Perceptions of personal privacy in different users regarding health monitoring technologies

ESR 1. **Caterina Maidhof**

RWTH Aachen, Germany

ESR 1. Caterina Maidhof – About me

- 25 years old & German
- working at the Chair of Communication Science at RWTH Aachen University, Germany
- **BSc. Communication Science (2018)**, University of Southern Switzerland
  - Major: Corporate/Business Communication
- **MSc. Applied Cognitive Psychology (2020)**, Utrecht University
- Interest in humans X (assistive) technology

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Perceptions of personal privacy in different users regarding health monitoring technologies

- **Why?** Privacy is a barrier of adoption and acceptance of AAL- and lifelogging technology.
- **What?** Perceptions, Attitudes, Behavior, Concerns regarding Privacy and influencing factors of various target groups but mainly potential users (caretakers) of visual AAL technology
- **How?** Assessing peoples` ***mental conceptualizations of privacy*** using ***mixed-methods studies***

Acceptance of AAL

Benefits	Barriers
helpful, beneficial, providing increased feeling of safety, greater independence	lack of personal contact, perceived control, continuous monitoring

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Acceptance of AAL

Benefits

- Increased Safety
- Positive contribution to health and wellbeing
- Ease of use
- No stigmatization

Barriers

Privacy Concerns

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- dependant on context
- dependant on personal attitudes

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What is Privacy?

„*One point on which there seems to be near-unanimous agreement is that privacy is a messy and complex subject*“ (Nissenbaum, 2010).

“*a concept in disarray. Nobody can articulate what it means*” (Solove, 2008)

“*an unusually slippery concept*” (Whitmann, 2004)

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„*First, we must have a **neutral concept of privacy** that will enable us to identify when a loss of privacy has occurred so that discussions of privacy and claims of privacy can be intelligible. […]*” (Gavison, 1980, S.423).

Privacy: A conceptual Analysis Altmann (1975)

Privacy = *„selective control of access to the self or to one´s group.“*

Privacy: A conceptual Analysis Altmann (1975)

Achieved privacy: outcome of social interaction

Desired privacy: subjectively defined ideal state of social interaction

Privacy: A conceptual Analysis Altmann (1975)

Achieved privacy: outcome of social interaction

Desired privacy: subjectively defined ideal state of social interaction

Achieved privacy **=** desired privacy	→	optimum control of privacy
Achieved privacy **<** desired privacy	→	intrusion, invasion of privacy
Achieved privacy **>** desired privacy	→	boredom, lonliness, social isolation

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Privacy and Communication Burgoon (1982)

Physical Privacy
"the degree to which one is physically inaccessible to others."

Psychological Privacy
"one's ability to control affective and cognitive inputs and outputs."

Social Privacy
"control over social contacts, interaction, and communication."

Informational Privacy
"control over personal information"

Perceptions of personal privacy in different users regarding health monitoring technologies

- **Goal**
  - context-specific ***privacy needs*** and ***privacy preferences*** and ***trade-offs*** of potential users of different (visual) AAL- and lifelogging technologies.
  - elaborate understanding of privacy as an influencing factor of ***technology acceptance***
- **Relevance**
  - informed, effective, and well ***targeted communication strategies*** for each user group of potential users
  - ***Inform technical designers*** about the privacy needs outlined needs to be considered for matching the technological functioning accordingly

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ESR 1. Caterina Maidhof –Overview of the Project

- **Why?** Privacy is a barrier of adoption and acceptance of AAL- and lifelogging technology.
- **What?** Perceptions, Attitudes, Behavior, Concerns regarding Privacy and influencing factors of various target groups but mainly potential users (caretakers) of visual AAL technology
- **How?** Assessing peoples` ***mental conceptualizations of privacy*** using ***mixed-methods studies***

1st qualitative study presented at the ICT4AW 2022 (23.-25.04.2022)

Exploring Privacy: Mental Models of Potential Users of AAL Technology

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Keywords: Perception of Privacy, Older Adults, AAL Technology, Lifelogging, Mental Models, Cognitive Maps, 3CM Method

Abstract: Ambient Assisted Living (AAL) technologies have a high potential to combat healthcare challenges while supporting older adults to live independently at their own home. Despite the general positive uptake of such technology, perceptions of barriers of acceptance persist, a major one regards privacy. With an explorative qualitative approach, the current study aimed at investigating participants' cognitive representations of a scenario in which AAL is installed in the own home as a support at an older age. Special focus was on eliciting participants' implications for privacy in this scenario and to understand the individual requirements of using AAL technology at home. Opinions of 12 participants (age range: 23-81 years) from Germany and Switzerland were assessed through semi-structured interviews. The paper presents descriptive results and emerging themes of the mapping approach. The results show the usefulness of the method to understand thought processes of potential users regarding privacy preferences and technology usage. Findings might be useful to inform technical designers as well as lawmakers to consider these usage requirements during technology or law development.

Exploratory qualitative research approach

(Maidhof, Ziefle, Offermann, 2022)

Research Aim

- Understanding thought processes regarding the role of personal privacy while being supported and cared for by AAL in older age
- Insights on opinions of a diverse sample (two European countries, broad age range, with and without professional care experience, various levels of technical understanding)

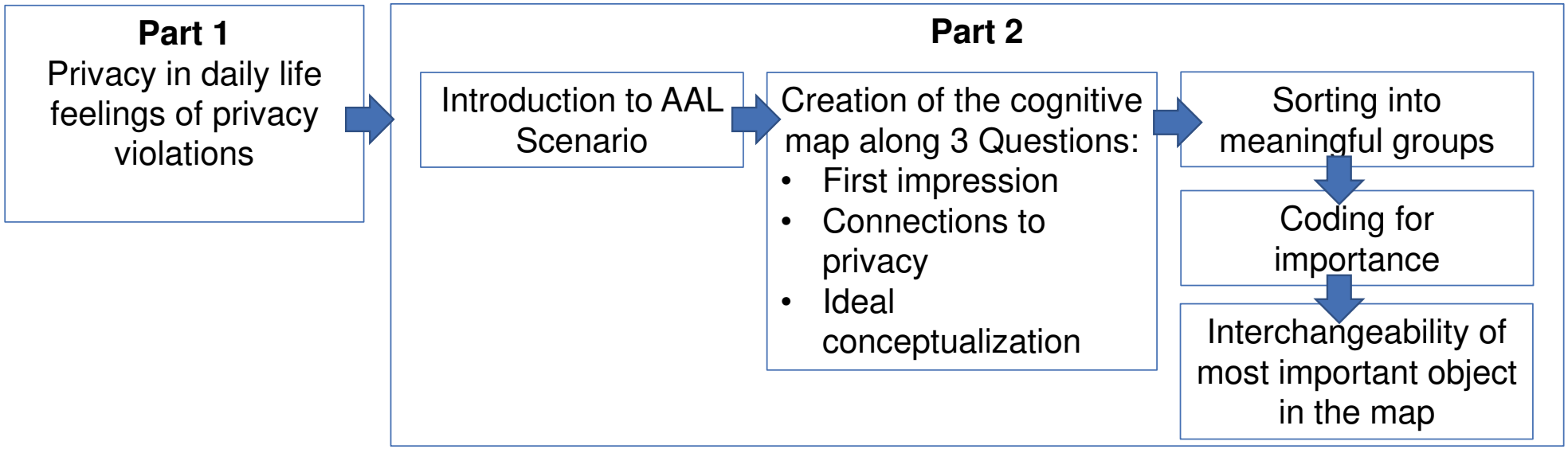
Method

- Open ended conceptual content cognitive map method (3CM) (Kearny & Kaplan, 1997)
- Suited to measure people´s viewpoints on complex domains, such as the interaction and support with AAL

Semi-structured interviews

- Interviews in German and Italian online (zoom) lasting ca. 1 hour
- Audiotaped, transcribed verbatim, thematic qualitative text analysis (Kuckartz, 2014)

Procedure



Sample Description: Participants N=12

Demographics

- Nationality: 5 Swiss and 7 Germans
- Age: range: 23-82 (M=52.67, SD=22.49)
- Gender: 6 females and 6 males
- Education: 7 academic degree, 4 vocational training, 1 A-level

Care Experience

- 7 (informal or professional) care experience
    - 3 working in medical or care sector

Technical Understanding

- 4 high, 5 average, 3 low
- No one hands-on experience with AAL

Descriptive Results: Map Complexity

Most complex map

P3, female, 59 years, M.A. Nursing and health sciences, medium technical understanding, 22 objects

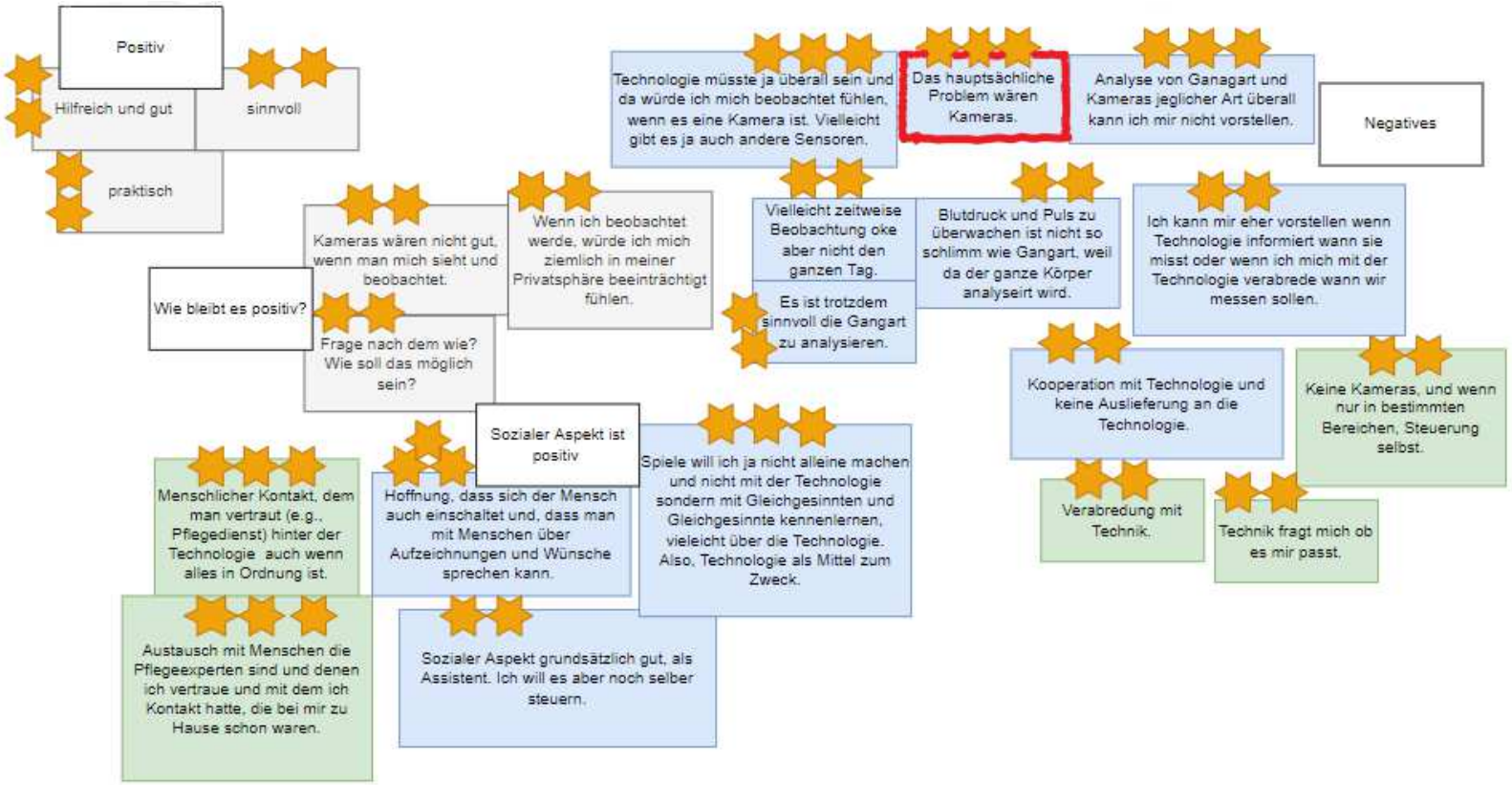
P6, female, 23 years (youngest participant), no care experience, high technical understanding, 21 objects

Least complex map

P11, male, and **P12,** female, both 82 years, P12 informal care experience, both low-medium technical understanding

- Participants with more complex maps were able to group their objects into two to six categories

Descriptive Results: Map Complexity - schematic visualization of most complex map (P3)



P3, female, 59 years, M.A. Nursing and health sciences, medium technical understanding, 22 objects

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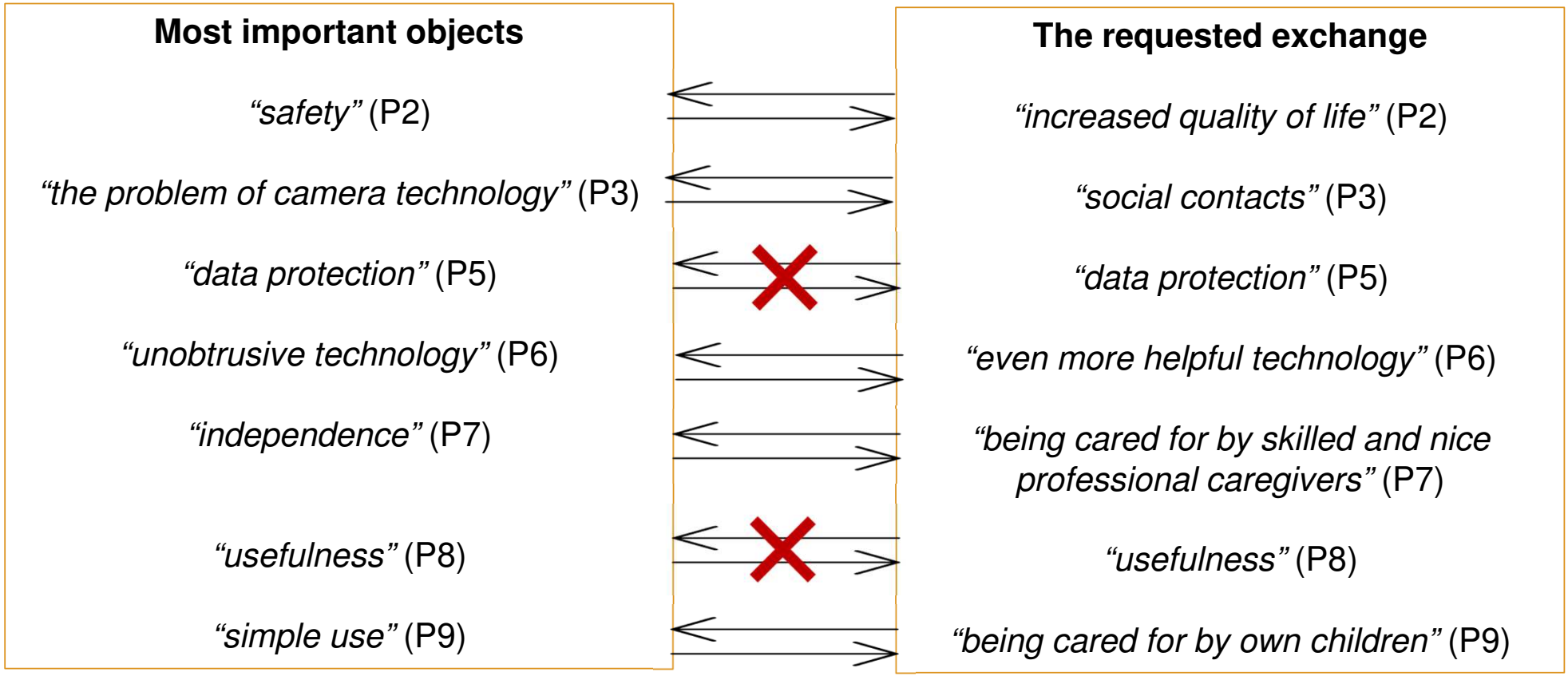
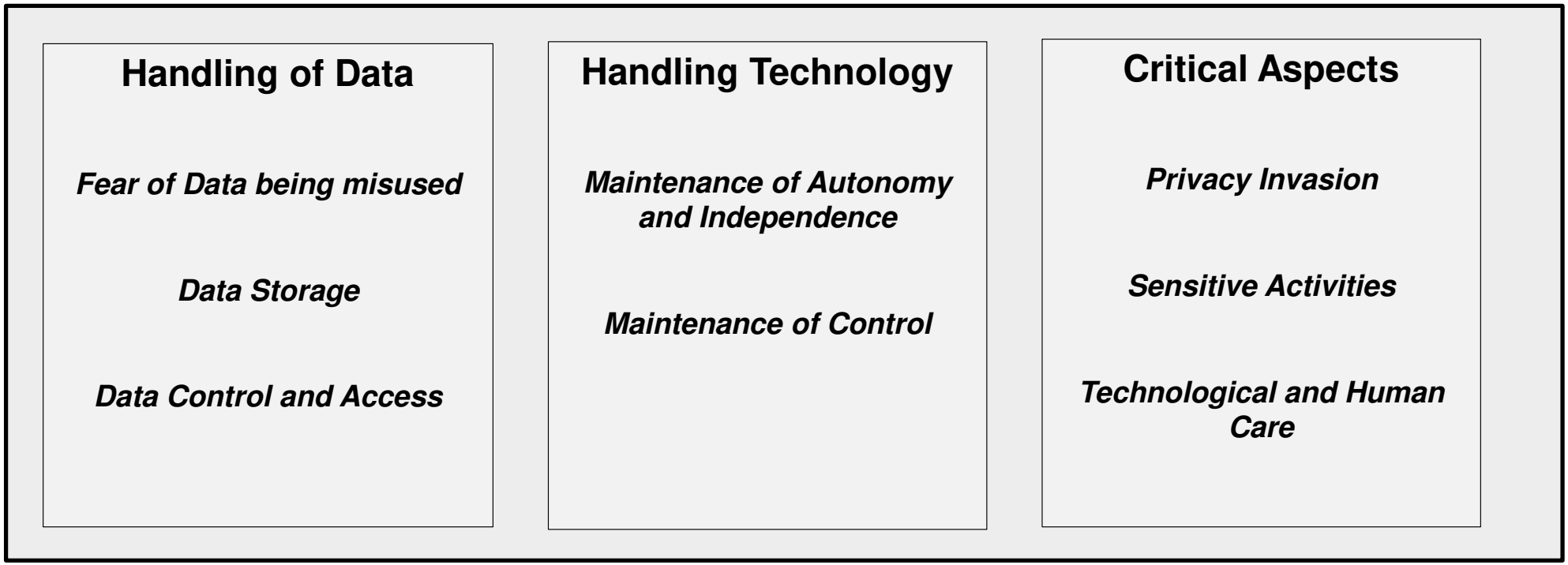
Descriptive Results: most important object and its interchangeability



Qualitative Findings: Privacy Aspects of AAL – Care Scenario



Qualitative Findings: Ideal conceptualization of AAL Technology in the care scenario

Straightforward and manageable	Able to learn	Individually Customizable	Offer to help is rejectable	Technology can be turned off	Neutral Appearance
Technology should be simple, and it should be easy to learn how to interact with it	Technology should have the ability to learn about the users, their habits, and (health) conditions.	Technology should adapt to the user´s rhythm of life and each function should be customizable and work as the user wishes.	Users should have the freedom to refuse help from technology.	Users should be able to switch the technology off anytime.	Technology should be hardly seen, be very subtle and discreet or at least look like a design object rather than a health device.

ESR 1. Caterina Maidhof – Research carried out

Understanding Privacy

Scenario-based, explorative and qualitative study

Measuring Privacy

Quantification of previous qualitative findings on Privacy Perceptions in daily life and when interacting with (visual) AAL-Technology

Online-questionnaire

Data collection from 29th November 2021 to 21st December 2021 in Germany.

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Sample Description: Participants N= 134

Demographics

- Age: range: 17 – 69 (M=31.15, SD=14.75)
- Gender: females 67.2% (N=90) and males 31.1% (N=43; one person indicated being divers)
- Education: 26.9 % (N=36) University Degree; 55.2% (N=74) A-Level Degree

Care Experience

- 24.6 % (N=33) have had either cared for another person either professionally or informally
- No participant needed care

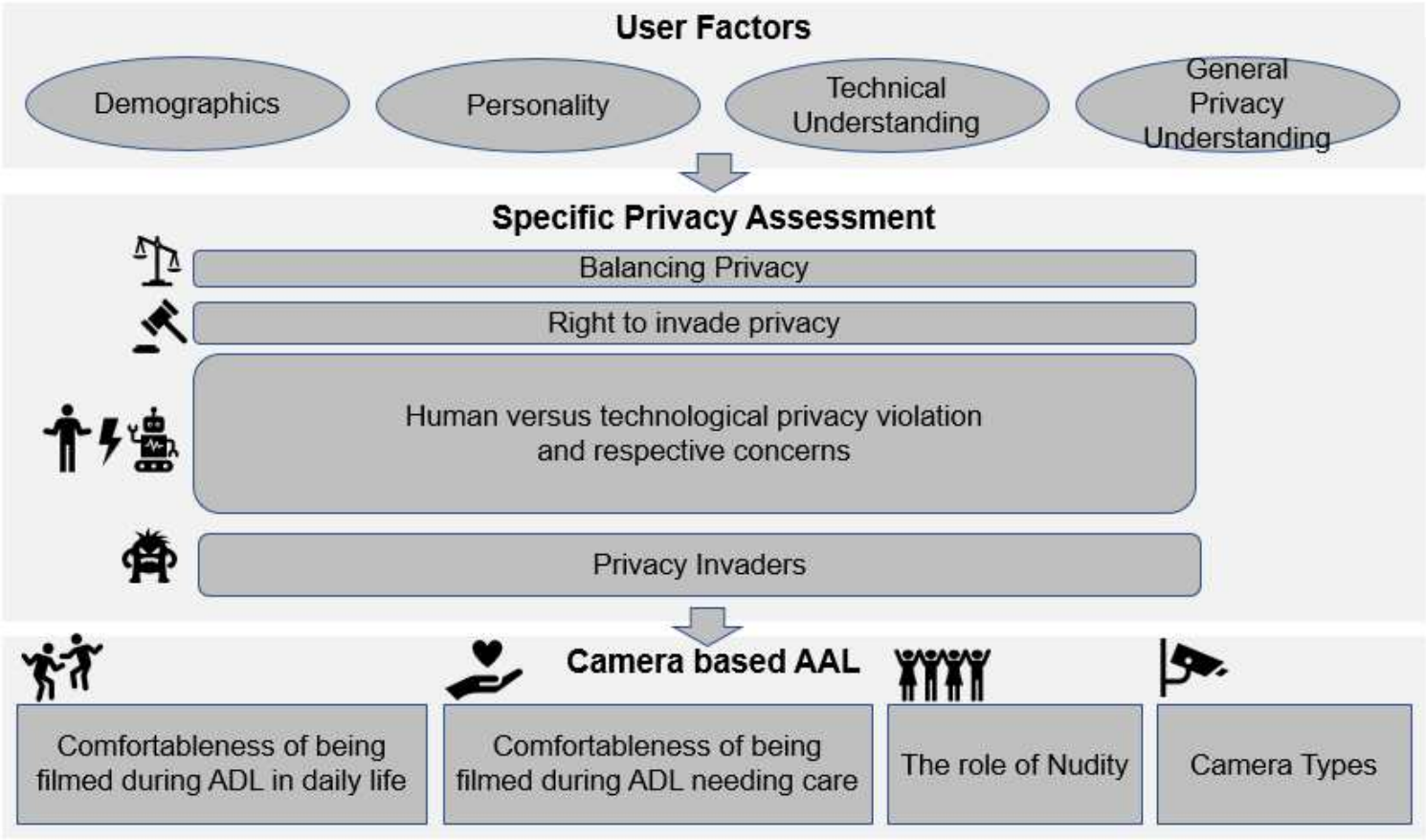
Technical Understanding

- Measured with the KUT Scale (Control beliefs in dealing with technology) (Beier, 1999, 2003): four items; M=4.19; SD=1.03; Cronbach´s α=.85; min=5 and max=24 scores).

→Technical understanding can be considered as decent

Online Questionnaire: Measuring Privacy Perception in the context of AAL

Procedure:



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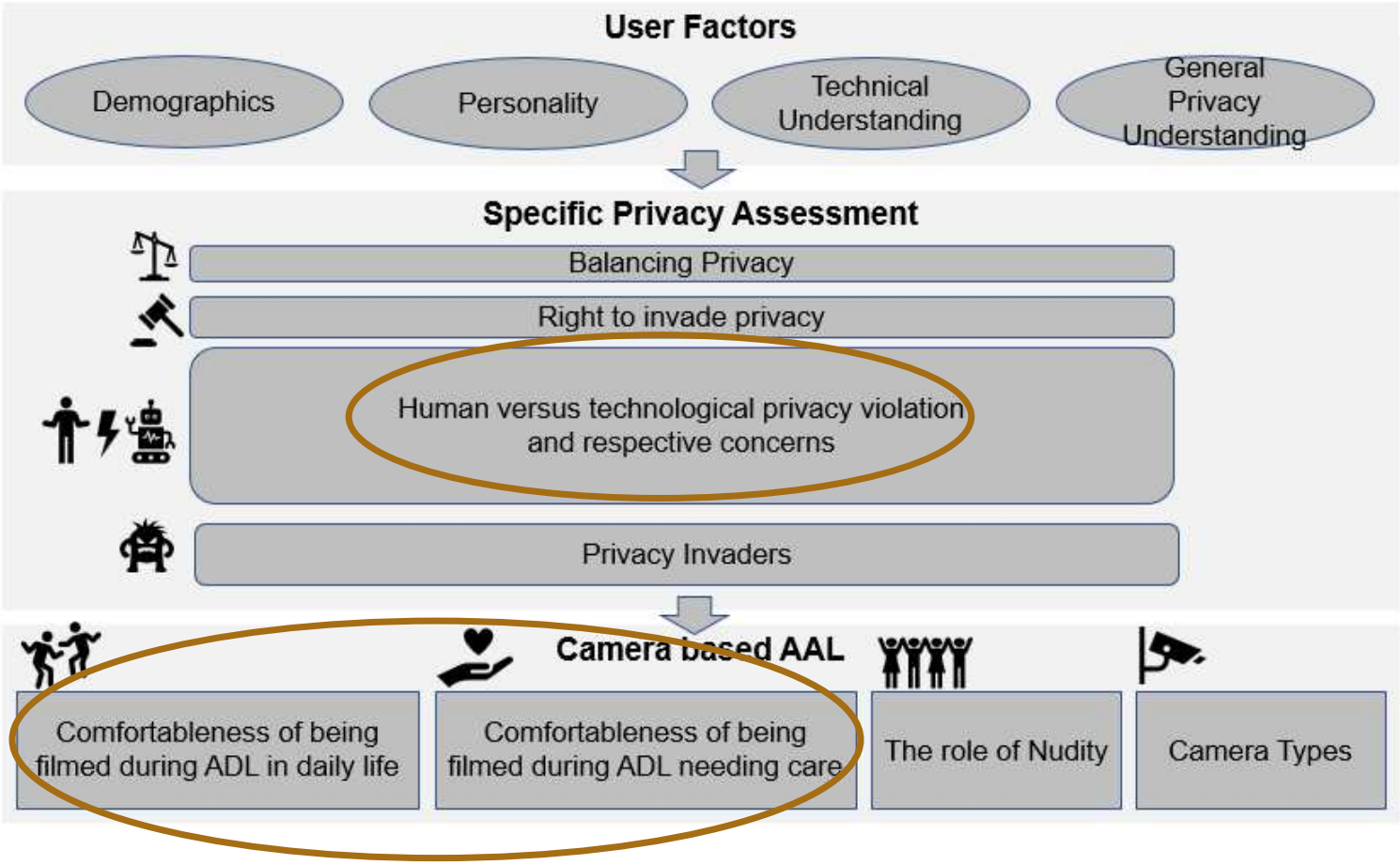

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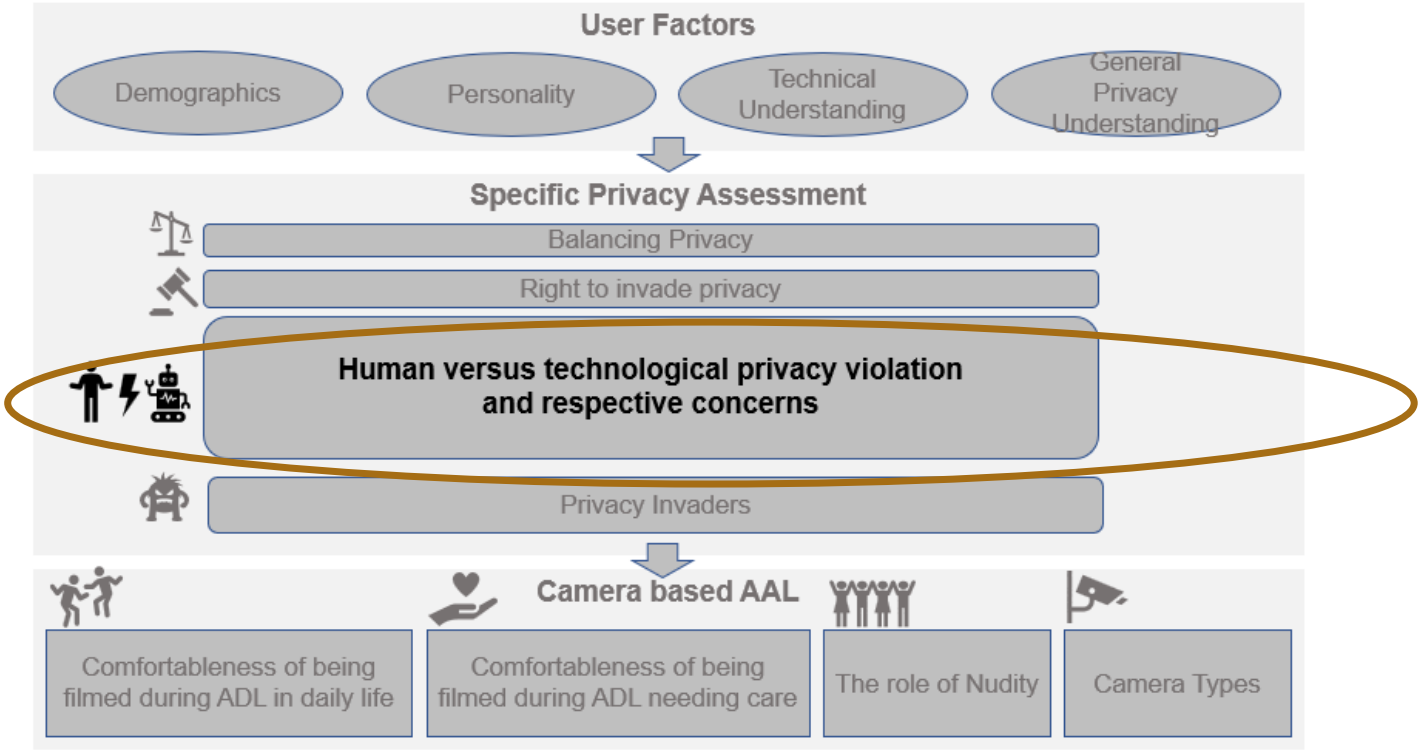
Online Questionnaire: Comparing Contexts – Human Versus Technology

Privacy Violation
Evaluation of a series of 11 bipolar adjective pairs which represent verbal opposites to express their perceptions of human and technological privacy violation (on a six-point scale).

Major Concerns
Selection of 3 or less items among 9 according to which item best describes participants` concerns.



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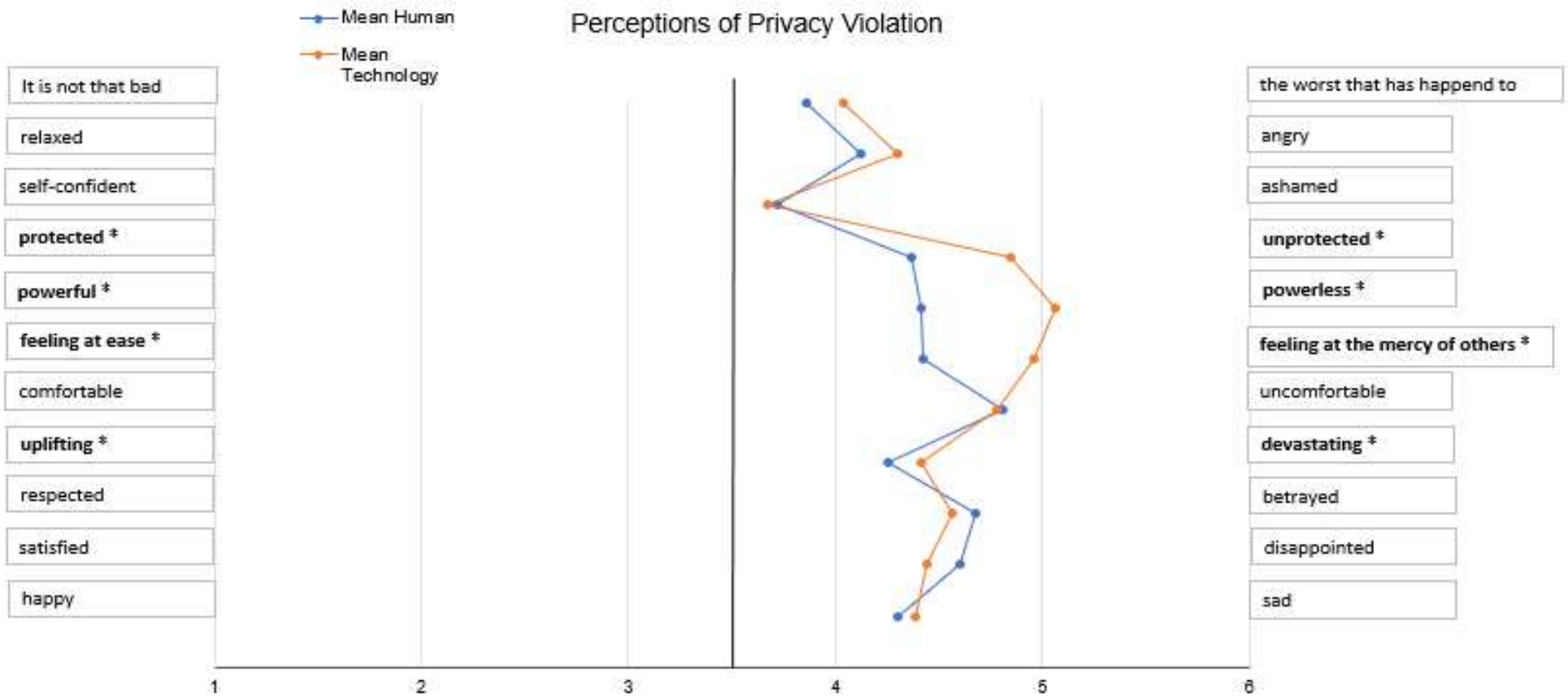
Human versus Technology: Maximal Differential of adjective pairs regarding privacy violation



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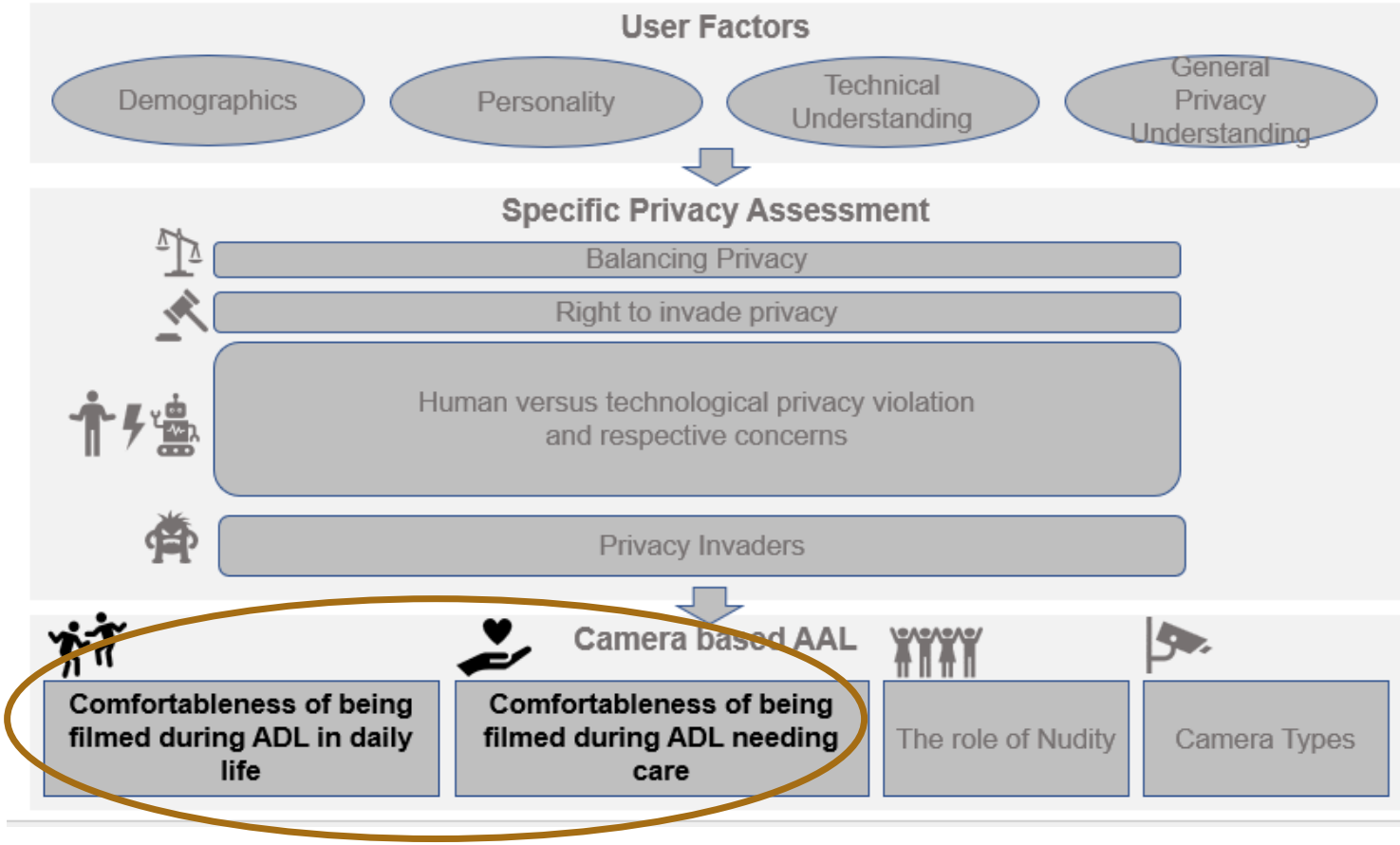
Human versus Technology: Three Main concerns

Human Privacy Violation	**Technological Privacy Violation**
Further dissemination the information (78.4%)	Fear of data being misused (89.6%)
Concern about being judged (55.2%)	Concerns about which people can see my data (67.9%)
Worry about no longer feeling protected in the place in question (40.3%)	Unpleasant feeling (40.3%)

Online Questionnaire: Comparing Contexts – daily life and when needing care

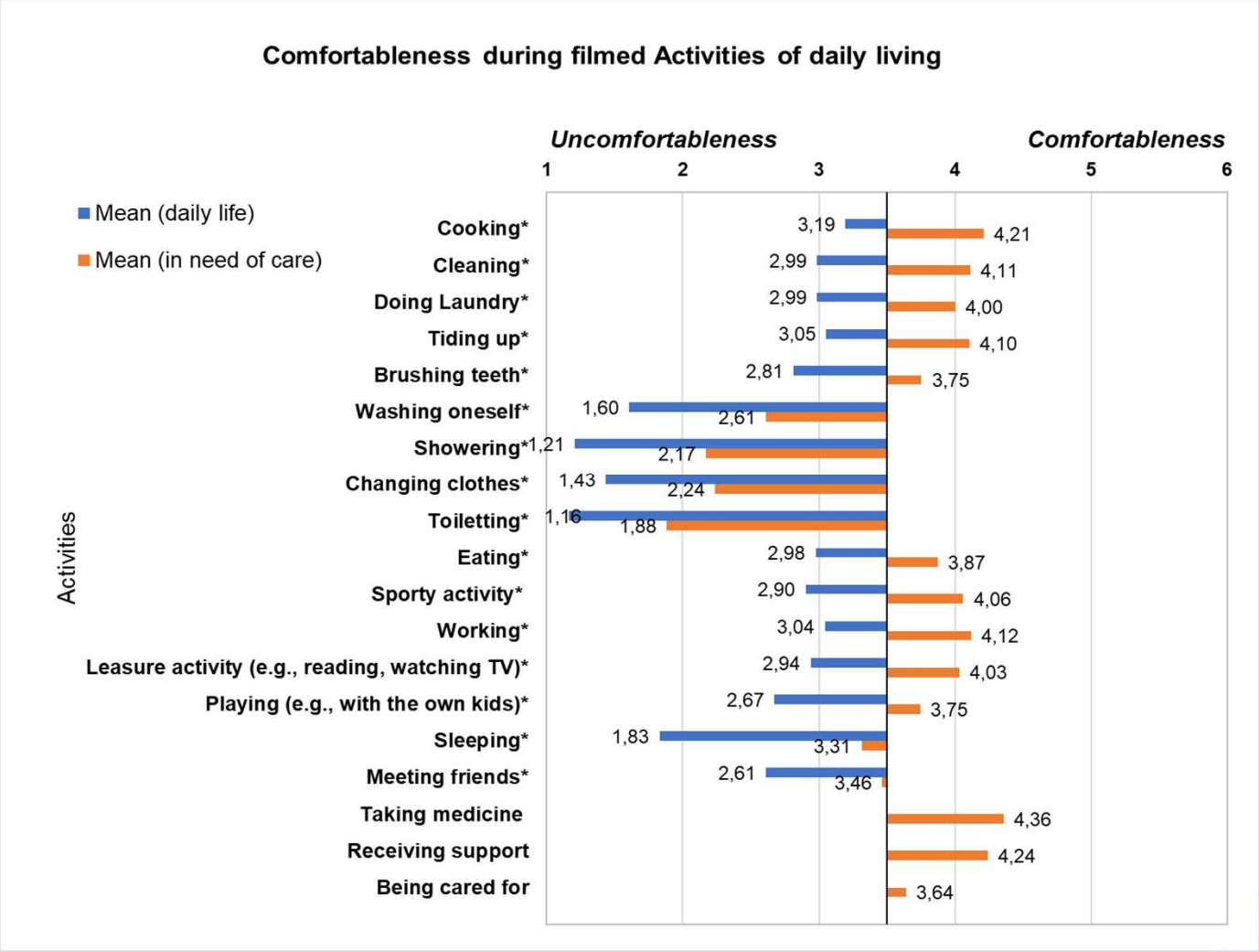
Being filmed
Rating of comfortableness of being filmed during 16 activities of daily living (19 activities in care condition) on a six-point Likert Scale.



Camera based AAL:

Results

Paired samples ttests were significant among all assessed activities suggesting that people are less disturbed in their comfortableness of being filmed when they imagine themselves needing care.



Nudity perception & Privacy: Interdisciplinary research with ESR14 Kooshan Hashemifard:

accepted at PETRA (28.06. – 01.07.2022)

Underneath Your Clothes: A Social and Technological Perspective on Nudity in The Context of AAL Technology

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ABSTRACT

One promising way to tackle healthcare challenges due to demographic change lies in the development of user-tailored AAL technologies. Video-based AAL technologies have the potential to pro-

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Caterina Maidhof, Kooshan Hashemifard, Julia Offermann, Martina Ziefle, and Francisco Florez-Revuelta. 2022. Underneath Your Clothes: A Social and Technological Perspective on Nudity in The Context of AAL Technology. In *Proceedings of PErvasive Technologies Related to Assistive Environments*

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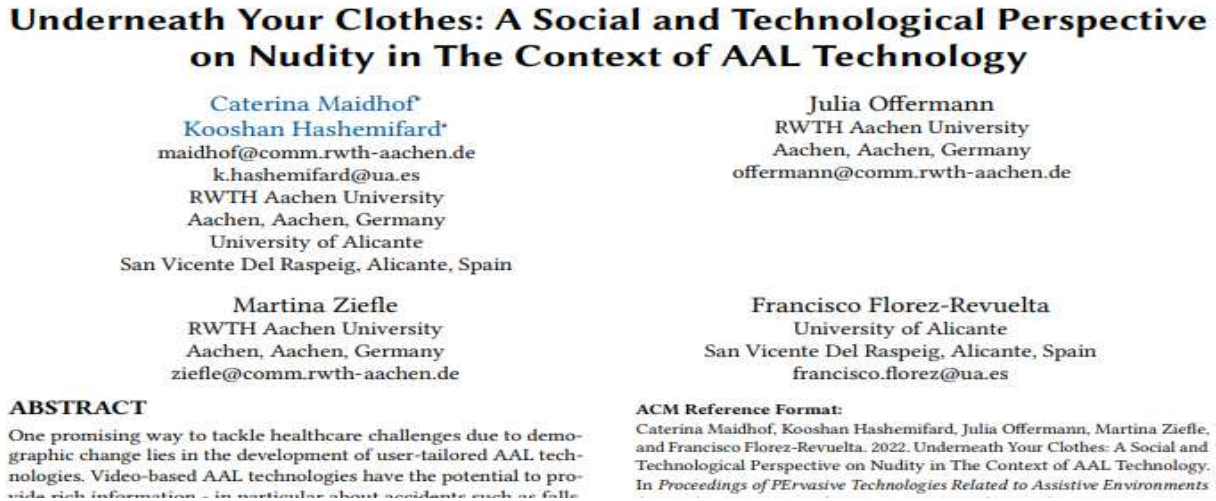

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Scoping Review: Acceptance and Privacy Perception of video based AAL with Tamar Mujirishvili →identifying the variety of methods and research designs used to date to study acceptance and privacy perceptions of video based AAL technology and to understand the implications different research methods have for the results

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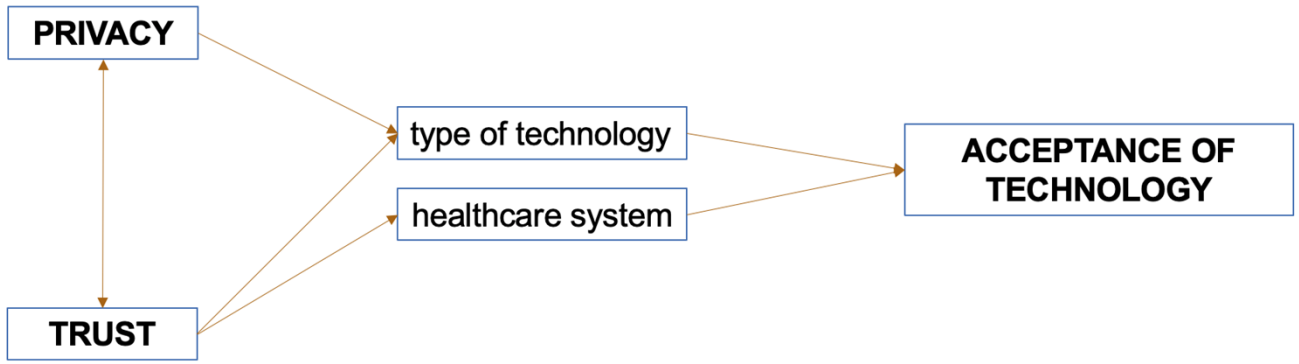
Collaboration with Sophia Otten and Alexander Hick

- ⇢ combine trust, privacy, and AI in one study
- ⇢ scenario-based approach with experimental design
- ⇢ different types of technologies (non AI vs. AI; camera types)



ESR 1. Caterina Maidhof – Future Research

Methods:

- Testing, validating and improving instruments (i.e., scales used in questionnaire)
- Corroborating research results with experimental studies

Content:

- Comparing technological to non-technological contexts
- Exploring User Factors
- Exploring privacy perceptions specifically during activities of daily living

Thank you for your attention!

Feel free to ask any questions ☺

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