disability (Nielsen et al., 2022). The latter figure is much lower than in the Norwegian National Travel Survey (NTS) (n=approx. 60,000) which reports about 10% (Gregersen & Flotve, 2021). If we are to assume that the NTS, based on a larger sample, provides more robust data, then we have reason to believe that the Sentio study also undercounts for psychosocial or cognitive disabilities.

All the above studies were conducted before the COVID-19 pandemic; hence, this study will shed new light on how the pandemic affected this group, and also increase the knowledge on measures needed to include this group in the universal design of the transport system.

2. Methods

In this study we have conducted in-depth interviews. Reasons for choosing this method are, firstly, that qualitative methods are especially suited for studies with (1) sparse prior knowledge of the subject, (2) high need of flexibility and openness, (3) personal and sensitive topics, (4) vulnerable user groups as informants (Thagaard 2009). Secondly, we wanted to compare the findings with a former study on the same topic, Nielsen and Skollerud (2018), and hence, choosing the same method would improve the comparison. The ambition of the study is not to produce representative or generalisable findings, but to identify the full range of barriers and solutions. Therefore, we interviewed 8 people with different types of psychosocial disabilities – as type and severity of disorders will affect what types of barriers the individual experience.

We prepared an interview guide focusing on barriers, suggested interventions and how the pandemic influenced their travel behaviour. Participants were recruited through national organisations for people with psychosocial disabilities. We recruited participants from across the country in order to get insights from different types of transport systems. The interviews were conducted by phone – which may be an advantage as the subject of mental health is still sensitive, and people are more reluctant to talk about sensitive topics in physical face-to-face interviews (Opdenakker, 2006).

The interviews were mostly analysed using a thematic approach, where we compared the information on each theme across all informants (Thagaard 2009). In order to get a systematic comparison, matrices are used. It is, however, important to understand that the information is taken out of its original context. The matrix is not used for presentation of the final results, only as part of the analysis.

An informant-centred approach was used for looking at travel behaviour as a response to COVID-19, as it was important to emphasise changes at the individual level.

Five of the eight interviewees lived in cities or close to urban areas, the rest in rural areas. Most informants have lived in the same place for eight years or more, but three of them have moved within their city in the last two years; change of living situation could also affect their travel behaviour. However, the informants were aware of this themselves, and we have most likely been able to separate what is caused by COVID-19 and what is not. Three informants indicated that they live alone, while the rest live with a spouse and/or child. Three informants are in their 20s, three in their 40s and two in their 50s. Two informants are 100% employed, while the rest receive disability benefits (both partial and whole). There is an overrepresentation of women in the study, as only two are men. Five informants had a driver's license and access to a car.

Almost all informants had several illnesses – some up to six mental and physical illnesses. The illnesses represented are: post-traumatic stress disorder (PTSD) (n=2), attention deficit hyperactivity disorder (ADHD) (n=4), Asperger (n=1), Bipolar Disorder (n=1), Anxiety disorders (n=6), obsessive compulsive disorder (OCD) (n=2), personality disorders (n=2), depression (n=4), drug disorder (n=1), eating disorder (n=1), obesity (n=1) and bowel disease (n=1). As this is not a representative study, we are not comparing different diagnoses. We are rather interested in understanding what types of problems people with psychosocial disabilities experience. As such, having different diagnosis represented is crucial.

It was very difficult to recruit informants for this project, and we also lost some informants in the process of getting a written consent. Signing the online consent form was difficult for several of the informants. For the last part of the study we only used oral consent, making it somewhat easier for the informant. Though the number of interviews is somewhat low, it should still be enough to reach saturation in terms of barriers related to travel in general. Guest et al., 2006 found that 73% of interview codes were identified within the six first manuscripts, while 92% of all codes where identified after 12 interviews. Similarly, other studies find that most themes are identified within 6–17 interviews (Namey et al., 2016; Hagaman and Wutish 2016; Chonen et al., 2012; Francis et al., 2010; Mackett, 2021).

As we have a previous study of 9 interviews, to which we have compared the findings, the total number of interviews is 17. However, only the last 8 interviews are concerned with COVID-19 effects. It is possible that additional interviews could have identified more aspects. It is, however, important to note that qualitative studies can never say anything about the relative importance between themes identified, but rather explain the *why* of phenomenon and identify *what* is of importance. In this study we can answer why it is problematic to travel for people with psychosocial disabilities, and what the barriers are.

3. Theory

Psychosocial disabilities consist of a varying group of difficulties related to lack of focus, lack of abilities of planning, panic/anxiety, hyperactivity, communication difficulties among others. Some examples are anxiety, depression, personality disorders, PTSD, OCD, ADHD, Asperger, etc. (Mackett, 2021; Nielsen et al., 2022).

Within the field of disability research, there are three different theoretical models. First, the *medical model* focuses on the medical diagnosis of the individual. The disability is looked upon as the individual's medical misfortune and measures to help this person are individually based, where the aim is to give the individual a 'normal' life (Holloway, 2009; Lid, 2013). Second, the social model regards disabilities as a product of society. In this model, disabilities are a social construct, and the shortcomings of the environment are the cause of the problem, not the medical diagnosis (Holloway, 2009; Lid, 2013). The measures to improve quality of life for a person with an impairment is, therefore, often related to corresponding improvements in the environment. A third theoretical approach – *the relational model* – views disabilities as an interaction between the environment and the individual's capabilities. Thus, a disability is understood as something that can affect a person in certain situations (Lid, 2013). To illustrate this point, a person with anxiety might experience being disabled when taking a crowded bus, while otherwise having a normal functioning life. The relational model implies that it is possible to adjust the environment to reduce the individual barriers, but at the same time, problems for the individuals might be more easily addressed through individual adjustments.

Developed mostly by Sen and Nussmann, the Capability approach is a theoretical framework that tries to explain how people can achieve well-being through capabilities and functionings (Robeyns & Morten Fibieger Byskov, 2021), see Fig. 2. Functionings are 'doings' (eating, voting, traveling, etc.) and 'beings' (being healthy, being educated, etc.), while capabilities are the real freedom - having the required means necessary - to achieve doings and beings one wishes to. In relation to transport, capability sets could be having access to different modes of transport: public transport, walking, bicycling, car, etc. However, in order to transform a resource into a functioning, and hence real freedom, – there are so-called conversion factors (Robeyns & Morten Fibieger Byskov, 2021).

1) Personal: the individual factors related to the person – sex, physical condition, intelligence, having a disability, etc.

2) Social: norms, public politics, discriminating hierarchies or powers relations, etc.

3) Environmental: physical or built environment – pollution, climate, condition of buildings, road condition, etc.

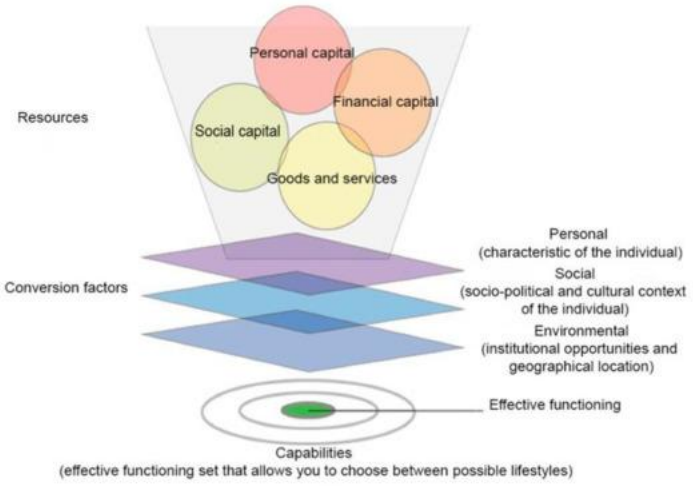

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Fig. 2. The capability approach (Latulippe et al., 2020).

Barriers for people with psychosocial disabilities may be related to all theories mentioned. Hence, we suggest a multi-dimensional approach to categorise the barriers identified. This multi-dimensional barrier approach utilises the medical perspective focusing on the individual's health, and acknowledges that some barriers are related to the disease itself. At the same time, it includes the social model, focusing on cultural aspects, society, place and environmental factors (physical, social, and organisational). This is very much in line with the relational model of interaction between both the individual and its context. Using this operationalisation of barriers, it is also easier to go a step beyond the focus of physical environment that is often prioritised in the universal design discourse. We will therefore categorise the barriers in the following way.

1) The individual level: barriers that are related to the disease itself or individual resources that can be used to improve travel for the individual (e.g., car ownership)

2) The social environment: the social context of travel like personnel and fellow passengers' behaviour

3) The organisational environment: the way the transport system or other support systems are organised

4) The physical transport environment: the physical design of the transport system

Even though some of the barriers are related to the individual level, solutions might still be found by making changes to the environment, as we will discuss further in the discussion section.

4. Results

Similar to Nielsen and Skollerud (2018), we found the following barriers related to travel: (1) crowding, (2) lack of information, (3) lack of access to public transport (4) lack of seamlessness, (5) financial barriers, and (6) negative experience with personnel.

Additional findings from our study include: (7) lack of toilet facilities, (8) negative experience with fellow passengers, (9) sensory overload (10) fatigue, (11) difficulties planning, and (12) COVID-19 related barriers were identified.

In Table 1, each barrier with the related problem is presented and compared to those found in Nielsen and Skollerud (2018).

Table 1. Table showing the main findings in Nielsen and Skollerud (2018) compared to the main findings of this study. Green=identified; Light gray=Not identified; Orange=slight difference.

	Barrier	Problem	Nielsen & Skollerud 2018 (9 interviews)	This study (8 interviews)
Physical environment	Crowding	Not enough space between passengers / people standing in the aisle		
	Crowding	Need for specific seating that is not always available		
	Crowding	Not enough seats		
	Toilets	Lack of toilets		
	Toilets	Dirty toilets		
	Toilets	Lack of information about toilet facilities		
	Information	Hard to find information when changing between modes of transport		
	Information	Difficulties using technology, e.g., buying tickets, finding information		
	Sensory overload	Noisy areas (sound, light), e.g., station areas		
	COVID-19	Face masks increase anxiety		
	Food/drink	Lack of food/drink on longer train rides		
Organisational environment	Availability	Few departures increase need of planning and reduce possibilities to exit	Few departures are problematic in unforeseen events	
	Availability	Low access of public transport		
	Availability	Long distances to station area increases anxiety		
	Seamlessness	Delays increases anxiety		
	Seamlessness	Difficulties related to transits		
	Financial	Expenses for volunteer work is not covered		
Social environment	Personnel	Afraid of asking for help		
	Personnel	Negative experiences with personnel		
	Personnel	Lack of knowledge on mental health		
	Personnel	Avoid personnel in order to avoid attention		
	Fellow passengers	Loud people increase anxiety, e.g., drunk people		
	Self-driving systems	Self-driving systems increase anxiety		Some prefer it
	Fellow passengers	Difficulties traveling alone		Some prefer traveling alone
	People at station areas	Station is gathering area for drug sales and use		
	COVID-19	Shame when not wearing face masks		
Individual level	Financial	Cannot afford vacations		
	Financial	Additional expenses due to anxiety (need to upgrade comfort level to increase physical space)		
	Financial	Cannot afford car		
	Information	Not enough knowledge about available support systems		
	Financial	Limited access to support systems	Low access, but differs between the informants	
	COVID-19	Fear of infection		
	Health	Fatigue		
	Health	Sensory overload		
	Health	Self-isolation		
	Planning	Difficulties with time management		
	Planning	Additional need for planning		

We can see there are some findings only mentioned by the informants in one of the studies – for example toilets or sensory overload. As stated in the methodology section, Guest et al., 2006 found that 73% of interview codes were identified within the six first manuscripts, while 92% of all codes were identified after 12 interviews. This could explain how we were still able to find new thematic concepts in the later study. Also, there was some difference in types of mental illness for the participants – this study includes people with ADHD, PTSD, personality disorders, OCD and drug disorder.

The barriers are divided into physical environment, social environment, organisational environment, individual level and COVID-19, as detailed in the following sub-sections.

4.1. Physical environment

Crowding was found to be problematic for most informants. In order to avoid this, they travel outside rush hours, take other routes to their destination and try to find places to stand on the station area that is less crowded. Within the transport vehicle, it can be problematic in terms of not being able to sit, or not being able to sit in preferred places – usually all the way in front or in the back.

Having available **information** while traveling is crucial in order to feel more in control over the journey. In Nielsen and Skollerud (2018), this appeared to be more problematic than in this study, which may be due to the increased prevalence of real-time information systems, which have been very helpful for this group. It is possible, though, that this can be due to chance. Furthermore, there were still some problems related to finding information and using newer technologies, e.g., mobile apps.

Lack of toilet facilities was problematic for several informants. One informant has a bowel disease in addition to social anxiety. This makes it problematic to use public transport without toilet facilities. Additionally, it is problematic that there is little or no information about where to find such facilities.
"*Sometimes I don't eat or drink for up to 12 hours if I don't have access to toilets*".

This informant reported having to make calls to the different companies to ask if there are available facilities, and also if they are open. During COVID-19, some bus companies started closing their toilet facilities, forcing the informant to drive by car instead. Another informant reported having a fear of nausea when traveling and a related concern about available toilet facilities. Toilets are also used as a place to calm down and withdraw from crowds by another informant.

Sensory overload due to sounds, lights or smells was also identified in this study. Sensory overload makes station areas or city centres problematic as the noise level is usually higher here. Sensory overload makes people very tired, and it is somewhat related to travel induced fatigue. At a broader level, this can be related to other parts of the journey as well (see more under individual level).
"*Struggling with sensory difficulties is like stepping on mines – you never know when they go off. […] Can be knocked out for several days. That's just it, it can also go well, - I never know on beforehand»*

Other challenges mentioned regarding physical factors was the availability of food and drink on longer journeys, which is currently not sufficient. A minimum of having drinking water available was requested.

4.2. Social environment

Negative experiences with fellow passengers was identified as a barrier. This is especially so when passengers behave in unusual ways, e.g., drunk, loud or intrusive. A former drug user also found it problematic that station areas are often a gathering point for drug sales and use, making it stressful to be near the station.

Interaction with personnel is related to (1) actual bad experiences that caused negative attitudes towards transport personnel, (2) feeling that the personnel do not care to help, and (3) being afraid of asking for help.

4.3. Organisational environment

Availability of transport in terms of departures and distance to public transport is important for several of the informants:
"*The more accessible public transport was to me, the easier it was. The less stress there is to get on, the lower the threshold for using it"*

"The distance to and from public transport - it is a very important factor – it is more difficult if its further away"

Some of the informants live in areas where there is poor availability in terms of departures per day. This makes it particularly problematic if one gets on the bus and then needs to get off again in order to calm down. One informant told about a time when she had to exit the bus in the middle of the countryside and ended up standing beside the road for 4h before being able to contact anyone for help.

Lack of seamlessness in terms of waiting time when transferring between modes, and general delays are problematic for several informants. Unforeseen events with bus-for-train was especially difficult to adjust to.
"*If I knew I had to wait for 15 min, I would have walked to the next stop or taken another route*".

4.4. Individual level

Planning difficulties are related to some of the informants having problems with time management, or the need for excess planning to reduce anxiety. One informant explains that she plans for a trip to the psychologist about 14 days before traveling just to prepare herself mentally. Having difficulties with time management also increases the financial burden for another informant who often ends up having to use a taxi after experiencing time-related problems with public transport.

Travel induced fatigue was mentioned by all informants.
"I stopped leaving the house. I did not do more than I needed. My hardest job was to take the bus. Traveling drains out all my energy".

Some of the informants explained that they can be set back for days after a difficult travel and require additional rest. It also negatively affects the outcome of their intended activity. E.g., being mentally drained before going to the psychologist makes it less effective as you are already exhausted before arrival and not able to focus on the session.

Financial barriers make it difficult for some of the informants to go on holiday. Also, in terms of owning a car, personal economy can be a challenge. Some of the informants also have an extra financial burden due to their disability. In multiple instances, informants reported having to spend more money on travel tickets and accommodations with the adequate flexibility and space to meet their specific needs, e.g., upgrading to a ferry cabin with a window due to claustrophobia.

In fact, none of the informants receive travel-related financial aid from the national support systems aimed at people with disabilities. This is mostly due to low awareness of support systems, not knowing how to apply, thinking that the support system is only for people with physical disabilities, having no energy to apply, or prior experiences with applications for support that were rejected.

4.5. The effects of COVID-19

COVID-19 has affected the informants' travel behaviors in different ways. The main tendency is that most have reduced their travel and/or started using car for travels that were formerly met with public transport. However, the difference in residential locations corresponded with differences in travel restrictions, thereby affecting the manner and extent to which the pandemic affected their behaviour. Also, some

informants were mostly using car as they live in areas with low or no availability of public transport – this would also reduce the effect of the pandemic.

One informant talked about how depression was the main reason for reducing their travel during the last few years, but also that catastrophe thinking (which increased due to the pandemic), and fear of ending up in isolation abroad might have triggered the onset of depression in the first place.

Even when COVID-19 did not necessarily have had a direct effect on travel behaviour, several informants said that their mental health has become worse, and that the pandemic intensified their prior issues. Predictability is, as mentioned, an important factor for this group; as one informant puts it:
"Unpredictability came with corona. Where should I enter? How should I show my ticket? The predictability disappeared".

Another informant who never had problems traveling before started experiencing difficulties with travel during the pandemic:
"I think it might have something to do with the fact that I have not traveled for two years – and now I'm unsure how it works – not practically – but emotionally. I would rather drive by myself as well, and get stressed if I need to drive with someone else".

Even though there are individual differences, there are some common barriers.

Face masks have been problematic to use for some of the informants as the feeling of not breathing properly has increased already existing feelings of anxiety. One informant also mentioned that not using face masks increased the feeling of being judged by fellow passengers. The informant mentions that the UK had information campaigns regarding people who could not use face masks, while in Norway one was even obliged to use it at the psychiatric wards when showing up for treatment. Another problem with face masks was that it was more difficult to read other passengers' facial expressions, making it more uncomfortable for one of the informants. However, some informants also preferred traveling with a face mask as it allowed for more anonymity and decreased the perceived risk of infection.

Fear of infection was another problematic aspect during the pandemic; even in the aftermath of the pandemic, some informants reported still being afraid of contamination.
"I see that there are so many people on the bus, and no one is using face masks. I have started thinking more about face masks, distance and washing my hands now."

The fear of infection is due to both fear of getting COVID-19, and also being responsible for spreading the virus. One informant was also concerned of being at risk due to physical disabilities. The fear has caused some of the informants to withdraw socially, e.g., avoid meeting friends or going to cultural events.

Social distancing on public transport has, however, had a positive effect on several informants. Having rules and regulations in terms of how to move and where to sit has made it easier to travel as crowding is less of an issue. *"Lovely to have that meter […] Quite nice to have that distance".* The physical distance to the driver – some transport modes have kept the physical barricade towards the driver even after the pandemic – is, however, considered negative by one informant who feels the need to communicate with personnel.

Availability of transport services affects traveling for several different reasons (Table 1). In the aftermath of COVID-19, availability of public transport in terms of departures and available lines might change, which is stated as problematic by the informants as some have yet to resume their normal routines. One informant feels guilty for not using public transport as much as they previous had.

5. Discussion

As we have seen in the results, the barriers and the intervention measures can be related to both the individual or the environment.

1. The individual barriers related to the disease itself (fatigue, self-isolation, etc.) or resources (financial means, awareness of legal rights, car ownership, etc.)
2. The social environment (non-technical issues): friendliness of personnel, available personnel, knowledge about mental health issues (for both transport personnel and other passengers)
3. The organisational environment: lack of public transport service, distance to public transport service, configuration of connected travels, variations in financial support among municipalities, etc.
4. The physical transport environment: lack of seating, crowding, the adequacy of information systems, toilet facilities, station area designs, etc.

Some of the barriers might be interconnected between the individual and the environment. Sensory overload is related to disease itself, but it will be much more problematic in noisy areas; therefore, the physical environment could be a barrier. Limited access to support systems might be related to the person's inability to apply. At the same time, there might be problems in the support systems itself, making it generally

difficult for people to apply. The solution to this may be to make it technically easier to use (physical environment) and/or train the people working in the system to provide better assistance to people in need of it (social environment). As we see there is no clear boundaries between the groupings, but rather an overlap between the areas for most of the barriers identified.

Social environment is crucial for having a good experience on the public transport system for this group. When having difficulties with the physical infrastructure that has replaced a lot of personnel tasks (e.g., selling tickets), it is important to have other types of personnel that can aid when needed. There is a need for the personnel to know how to interact with people struggling with anxiety and other psychosocial barriers, when the anxiety can also be related to asking for help or getting attention from people. One of the informants pointed out that there is a difference between airlines in terms of how she perceives the personnel, and as a result, how safe she feels. This implies that it is fully possible to train personnel to interact with passengers with psychosocial needs in better ways. In terms of social environment, information campaigns towards fellow passengers could also be of importance in order to reduce stigma and feeling of shame.

Physical design of the transport vehicle and station area is also important for people with psychosocial disabilities. Barriers related to crowding, toilet facilities, design of information systems, sound/light environment are all related to the physical environment. The pandemic also added another barrier in term of use of face masks. Some of the physical solutions are very specific: seating areas, serenity rooms, toilet facilities, etc. But physical design can also affect the passengers on a subtler level; one of the informants talked about how she perceived some companies as better and safer due to physical design. What these design factors might be is unclear, and there is a need to study this further.

The **organisation of the transport system** is also important. E.g., problems related to lack of departures, trip chaining, and long distances between stations/stops. This might be one of the areas where its most difficult to solve problems as there are conflicts with other 'needs'; other factors like population (density) and land use are also important. With regards to number of passengers in sparsely populated areas, there are clear financial implications, and increasing the number of stops will delay public transport. There are also some advantages in making the system have several points of transfer outside city centres, e.g., feeder lines to trunk routes, rather than having numerous direct lines.

In terms of "universal design", one could state that the environmental factors are of greater importance, since the **individual factors** are more related to special and customised solutions. However, it is important to have in mind that the main goal is to include all people in the society, and some focus still needs to be on individual-based measures, as some people might never be able to use public transport. One of the informants had forced himself to use the bus for years, but never got used to the stress he experienced. As he recently got a car, this had changed his quality of life:
"I get to visit a lot of people. My life is so much easier. It is like I have been in prison and finally been released. And this is due to getting a driver license and car. Now I feel like a normal person".

The services related to individual solutions must also be universally designed for the people in need to actually utilise them. This includes making the application system for financial support for car use or taxi solutions easier to navigate. Another measure would be offering exposure treatment where people could practice their travel skills. The organisational environment outside of the transport sector is also relevant. Some of the informants need treatment for their travel barriers, and in order to do so, it is crucial that they are able to get to the treatment location without being drained of energy. Online treatment solutions got a head start due to COVID-19, and this is especially helpful for this group. The possibility of getting an exemption from work-related driving for those in need is also a crucial measure.

In relation to **COVID-19**, the importance of the social environment has increased. Having information about passengers that are not able to use face masks would make it easier for people who have issues related to this. The physical environment however seemed to improve with social distancing, reducing crowding and increasing space between passengers. To sustain some of the benefits of COVID-19, increasing service frequency to avoid crowding, and/or designing transport with more physical space for each passenger may be beneficial. However, this measure is probably unlikely to happen as most transport companies discuss the opposite as a cost saving measure. However, saving money by making a public transport system less attractive will increase the competitiveness of private car use, which may result in a vicious cycle wherein public transport declines even further. Some of the informants in this study talked about how they had not yet been able to 'restart their life' after the pandemic and go back to their normal routines. For people struggling with fear of contamination, this was especially problematic.

When looking at the findings through the lens of the capability approach, we find barriers related to resources (e.g., access to public transport services, access to car, money to pay for different services, knowledge of legal rights) and all three conversion influences: personal (e.g., fatigue, self-isolation), social (e.g., friendliness of personnel) and environmental factors (e.g., crowding, available toilet facilities). The organisational environment does, however, bring another aspect into the model, since the transport system itself can be organised in different ways, creating different types of barriers. Categorizing the barriers through the capability approach may not have provided this insight. Organisational factors may bring a new dimension if separated, emphasising the way the transport system is organised in terms of how the system is set up. Frequency of departures, door-to-door systems, minimizing waiting time between legs are all very important for people with mental health issues. This aspect is not necessarily covered in any of the other conversion factors. We suggest adding a 4th layer to the conversion factors to fit the concept of universal design (Fig. 3).

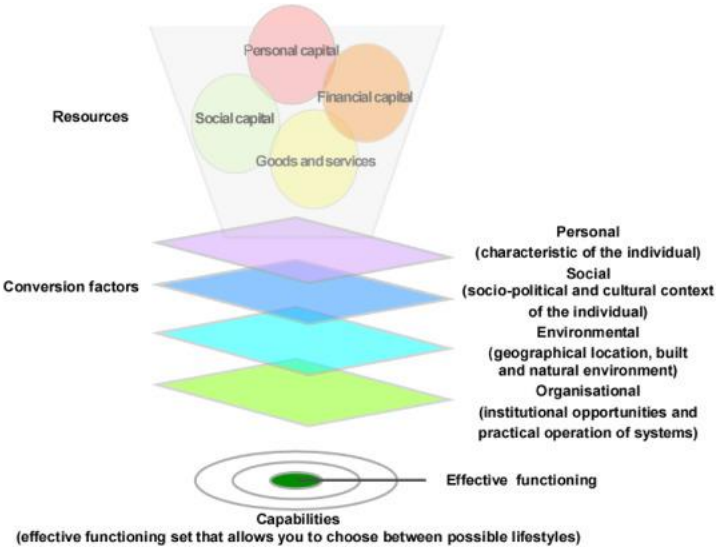

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Fig. 3. The capability approach with a 4th layer of Organisational factors. Illustration by Hans Rune Kvåle Nielsen.

6. Conclusion

Physical infrastructure and physical impairments have been the main focus of universal design for a long time. This study has shown that universal design is also relevant for people with psychosocial disabilities. Social and organisational environments seem to be of equal importance for this group. It is noteworthy that many of the problematic areas highlighted in this study present opportunities to improve travel for other user groups, making them easier to prioritise. Toilet facilities, for example, are also highly relevant for people with bowel diseases, elderly, pregnant women, or anyone spending time away from home for more than a couple of hours. Serenity rooms and seating areas might be helpful for other groups that need to rest for a short time. The availability of well-trained personnel to improve travel for this group and could also benefit those with other types of disabilities, tourists, and the elderly. The next research steps would be to investigate and prioritise the relative importance of barriers and related policies through a quantitative study.

Declaration of interests

None.

CRediT authorship contribution statement

Anja Fleten Nielsen: Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Project administration.

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