The Use of Wearable Sensors in Familiy Research – A pre-study

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Introduction

Motivation

Are wearables suitable for use in family sociology? The use of wearables could provide an opportunity to measure interaction patterns in households and to assess social desirability bias by directly comparing results of objective and self-report measurements. With an initial, exemplary focus on the division of paid and unpaid work in couples, we conducted focus groups in order to assess opportunities and barriers for the use of wearables in families. The results are used to design a pilot study for taking the wearables to the field.

Previous Research

- Remaining gender gap in unpaid work
- Based on surveys, time-use studies, official statistics
- Subject to social desirability bias
- Low temporal and spatial/interactional resolution

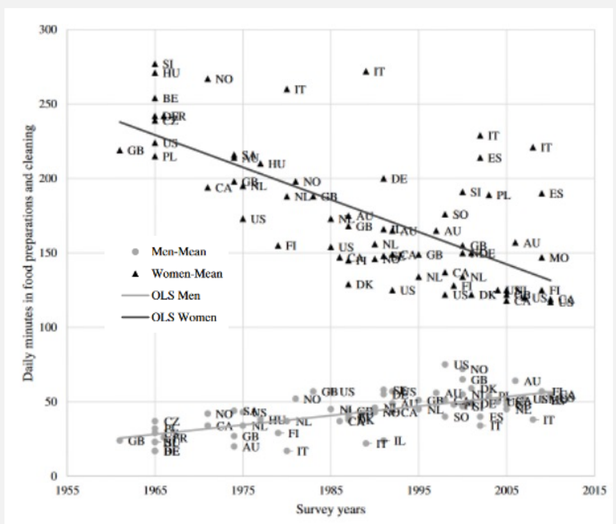

Fig. 1 Source: Grunow 2019 (Fig 2)

Wearables

RFID-Tags

- Tags & software by OpenBeacon.org-Project
- Send out ultra-low-power radio signals
- Measure device proximity within 1 – 1.5 m
- Only face-to-face contacts
- Data stored on the tags, exportable

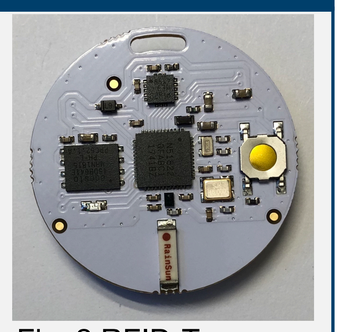

Fig. 2 RFID-Tag (front view)

Examples for Use of Wearables in Other Research Areas

Epidemiology: measurement of potential routes of infection in social networks

- Conferences *(Catutto et al. 2010)*
- Village community *(Ozella et al. 2021)*
- Hospitals *(Vanhems et al. 2013)*
- Schools *(Stehlé et al. 2011)*
- Households *(Kiti et al. 2016; Ozella et al. 2018)*

Psychology:

- Developmental: Parent-Child Interaction *(Salo et al. 2022)*
- Organizational Communication (Kim et al. 2012)

Advantages

- Minimalistic (vs, e.g., smartphones)
- Collects few/focused data
  ► willingness to participate
- Less invasive / low reactivity *(Keusch/Kreuter 2021)*
- Potential use in household context

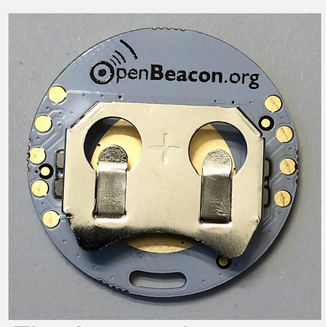

Fig. 3 rear view (battery holder)

Preliminary Results

Research Design of the Pre-Study

Objective: Capture diversity of possible problems, barriers and opportunities

Method: Focus groups with parents

Current status:

- 3 focus groups
- 15 participants
- w/children 9m - 18y of age
- variation re: age, parental leave (y/n), employment (y/n)

Preliminary Results of Focus Groups

In which situations would an RFID tag **not** record relevant interactions?

- Play between adults/children (at home)
- Play situations (outside)
  - Playground
  - Outside walks
  - Swimming pool
  - Shopping
- Trips to/from childcare/school
  - By car
  - By bike / bike trailer

Potential solutions

Different placement of tags
→ **stationary tags**

- Rooms (e.g. kitchen, kids room, bathroom)
- Things (e.g. washing machine, oven)
- Places of interaction (e.g. kitchen table, garden, balcony/ terrasse, children‘s play area)
- Means of transportation (e.g. bike (trailer), car)

Preliminary Conclusion

Wearables can complement classical methods of data collection:

- Higher temporal resolution of household task division
- Potential comparison of objective/subjective measures
- Potentially combinable with finer measurement of other processes (e.g. emotional/stress reactions)
- Focus groups:
  - Openness of participants to participate in respective studies
  - Stationary placement of tags helps expand applicability
  - But tags have blind spot re: some aspects of task division (e.g. „mental load“)

Next Steps

- Employ tags in simulation study: simulate scripted household tasks / interactions (UOL OFFIS simulation apt.)
- Employ tags in real family settings
- Challenge: requires new research design (high temporal resolution, but likely smaller n)

References

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