Lower Saxony Research Network Design of Environments for Ageing (GAL)

Personality and Adaptive Technology Use in Old Age

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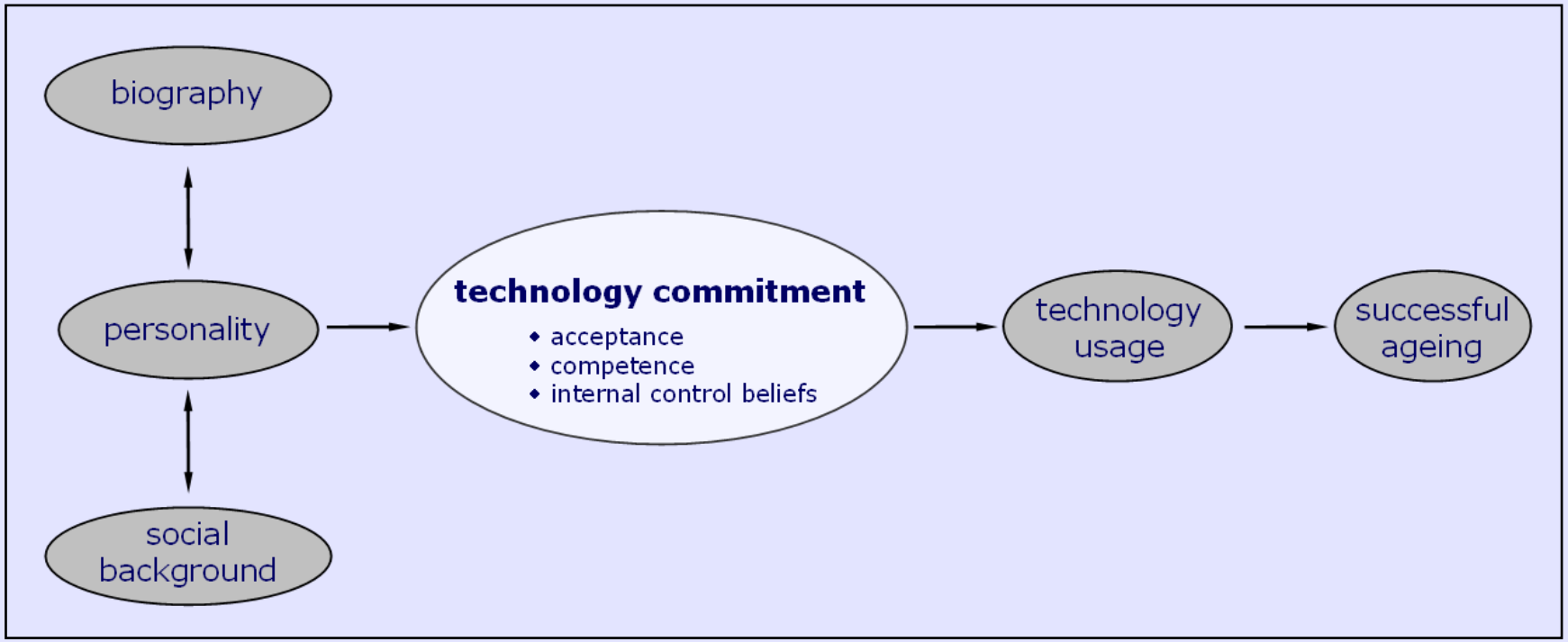
seit 1558

Technology Commitment and Ageing



Agenda

Objective

- empirical verification of a theoretical model explaining individual differences in ***technology commitment***

Approach

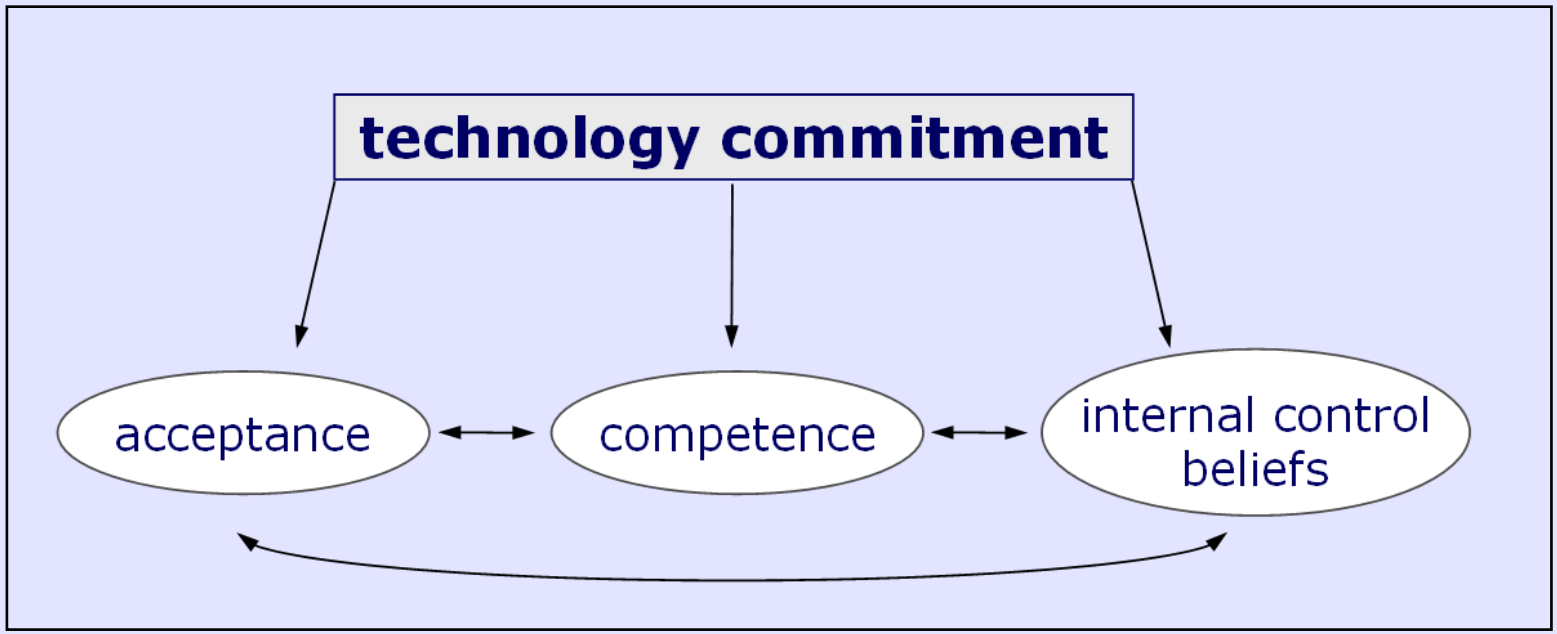
- development and validation of a scale for measuring technology commitment as a predictor of **technology usage**

Benefits

- information about potential **user profiles**; knowledge about **concerns**, special **needs** and requirements of elderly people concerning the implementation and usage of assisting systems

Theoretical background

⇨ **technology commitment as a personality trait**



Theoretical background

items (examples)

- **technology acceptance (⇨ attitude)**

  „I think new technologies are helpful.“

  „I enjoy the usage of new technologies.“

- **technology competence (⇨ mastery)**

  „I have trust in my ability to use new technologies.“

  „Often I am in fear of failing when using new technologies.“

- **technology related control beliefs (⇨ internal vs. external control)**

  „When I am successful in dealing with new technologies, then it is because of luck.“

  „It depends on me whether or not I solve problems that I might face when dealing with new technologies.“

Approach to model testing

⇨ **study plan for the development and validation of an inventory measuring technology commitment**

(1) pilot phase (*completed*)
generation of an item pool based on a literature screening and consultation of established inventories measuring acceptance, competence and control beliefs

(2) scale construction (*completed*)
questionnaire studies for item selection; empirical test of the three-dimensional structure of technology commitment

(3) validation phase (*ongoing*)
construct and criterion validation of the technology commitment scale; empirical test of the theoretical model concerning the determination of technology commitment and its significance for predicting technology usage

Measuring technology commitment: Scale construction

Aims

- construction of a reliable and economic scale measuring technology commitment
- empirical test of the hypothesized three-dimensional structure of technology commitment (acceptance, competence, control beliefs)

Preliminary validity checks

- sex / age / education-based differences
- behavior prediction

Measuring technology commitment: Scale construction

Method

- 2 questionnaire studies (online + paper pencil), May – August 2009
- N_{all} = 774; N_{Online} = 627 (65.9% female; *Mean Age* = 36.1 years)
  $N_{PaperPencil}$ = 147 (46.3% female; *Mean Age* = 64.8 years)

Contents

- demography; educational & job biography
- item pool for the construction of the technology commitment scale
  - technology acceptance: 43 Items
  - technology competence: 22 Items
  - technology related control beliefs: 16 Items
- actual usage of new technologies in different domains of daily living
  - e.g., household, communication, public life

Analysis

- factor analysis (EFA, CFA); reliability and validity analysis

Measuring technology commitment: Scale construction
(33 item pool)

(1) exploratory factor analysis (maximum-likelihood, varimax rotation)

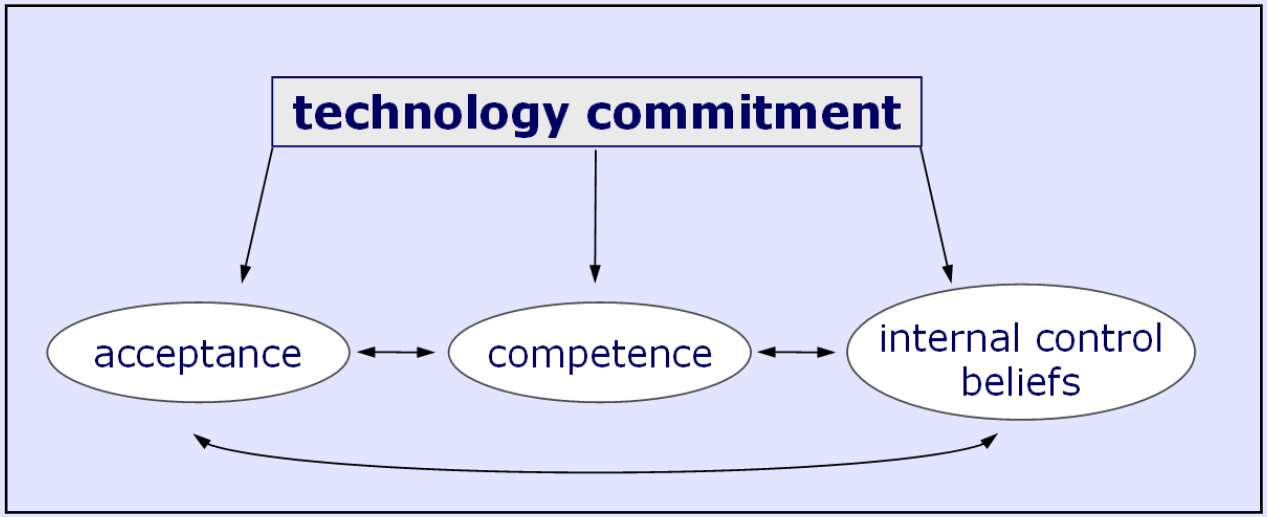
⇨ **intercorrelations of the 3 selected factors**
(5 items per factor with highest factor loadings)

	F2: acceptance	F3: internal control beliefs
F1: competence	**.52****	**.26****
F2: acceptance	**---**	**.35****
F3: internal control beliefs		**---**

Measuring technology commitment: Scale construction
(33 items pool)

(2) confirmatory factor analysis

- model fit of the theoretical 3-factor solution: *CMIN*, *RMSEA*, *NFI*, *CFI* ✓



(3) reliability analysis

- acceptance — Cronbach's α = .89; r_{it} = .67-.77
- competence: — Cronbach's α = .89; r_{it} = .66-.78
- internal control beliefs: — Cronbach's α = .75; r_{it} = .46-.55

Continued Analysis

- Sex / age / education-based differences in technology commitment

female	<	male
age+	=	age-
education-	<	education+

- Technology commiment predicts actual technology usage.

Scale construction study: Summary

- three-dimensional structure of technology commitment established!
- scale construction analysis:
  - interpretable factor structure (reliability)
  - satisfying item- and scale statistics
- technology commitment scale: 15 items (5 per subscale), 5-point answer scale (1 = not true at all; 5 = very true)
- first evidence for scale validity ⇨ predicting technology usage

Approach to model testing

⇨ **study plan for the development and validation of an inventory measuring technology commitment**

(1) pilot phase (*completed*)
generation of an item pool based on a literature screening and consultation of established inventories measuring acceptance, competence and control beliefs

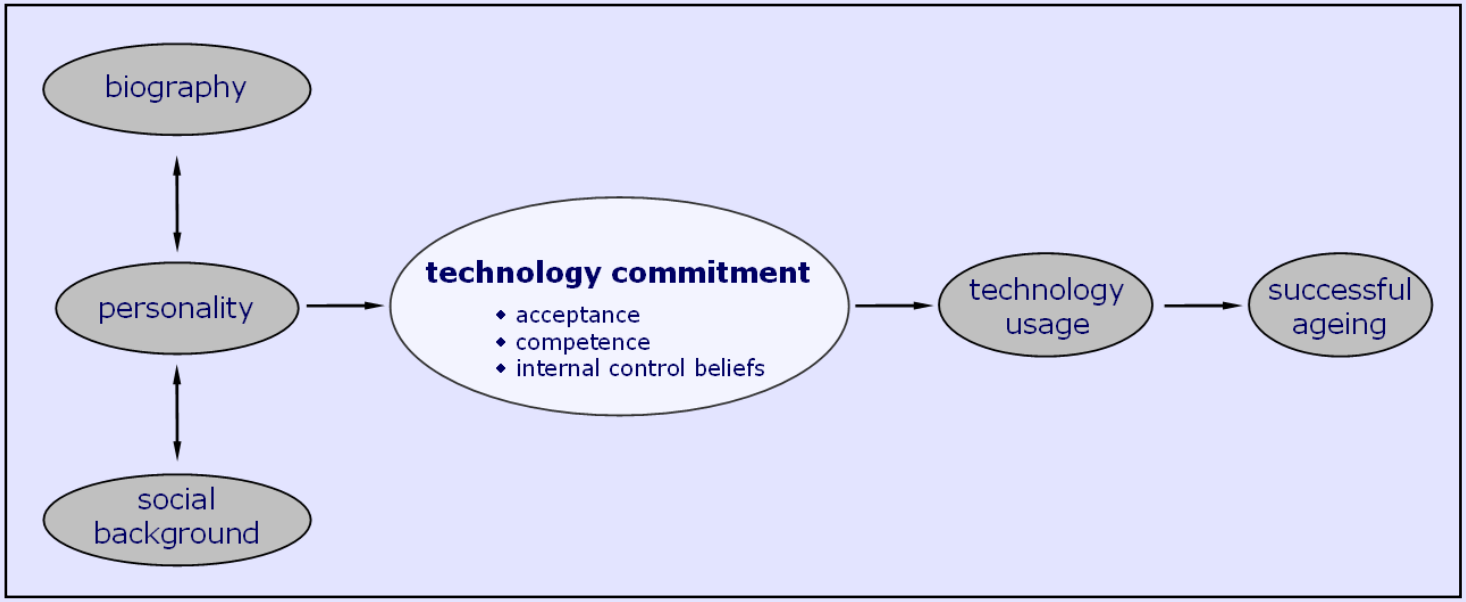
(2) scale construction (*completed*)
questionnaire studies for a data-driven item selection; empirical test of the hypothesized three-dimensional structure of technology commitment

(3) validation phase (*ongoing*)
construct and criterion validation of the technology commitment scale; empirical test of the theoretical model concerning the determination of technology commitment and its significance for predicting technology usage

Validation studies

Aims

- construct and criterion validation of the technology commitment scale
- empirical test of the theoretical model:
  - ⇨ predictors of technology commitment
  - ⇨ technology commitment as a predictor of technology usage + successful ageing



Validation study 1 (*ongoing*)

Method

- computer-based interviews (ca. 1½ hours)
- sample: middle-aged and eldery people (55-75 years)

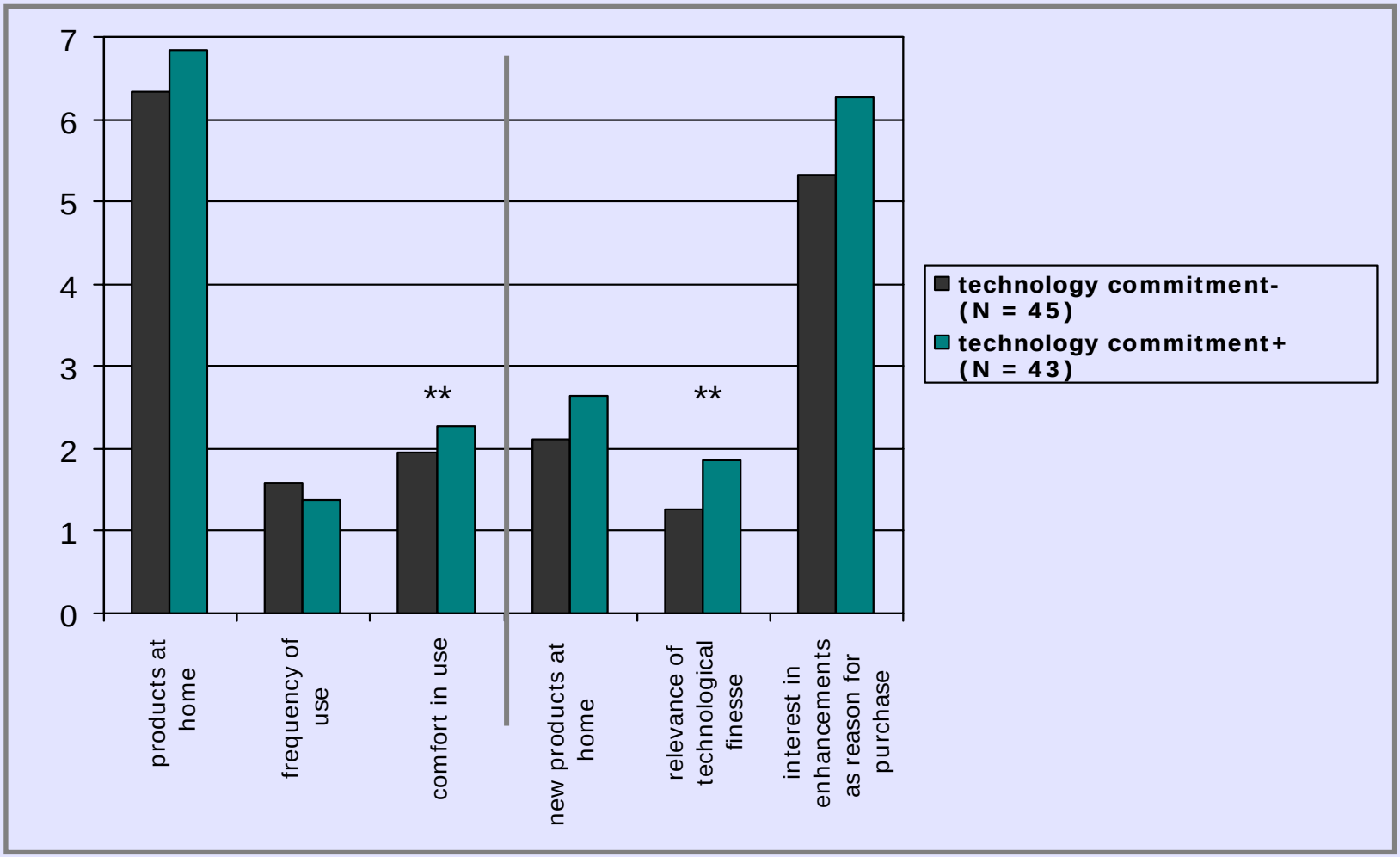
Sample

- $N_{aim} = 200$
- $N_{current} = 91$ (61.5% f; 38.5% m; $M_{Age} = 66.4$ years)

Contents (selection)

- technology commitment scale, technology related biography (job-related/privat), technology usage in daily life, interest in GAL-scenarios
- performance (concentration, figural intelligence ⇨ fluid intelligence), personality, health, social network, attitude towards aging

Technology commitment and use: Scale validity



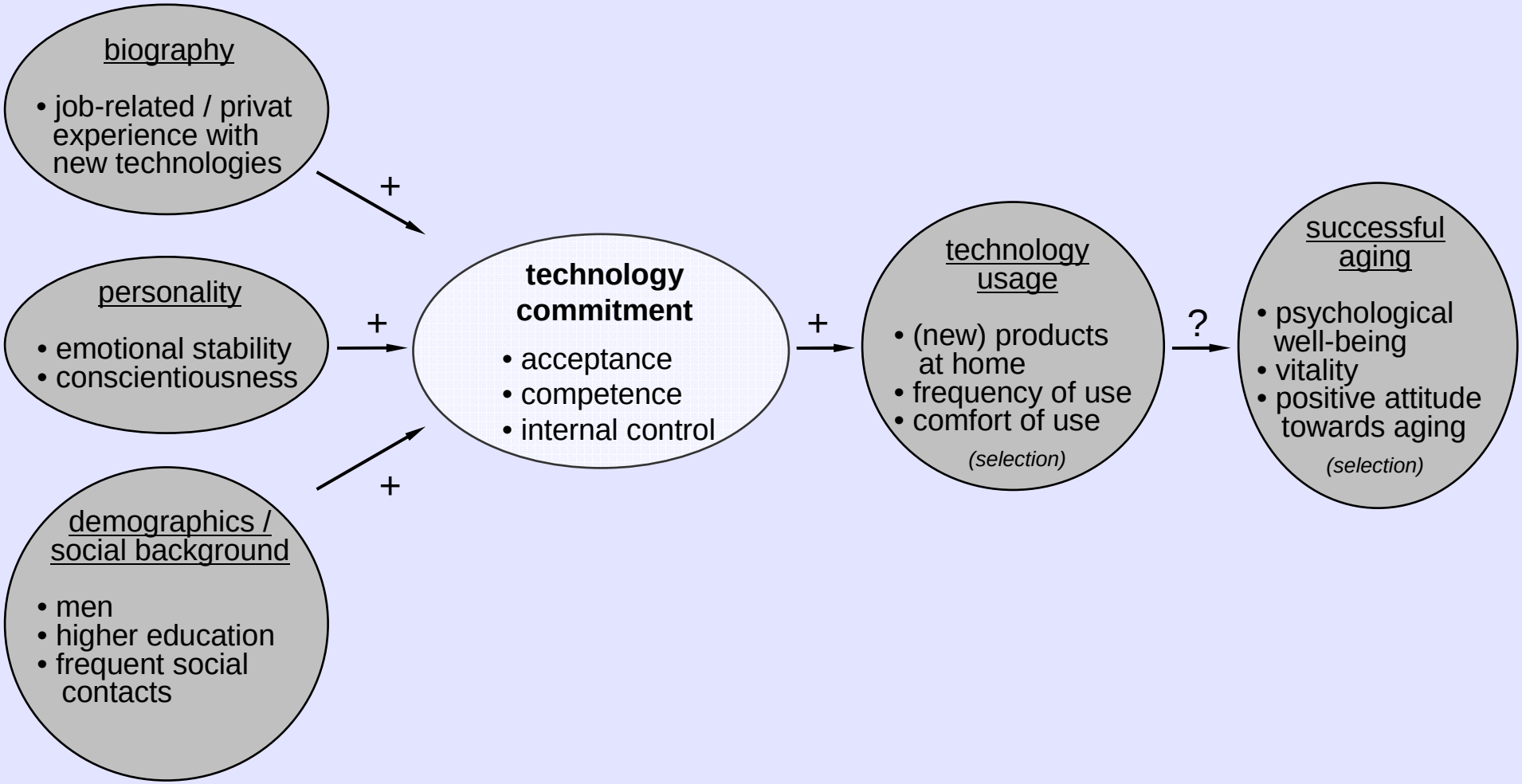
$^{**}p < .01$.

Correlates of technology commitment (*selection*)

	acceptance	competence	internal control	commitment
⇨ **experience**				
• job-related	.29**	.37*	---	.27*
• private	.49**	.40**	---	.39**
⇨ **cognitive ability**				
• fluid intelligence (figural)	---	---	---	---
⇨ **personality**				
• neuroticism	---	-.39**	---	-.20*
• conscientiousness	---	.23*	---	.20*
⇨ **social network**				
• contact frequency	.18*	---	---	---
⇨ **health**				
• psychological well-being	.23*	.23*	---	.21*
• vitality	---	.18*	---	---
⇨ **successful aging**			---	
• positive attitude towards aging	.26*	.28**	.18*	.32**

**$p < .01$; *$p < .05$.

Summary: Approved model paths (*selection*)



Summary and Perspectives

Established:

- Theoretical model of technology commitment ⇨ acceptance, competence, and control beliefs.
- Reliable measure of technology commitment.
- Convergent and discriminant validity of technology commitment.

To be done:

- Confirming predictive validity based on representative samples and subsamples with special needs.
- Application on GAL-scenarios.

Thank you very much for your attention.

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