Assessing Personality Differences in Human-technology Interaction: An Overview of Key Self-report Scales to Predict Successful Interaction & a New Scale to Assess Affinity for Technology

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Personality differences in HCI

- **Pervasiveness of technology** increases **user diversity** in technology interaction
  - High pace of innovations = **high demands on learning to cope with technology**
- Crucial: Focus on the **individual fit** between **users & technical system**
  - **Numerous**, interconnected and partly overlapping **personality constructs** exist in **HCI**
  - Need for structuring the prevailing constructs and scales
- **Research objective**: Review & structure existing **HCI personality scales**
- **Research questions**:
  (Q1) Which technology-related personality scales are **frequently applied** in HCI research?
  (Q2) Which technology-related personality scales have been **recently proposed**?

Method

- ***1st Step: Identification***
  - Literature search in Google Scholar with the search string
    `("human-technology interaction" OR "human-computer interaction") AND "personality" and ("questionnaire" OR "scale") AND "reliability"`
  - Iterative forward and backward search including five review articles [6, 12, 13, 19, 24]
  - **59** technology-related personality scales identified
- ***2nd Step: Selection***
  - **Criteria**: citations in HCI/HFE journals/proceedings & recency – **3 clusters**:
    (C1) *established scales*: **>10 citations** in key HCI/HFE journals/proceedings
    (C2) *recent scales*: published in **last 10 years** & **>5 citations**
    (C3) *very recent scales*: published in **last 5 years**

Results

- **(Q1): Frequently applied scales** (see Table on right; full table in paper)
  - Most frequent: computer attitude (9x), c. anxiety (8x), c. efficacy (3x)
  - Also relevant: c. playfulness, personal innovativeness, technology readiness (each 1x)
  - Established **computer attitudes** scales are **rarely cited** anymore
  - Attitude, anxiety, and efficacy scales are **conceptually overlapping**
- **(Q2): Recently proposed scales**
  - Control beliefs while dealing with technology, internet attitude and self-efficacy, technology commitment, computer-related motivations, nomophobia, geekism
  - Constructs and scales have become **more domain-specific**
  - **Shift** from computer anxiety and **technophobia** to **nomophobia** (fear to be w/o device)

Authors	Scale names and abbreviations	Co	C5
(C1) *established scales*: >10 citations in key HCI/HFE journals/proceedings		Citation counts overall (Co) and within the last five years (C5)	
Loyd & Gressard (1984) [14]	Computer Attitude Scale (CAS-L)	90	4
Nickell & Pinto (1986) [17]	Computer Attitude Scale (CAS-N)	56	6
Kay (1993) [10]	Computer Attitude Measure (CAM)	39	0
Heinssen et al. (1987) [7]	Computer Anxiety Rating Scale (CARS-H)	87	17
Rosen et al. (1987) [20]	Computer Anxiety Rating Scale (CARS-R)	65	2
Barbeite & Weiss (2004) [2]	New Computer Anxiety and Self-efficacy Scales	29	17
Compeau & Higgins (1995) [5]	Computer Self-Efficacy Measure (CSEM)	180	93
Murphy et al. (1989) [15]	Computer Self-Efficacy Scale (CSE)	45	9
Webster & Martocchio (1992) [25]	Computer Playfulness Scale (CPS)	70	23
Argawal & Prasad (1998) [1]	Personal Innovativeness in Information Technologies (PIIT)	57	38
Parasuraman (2000) [18]	Technology Readiness Index (TRI)	17	13
(C2) *recent scales*: published in last 10 years & >5 citations			
Beier (2009) [3]	Control Beliefs while Dealing with Technology (KUT)	8	
Karrer et al. (2009) [9]	Affinity for Technology Questionnaire (TA-EG)	8	
Schulenberg & Melton (2008) [22]	Computer Aversion, Attitudes, and Familiarity Index (CAAFI)	7	
Joyce & Kirakowski (2015) [8]	General Internet Attitude Scale (GIAS)	6	
(C3) *very recent scales*: published in last 5 years			
Neyer et al. (2012) [16]	Technology Commitment (TB)	1	
Kim & Glassman (2013) [11]	Internet Self-Efficacy Scale (ISS)	3	
Yildirim & Correira (2015) [26]	Nomophobia Questionnaire (NMP-Q)	3	
Senkbeil & Ihme (2016) [23]	Short Scale for Computer-Related Motivations in Adults (FECAF)	0	
Schmettow & Drees (2014) [21]	Gex (Geekism, explicit)	0	

The ATI scale

- **Affinity for technology** as **key personal resource** for coping with ever-new systems
  - Specifically: affinity for technology ***interaction***
- **Previous** related **scales**:
  - Focus on outcomes (e.g., competence), purchase-related facets, general attitudes [9]
  - Assess rather intense forms of affinity for technology (e.g., geekism [21])
- The **Affinity for Technology Interaction (ATI) scale:**
  - ATI as a preferred **interaction style** (i.e., cognitive style)
  - Grounded in established psychological construct **need for cognition** [4; see also 21]
- First results with ***N* = 502** participants:
  - Excellent reliability (**Cronbach's alpha = .90**) & **unidimensionality** (factor analysis)
- The **ATI score**: reverse negatively worded items (3, 6, 8) & compute mean

In the following questionnaire, we will ask you about **your interaction with technical systems**. 'Technical systems' refers to apps and other software applications, as well as entire digital devices (e.g. mobile phone, computer, TV, car navigation).

	Please indicate the degree to which you agree/disagree with the following statements.	completely disagree	largely disagree	slightly disagree	slightly agree	largely agree	completely agree
1	I like to occupy myself in greater detail with technical systems.	☐	☐	☐	☐	☐	☐
2	I like testing the functions of new technical systems.	☐	☐	☐	☐	☐	☐
3	I predominantly deal with technical systems because I have to.	☐	☐	☐	☐	☐	☐
4	When I have a new technical system in front of me, I try it out intensively.	☐	☐	☐	☐	☐	☐
5	I enjoy spending time becoming acquainted with a new technical system.	☐	☐	☐	☐	☐	☐
6	It is enough for me that a technical system works; I don't care how or why.	☐	☐	☐	☐	☐	☐
7	I try to understand how a technical system exactly works.	☐	☐	☐	☐	☐	☐
8	It is enough for me to know the basic functions of a technical system.	☐	☐	☐	☐	☐	☐
9	I try to make full use of the capabilities of a technical system.	☐	☐	☐	☐	☐	☐

www.mytuc.org/dsdn
scale as pdf
(English and German)

www.mytuc.org/vyzb
poster as pdf

Authors at the Conference

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Christiane Attig is a PhD candidate in the field of Engineering Psychology. Her current project examines behavioral indicators for the need for help in HCI.

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Thomas Franke is a professor of Engineering Psychology and Cognitive Ergonomics. He is particularly interested in user diversity and a resource perspective on user-technology interaction.

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