

Understanding Customer's Preferences and Expectations within the POSEIDON* Project

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(* **POSEIDON**: PersOnalized Smart Environments to increase Inclusion of people with **Down's syNdrome**. *Objective ICT-2013.5.3 ICT for smart and personalised inclusion*



IGD



POSEIDON

About the project

- Most people with Down's Syndrome experience low integration with society.
- A perception that they can achieve less than what they really can.
- The POSEIDON project aims at developing technology to support people with Down's Syndrome in their daily routines.

Consortium

Participant no.	Participant organisation name	Part. short name	Country
1 (Coordinator)	Karde AS	Karde	Norway
2	Middlesex University	MU	UK
3	Fraunhofer IGD	Fraunhofer	Germany
4	Berliner Insitut für Sozialforschung	BIS	Germany
5	Funka Nu AB	Funka Nu	Sweden
6	Tellu AS	Tellu	Norway
7	Norwegian Network for Down Syndrome	NNDS	Norway
8	Down's Syndrome Association	DSA	UK
9	Arbeitskreis Down-Syndrom	ADS	Germany

Consortium



Objectives

POSEIDON aims at developing a technological infrastructure which can foster a growing number of services developed to help people with Down's Syndrome to:

- Become more **integrated**
- Support their **development** as citizens
- Make a greater **contribution to society**



Main subjects



Methodology

User involvement for requirements and testing

- Primary, Secondary and Tertiary users
- Questionnaires and interviews
- Workshops for requirements acquisition
- Field trials
- Pilots

Pan European focus

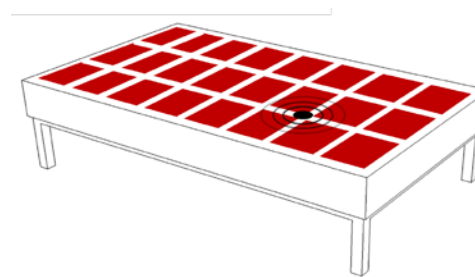
- Downs Syndrome associations from 10 different European countries invited to workshops

Technology

Virtual Reality



Interactive table



PC, Tablets, Smartphones



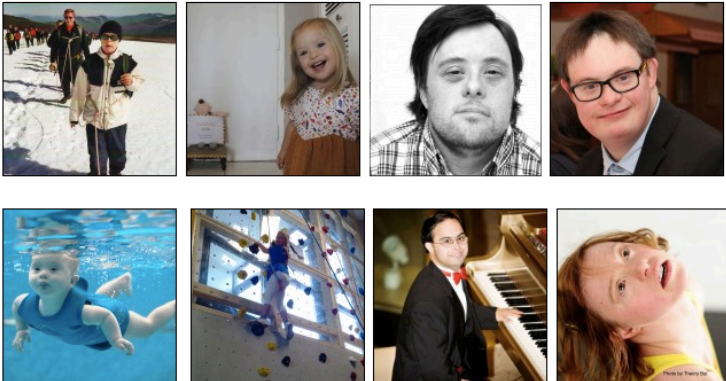
Web

POSEiDON Home About the project Technology Work Packages Partners Publications Contact

POSEIDON – PersOnalized Smart Environments to increase Inclusion of people with DOWn’s syNdrome

Many people with Down’s Syndrome have abilities that they can contribute with in our society. Here are some examples of talented people with Down’s Syndrome. In all age groups. From all over the world.

Click on the image to see more about each person and his/her achievements.



[View more success stories](#)

[View Inspiring YouTube videos](#)

<http://www.poseidon-project.org>

POSEiDON

Understanding User's Needs

The presentation of:

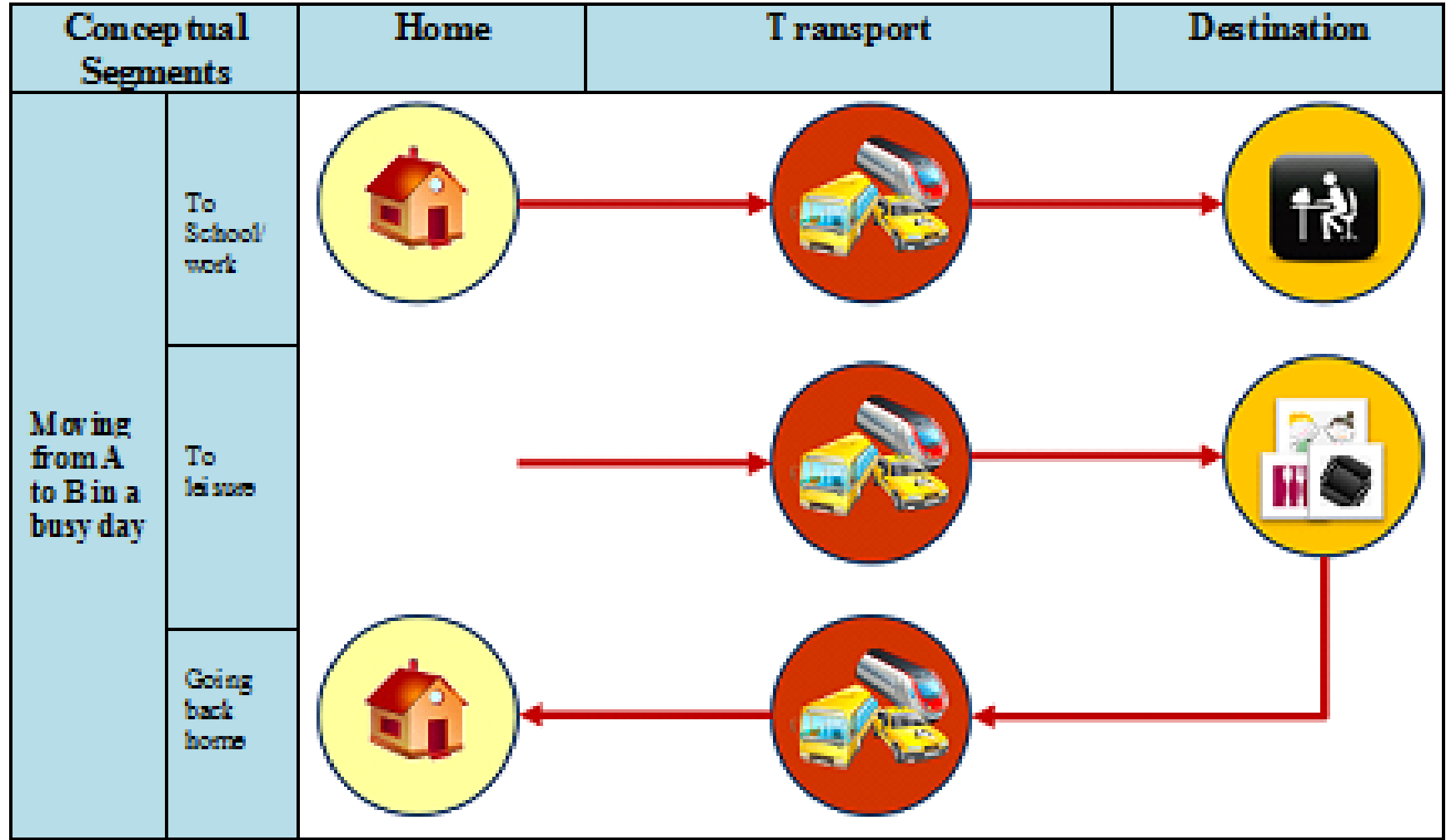
Can AAL Technology Help People with Down's Syndrome to Live Better Lives?. Juan Carlos Augusto. Proceedings of AALForum2012 (Tomorrow in Sight: from design to delivery), pp. 79-83, Eindhoven, The Netherlands, 26th of September, 2012

led to contact with a company working in AAL. They have been working on a basic set of requirements to develop systems for people with D.S.

This led to contacting three end user organizations:

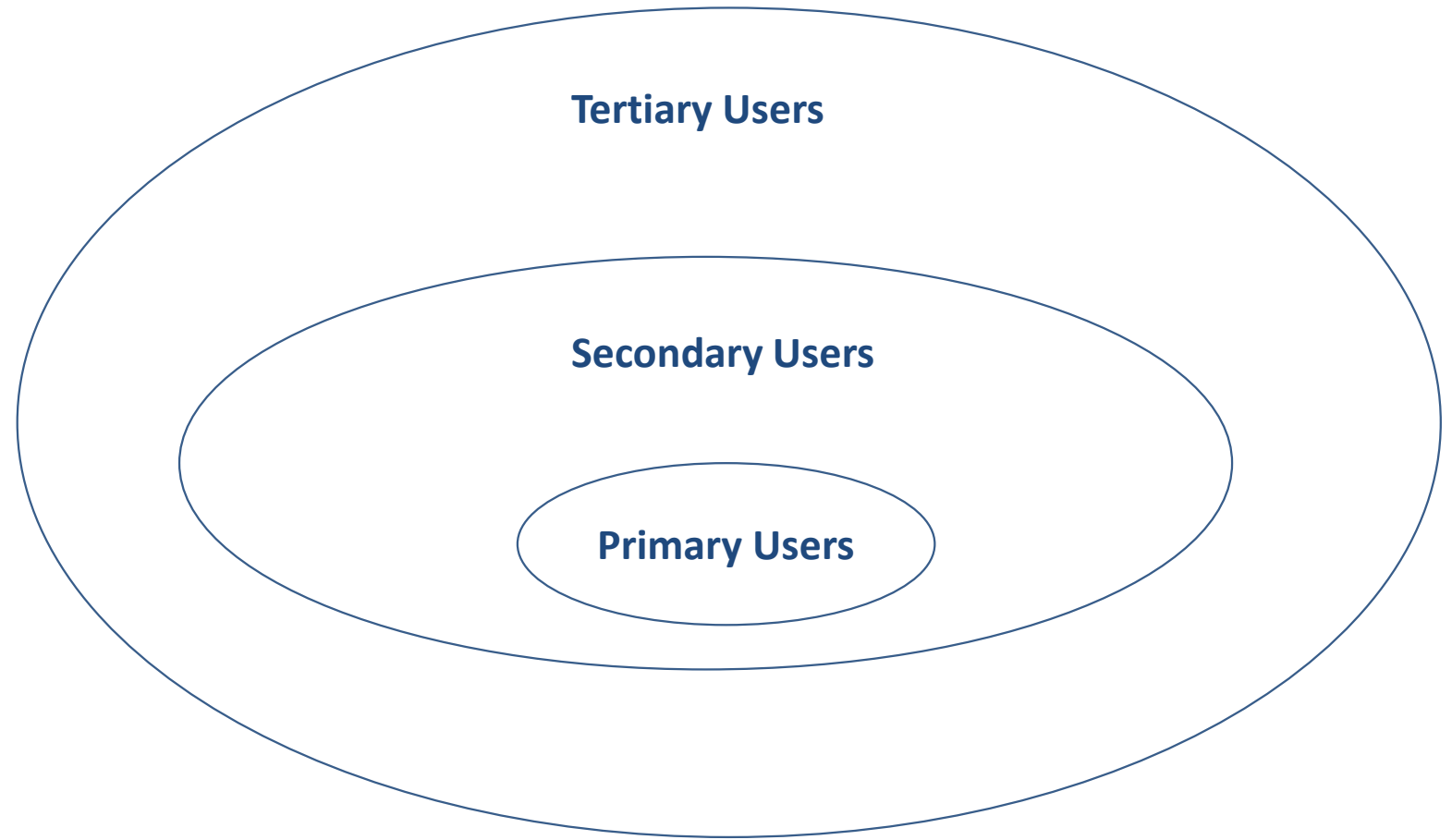


Initial vision



Stages of the Day	Person with DS	Family and Carers (from community)	Friends	Circumstantial interactions (teachers, employer, bus drivers, shop owners, etc.)
At home – start of the day	Preparing for the important tasks ahead in the day (books for school, papers for work, information for leisure and socialization)	Reminders of ADL.	Get a message if a friend with DS is unwell today.	Teachers/Employers: get a message if a student/employee with DS is unwell today.
Travelling to School	Travelling safely from home to destination (e.g. taking the correct transport, dealing with tickets and money, find the way from the station to school).	Know where the person with DS is and where has been during the day. Maximum safety level.	Know where friend is, if meeting agreed to go together.	Facilitate transactions with money, cards, and passes. Contact somebody who can help if something unforeseen happens.
School Or Work	Scheduling of activities (know where to be and when). Handling supporting resources (for work and learning).	Reminder to bring personal belongings. Agree, understand and record what the assignments for next day are.	Know where friend is, if meeting agreed.	Teachers: facilitate education. Employers: facilitate achievement of tasks and support explanations.
Travelling to Restaurant	Same than travelling to work/school. Depending on age and capabilities higher safety measures may apply.	Know where the person with DS is and where has been during the day. Maximum safety level.	Know where friend is, if meeting agreed to go together.	Facilitate transactions with money, cards, and passes. Contact somebody who can help if something unforeseen happens.
Restaurant	Find friends at meeting point. Handle table reservation. Assist with ordering and paying.	Reminders issued on healthy eating and identification of potential hazards (e.g., allergies to specific products).	Finding where friends are. Handling payments.	Assistance satisfying health conditions related to food and handling payments.
Travelling back to Home	Reminders on when to leave for home depending on transport to be used. Handling all aspects of travel as in previous travelling segments. Given the time tighter security measures apply.	Know where the person with DS is and where has been during the day. Maximum safety level.	Know whether friends arrived safely.	Taxi/bus/train payment.
Back at home – end of day	Encouraging healthy habits (food, hygiene, sleeping habits). Supporting preparation for next day (e.g., homework, work activity planning, meeting with friends).	ADLs activities. Review daily activities with family. If required, plan together activities for next day.	Contact friends to review joint activities for next day.	Some schools or employers may like to know the person arrived home safely.

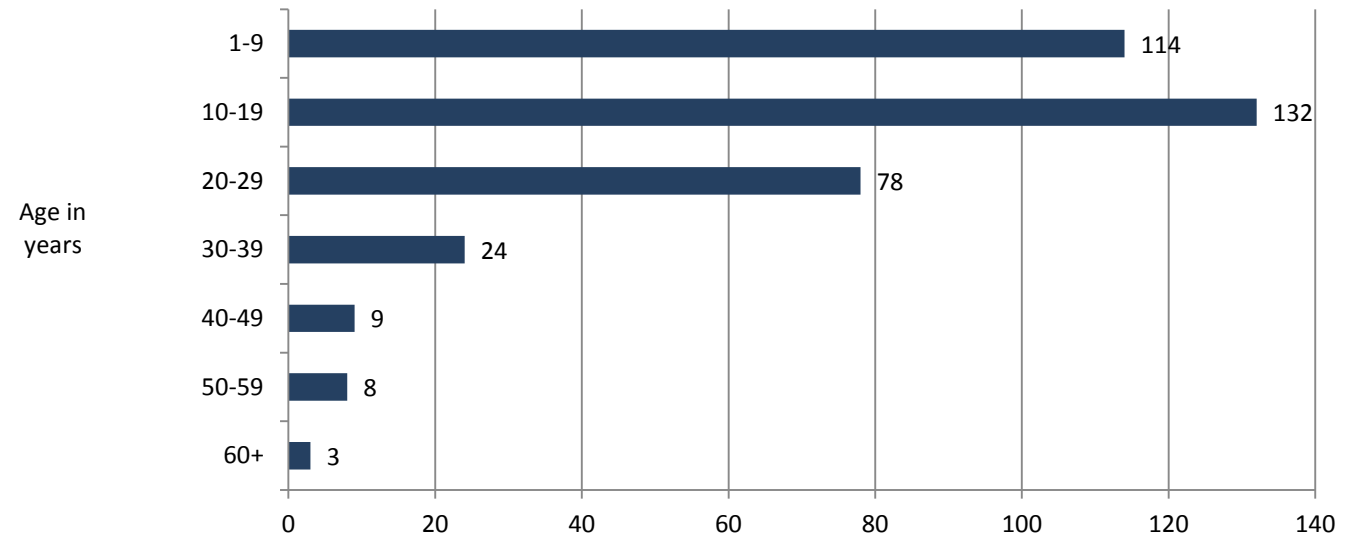
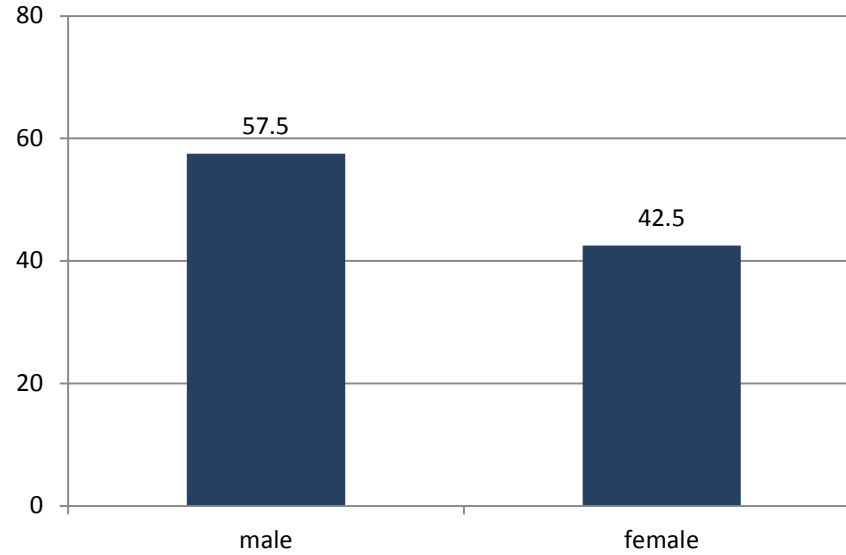
Stakeholders involvement



Questionnaire

- 400+ answers from families in various countries in Europe.
- These questionnaires have been answered mostly by carers of people with DS (what we call secondary users).
- <http://www.poseidon-project.org/questionnaire/>

Results from the questionnaire



Sample Description

Figure 4: Living situation (in percent, N=389)

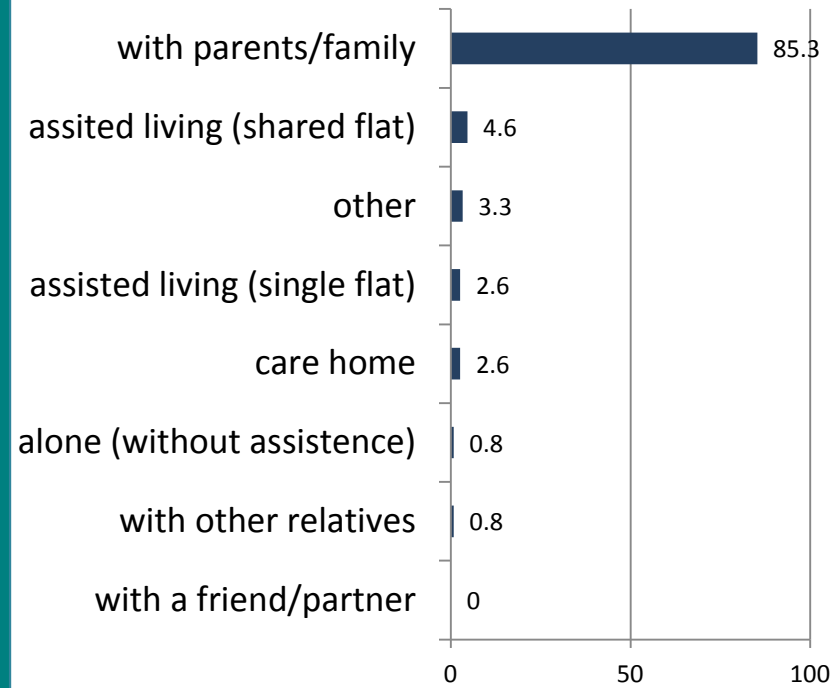


Figure 5: Going to school/work (in percent, N=386/373)

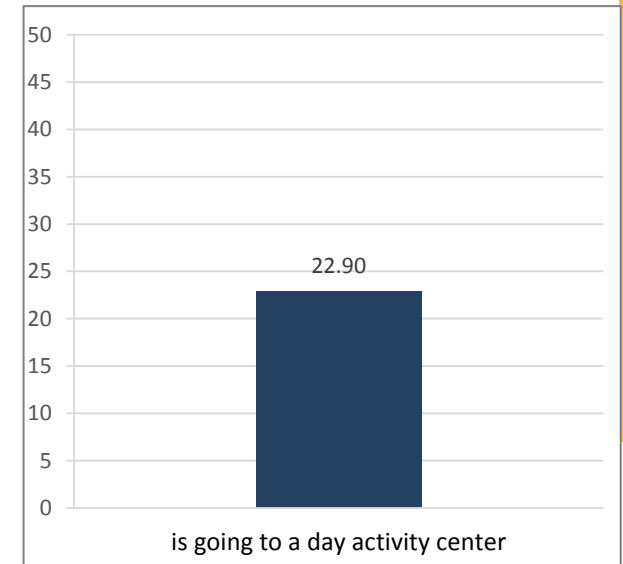
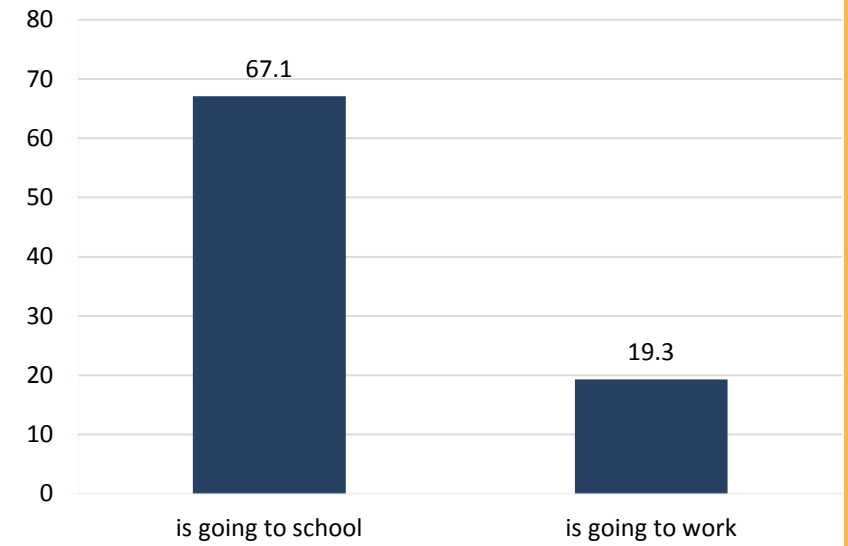


Figure 7: Using entertainment technology (in percent, N varies between 254 and 375)

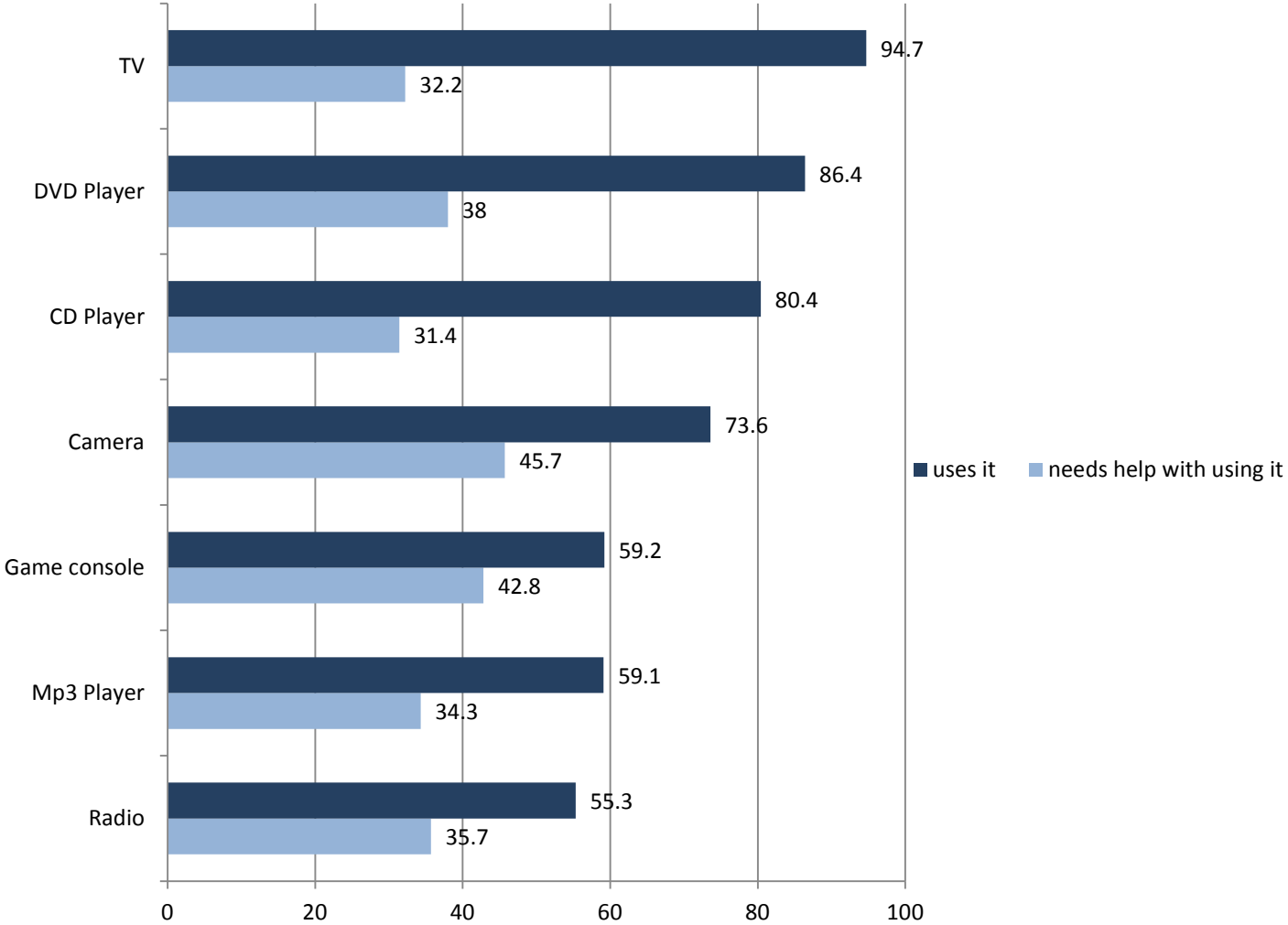


Figure 8: Using information technology (in percent, N varies between 204 and 339)

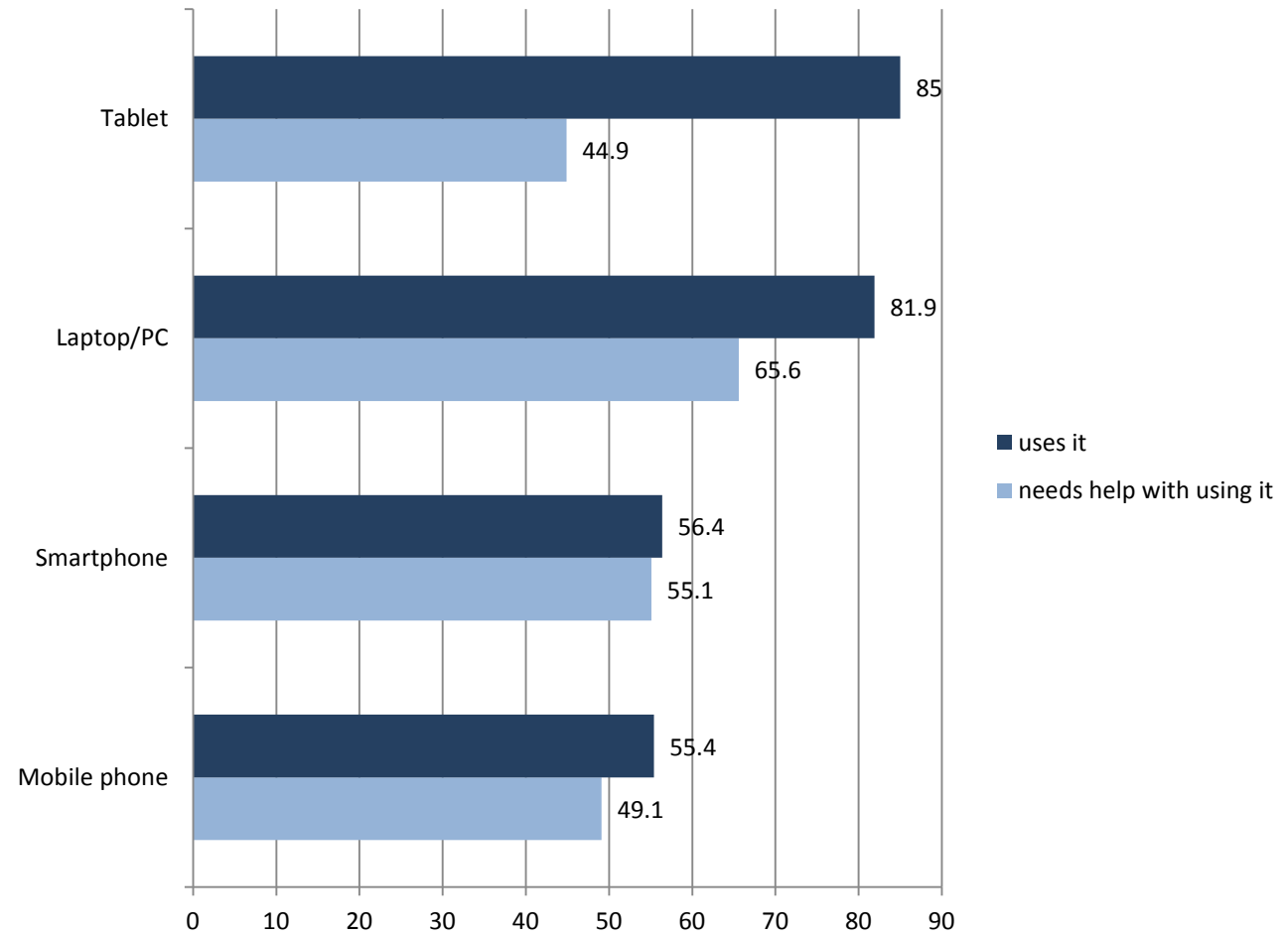


Figure 9: Owning smartphone/tablet and using apps on them
(in percent, N varies between 349 and 397)

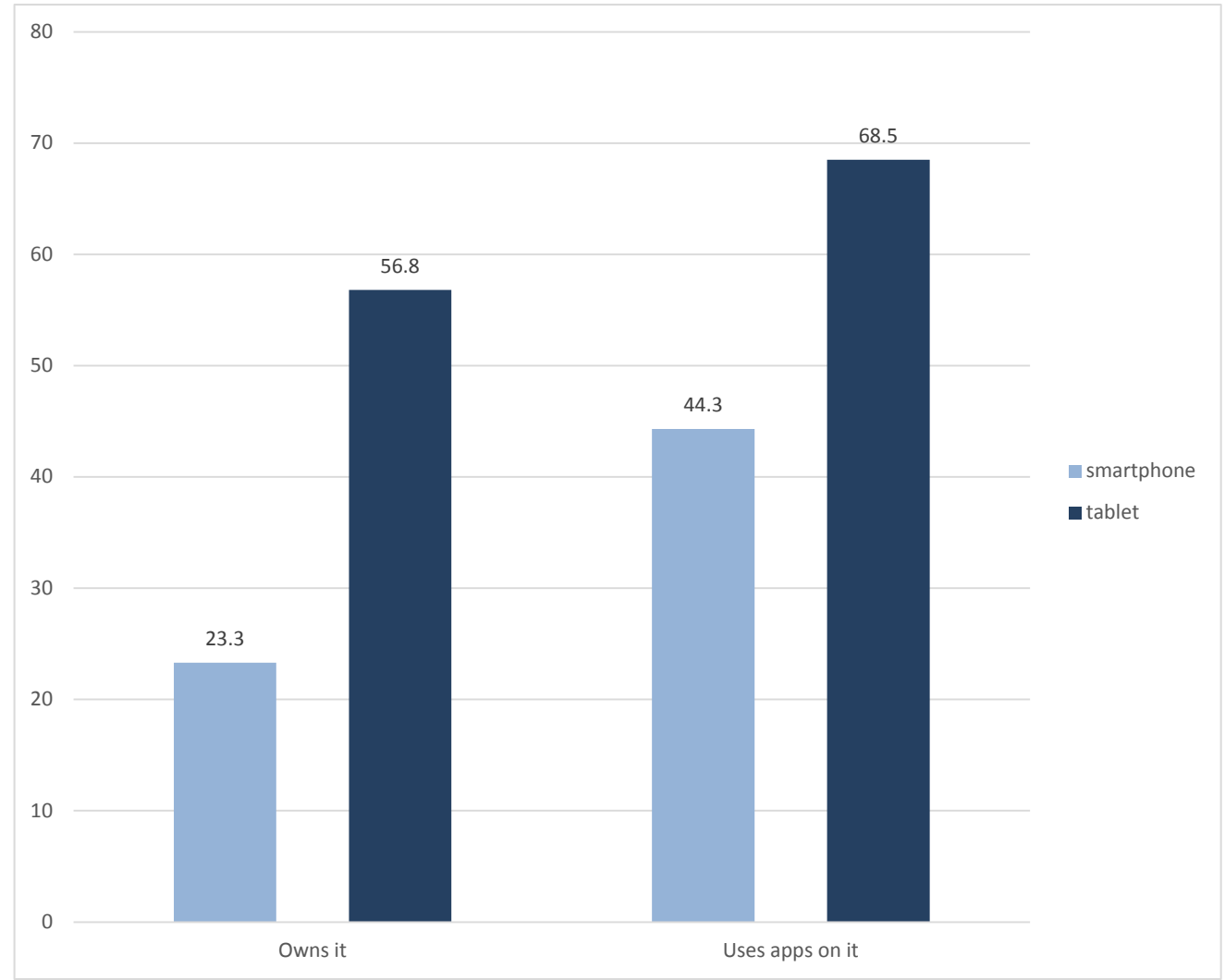
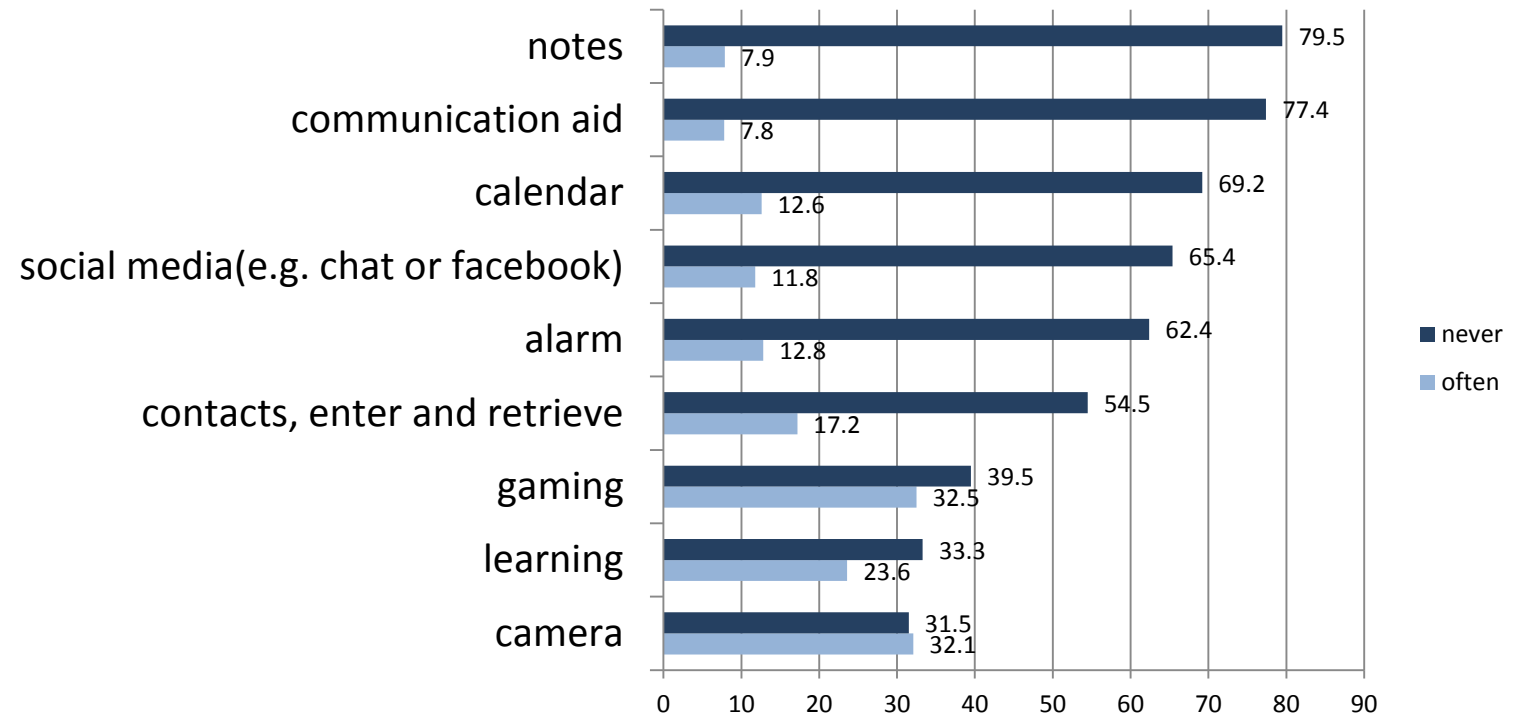


Figure 10: Difficulties using apps on a smartphone (in percent, N varies between 115 and 162)



Living Situation

Figure 15: Everyday life competencies, traveling about (in percent)

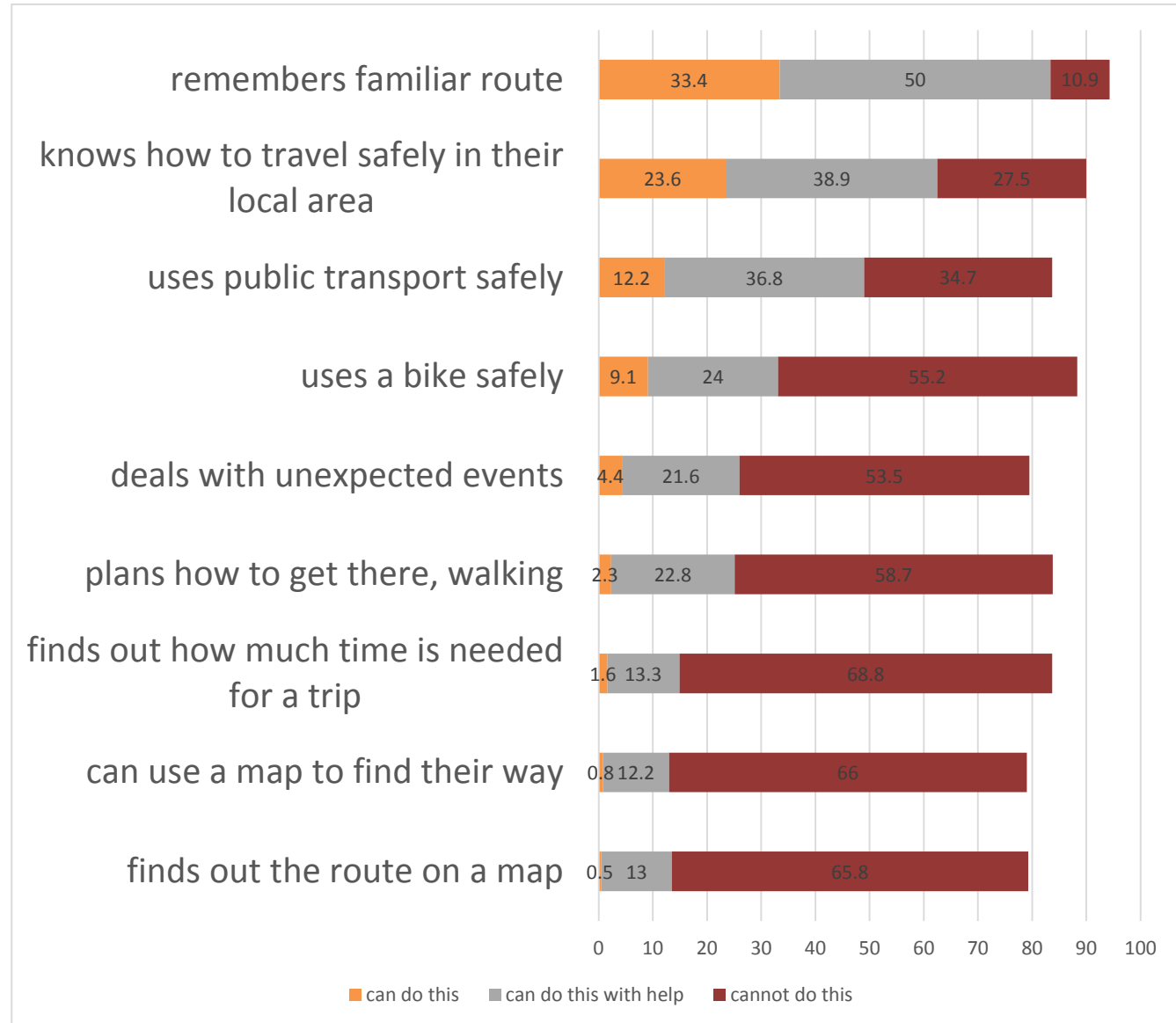


Figure 16: Everyday life competencies; time management
(in percent, N varies between 378 and 390)

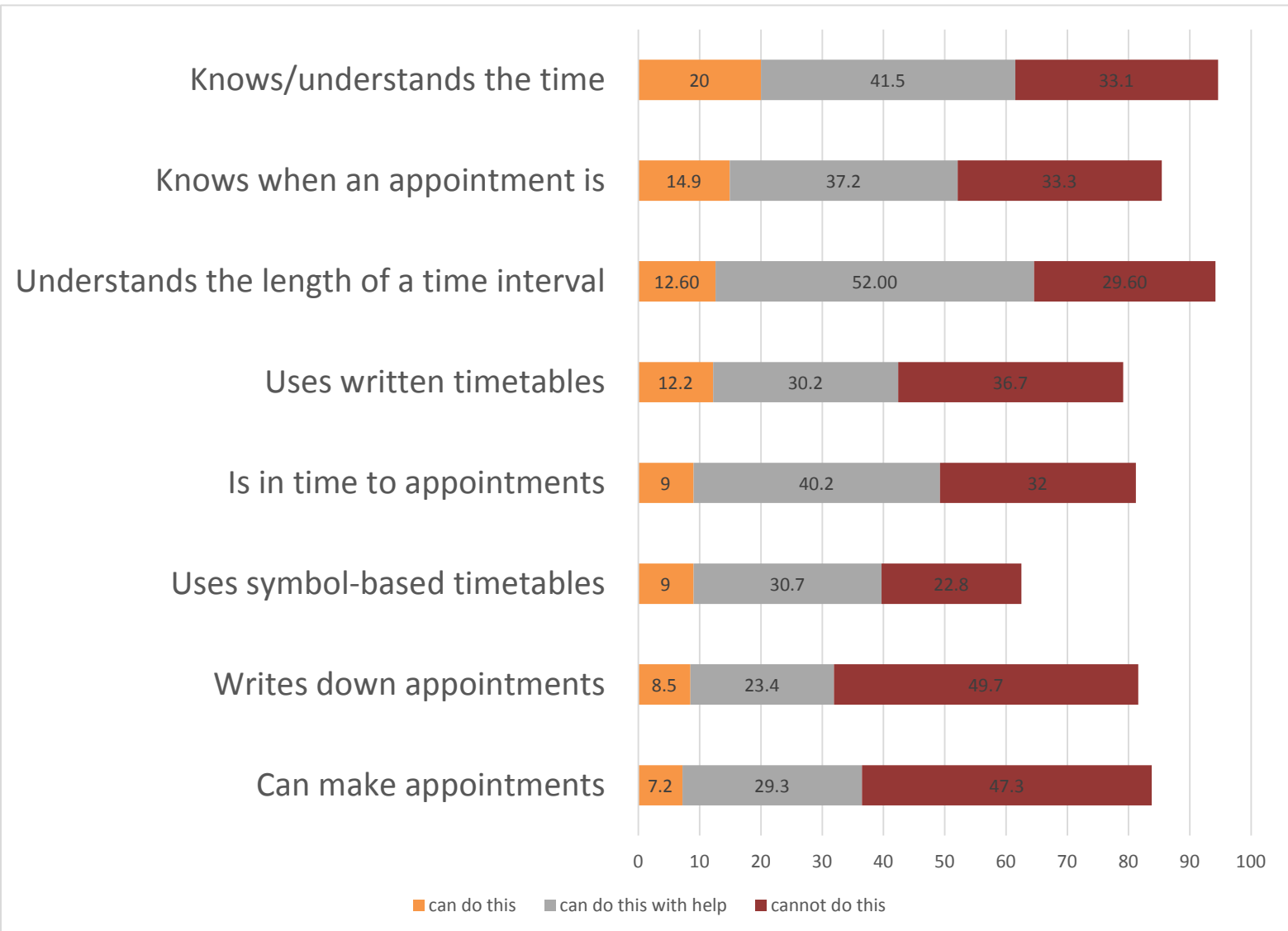


Figure 17: Everyday life competencies; handling money (in percent, N varies between 383 and 387)

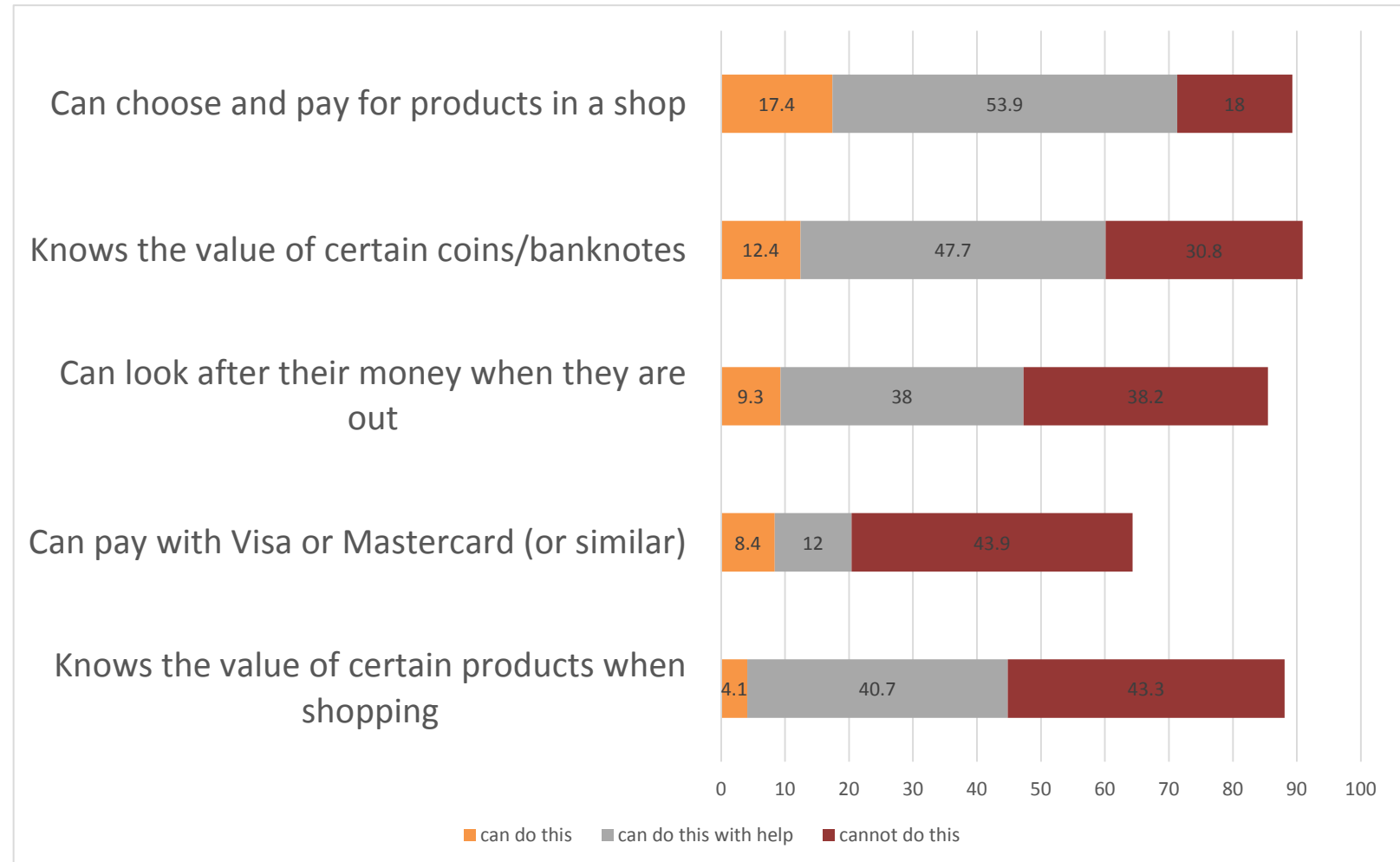


Figure 19: Everyday competencies, communication
(in percent, N varies between 377 and 388)

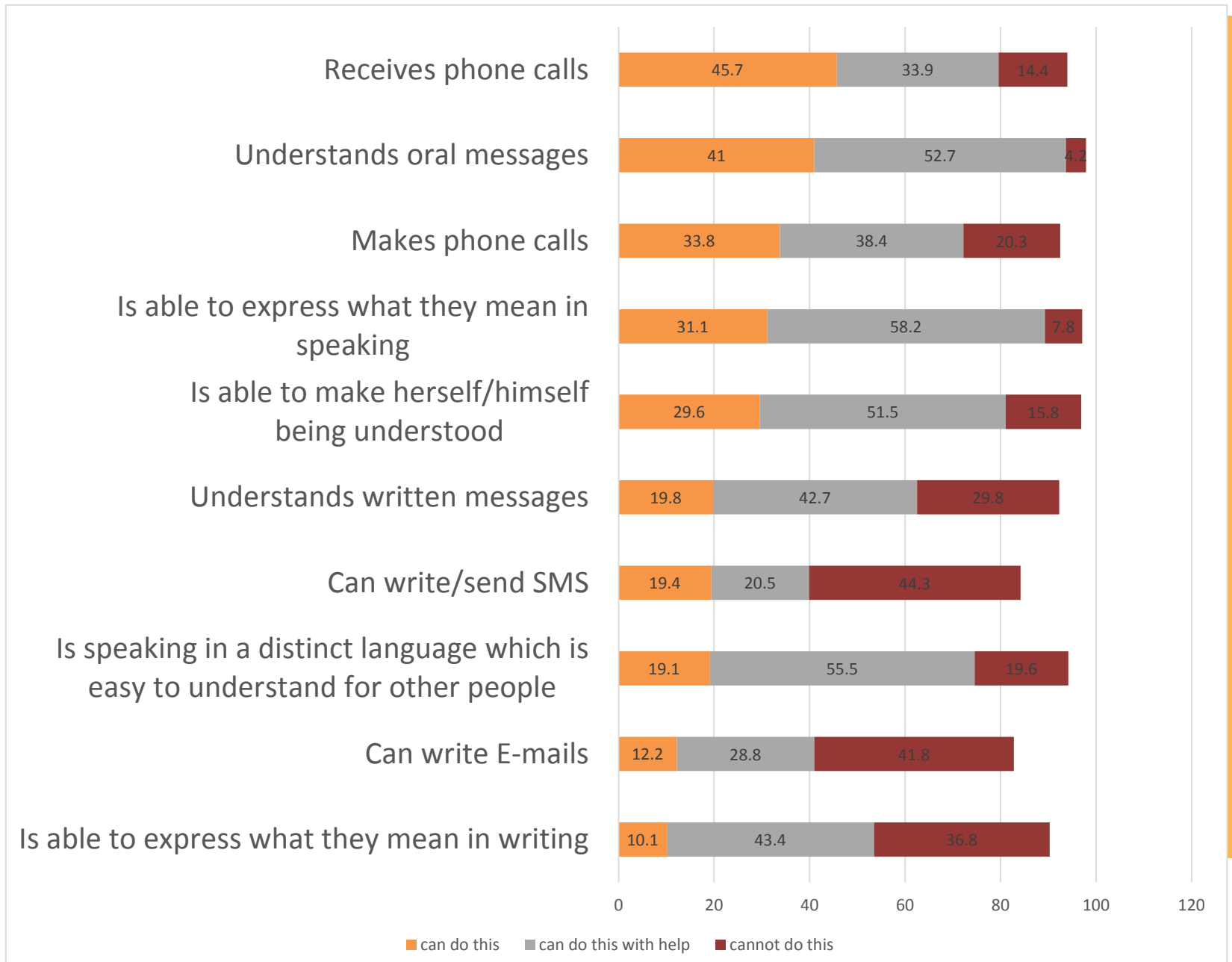
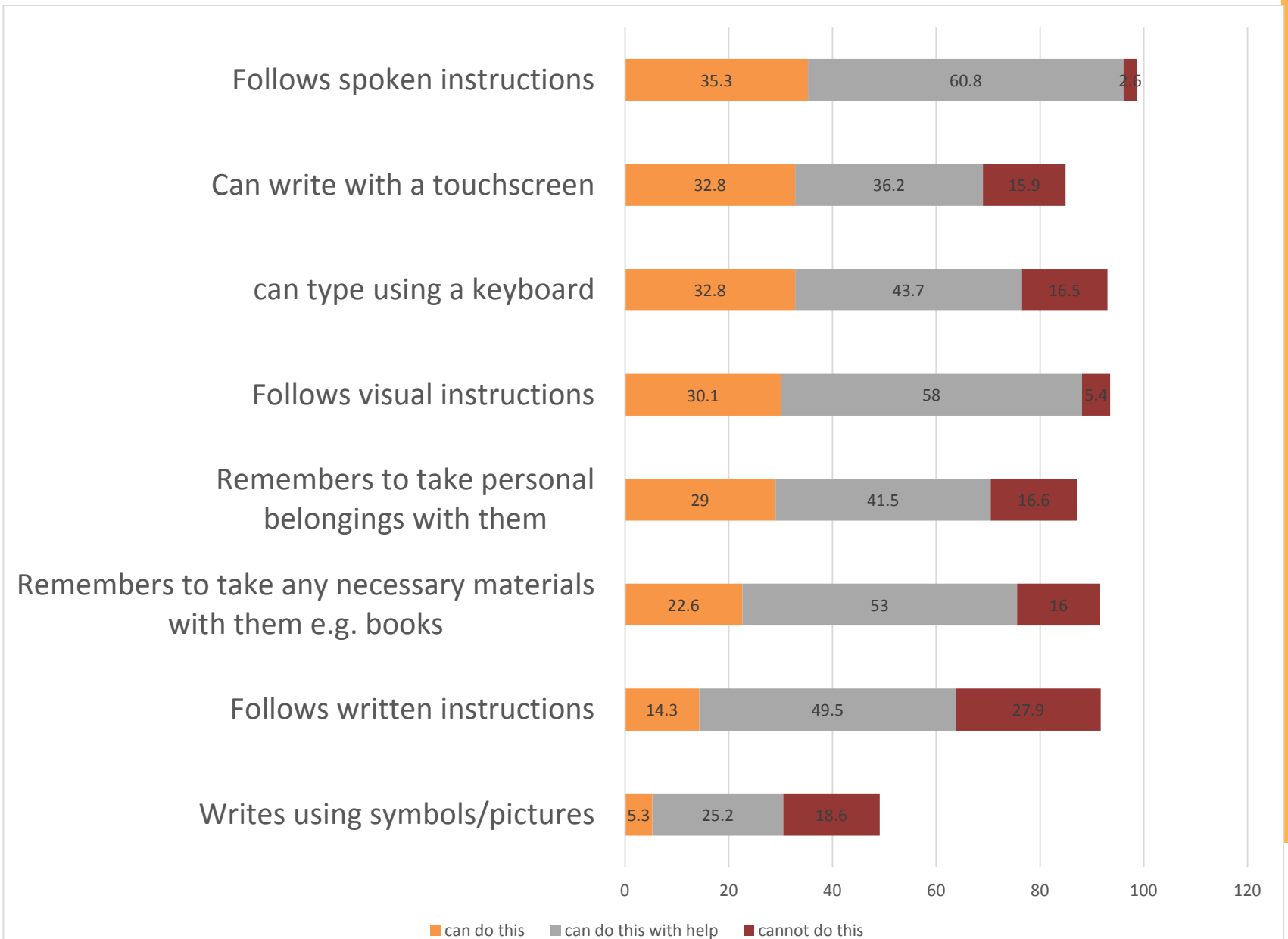


Figure 21: Everyday life competencies; school/work/learning
(in percent, N varies between 379 and 389)



Need and use of assisting technologies

Figure 24: Going to school or work (multiple options possible, in percent, N=397)

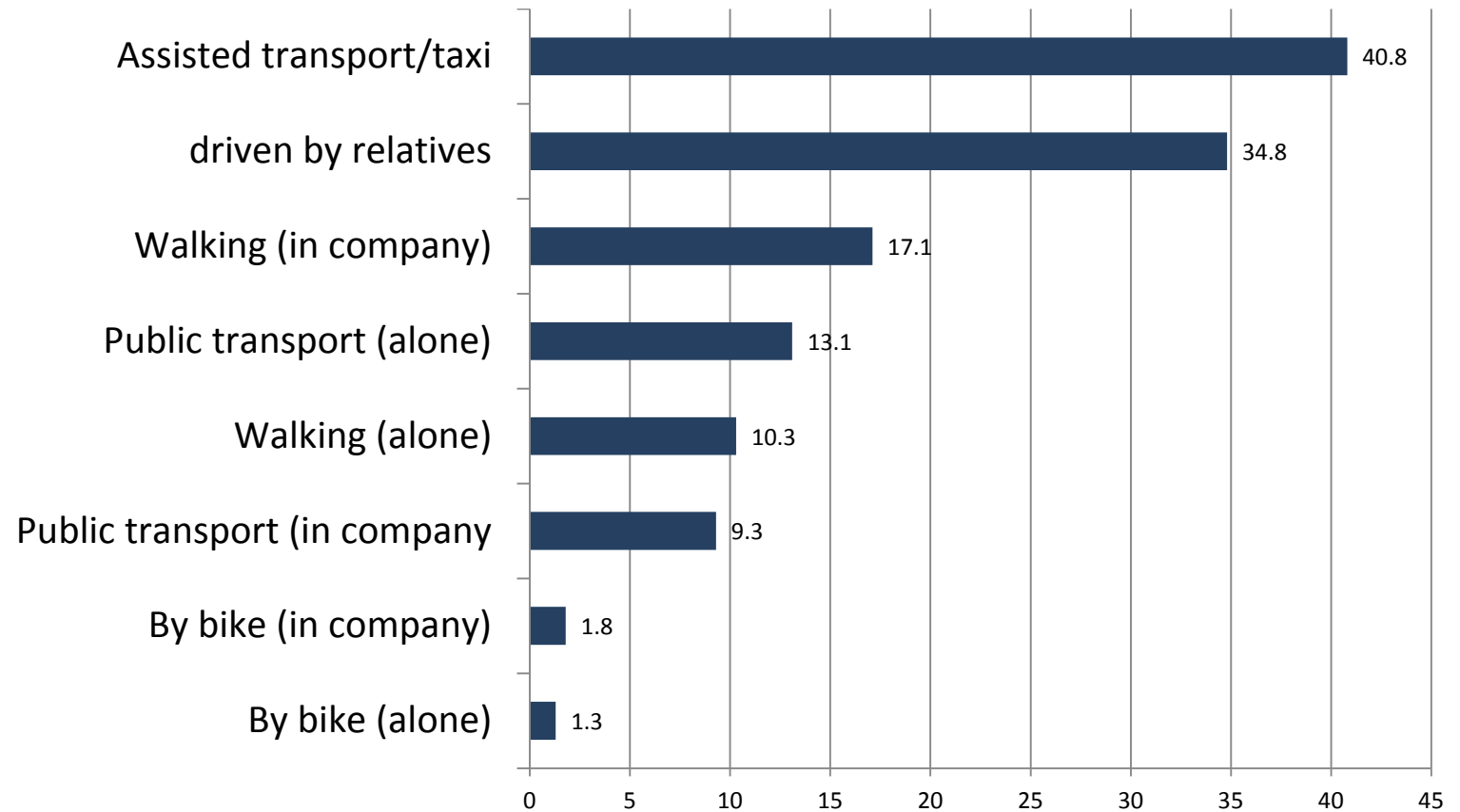


Figure 26: To what extent is it important to support the autonomy and independence of people with DS?
(only the category «most important» from a five point scale; multiple options were possible;
in percent; N varies between 381 and 388)

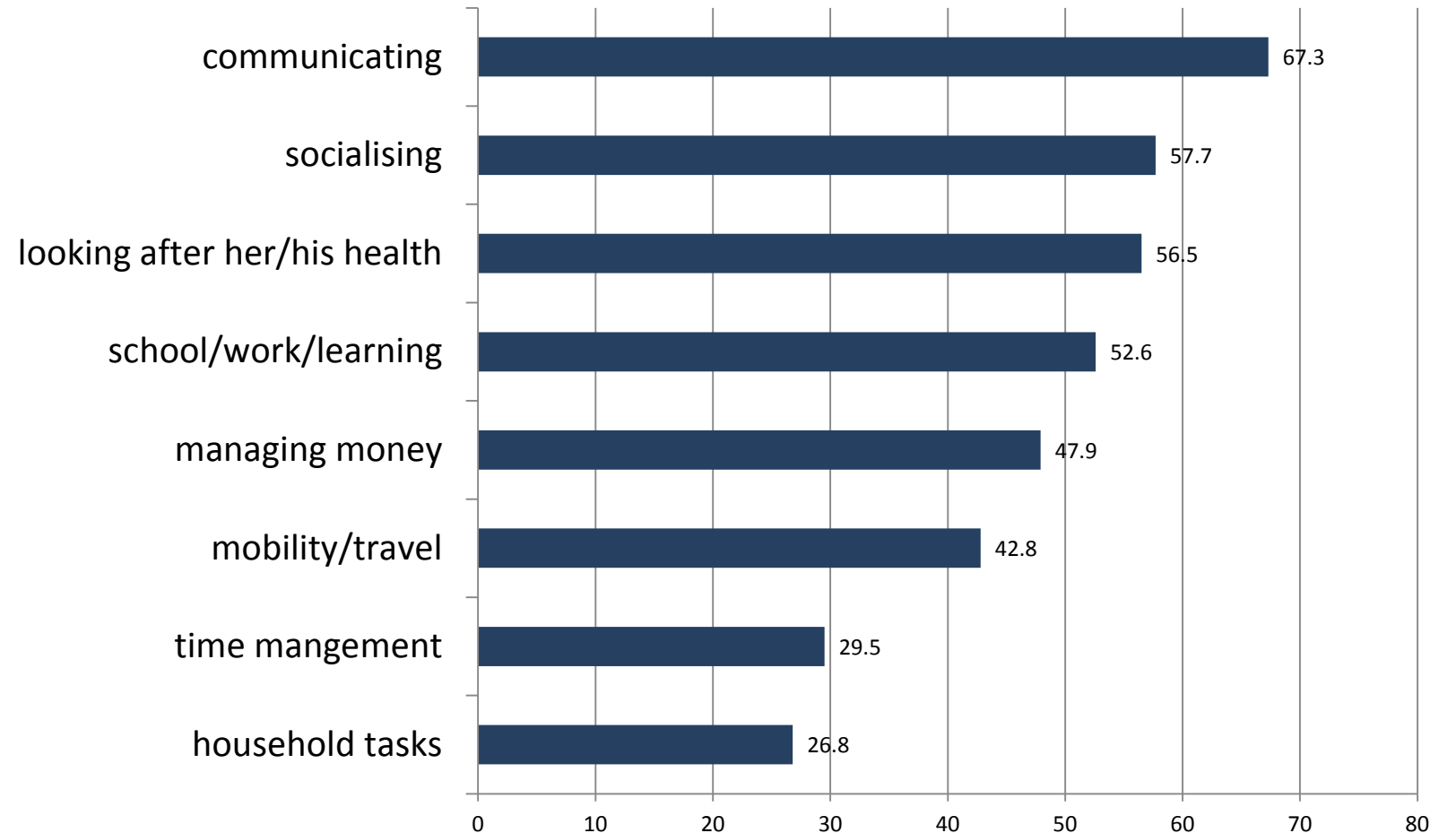


Figure 28: Design aspects being important for people with DS
(*"very important"* in percent, N varies between 377 and 385)

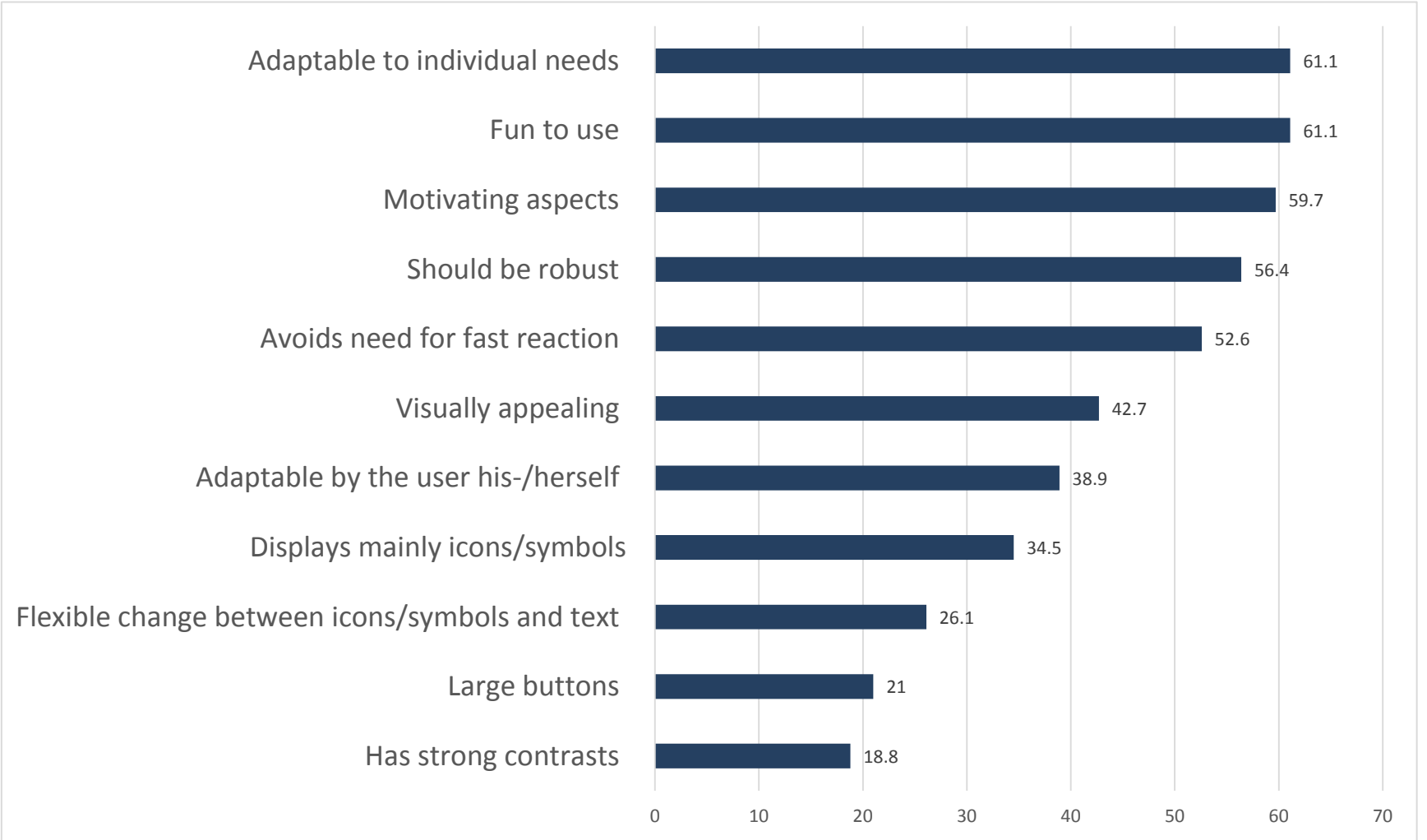


Figure 30: Qualities assistive technologies for people with DS should have
(“very important”, in percent, N varies between 367 and 381)

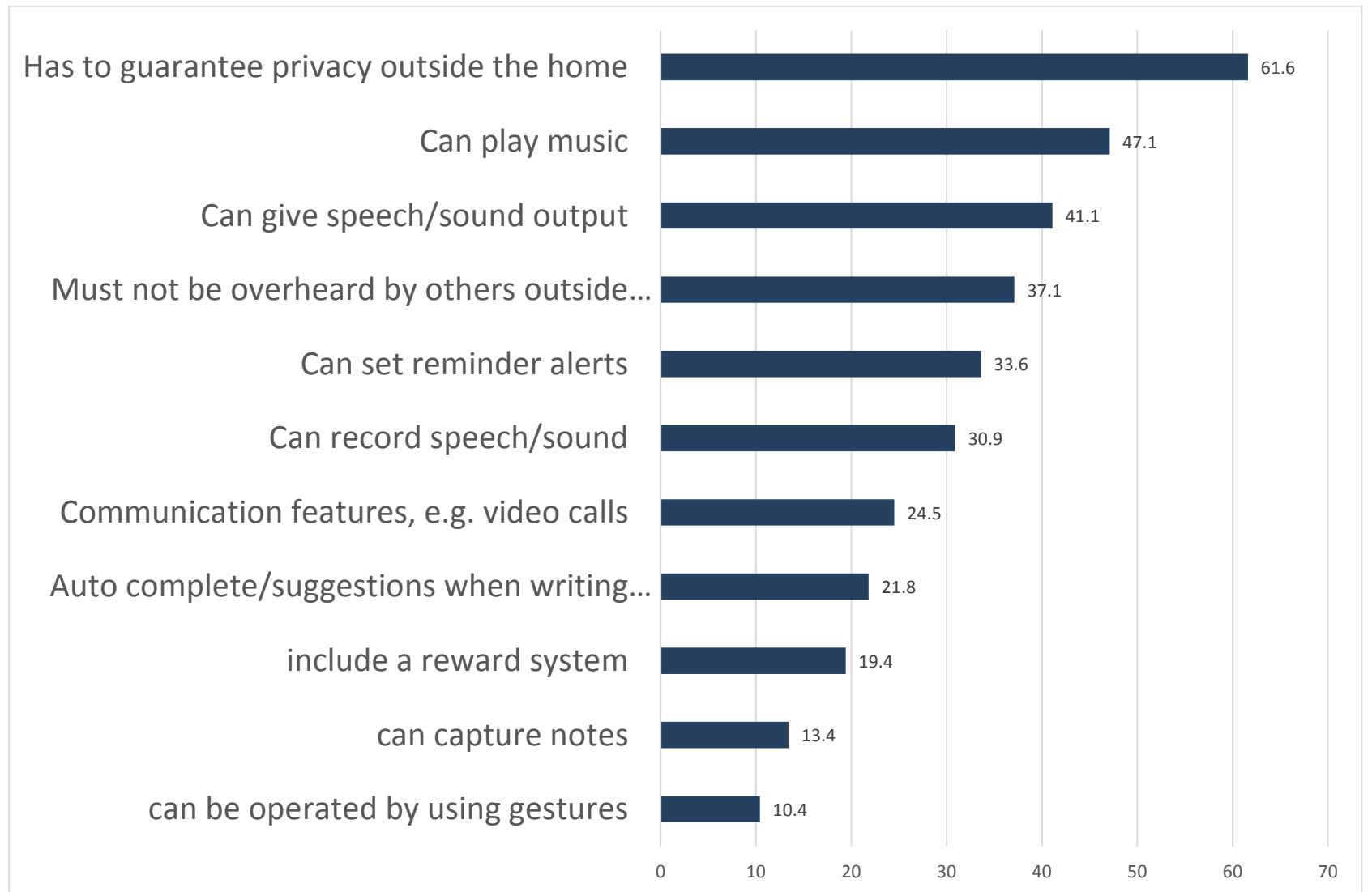
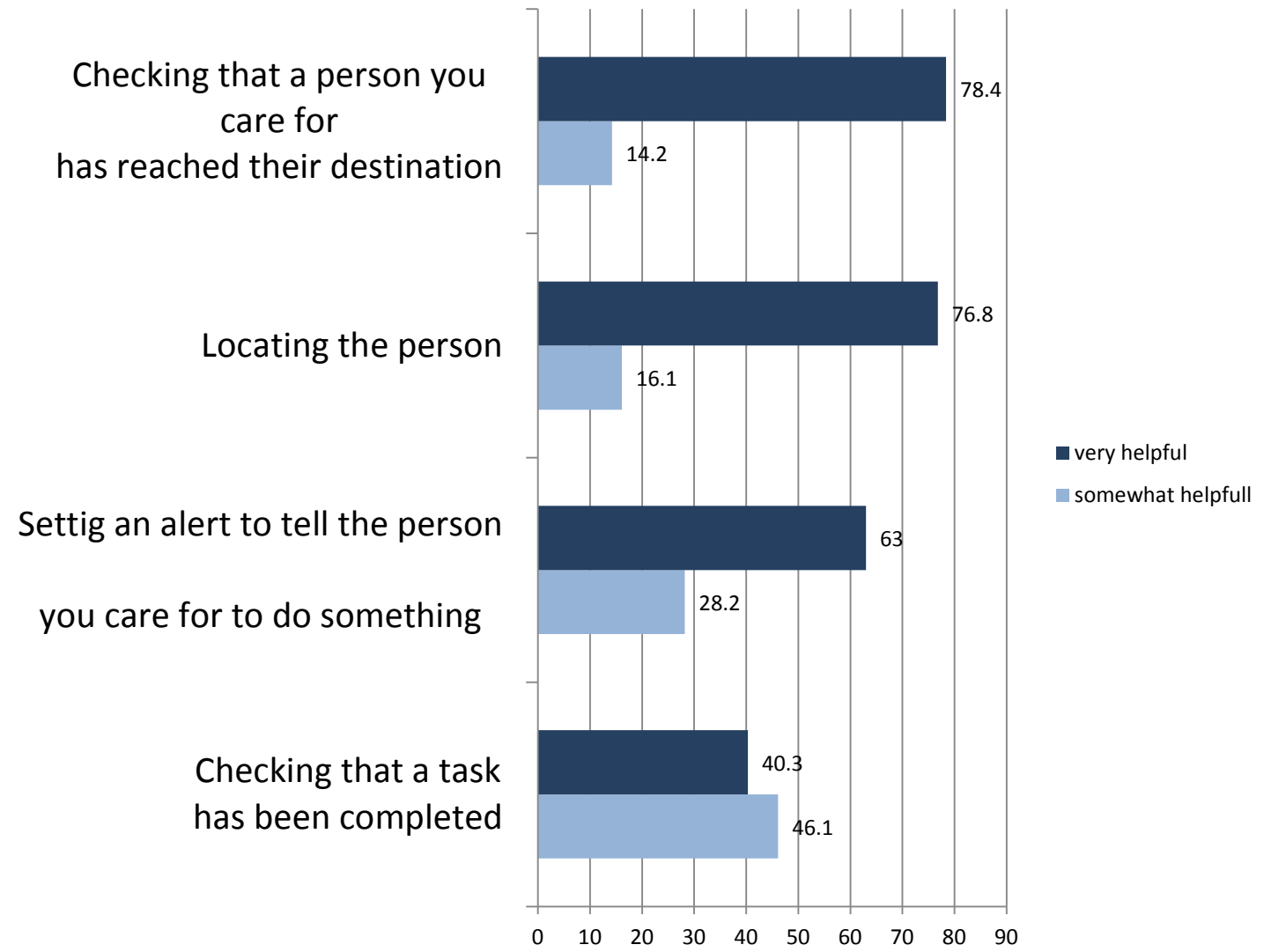


Figure 31: Features of assistive technologies which would be helpful for carers themselves
(in percent, N varies between 366 and 380)



- A dozen interviews to people with DS living in England, Germany and Norway
- Noticeable variety of lifestyles and needs

Sections

Part 1: Ice-braker

Part 2a: Education/work/day activity centre

- **General**
- **Mobility**

Part 2b: Leisure Activities and Socializing

- **General**
- **Mobility**

Part 2c: Wellbeing

Part 3: Technology

Part3: Technology

J. has got a special mobile phone for elderly people. This phone has bigger buttons and about 6 numbers can be stored. J. can easily handle this phone. She has stored the handy number of her mothers and the landline telephone of her parents. She uses it for emergency cases.

Fathers comment: If a friend would have a tablet too it would be much easier to communicate over Face time. They tried out Face time with her brother, but with friends it is not yet possible because they do not have tablets jet.

Since a few weeks her father owns a tablet. J. is very keen on this device. She is motivated to handle it by herself. She tried out Face time and together with her mother she looks at the homepage of her workshop what they will serve for lunch the other day. She nearly can do it by now without help.

We tried out some different games during the interview. J. was very much concentrated and tried out all the different offers. The touch screen brought some difficulties. Sometimes she pressed too much, like she would use a button. Very difficult was to make things bigger trough widening your fingers from each other. Nearly she managed it after a while in taking two hands parallel. Sometimes she used the thumb instead of the pointer. That made the control on the touch screen a bit difficult. Sometimes she used as well her fingernails. But she was so much focused on what she was doing and had a lot of fun that after a while the finger motoric increased.

Which features would you like to have on a tablet?

Watching the menu card on the homepage, music, games (she was avid about the math learning apps, the interactive Books, the painting app) E- Mail (she has her own Email address), taking photos, calling her brother in England.

Father: An easy Email program would be good. She can write mails but she needs a long time for that. She likes to write to her brother.

Extract 1

Part3 Technology

C. has got her own mobile phone. It is only for use in an emergency. She showed me where she can find the time and her contacts. The numbers of three carers from work and her communal living are stored, as well the number of her mother and sister. She doesn't have any numbers of friends stored. She knows how to text but at the moment she is not allowed to.

She knows that an alarm clock, a calendar and some games are on the cell phone, but she is not using these features. She knows about the SIM-card and that a carer has to recharge it. She says that the use of the cell phone is very expensive, she has it always in her trouser pocket but does not use it very often. She gets called by colleagues who tell her at what time they have their meeting.

C uses the computer at her parents' home. She mostly uses the internet to watch youtube or music videos. She searches with the try and error system. Last year she downloaded some illegal material and caught a trojan. Therefore the parents changed the password because they have some business related files on the computer. Now C. is only allowed to use the computer under the supervision of her father or sister. If they leave the room C. quickly opens google and searches for sites where she can buy things. Once she even took her father credit card and was just about to enter his credit card number when he entered the room and took the card away from her. Her mother explains that C. understands how things work but has no idea about possible consequences. And that's why she is not allowed to use the computer anymore.

C. knows about Smart phones and tablets because the younger carers all use them. She was very curious about trying out my tablet. She had no problems using the touch surface and the different combinations of finger use right from the start. She tried out painting, playing differences games and to take photos. She also discovered quickly how to get access to the internet.

What other device would you like to have and why?

She would love to get more access to this device and asked me to come back with the tablet. But she is very happy about her new Nintendo 2 DS she just got for Christmas.

Extract 2

Personas

Name (country)	Gender, age	Specifications
Sajid (UK)	Male, 32	Living in supported living home. Moderate learning disability. Poor visual acuity Very active. <u>Uses technology, needs help with new apps.</u>
Rachel (UK)	Female, 23	Living with her mother. Poor visual acuity. Poor hearing. Problems with fine motor skills. Works. <u>Uses PC.</u>
Jennifer (UK)	Female, 19	Living with her parents. Moderate learning disability. Visiting college. Problems in managing time and money. <u>Uses PC</u>
Elisabeth (Norway)	Female, 15	Living with her parents. Mental age lower than physical. Goes to school. Very social. Struggles with time. <u>Uses PC, Ipad etc.</u>
Jerik (Norway)	Male, 25	Living in supported living home. Mental age lower than physical. Very independent. Gets help from Assistive Technology. Struggles with concentration. <u>Uses every kind of technology.</u>
Nico (Germany)	Male, 15	Living with his parents. Learning by observing. Going to school. <u>Has a Mobile-Phone for emergency and plays Wii.</u>
Karin (Germany)	Female, 17	Living with parents. Learning disability. Integrated in normal school system. <u>Owns a Smartphone, uses keyboard, mini computer and plays „Sing-Star“</u>

Example

		Sajid, UK
General information	Condition	Technology
<p>Age: 32</p> <p>Gender: Male</p> <p>Family/support: Mother, Father, no siblings.</p> <p>Living conditions: Lives in supported living with two other men in their 20s-30s with learning disabilities.</p> <p>Hobbies/Interests: Sajid enjoys comedies, socialising, watching cricket and football, going to the gym with his support worker on Tuesdays and Fridays and his job.</p> <p>Attitude/Feelings: Sajid is a well-liked, confident person and he enjoys life. He sometimes gets frustrated when he can't do things or if someone asks him to do something he doesn't want to do. He is quite good at avoiding doing what he needs to do, especially at work.</p>	<p>Cognitive: Moderate learning disability</p> <p>Sensory: Poor visual acuity – needs to wear glasses.</p> <p>Body: Overweight. Has difficulties making healthy eating choices.</p> <p>Skills: Sajid can cook with some supervision and assistance. He enjoys reading but isn't so good at writing.</p> <p>Limitations: Sajid has trouble making healthy choices and understanding long term consequences. He also needs prompts to remember things.</p>	<p><u>Technology use: Sajid is already quite confident with technology. Sajid got an iPad last Christmas and with the help of his support worker and parents he is now able to use it more independently, although he sometimes needs help.</u></p> <p><u>Attitude towards technology: Sajid likes using the internet and his iPad, though he doesn't like it when things go wrong and panics when he sees 'error' messages. He finds the screen on iPhones too small.</u></p> <p><u>Sajid will not need too much sustained support to help him use technology. However, he does need help with unfamiliar apps and programmes, so he will need to be shown several times how to use his apps, and to be reminded by his support worker to make use of his tablet each day.</u></p>

Scenario

Sajid, UK

User type: Person with Down's syndrome living in supported living, needs technology alongside external support to help him live more independently.

Actors: Sajid (32), his mother Aalia (67) and his father Thomas (65). Support workers.

Help needed with: weight, information processing, time management

Sajid lives in a shared house in supported living with three other male friends with mild to moderate learning disabilities in South East London. He moved into supported living five years ago and enjoys being independent and living with friends. He has a support worker who visits his flat three times a day: in the mornings to help him get ready for work or daily activities, in the evenings to help him and his housemates cook meals, and at night to remind them all to go to bed.

Sajid has visual timetables in his shared flat and his support worker always prompts him about what he needs to do each day. He has visual step by step guides in his house to help him remember how and when to do things, but these aren't portable and Sajid finds it harder to remember outside his home. Sajid needs to be prompted to do the things that he does each day, such as eating healthily,

Sajid works for three hours from 13.00 – 16.00 on Wednesdays and four hours from 11.00 – 15.00 on Thursdays in a supermarket a five minute walk away from his house. His job involves sorting items in the stock room, helping stack shelves and transporting stock. He enjoys the job but sometimes has trouble remembering everything his manager has asked him to do. If his manager gives him a list of several instructions, he will do the first and then go and talk to customers, as he is only able to process steps one at a time. He does have a work buddy with him to help remind him what he is doing and to help him stay on track, but she is not with him all the time.

Scenario (cont.)

Sajid **needs** something that will help reinforce what his manager and work buddy have shown him how to do. Sajid has trouble processing a lot of information at once, so the prompts need to be visual and break tasks down into one at a time steps that he can follow at his own pace. He hates being rushed, and if his manager asks him to do things too quickly he will slow right down and sometimes refuse to do anything at all. The prompts therefore can't overwhelm him.

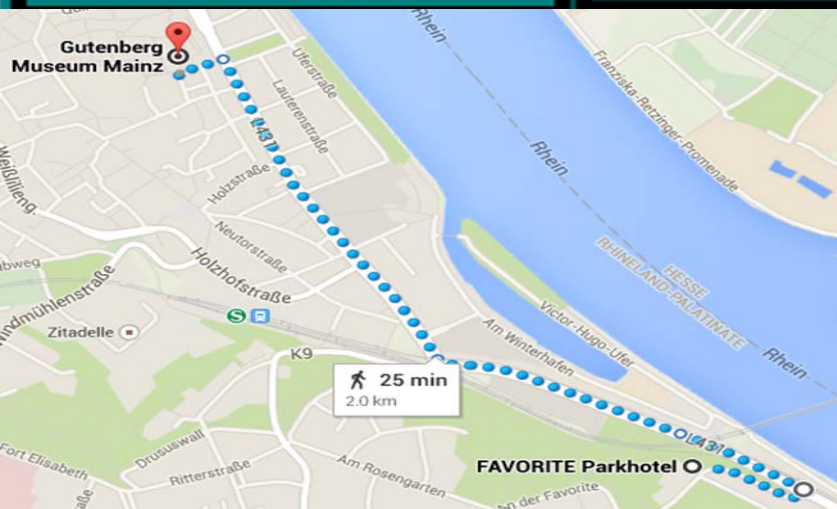
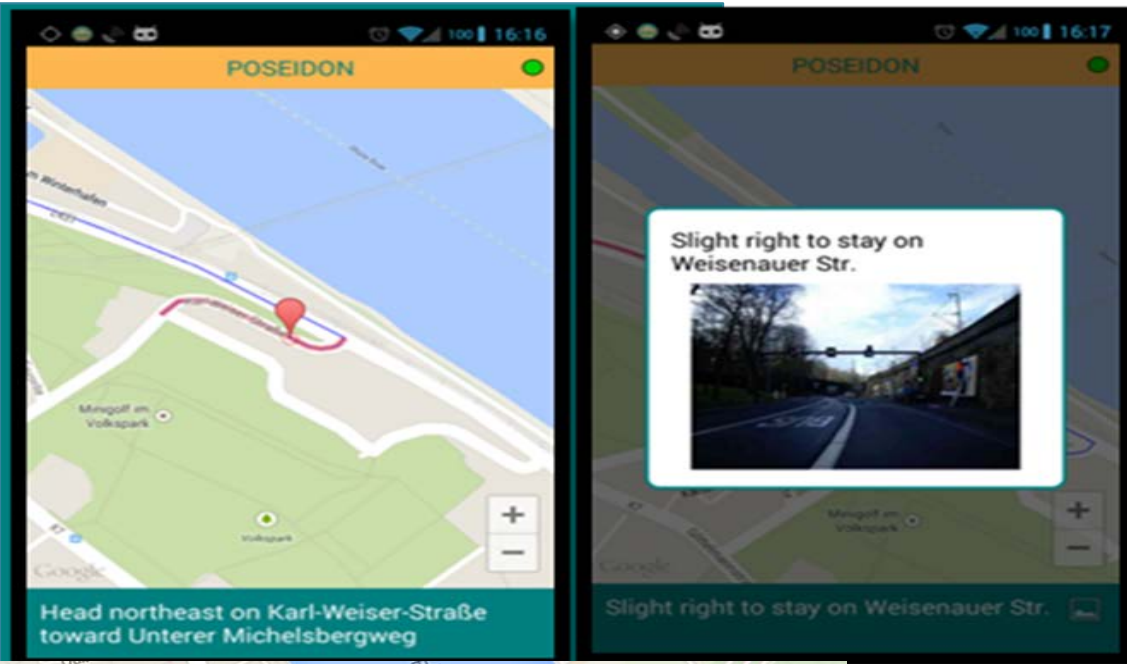
Sajid's **main problem is** his weight. Since moving into supported living, Sajid's weight has gone up at a worrying rate, and Sajid's parents are concerned. Sajid does go to the gym on Saturday and Tuesday afternoons with a support worker, but since moving out of his parents' house his eating habits have deteriorated. He and his friends often buy chips and burgers from the takeaway opposite his house. His support worker helps him make a healthy lunch to take to work with him, but he often chooses to visit the corner shop on the way to work and buys chocolate, crisps and fizzy drinks for lunch.

Sajid **needs** help making healthier choices without being prescriptive. It would be ideal if he could have a visual list of healthy snack and meal options that he can choose from. He also needs to be reminded what foods are healthy and he can eat lots of, what foods he can eat sometimes and what foods he can eat a few times a week. It would also be good if these could correspond with the traffic light system of food he sees in the supermarket where he and his support worker buy food.

Sajid **likes** to socialise and spend time with friends. However, he only really visits other people when his support worker is with him, and he would like to visit friends more independently. Sajid isn't very good at remembering when events are happening, and last week missed his friend's exciting bowling party because he forgot what day it was on, which he found incredibly frustrating.

Sajid **needs** to be reminded when social events are happening so he doesn't miss out. Ideally, Sajid could use an app that gave him prompts when to get ready, when to leave the house and what to take with him. He doesn't process lots of information well all at once, so he needs to be reminded to do one thing at a time and given plenty of time to do it before going onto the next step.

Preliminary filed trials



- Experimented navigation prototype in Mainz.
- 6 participants with DS in 3 groups, no route experience
- Android prototype
- Google/OpenTripPlanner routes.
- Instruction prompts at key points incl. photos

Two specific areas:

- **Safety**

- Heavy concentration on device
- No navigation instructions for safe crossing locations

- **Directional Assistance**

- Difficulty knowing what side of the road to walk along
- Difficulty translating turns indicated on the map to movements
- User images during journeys

Challenge: How to train the way finding skill and how to assess the transfer of knowledge?

- Every route is different (landscape, crossing points, number of decision points) → For a realistic experience, the environment needs to be based on Street View like imaginary

Advantage: users can actively and repeatedly explore an environment in a safe setup

- This information can be further customized by caregivers

Preliminary study at
DSA-London

- **(a) Landscape recognition:** contextual inquiry using Street View images; **(b) Memory for landmarks and (c) Route learning:** VE composed of Street View like images, and additional information - heading, photos of landmarks and text instructions about an unknown route

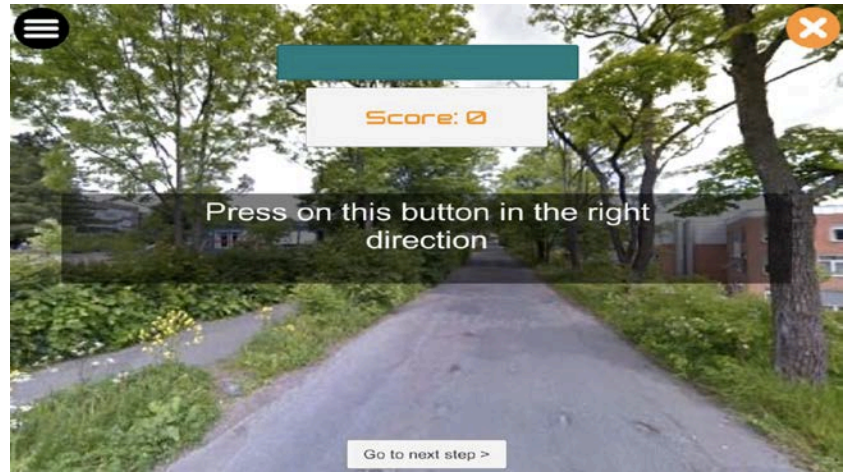
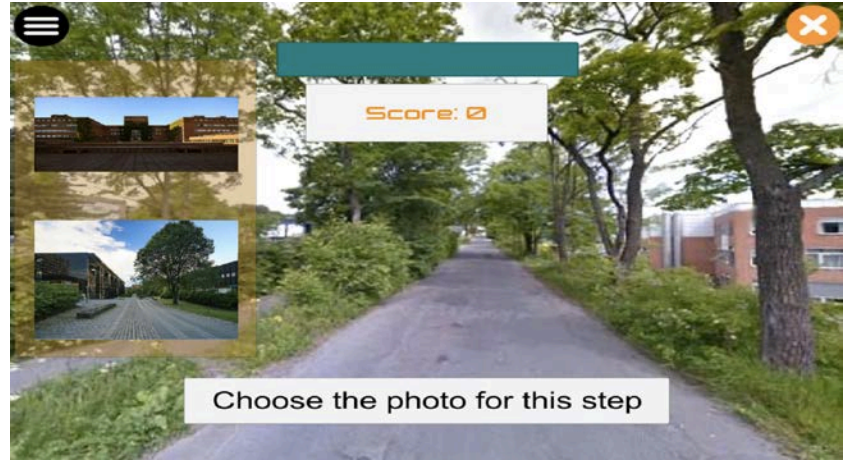
Conclusions:

- System should be enhanced with information that can help them choose more appropriate landmarks
- Delivering related information about a certain place or route enhances their recognition



Customisation

Learning mode



Assessment mode

Feedback after Pilot 1

- The primary users enjoyed participating to customising routes
- The primary users recognised places presented in the system
- More customisation options (the system should give the possibility of adding more check points in a route – 360 degrees panoramas wherever the carer finds it necessary)

Summary...

- As a result of this process then the Developers in the project elicited 70+ requirements.
- Pilot 1 (ongoing), three families in each country:
 - UK
 - Germany
 - Norway
- The outcome of the pilot will lead to a revision of requirements
- “Extended” Pilot in November
- Pilot 2: due in Spring 2016 with another 9 (different?) families

Thanks!

