

# The Persuasive Strategies in SAAM – the Approach, Evidence and Reasoning

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SAAM Final Event



Supporting Active Ageing  
through multimodal coaching



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# SAAM Persuasive Goals

Persuasive strategies in SAAM are designed to support the coaching systems and trigger the optimum behavior from users, based on data collected through the system.



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# SAAM Aims for Users

- **Primary users:**
  - to motivate and support the users to achieve behavioral change goals
  - to alert and motivate users whenever their activity patterns are untypical, or point to more serious problems
  - to trigger behavioral changes in the primary users, by appealing to them through secondary users, (i.e. family, friends and caregivers)
- **Secondary users:**
  - To encourage secondary users to get involved and support primary users when the situation demands for an indirect persuasion strategy

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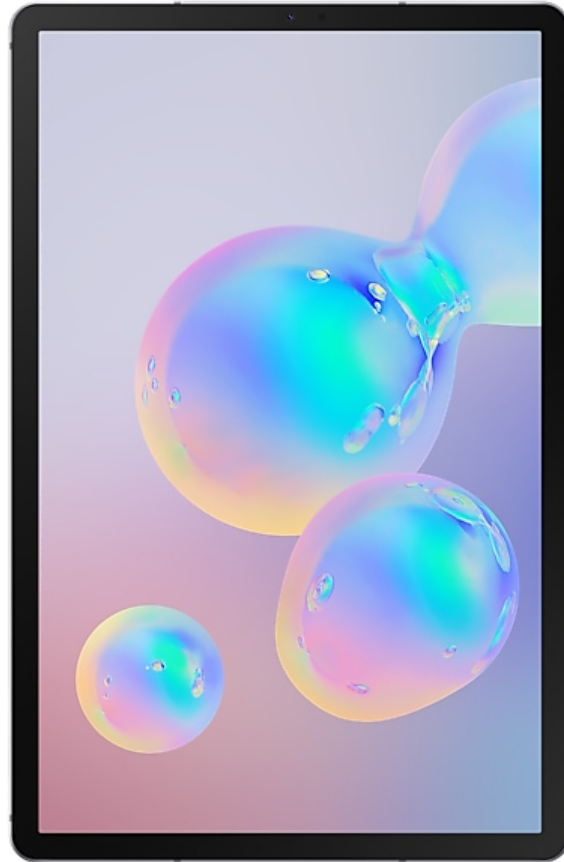


# Primary User Profiles

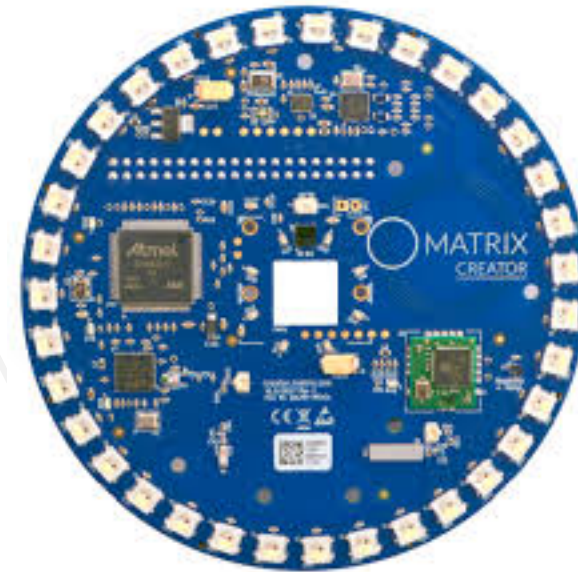
	Basic user profile 1	Basic user profile 2	Basic user profile 3	Basic user profile 4
EURAG	Male, 70 years old, secondary education, suburban area, no heart problems, stroke or diabetes, no need for assistance in daily activities, socially active	Female, 67 years old, secondary education, urban area, no high blood pressure, stroke or diabetes, no need for assistance in daily activities, socially active	Female, 69 years old, urban area, high blood pressure but no stroke / diabetes, no assistance in daily life, satisfied with social life.	Male, 72 years old, secondary education, lives with another person, heart problems, stroke, no diabetes, no need for assistance in daily activities.
BRC	Woman, urban areas, 74 years old, high blood pressure, secondary education, no diabetes	Woman, urban or suburban, 68 years old, lives with another person, independent in daily activities, may or may not have high blood pressure,		
CARITAS	Woman, suburban area, primary education, 76 years old, high blood pressure, neither satisfied nor dissatisfied with social life, needs assistance in daily activities	Male or female, 68 years of age, may or may not have high blood pressure, lives together with someone, neither satisfied nor dissatisfied with social life		
SOCA	Male, 69 years old, heart problems or stroke, secondary education, may or may not have diabetes	Male or female, 76 years old, high blood pressure, diabetes, needs support in daily activities, lives together with someone.		



# Interaction Systems



Tablet



Matrix Creator

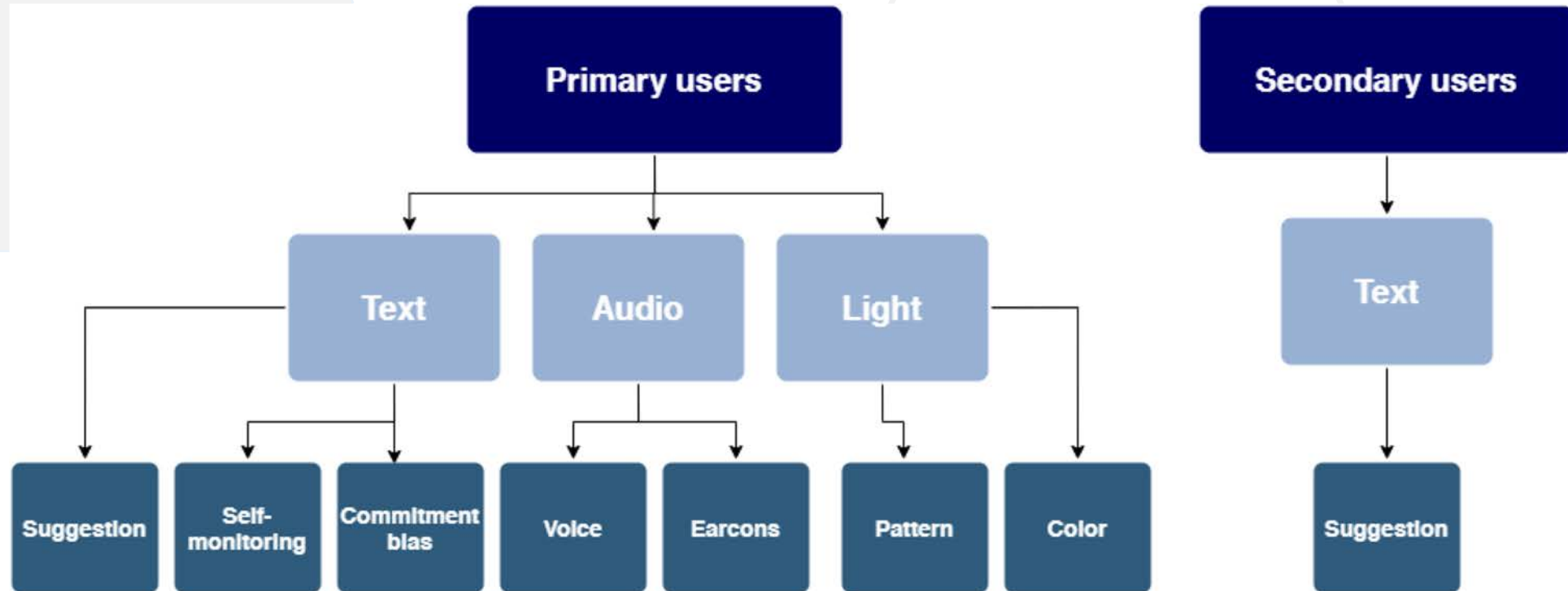


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# Persuasive and multimodal approaches



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# Screen Interface Designs - Text

- **Text:** alerting the user through text messages, either from the system or from other users (social circle, care)
  - Notifications
  - Reminders
  - Rendering of coaching actions, all of which can include persuasive elements



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# Screen Interface Designs - Iconography

- **Iconography:** iconography can be used as a persuasive instrument, particularly in establishing habits, setting reminders, and serving as a substitute for text when reading is problematic or impossible
  - **Thematic icons:** associated with the life domains tackled in SAAM used to send reminders, notifications associated with that domain
  - **Diagrams:** used to show the association of different activities and their impact on the user
  - **Graphs and charts:** used for data visualization of the user behaviour (self-monitoring)



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# Ambient Interface Designs

- **Sound:** speaker plugged into the Raspberry Pi to play pre-recorded instructions, notifications, reminders as well as ear-cons
  - **Speech:** pre-recorded messages will alert the user about certain behaviours, make suggestion and recommendations, remind the user of set goals
  - **Ear-cons:** will be used as reminders associated with certain tasks or behaviours



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# Ambient Interface Designs

- **Light:** the LEDs integrated in the Matrix can be used as an ambient persuasive interface
  - To send notifications
  - Reminders for specific activities



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# Example Patterns

- **Social interaction:**
  - Slightly ascending melody
  - Voice recording
  - Two halves, green and blue, filling half circles
- **Sleep:**
  - Calm descending melody
  - Voice recording
  - Slowly pulsating purple light



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# Persuasive Strategies

- **Digital Nudging:** *“any aspect of the choice architecture that alters people’s economic behaviour in a predictable way without forbidding any options or significantly changing their economic incentives”* (Thaler & Sunstein, 2009)
- **Framing:** decision makers respond differently to different but objectively equivalent descriptions of the same problem (Kahneman & Tversky, 1979)
- **Designing for Habit Formation:** Habitual behaviour is learned behaviour that is *“frequently repeated, has acquired a high degree of automaticity, and is cued in stable contexts”* (Orbell & Verplanken, 2010)



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# Persuasive Strategies (continued)

- Rewards (Colwill & Rescorla, 1985)
- Suggestion (Fogg 2003)
- Tailoring (Fogg 2003)
- Self-monitoring (Fogg 2003)
- Authority (Cialdini, 2009)
- Reciprocity (Cialdini, 2009)
- Consistency (Cialdini, 2009)
- Consensus / Social Proofing (Cialdini, 2009)



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# Domain-specific Approaches

- **Activity Module**

- Self-monitoring
- Tailoring

- **Social Module**

- Personal contact
- Relationship building
- Digital: social media, mobile, smart home devices
- Suggestion
- Reciprocity

- **Mobility Module**

- Habits and routines
- Self-monitoring and self-efficacy
- Intrinsic motivation
- Tailoring

- **Sleep Module**

- Habits and routines
- Recommendation systems
- Cognitive behavioural therapy
- Suggestion



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# Interface Variations

Persuasive approaches	Domains	Interfaces	Modalities	Users
Digital nudging	All	All	Multimodal – text, video, vibration, light, sound (esp. ear-cons)	Primary users (seniors) Secondary users (social circle)
Framing	All	Screen based interfaces, Ambient sensor	Text and sound (speech / pre-recorded)	Primary users (seniors) Secondary users (social circle)
Designing for habits	All, especially sleep and activity	All	Multimodal – text, video, vibration, light, sound (esp. ear-cons)	Primary users (seniors)
Suggestion	All, especially sleep and social interaction	Screen based interfaces, Ambient sensor	Text, video, sound (speech / pre-recorded)	Primary users (seniors) Secondary users (social circle)
Tailoring	All, especially mobility and activity	Screen based interfaces, Ambient sensor	Text and sound (speech / pre-recorded)	Primary users (seniors)
Self-monitoring	Mobility and activity	Screen-based interfaces	Text, iconography	Primary users (seniors)
Authority	All, especially when coming from secondary users (care)	Screen based interfaces, Ambient sensor	Text and sound (speech / pre-recorded)	Primary users (seniors)
Reciprocity	Social activity	Screen based interfaces, Ambient sensor	Text and sound (speech / pre-recorded)	Primary users (seniors) Secondary users (social circle)
Consistency	All	Screen based interfaces, Ambient sensor	Text and sound (speech / pre-recorded)	Primary users (seniors) Secondary users (social circle)
Consensus	All	Screen based interfaces, Ambient sensor	Text and sound (speech / pre-recorded)	Primary users (seniors) Secondary users (social circle)

# Examples

- Primary Users
- Sleep Domain
- Suggestion
- Example of suggestion phrasing, affirmative sentence:  
*“You might sleep better if you only go to bed if you feel sleepy”*
- Example of suggestion phrasing, interrogatory sentence:  
*“Have you considered you might sleep better if you go to bed only when sleepy?”*



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# Examples

- Primary Users
- Sleep Domain
- Self-Monitoring
- Example of self-monitoring phrasing, numbers:

*“Your data show that you are spending **X minutes**\* in bed before falling asleep. You might sleep better if you only go to bed when you feel sleepy”. \*based on sensor data*

- Example of self-monitoring phrasing, comparison:

*“Have you considered you might sleep better if you go to bed only when sleepy?”*



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# Examples

- Secondary Users
- Sleep Domain
- Suggestion

*“The data shows the **PU**’s\* sleep quality has been decreasing by **X**\*\* this week compared to previous weeks. You might want to encourage **PU**\* to visit a doctor about their sleep quality.”*

*\* primary user*

*\*\* number from sensor data*



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# Sleep Module Austria

- 12 weeks pilot study
- Sample of 8 participants (4 female, 4 male)
- Average age is about 75 years (youngest 69 years, oldest 80 years)
- Most participant's highest level of education is apprenticeship/secondary education

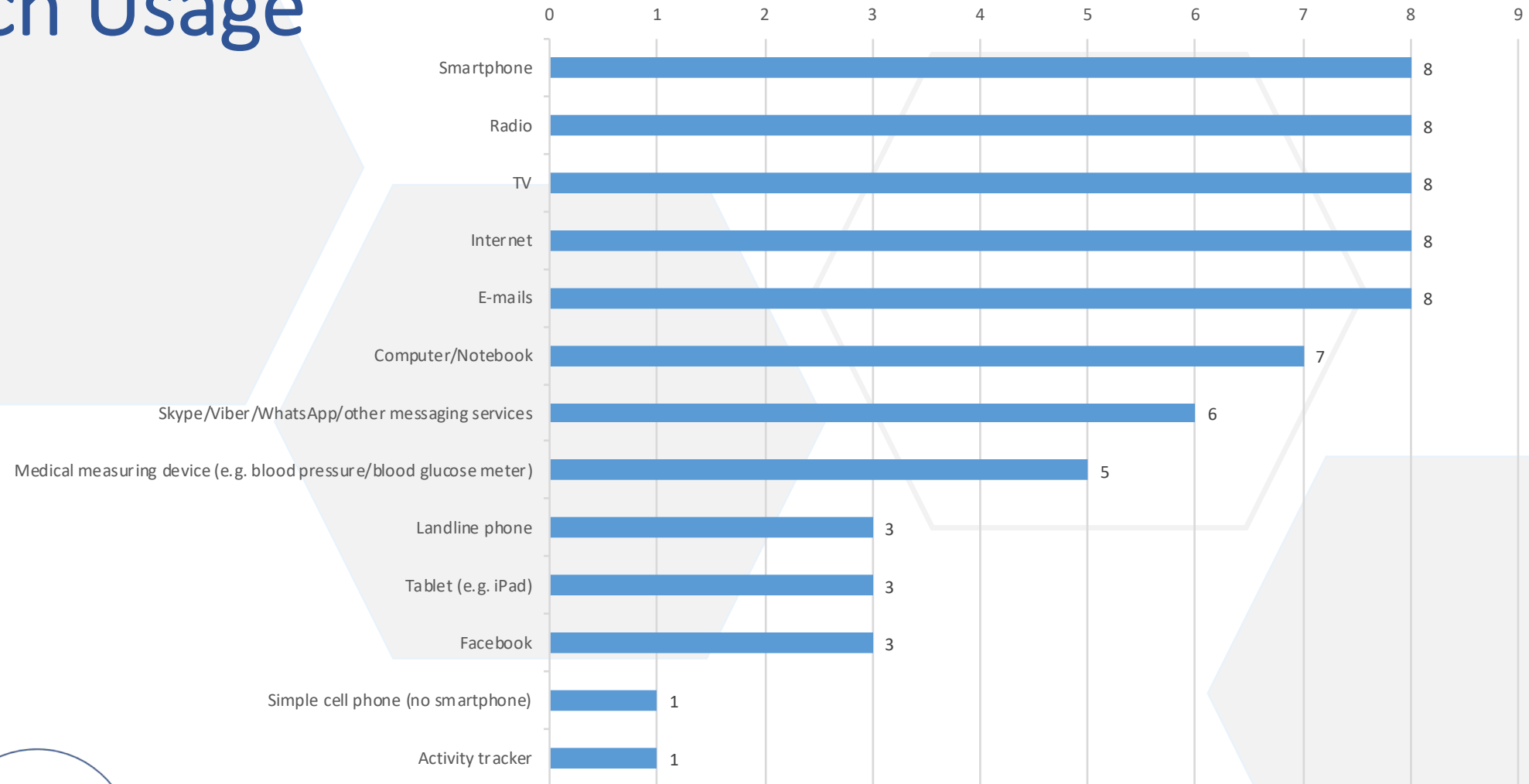


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# Tech Usage

Technological Devices Used (N=8)



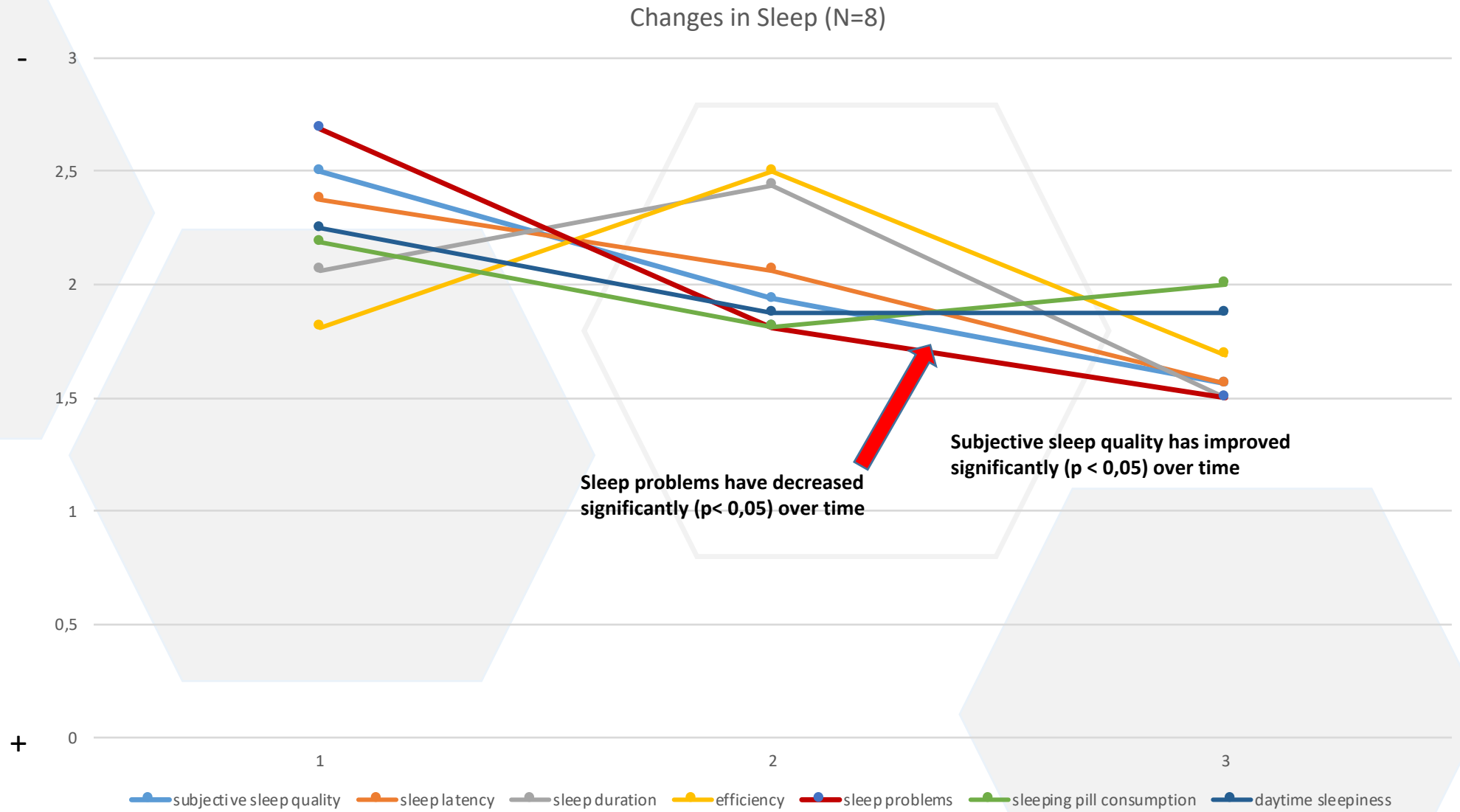
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# Sleep Quality

Pittsburgh Sleep Index



Sleep problems have decreased significantly ( $p < 0,05$ ) over time

Subjective sleep quality has improved significantly ( $p < 0,05$ ) over time



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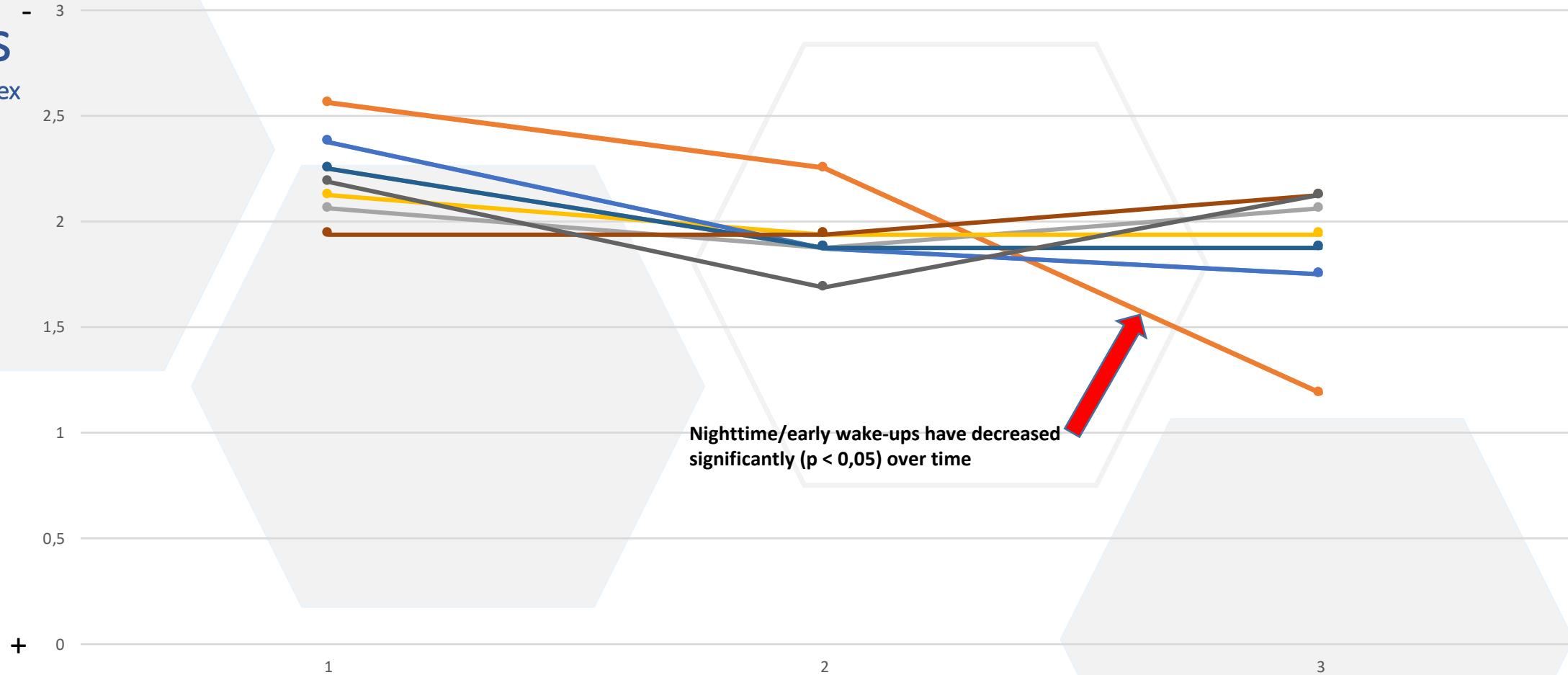


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# Sleep Problems

Pittsburgh Sleep Index

Sleep Problems (N=8)



Nighttime/early wake-ups have decreased significantly ( $p < 0,05$ ) over time

- time to fall asleep (>30 min.)
- nighttime/early wake-ups
- nocturnal toilet visits
- breathing problems
- coughing/snoring
- zu kalt
- zu warm
- schlecht geträumt
- Schmerzen



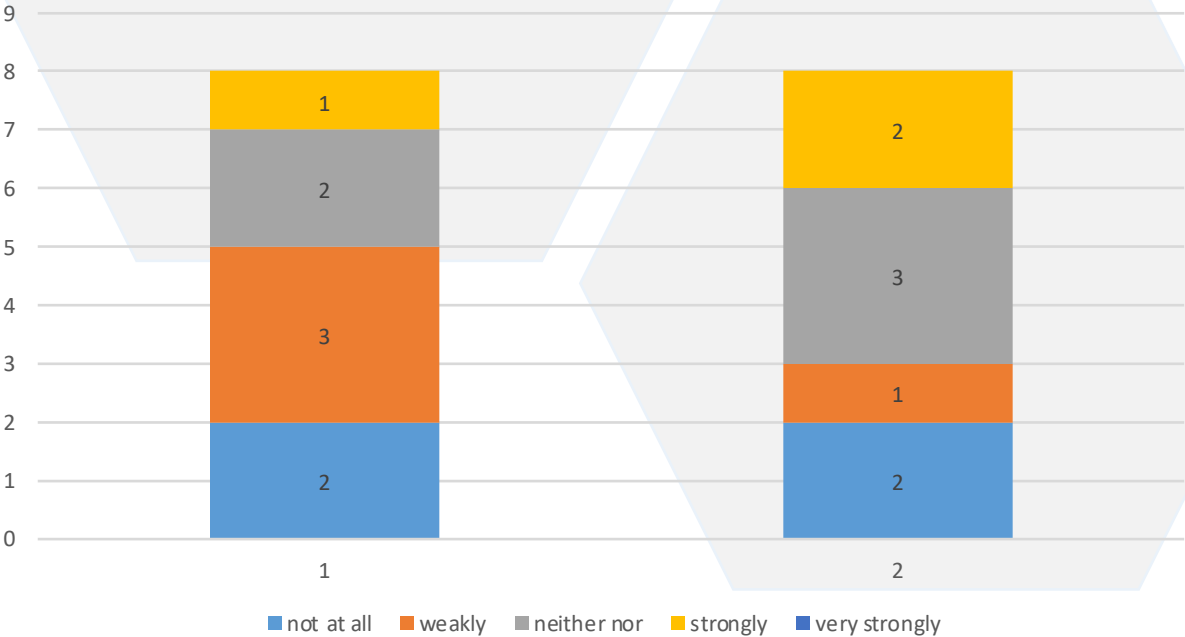
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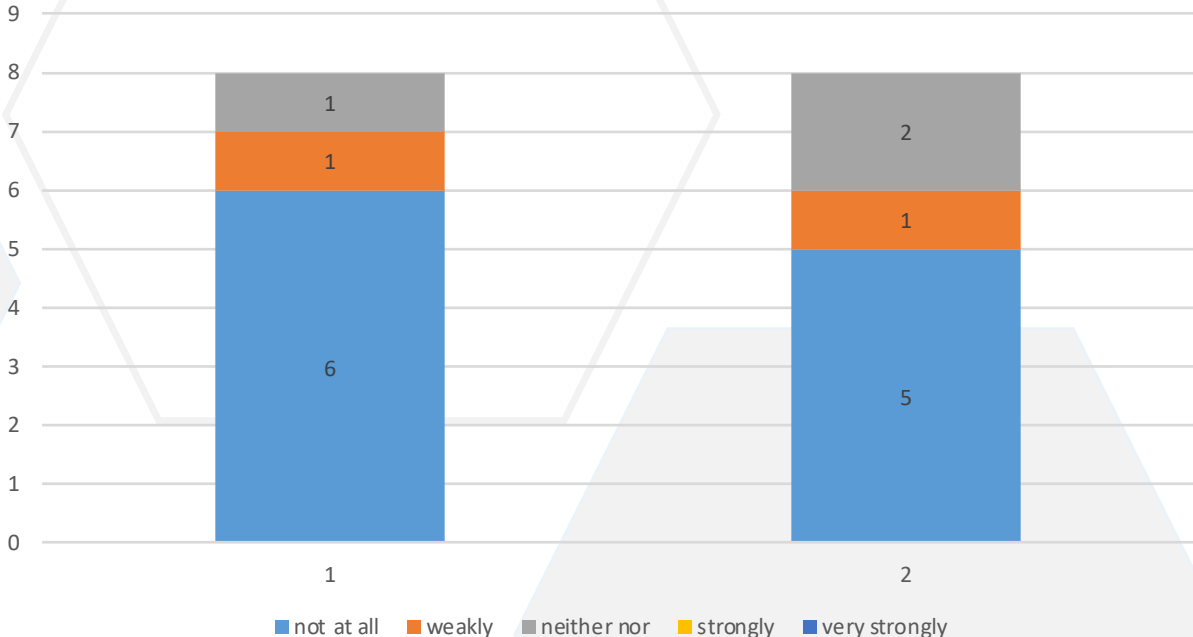
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# Intrusiveness

SAAM System: How much Noticed? (N=8)



Feeling Uncomfortable (N=8)



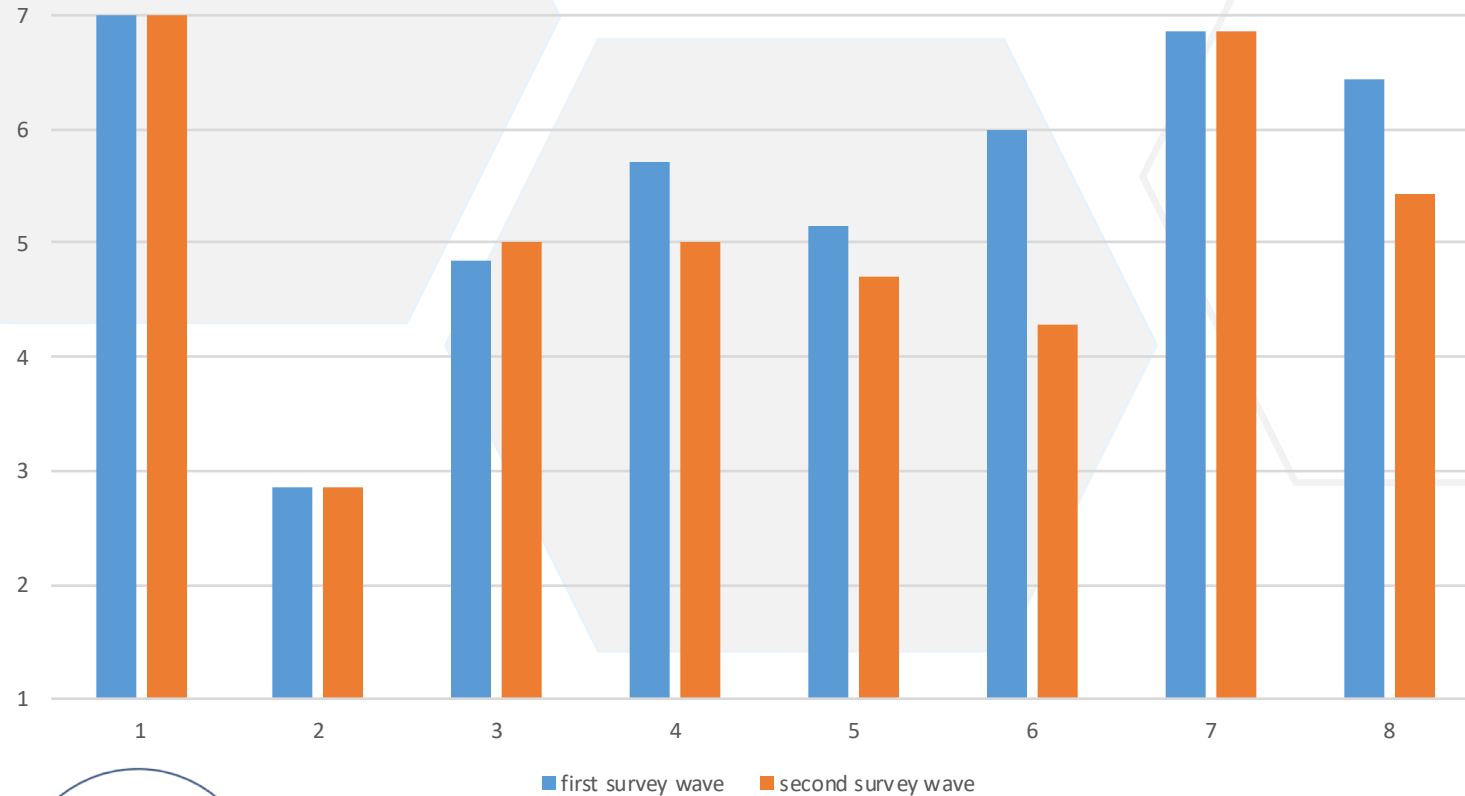
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# Usability

Usability Index by Participant (N=8)



Index from “1” (=does not apply at all) to “7” (=completely applies), consisting of:

- Confusing to use SAAM\*
- Would make mistakes using SAAM\*
- Using SAAM would be frustrating\*
- Would need the manual frequently\*
- Would require mental effort\*
- Would find it inconvenient\*
- SAAM would be easy to use\*

\*The polarity of the item scale was reversed so that higher scores indicate better usability.

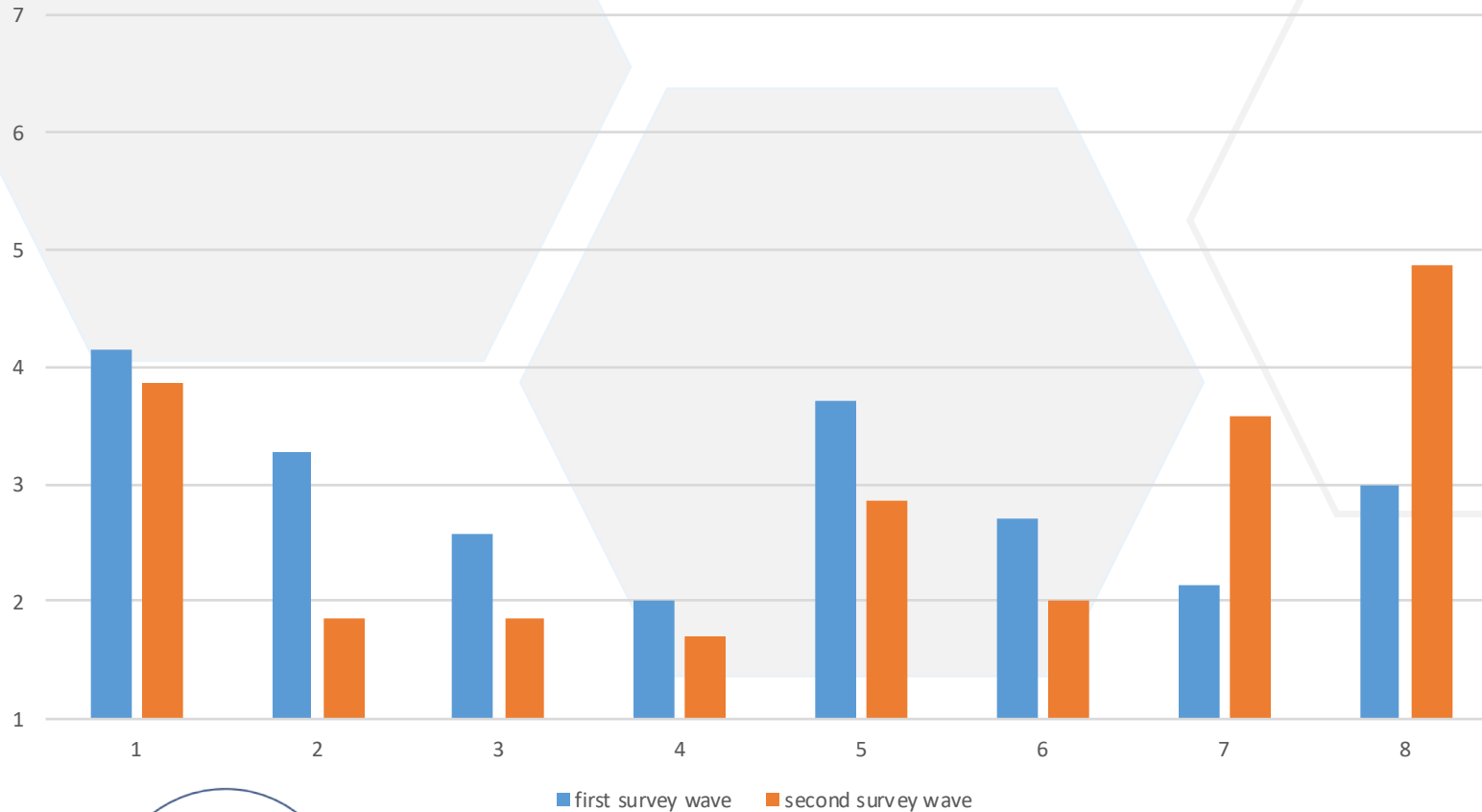


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# Utility

Utility Index by Participant (N=8)



Index from “1” (=does not apply at all) to “7” (=completely applies), consisting of:

- SAAM improves quality of living
- Comfortable to be supported by SAAM
- SAAM supports living in own household
- SAAM allows living in own household longer
- Owning SAAM increases standing in community
- SAAM makes living in own household easier
- Overall SAAM useful for own household



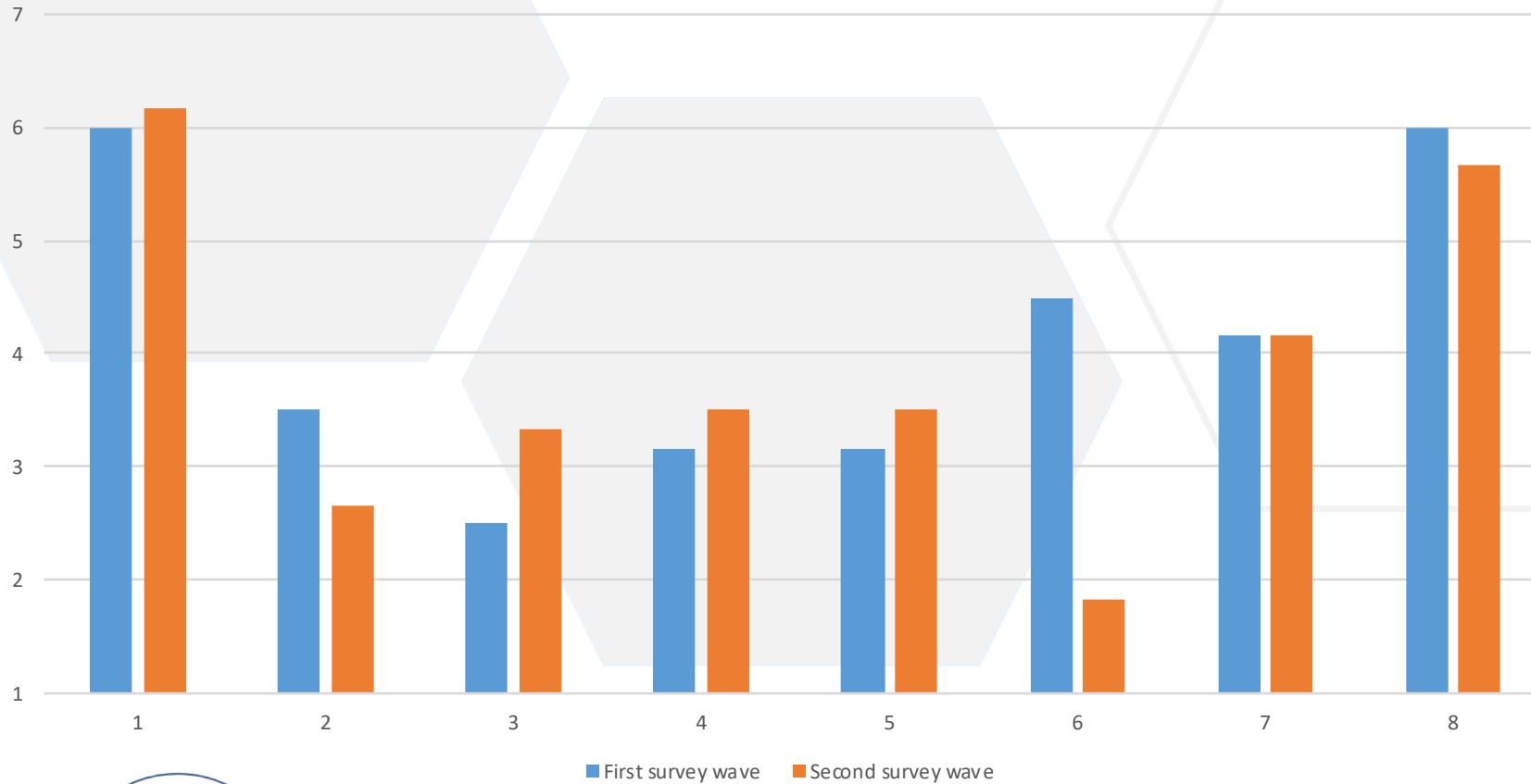
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# Reliability

Reliability Index by Participant (N=8)



Index from "1" (=does not apply at all) to "7" (=completely applies), consisting of:

- SAAM - reliable
- SAAM - precise
- SAAM - safe
- SAAM - honest
- SAAM - will work without errors
- SAAM - shows reliability



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# Thank you

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