(Dis)trust in medical technology and medical support considering severe health decisions

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Research Progress

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TU WIEN

1. **Overview of the project & the work** 📌

2. (Quick) recap of the literature 🔁

3. (Quick) recap of the progress 🎯

4. Trust across technologies and situations 🤝

5. Trust in sensitive user groups 📊

6. Research in progress and Timeline 🔮

7. Publications, future career plans, and feedback 📚

- **Why?** Trust in the healthcare system and in technology are key variables embedded in a complex system leading to the adoption of medical technology, i.e. AAL solutions

- **What?** Perceptions, attitudes, (pre)determinants, and decisions influencing trust in the medical AAL technology

- **Who?** Various target groups, including people with chronic illnesses and disabilities

- **How?** Assessing context- and user-specific influences of trust and decisions about their health

- **Goals**
  - Understanding of trust in sensitive user groups
  - Development of trust metrics in AAL technology
  - Holistic framework of user and context requirements

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  - Development of trust metrics in AAL technology
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- **Relevance**
  - Trust as the key to successful adoption of AAL technologies
  - Trust as compass for protection of autonomy and agency
  - Implementation in all sectors of society

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- Core component of human thinking and consequent behaviour – key factor in interactions between humans, situations, and institutions

  ⤳ most common conceptualisation as *belief* and *expectancy* (McKnight & Chervany, 2001)

- Trust in technology has been investigated in multiple contexts, e.g., mobility & e-commerce (McKnight et al., 2002; Lee & See, 2004)

  ⤳ no unified theory of trust across contexts

- Individual and institutional variables are relevant in the understanding of trust in the healthcare system (Zhao et al., 2018)

  - Trust influences (subjective) health behaviours (Birkhäuer et al., 2017)

    ⤳ important for therapy outcomes and the improvement of the healthcare system

- Trust in medical technology depends on several other context-specific variables, such as trust in their primary care physician, etc. (Qiao et al., 2015)

  ⤳ suggests predictive relationship of trust in the healthcare context and trust in medical technology

- Sustained adoption of these innovative technologies in home environments have failed (Wichert et al., 2012)

  ⤳ missing trust requirements in intimate and sensitive context?

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What are conditions of trust in AAL? How are trust and acceptance of AAL related? How is trust in AAL different than other trust evaluations?

Exploratory Approaches 10/21 – 07/22
- Validity of trust (requirements)
- Definitions of severe health decisions

Otten & Ziefle, 2022; Biermann et al., 2023; Otten et al., 2023a; Otten et al. 2023b; Wilkowska et al., 2023

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- Connection of trust and acceptance
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Context-specific Trust Evaluations
- difference across (non-)technological care offers?
- dependence on different health situations?

Otten & Ziefle, 2022; Biermann et al., 2023; Otten et al., 2023a; Otten et al. 2023b; Wilkowska et al., 2023

- Online survey with a scenario-based approach

- 3x3 within subjects design
  - 3 care offer scenarios
  - 3 health situations

- Evaluation of trust and ItU
  - Level of agreement on scale from 1 (= disagreement) to 100 (= agreement)
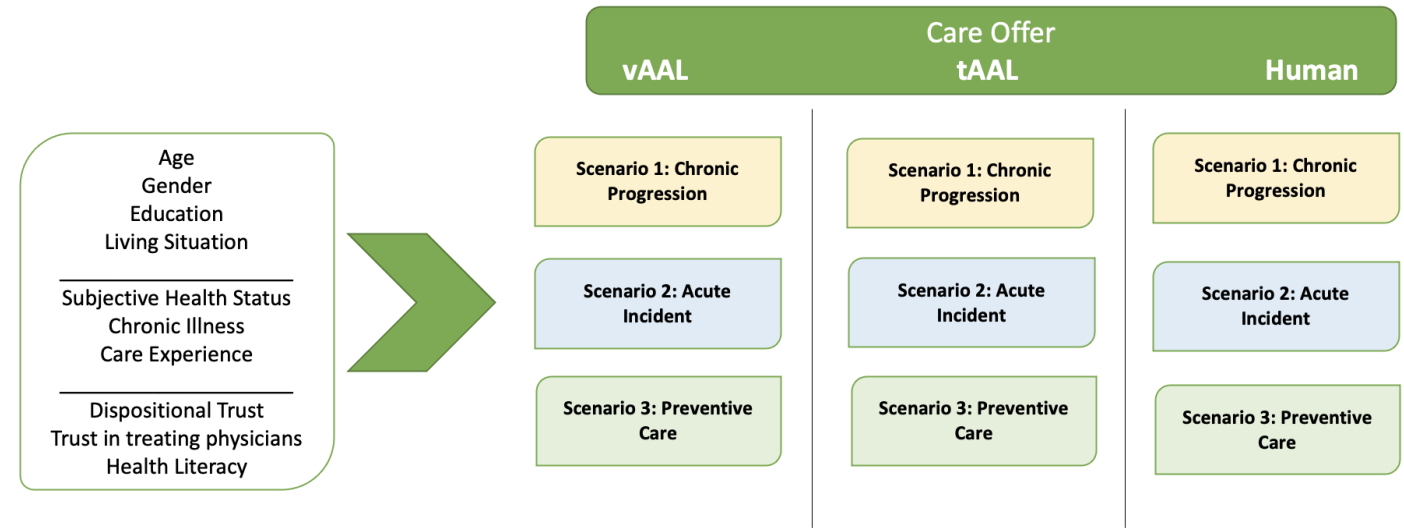
- Sample characteristics (N=275)
  - ❖ Data collection in Summer 2023 on German individuals
  - ❖ M_{age}=59.2 (*SD=10.3,* Range: 40-79)
  - ❖ 47.3% female participants
  - ❖ 45.8% reported to have one or more chronic illness, a. o. hypertension, depression, and arthritis
  - ❖ 49.4% reported to have care experience (37.8% private, 11.6% professional)

- Generally favourably evaluated across all care offers and health conditions
- Human care professional to achieve highest ratings of trust
- vAAL technology to reach lowest ratings of trust
- Preventive health situation least trusted
- Acute health situation most trusted
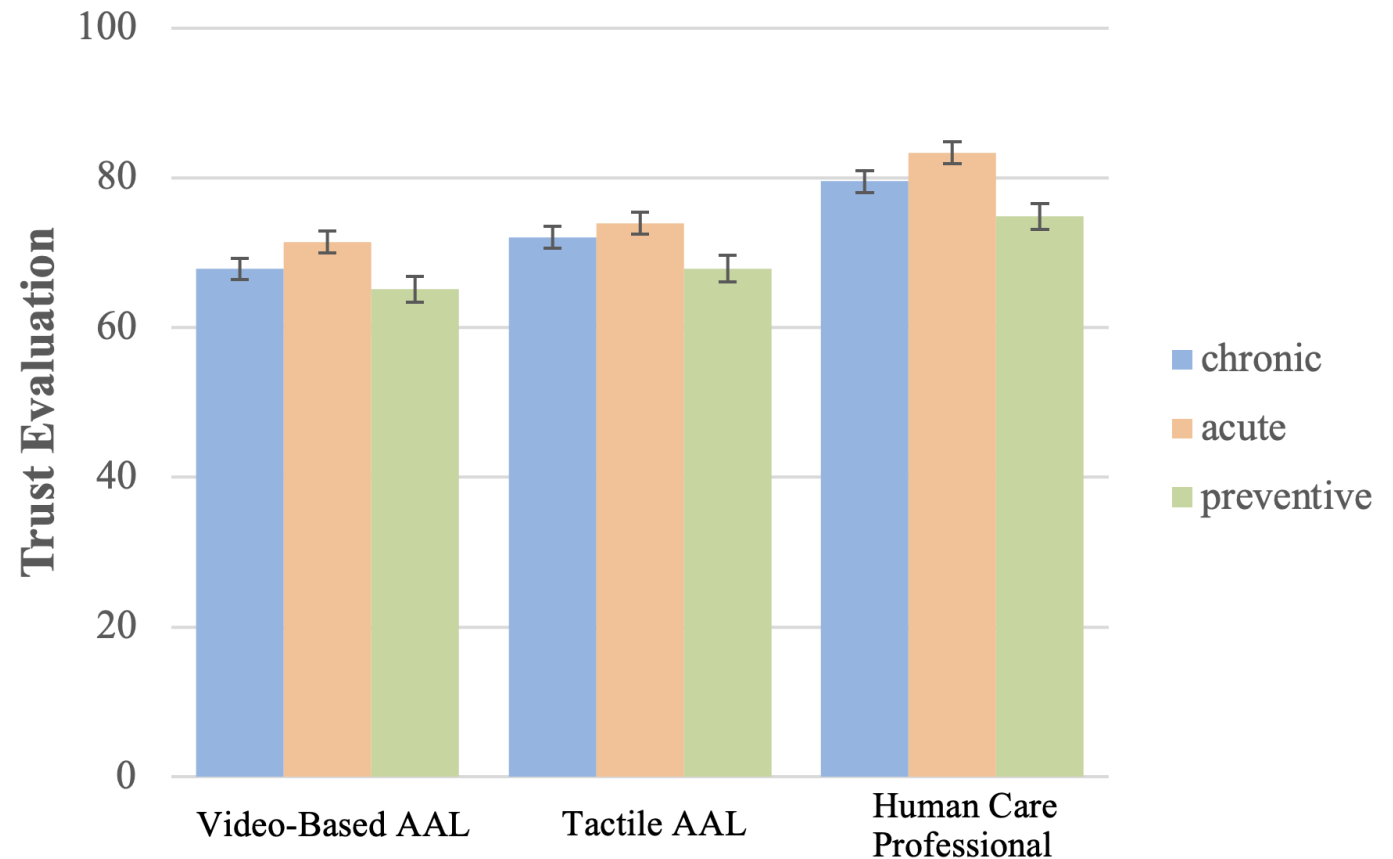
Hick, S., Wilkowska, W., & Ziefle; M. The Choice is Yours: Comparing Trust Evaluations of Medical Technologies in Varying Health Situations. *(submission tbd)*

- Generally favourably evaluated across all care offers and health conditions

- Human care professional to achieve highest ratings of intention to employ

- vAAL technology to reach lowest ratings of intention to use

- Preventive health situation least willing to use

- Acute health situation most favourable evaluated
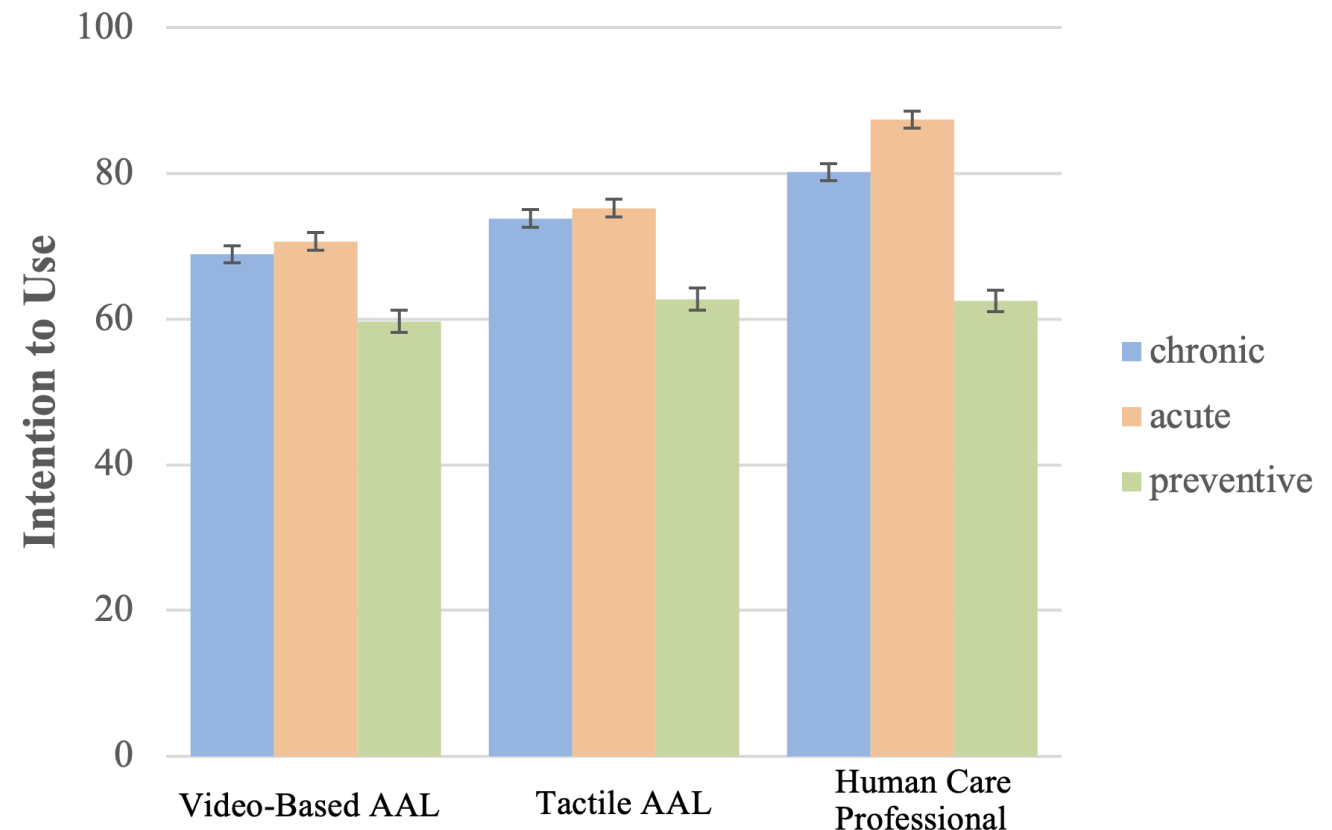
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visuAAL

- Secondment at the Lebenshilfe in three distinct sectors [May – September 2023]
  - ❖ Workplace ("Werkstätte")

Otten, S., (2023). Wissenschaft trifft Werkstatt - Interview mit Sophia Otten zur Einführung von Assistenzsystemen aus psychologischer Perspektive. ***Werkstatt: Dialog.*** 3/2023

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  - ❖ Daycare and early assistance ("Kita und Frühförderung")

- Objective to understand and experience the reality of people living with disabilities

- Identify practical possibilities of assistive technologies in this context

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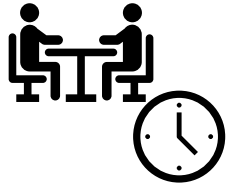
Getting to know the population of interest takes much longer than in other groups
- Communication needs are different (esp. non-verbal cues)
- Reliable estimation of needs are based on different interactions

Individuality above everything
- Each person is highly individual and actions are subject to contextual variables (e.g.feeling safe and respected)
- Relationships to peers, relatives, or superiors highly influential
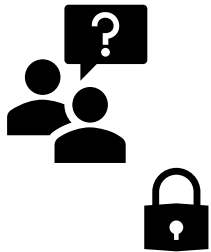
Application of AAL difficult
- Many people in the rooms, initiative for independent living means less "surveillance"
- Wearables (such as activity tracker) have more potential
- Physical disability more predictable than mental disability

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Lebenshilfe

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Identification of decision patterns in the evaluation of trust requirements in vAAL systems

⇢ Data Protection (operationalised as data access of chosen others)

⇢ Reliability (operationalised as success and error rate)

⇢ Integrity (operationalised as the amount and transparency of information)

⇢ Relief of Care

DATA COLLECTION
IN PROGRESS (→ 12/23)

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Identification of decision patterns in the evaluation of trust requirements in vAAL systems

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DATA COLLECTION IN PROGRESS (→ 12/23)

Evaluation of trust in network of predictors leading to the evaluation of trustworthiness of vAAL systems

⇢ Structural equation modelling to estimate pathways of trust and influencing variables
⇢ balancing predictiveness of trustworthiness and acceptance conceptualisations

DATA COLLECTION COMPLETED
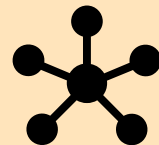
December '23 – October '24

→ Write and defend thesis
→ Continue with submissions of planned publications

December '23

→ Finish data collection and analysis
→ Write up results

January – August '24

→ Finish writing and submit thesis
→ organise and submit publications

Submit Thesis [August '24]

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2022

Otten, S., & Ziefle, M., (2022). Exploring Trust Perceptions in the Medical Context: A Qualitative Approach to Outlining Determinants of Trust in AAL Technology. In *ICT4AWE 2022* (pp. 244-253). DOI: 10.5220/0011058300003188

2023

Biermann, H., **Otten., S.,** & Ziefle, M. (2023). Understanding trust in automation: A consideration of human factors and context. In **AFHE 2023 Conference.**

Otten, S., Offermann, J., & Ziefle; M. (2023). Paving the way: Trust in healthcare systems as a pre-requisite for technology usage. In **HCI International 2023 Conference**.

Otten, S., Wilkowska, W., Offermann, J., & Ziefle; M. (2023). Paving the way: Trust in and acceptance of video-based AAL technologies. In *ICT4AWE 2023.*

Wilkowska, W., **Otten, S.,** Maidhof, C., & Ziefle, M. (2023). Trust conditions and privacy perceptions in the use of accepted ambient technologies for health-related purposes. *Journal of Human-Computer Interaction)*

Otten, S., (2023). Wissenschaft trifft Werkstatt - Interview mit Sophia Otten zur Einführung von Assis- tenzsystemen aus psychologischer Perspektive. *Werkstatt: Dialog.* 3/2023

submitted/under review

Otten, S., Biermann, H., & Ziefle; M. How deep is your trust? – A Comparative User Requirements' Analysis of Automation in Medical and Mobility Technologies *(submitted to* **Humanities and Social Science Communications***)*

Planned

Hick, S., Wilkowska, W., & Ziefle; M. The Choice is Yours: Comparing Trust Evaluations of Medical Technologies in Varying Health Situations. *(submission tbd)*

Wilkowska, W., **Hick, S.** & Ziefle; M. Predictors in the Evaluation of AAL Technologies: A Cluster Analysis of Trust Types *(submission tbd)*

Hick, S., Offermann, J., & Ziefle; M. What's Personality got to do with it? Evaluating Decisional Patterns of Trust in AAL Using Conjoint Analyses *(submission tbd)*

Offermann, J., **Hick, S.** & Ziefle; M. Trust in AAL Technologies: A Meta-Analytical Approach to Predictors of Acceptance *(submission tbd)*

Hick, S. & Ziefle; M. It's All Relative: The Importance of Assessing the Needs of People with Disabilities in the Evaluation of Assistive Technologies *(submission tbd)*

Academic environment
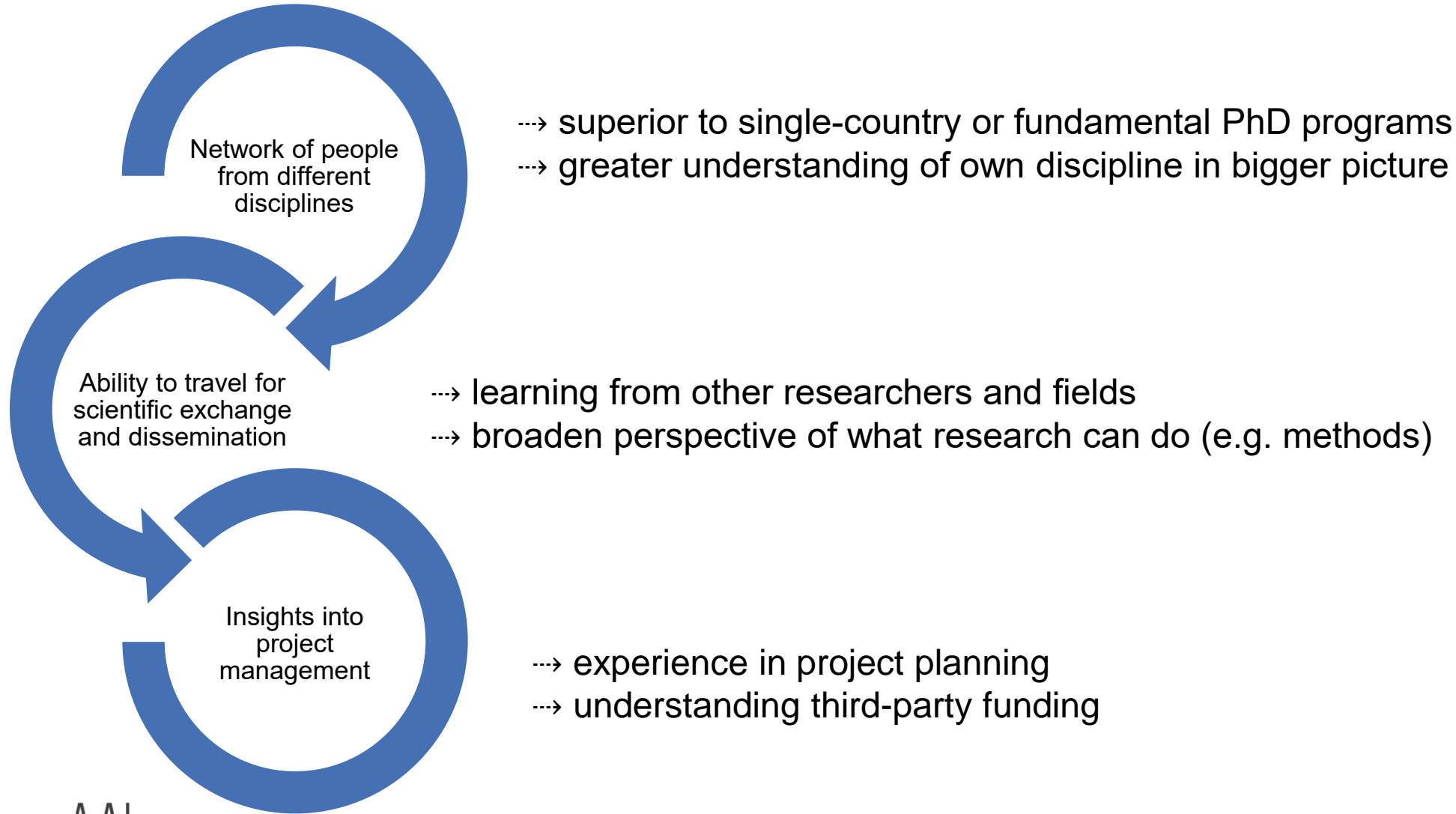
Non- Academic environment

Continuing to understand predictors of health attitudes and behaviours in clinical settings

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Implementing protocols to enhance public/individual health working directly with individuals

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Build portfolio and identity about strengths and weaknesses

Network of people from different disciplines

⋯→ superior to single-country or fundamental PhD programs
⋯→ greater understanding of own discipline in bigger picture

Ability to travel for scientific exchange and dissemination

⋯→ learning from other researchers and fields
⋯→ broaden perspective of what research can do (e.g. methods)

Insights into project management

⋯→ experience in project planning
⋯→ understanding third-party funding

Thank you!

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