Determinants of Health Information Literacy in Vocational School Students: The Role of Personal Beliefs

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What to expect…

Outline of importance of

- Health information literacy (HIL)
- Health-related locus of control (HLOC)
- Epistemic beliefs about medicine (EBAM)

Overview of research illustrating associations of HIL with

- HLOC
- EBAM
- sociodemographic characteristics

- Presentation of findings on
  - relation of HIL, HLOC, and EBAM in a sample of young adults,
  - controlling for effects of demographic characteristics.

Significance of health (information) literacy in young adulthood

Generally:

- Personal responsibility for health („informed patient“).
- Participation in decision-making and empowerment (Abel & Sommerhalder, 2015).
- Prevention of and successful psychosocial adjustment to illness (Jung, 2014).

Especially in emerging adulthood:

- Designing social environment beneficial to health (DeWalt & Hink, 2009).
- Dealing with information overload even in simple questions like nutrition, sports, sleep (Kickbusch, 2008).
- Setting course for everyday health behavior.

Younger age associated with more information-seeking behavior (Anker, Reinhart & Feeley, 2011), especially on the internet (Spadaro, 2003).

Problems regarding HIL in young adults

Current finding for young German adults regarding problematic or inadequate HL (Schaeffer, Vogt, Berens & Hurrelmann, 2016) in areas of

- Searching for information (47.1 %)
- Understanding information (35.7 %)
- Evaluating information (55.1 %)
- Using information (30.4 %)

Findings correspond with deficiency of information age students in

- conducting advanced information searches.
- judging on trustworthiness of health-related websites and articles.
- differentiating between information sources.

(Ivanitskaya, Boyle & Casey, 2006)

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Which factors are related to HIL?

1. Review of literature focusing on individual factors related to health information literacy and health information-seeking behavior.

2. Identification of three major categories:

   - Demographic characteristics
   - Psychological factors
   - Illness-related aspects

3. Development of theoretical model illustrating relationships between variables.

4. Examination of relationships by analyses of variance and correlations as well as multiple regression analyses.

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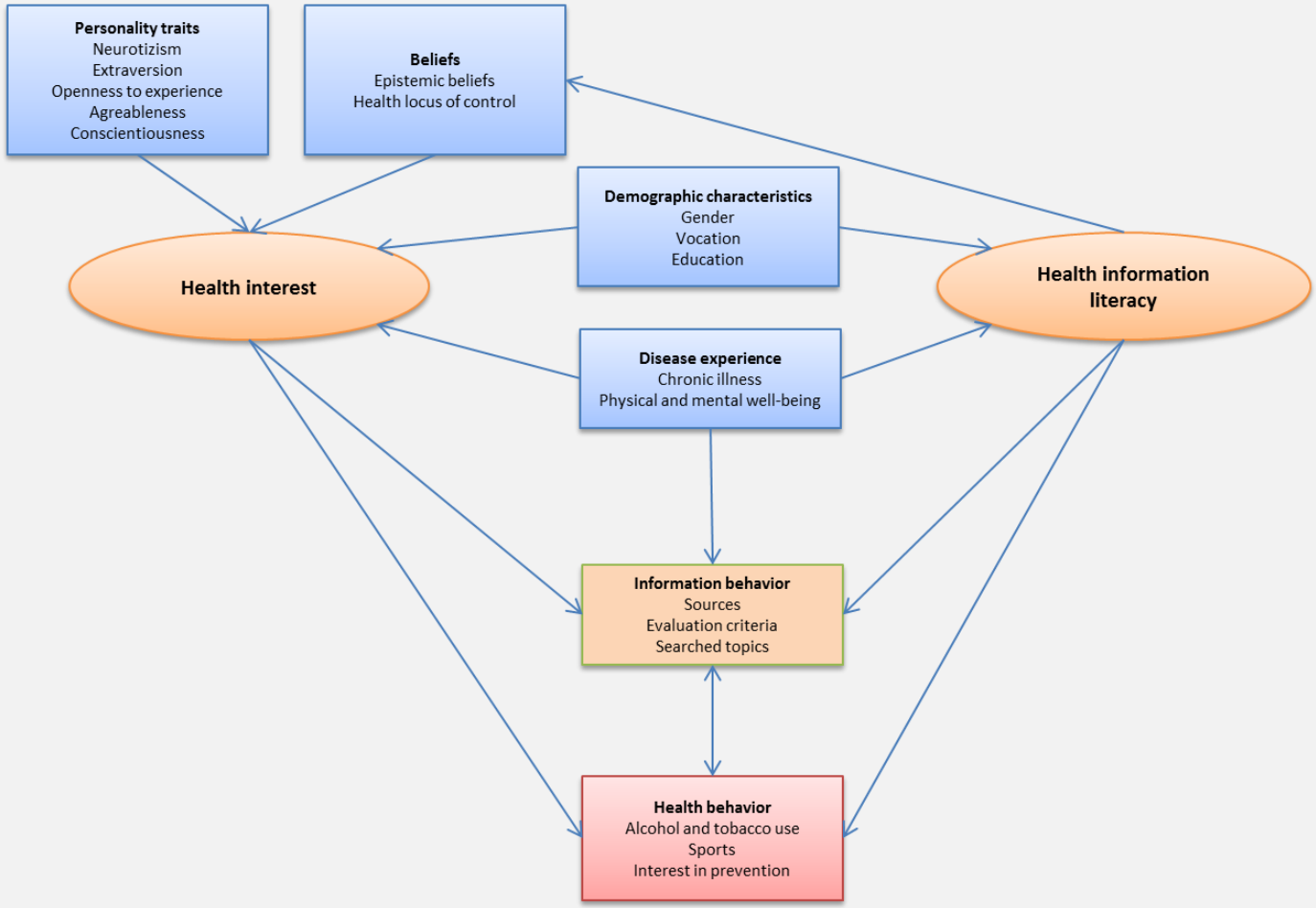
Theoretical model



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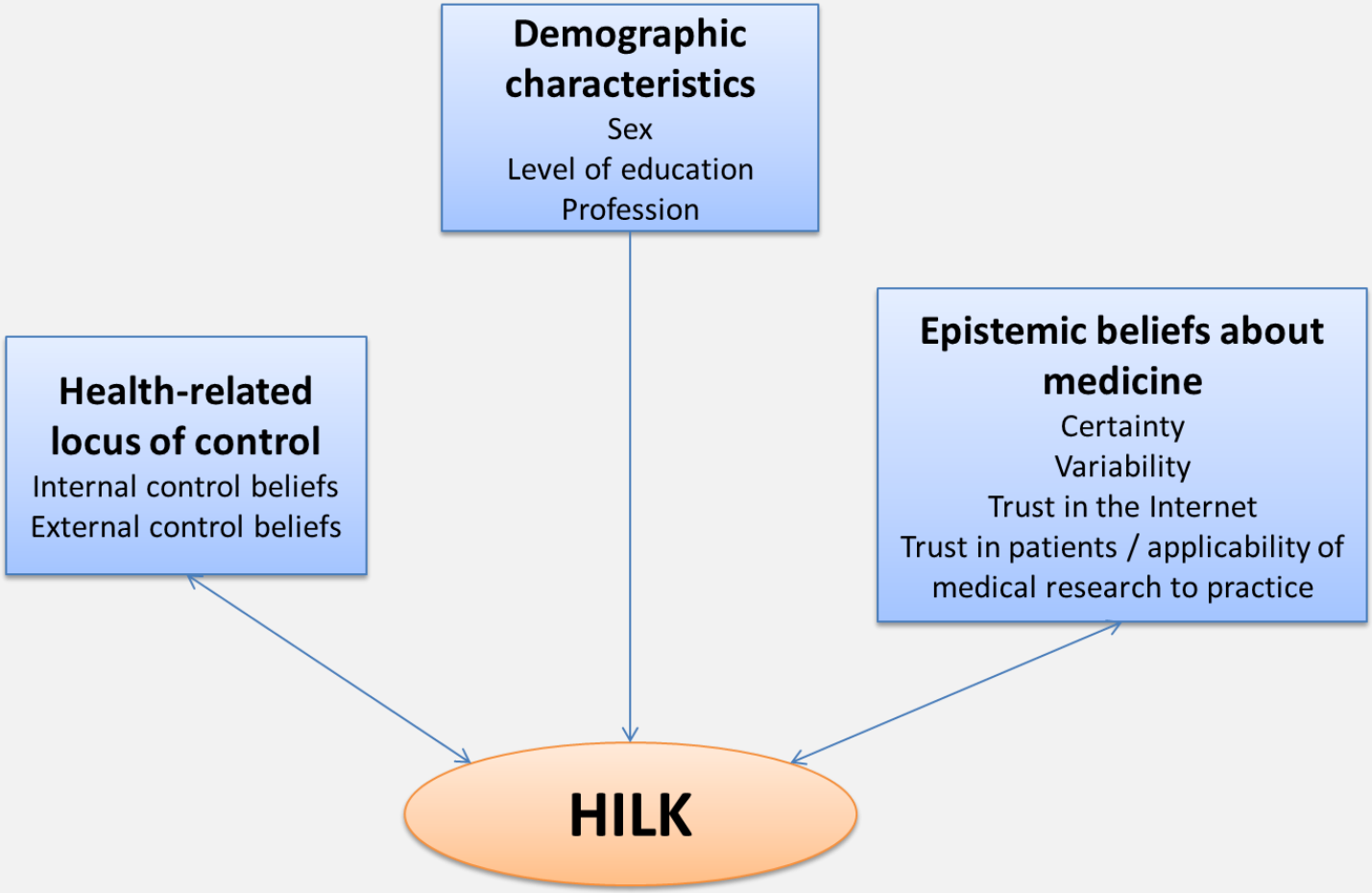
Model cutout focusing beliefs



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Health-related locus of control (HLOC)

Health Locus of Control: "Degree to which individuals believe that their health is controlled by internal versus external factors" (Wallston & Wallston, 1982, p. 62).

Two separate factors (Krampen, 1981):

- **Internal HLOC**: Belief in being able to control.
- **External HLOC**: Belief in dependence on circumstances (fate) or powerful others.

Influenced by previous experiences in particular situations and by generalized expectancies regarding reinforcement (Rotter, 1982).

Health-related locus of control (HLOC)

Relations of HLOC with HL, health information-seeking, and health behavior (see review by Oberle, 1991; de Brabander, Hellemans, Boone & Gerits, 1996):

Positive correlations of **internal HLOC** with

- life satisfaction
- participation desire
- adherence to health recommendations

Positive correlation of **external HLOC** with

- adherence

and negative correlation with

- desire for control over health care process

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Assumptions regarding health-related locus of control

Selected findings:

- HL $\overset{+}{\longleftrightarrow}$ internal and HL $\overset{-}{\longleftrightarrow}$ external locus of control (Tsai, Lee & Tsai, 2013).
- Internal HLOC $\longleftrightarrow$ information-seeking behavior (Ek & Heinström, 2011).
- Fatalistic view on health $\longleftrightarrow$ less motivation for information-seeking (Myrick, Willoughby & Verghese, 2016).
- Low external HLOC $\longleftrightarrow$ preference for information & decision (Hashimoto & Fukuhara, 2004).
- Information about health status $\overset{+}{\longleftrightarrow}$ internal HLOC
  $\overset{-}{\longleftrightarrow}$ external HLOC (Ferring & Filipp, 1989)

Hypotheses: Higher HIL is associated with

1a: higher internal health-related control beliefs

1b: lower external health-related control beliefs

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Epistemic beliefs about medicine

Epistemic beliefs: Assumptions about the nature of knowledge and the process of knowledge acquisition.

Reflective judgment model (King & Kitchener, 1994) of developmental stages:

1. **Pre-reflective** (knowledge is simple, concrete, and absolute)
2. **Quasi-reflective** (a reality exists that is known to authorities)
3. **Reflective** (temporary uncertainty; personal opinion is needed in judgment)

Epistemic beliefs about medicine

Epistemological beliefs as relatively independent dimesions (Hofer & Pintrich, 1997):

Structure of knowledge	**Certainty** (certain/right-wrong vs. tentative / evolving)
	Simplicity (simple vs. accumulation of interrelated facts)
Structure of knowledge acquisition	**Source** (authority vs. self as constructor of meaning)
	Justification (no justification required vs. knowledge constructs needing reevaluation)

Epistemic beliefs about medicine

Domain-specific epistemic beliefs: Differences between scientific fields (e.g., computer sciences vs. psychology; Birke, Rosman & Mayer, 2016).

Elements of medicine-specific epistemic beliefs (EBAM, Kienhues & Bromme, 2012)

1. **Certainty** of medical knowledge
2. **Variability** of medical knowledge
3. **Credibility** of the internet as source of knowledge
4. **Trust in medical experts** and applicability of medical knowledge

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Assumptions regarding epistemic beliefs (EB) in medicine

Selected findings:

- EB ⟷ handling of information (e.g., in decision-making) & ⟷ experience (Kienhues, Stadtler & Bromme, 2010).
- EB ⟷ dealing with conflicting information, search techniques, and source appraisal (Whitmire, 2003).
- Competent research approaches ⟷ trust in Internet as information source (Kammerer, Amann & Gerjets, 2015).
- Ill-structured problems: EB ⟷ information-seeking & processing (Roex & Degryse, 2007; Rosman, 2016).

Hypotheses: Higher HIL is associated with

2a: lower perceived certainty and stability of medical knowledge

2b: higher trust in the internet as a possible source of reliable information

2c: lower trust in the general authority of medical experts.

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Assumtions regarding demographic characteristics

Selected findings:

- **Gender**: Female ⟶ health information-seeking & information needs (e.g. review by Tong, Raynor & Aslani, 2014, Ek & Heinström, 2011, Eurobarometer, 2014). HL a little better in women (HLS-EU Consortium, 2012).
- **Education**: Higher level of education ⟷ larger HIL (Eriksson-Backa, 2014; Schaeffer et al, 2016). Educational attainment ⟷ frequency of health information-seeking behavior (Wang, Viswanath, Tai, Wang & Chan, 2013).
- **Vocation**: HIL ⟷ experiences with and knowledge about health and illness (Berkman, Divis & McCormack, 2010).

Hypotheses: Higher HIL is associated with

3a: female gender.

3b: higher level of education.

3c: health-related vocations.

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Sample

N = 352 adolescents and young adults (60.2 % female) aged 16 to 34 years (*M* = 20.8, *SD* = 3.15).

Direction of vocational school	Vocation	female	male	total
Economy and administration	Retailers	35	23	58
	Tax accountant assistants	34	20	54
Technical occupations	Electricians industrial engineering	-	26	26
	Bath technology assistants	7	14	21
	Automotive mechatronics technicians	4	33	37
	Industrial mechanics	1	17	18
	Photographers	14	2	16
	Laboratory chemists	9	5	14
Health	Medical assistants	86	-	86
	Dental assistants	22	-	22
				352

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Assessment scales

Variables	Assessment instrument	Scales	Number of items	Reliability (α)
Demographic characteristics (age, level of education, profession)	Questionnaire			
Epistemic beliefs	Epistemic Beliefs about Medicine (EBAM, Kienhues & Bromme, 2012), German version	Certainty Variability Trust in the Internet Trust in patients	9 5 3 3	.78 .71 .66 .85
Health-related locus of control	Health-Related Locus of Control Questionnaire (FEGK, Ferring & Filipp, 1989)	Internal control External control	16 13	.68 .80
Health information literacy knowledge	Health Information Literacy Knowledge Test (HILK, Mayer & Holzhäuser, 2015)		24	.72

Effects of demographic characteristics tested by analyses of variance

Gender:

No significant effects.

Vocation:

No significant effects.

Education:

Significant effect for level of education $F_{(2,315)} = 21.74$ ($p < .001$), $d = .38$.

Higher educational attainment → greater health information literacy ($p < .001$ for both comparisons).

Effect can be found in every vocational group.

Health vocations: Only significant difference between lowest and highest educational attainment.

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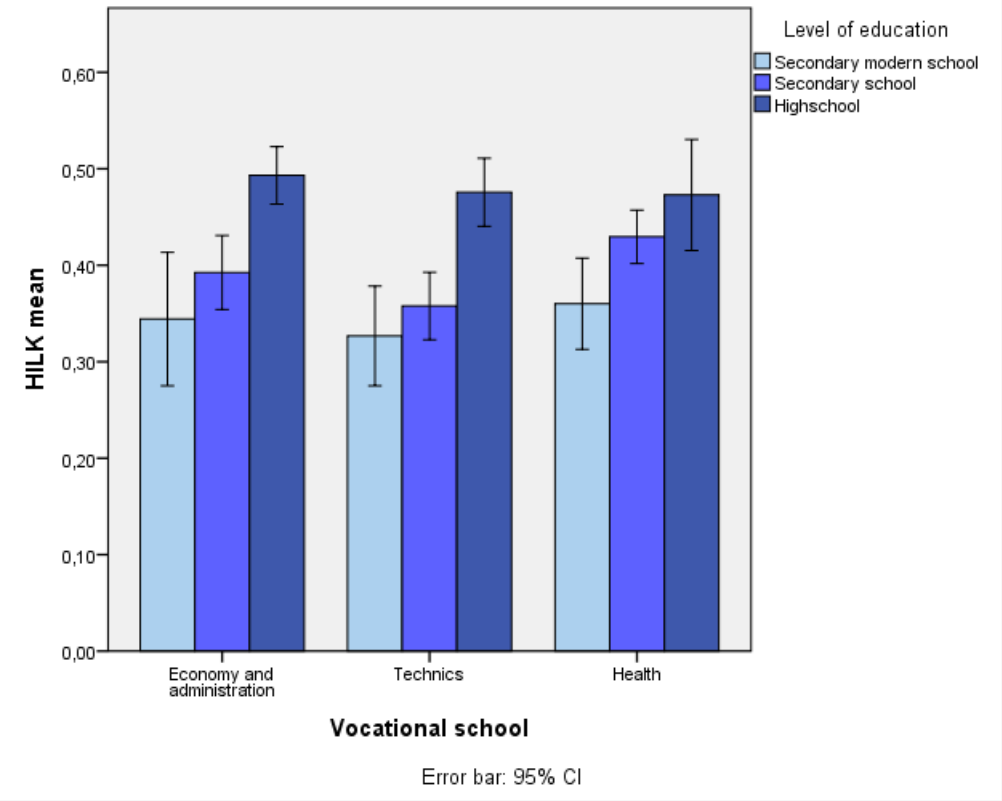
HIL in subjects with different vocational orientation and level of education



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Correlations

- Correlation of HILK with locus of control:

	N	r	p
Internal HLOC	317	-.01	.801
External HLOC	317	-.12	**.033**

- Correlation of HILK with epistemic beliefs:

	N	r	p
Certainty	315	-.11	.059
Variability	315	.33	**.000**
Trust in the Internet	315	-.16	**.004**
Trust in practical value of medical science and in patients	315	-.08	.148

N = sample size, r = Pearson's correlation coefficient, p = significance level (red figures: p < .05).

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Regression analysis

	b	CI b		SE b	β	p
Constant	0.35	0.17	0.52	0.09		.001
Block I						
Gender	-0.02	-0.05	0.02	0.02	-.06	.330
Age	0.00	0.00	0.01	0.00	.04	.492
Block II						
Secondary modern school (9 years)	-0.11	-0.15	-0.07	0.02	-.32	**.001**
Secondary school (10 years)	-0.08	-0.11	-0.04	0.02	-.30	**.001**
Vocational school for economy and administration	-0.01	-0.04	0.03	0.02	-.02	.726
Vocational school for technics	-0.02	-0.07	0.02	0.02	-.09	.267
Block III						
Internal HLOC	0.00	-0.03	0.02	0.01	-.01	.897
External HLOC	-0.02	-0.04	0.00	0.01	-.11	**.039**
Block IV						
Certainty	0.01	-0.02	0.03	0.01	.03	.557
Variability	0.06	0.04	0.08	0.01	.28	**.001**
Trust in the Internet	-0.01	-0.03	0.01	0.01	-.07	.183
Trust in practical value of medical science and in patients	-0.02	-0.04	0.00	0.01	-.09	.098

b = regression coeffizient, CI b = confidence interval, SE b = standard error, β = standardized beta, R^2 = coefficient of determination, p = significance level (red figures: p < .05). Regression coefficient: R^2 = .29.

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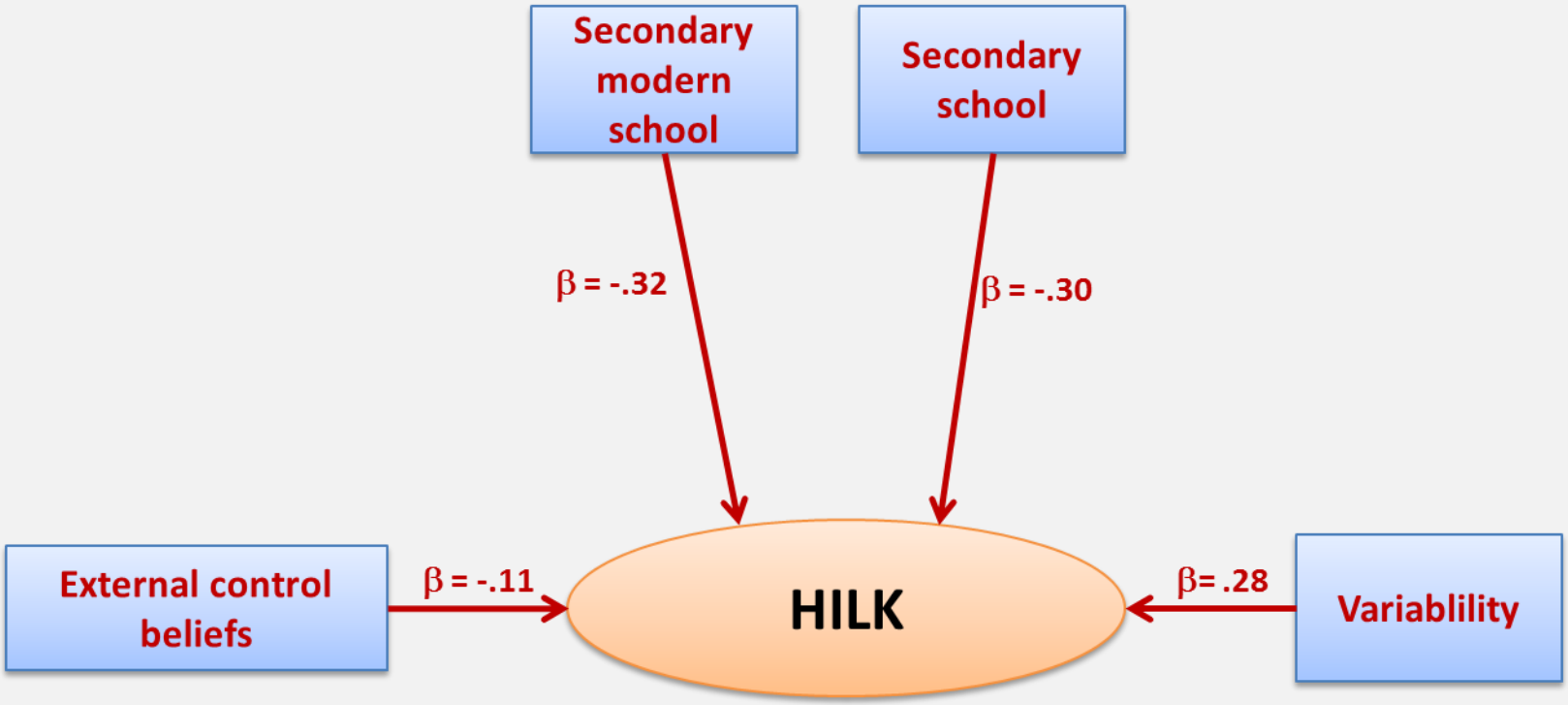
Significant relationships



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Conclusions

- Impact of education, but not of vocation:
  - Significance of school education.
  - Possibly mediated by intelligence.
- Negative correlation with external HLOC:
  - More knowledge / skills → less belief in fate / dependence on others.
  - High external HLOC → no search behavior & no corrective experiences.
- Relationship to variability and certainty of knowledge:
  - Sophisticated research → insight in dynamics of knowledge.
  - Awareness of dynamics → motivation for information-seeking.
  - Higher HILK → trend to awareness of subjective opinions.
  - Belief in uncertainty → need of knowledge / skills in information evaluation.

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Conclusions

- Promotion of HIL in healthy young adolescents should aim at
  - addressing health information literacy skills in school education.
  - challenging belief in certainty and stability of medical knowledge, thereby increasing motivation for information-seeking and evaluation.
  - reducing external HLOC that may prevent acquisition of health information literacy and information-seeking behavior.

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