Home Is Where The Smart Is: Development and Validation of the Cyber Security in Smart Homes (CySESH) Scale

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Motivation

- Phenomenon: Ad-hoc „upscaling“ (fig. 1)
- Provide quality: practicality, validity & reproducibility

→ Closing research/methodological gap with practical benefits.

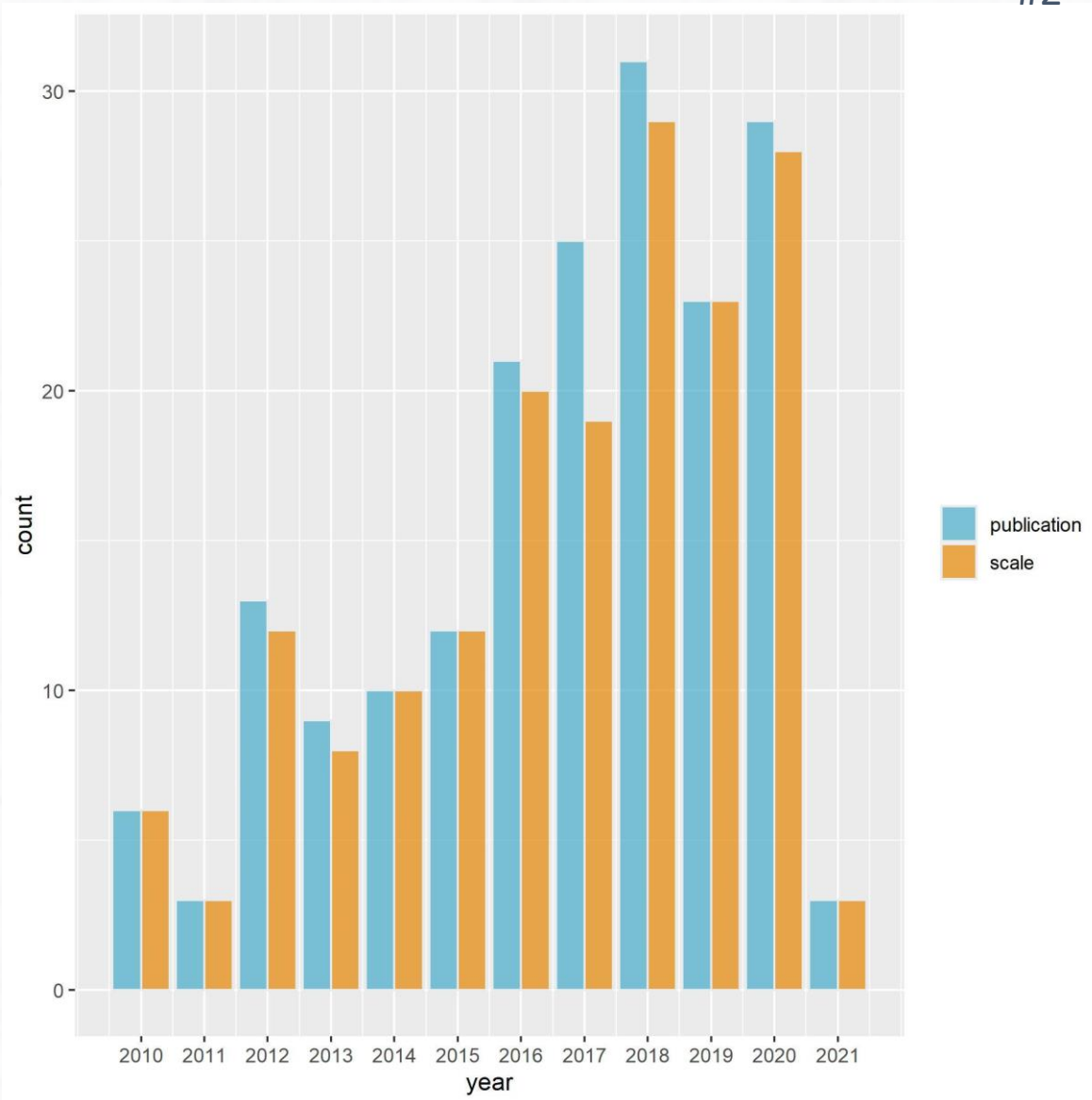


Figure 1: Amount of published self-efficacy measures per year in reviewed publications (Borgert et al. 2021)

Methods

Preregistration

45 Items

13 Items

Development

- Experts of Law, Programming, Science
- Bottum-Up Approach
- Situational aspects of SE in smart homes were considered.

Pre-Tests

- N = 5
  - Face validity
- N = 20
  - Content Validity
- N = 80
  - Wording & Clarity
- Refinement with Parallel Analysis & EFA

Validation

- N = 166
  - Discriminant Validity
- N = 971
  - Further Criterion Validity
  - Reliability
  - Performance

Final Analysis

- Item Analysis
- Scale Analysis
- CFA
- Demographic Regression
- Model Tests

Results

Item No.	Item
1	I can use devices' privacy policies for risk assessment of my privacy.
2	I can delete the data stored in a cloud if I no longer want to use my devices.
3	I can get the information I need to delete my data stored on my devices.
4	I can find out which third parties have access to the data my devices collect.
5	I can find out what data my devices collect.
6	I can learn the technological know-how to understand my devices' technical data sheets.
7	I can keep track of my privacy implications when I link multiple devices.
8	I can detect when interfaces are designed to influence my decisions about security options.
9	I can identify violations of my privacy rights by a device feature.
10	I can get in touch with a manufacturer's data protection officer when necessary.
11	I can find out about existing privacy implications before buying a new device.
12	I can disable my devices in case of a security attack.

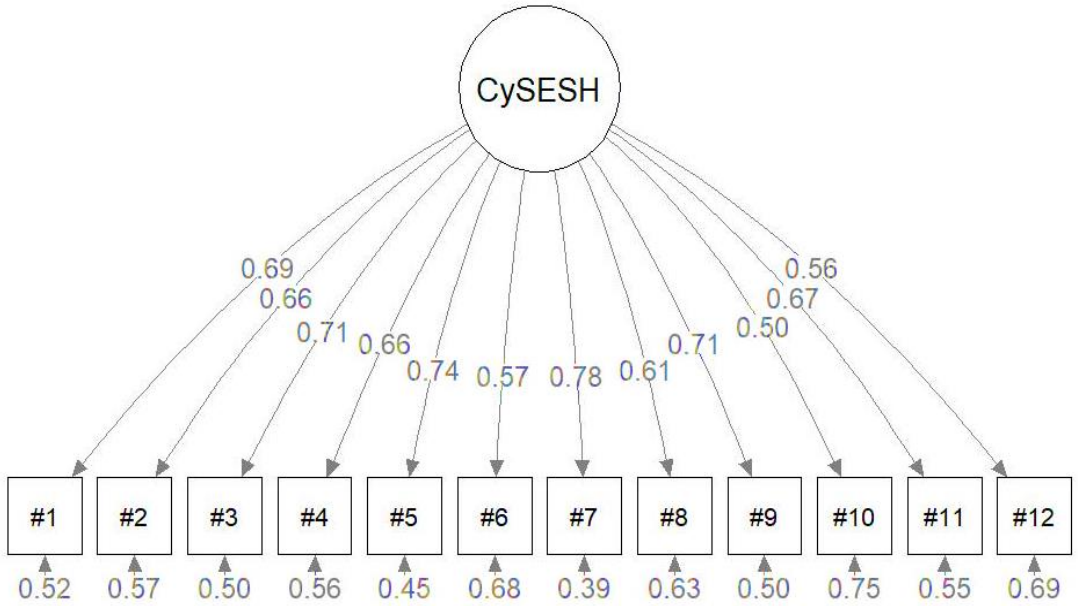
Reliabilities: $\alpha = 0.9$, $\omega = 0.9$

Item analysis:

- Item 13 removed.
  → 12 Items
- Rest: Good performance

Consecutive scale analysis:

- Factor Structure: ✓
- Model Fit: ✓
- Reliability: ✓
- Validity: ✓



Discussion

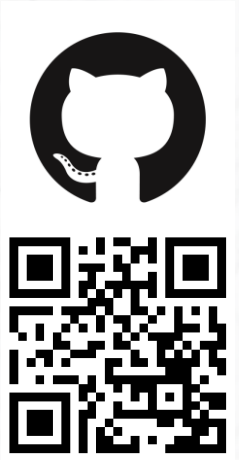
- CySESH is a well performing scale for the assessment of self-efficacy in smart home security.
- Practical benefits:
  - Professionals: Consultants, HR, IT
  - Users
  - Politics/Public Policy
- Scientific use: Validation benefits.
- Slightly different effects for male participants.

Limitations/Future Work

- Replication
- Gender representation
- Cultural scope
- Translations

- Short form
- Long-term validity
- Construct stability
- Updating (Security-conventions)

Thanks for your attention! Questions & comments welcome!



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