
Pro-environmental behavior and attitudes – conception and application

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Content

I Introduction (Peter Krause)

Innovative Data Modules –

- GeNECA [Sustainable Consumption: Car use / Organic Food]
- GEB-Scale (Adaptive Test)
- Descriptives [Results]

II GeNECA-Modul (Torsten Masson)

- Conception (Splits; Theory of Planned Behavior)
- Empirical Tests & Results

III GEB-Scale (Sigmar Otto)

- Campbell-Paradigm
- GEB-Scale – Methods and Assumptions
- Further Comments

II GEB-Scale

Idea of the General Ecological Behavior Scale by Kaiser:

- GEB scale: a composite of 50 performances (32 Items with 5 response possibilities and 18 yes/no Items)
- Delta=Itemdifficulty
- Campbell Paradigm: Behavior=Attitude

Six performance domains:

Consumerism

Energy conservation

Mobility and transportation

Waste avoidance

Recycling

Vicarious, social behaviors toward conservation

• Source: Kaiser, F. and Wilson, M. (2004): *Goal-directed conservation behavior: the specific composition of a general performance.* Personality and Individual Differences , Vol.36, p.1531–1544

II GEB-Scale

Itemtext	Response format	Score	Delta
I ride a bicycle or take public transportation to work or school	never;seldom;occasionally;often;always	0;0;0;1;1	0.05
I buy meat and produce with eco-labels	never;seldom;occasionally;often;always	0;0;0;1;1	1.46
I prefer to shower rather than to take a bath	never;seldom;occasionally;often;always	0;0;0;1;1	-1.9
I buy beverages in cans	never;seldom;occasionally;often;always	1;1;0;0;0	-1.43
I use an oven cleaning spray to clean my oven	never;seldom;occasionally;often;always	1;1;0;0;0	-0.89
I wait until I have a full load before doing my laundry	never;seldom;occasionally;often;always	0;0;0;1;1	-2.45
I drive my car in or into the city	never;seldom;occasionally;often;always	1;1;0;0;0	0.46
In the winter, I leave the windows open for long periods of time to let in fresh air	never;seldom;occasionally;often;always	1;1;0;0;0	0.04
I wash dirty clothes without prewashing	never;seldom;occasionally;often;always	0;0;0;1;1	-0.98
I drive on freeways at speeds under 100 kph (%62.5 mph)	never;seldom;occasionally;often;always	0;0;0;1;1	1.55
If I am offered a plastic bag in a store, I take it	never;seldom;occasionally;often;always	1;1;0;0;0	1.4
In nearby areas (around 30 km; around 20 miles), I use public transportation or ride a bike	never;seldom;occasionally;often;always	0;0;0;1;1	0.75
I collect and recycle used paper	never;seldom;occasionally;often;always	0;0;0;1;1	-2.78
I bring empty bottles to a recycling bin	never;seldom;occasionally;often;always	0;0;0;1;1	-3
I have pointed out unecological behavior to someone	never;seldom;occasionally;often;always	0;0;0;1;1	1.52
I contribute financially to environmental organizations	never;seldom;occasionally;often;always	0;0;0;1;1	2.55
I buy milk in returnable bottles	never;seldom;occasionally;often;always	0;0;0;1;1	2.12
I buy bleached and colored toilet paper	never;seldom;occasionally;often;always	1;1;0;0;0	0.04
I buy convenience foods	never;seldom;occasionally;often;always	1;1;0;0;0	-0.64
I buy products in refillable packages	never;seldom;occasionally;often;always	0;0;0;1;1	-0.42
I buy domestically grown wooden furniture	never;seldom;occasionally;often;always	0;0;0;1;1	0.73
I boycott companies with an unecological background	never;seldom;occasionally;often;always	0;0;0;1;1	0.49
I buy seasonal produce	never;seldom;occasionally;often;always	0;0;0;1;1	-1.42
I use a clothes dryer	never;seldom;occasionally;often;always	1;1;0;0;0	-0.26
I read about environmental issues	never;seldom;occasionally;often;always	0;0;0;1;1	1.81
I talk with friends about problems related to the environment.	never;seldom;occasionally;often;always	0;0;0;1;1	1.5
For longer journeys (more than 6 h), I take an airplane	never;seldom;occasionally;often;always	1;1;0;0;0	0
I keep the engine running while waiting in front of a railroad crossing or in a traffic jam	never;seldom;occasionally;often;always	1;1;0;0;0	-0.92
At red traffic lights, I keep the engine running	never;seldom;occasionally;often;always	1;1;0;0;0	0.98
I kill insects with a chemical insecticide	never;seldom;occasionally;often;always	1;1;0;0;0	-0.54
In winter, I turn down the heat when I leave my apartment for more than 4 h	never;seldom;occasionally;often;always	0;0;0;1;1	0.14
I drive to where I want to start my hikes	never;seldom;occasionally;often;always	1;1;0;0;0	-0.11

II GEB-Scale

Itemtext	Response format	Score	Delta
I reuse my shopping bags	yes;no	1;0	-3.84
In the winter, I keep the heat on so that I do not have to wear a sweater	yes;no	0;1	-0.75
I use fabric softener with my laundry	yes;no	0;1	0.22
I put dead batteries in the garbage	yes;no	0;1	-2.51
After meals, I dispose of leftovers in the toilet	yes;no	0;1	-1.13
I use a chemical air freshener in my bathroom	yes;no	0;1	-0.29
I am a member of an environmental organization	yes;no	1;0	1.97
In hotels, I have the towels changed daily	yes;no	0;1	-1.63
I own energy efficient household devices	yes;no	1;0	-1.36
After a picnic, I leave the place as clean as it was originally	yes;no	1;0	-4.07
I bought solar panels to produce energy	yes;no	1;0	3.65
I have already looked into the pros and cons of having a private source of solar power	yes;no	1;0	0.98
I requested an estimate on having solar power installed	yes;no	1;0	2.46
I use renewable energy sources	yes;no	1;0	1.91
I refrain from owning a car	yes;no	1;0	1.79
I am a member of a carpool	yes;no	1;0	3.26
I drive in such a way as to keep my fuel consumption as low as possible	yes;no	1;0	-1.43
I own a fuel-efficient automobile (less than 7 l per 100 km; i.e., less than 3 gallons per 100 miles)	yes;no	1;0	0.9

II GEB-Scale

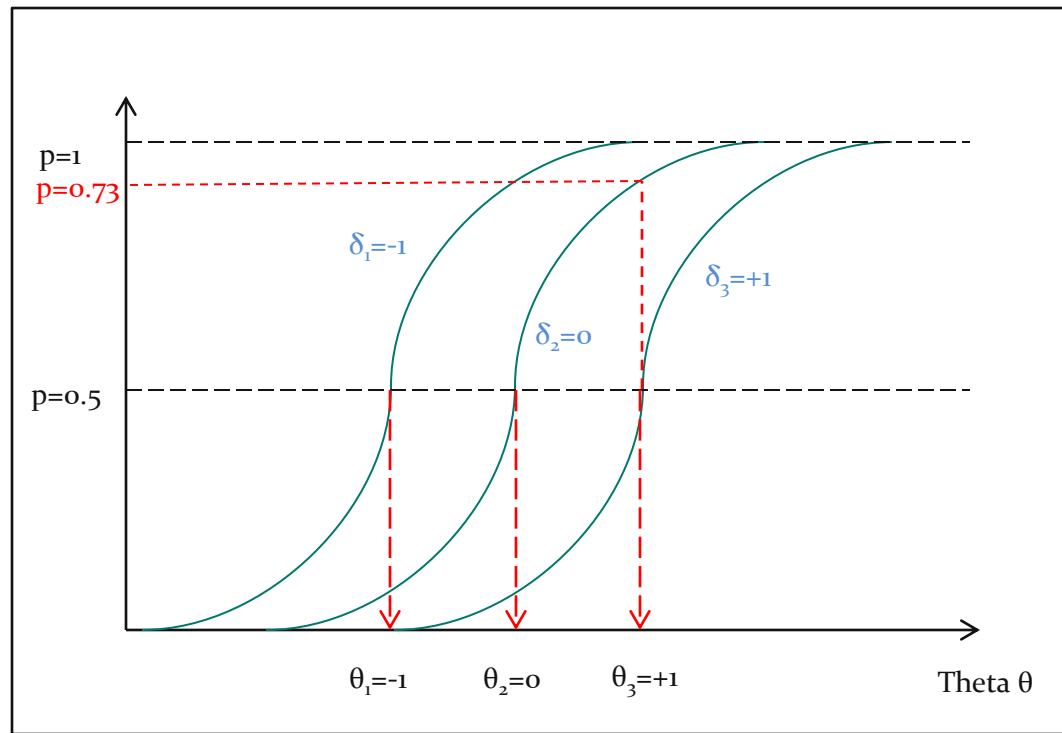
Method:

- Based on the Rasch-Model:
 - Describes the probability of performing a certain activity. That can be determined through the arithmetic difference between the strength of the environmental attitude and the difficulty of a specific behavior. Dies wird durch die arithmetische Differenz zwischen der Stärke der Umwelteinstellung und dem Schwierigkeitsgrad eines betrachteten Verhaltens ermittelt (S.354).
 - Differences in the behavior are included through the probabilistic nature of the item-responser-model. Unterschiede im Verhalten werden durch die probabilistische Natur des Item-Response-Modells berücksichtigt (beim deterministischen ist dies nicht der Fall) (S.353-354).
 - The costs of a certain behavior are stochastic (independent of the person). Die Kosten für ein bestimmtes Verhalten sind stochastisch (unabhängig von der Person) (S. 354)

Quelle: Kaiser, F., Byrka, K. und Hartig, T. (2010): Reviving Campbell´s Paradigm for Attitude Research. *Personality and Social Psychological Review*, Volume 14, Nr. 4, S. 351-367

II GEB-Scale

Graphic: Rasch-Model



II GEB-Scale

- Mathematische Darstellung des Zusammenhangs zwischen der Umwelteinstellung einer Person und der Wahrscheinlichkeit eine bestimmte Handlung zu tatigen:

$$\ln \left(\frac{p_{ki}}{1 - p_{ki}} \right) = \theta_k - \delta_i$$

Der naturliche Logarithmus vom Verhaltnis der Wahrscheinlichkeit der Person k eine bestimmte Handlung i zu tatigen zu der Wahrscheinlichkeit diese zu unterlassen ($1-p_{ki}$) (seine Odds) ist gegeben durch die Differenz zwischen dem Einstellungsgrad der Person k (θ_k) und dem Schwierigkeitsgrad dieser Handlung i (δ_i) (S.354).

Quelle: Kaiser, F., Byrka, K. und Hartig, T. (2010): Reviving Campbell's Paradigm for Attitude Research. *Personality and Social Psychological Review*, Volume 14, Nr. 4, S. 351-367

II ECO_Behavior

Sustainable Consumption

- Having a car (yes/no)
- Restricted car use
- Buy organic food

Eco[logical]_Be[havior] (Mean of [item score x item difficulty])

- EcoBe_con[sumption]
- EcoBe_mob[ility]
- EcoBe
- Theta

II GEB-Scale

	Theta	EcoBe	EcoBe_Con	EcoBe_Mob	EcoBe_Rec	EcoBe_En	EcoBe_SoBe	EcoBe_Wa	Car yes/no	Give up car	Buy organic
Theta	1.0000										
	476										
EcoBe	0.8474*	1.0000									
	476	476									
EcoBe_Con	0.5556*	0.6386*	1.0000								
	475	475	475								
EcoBe_Mob	0.4720*	0.4925*	0.1308*	1.0000							
	476	476	475	476							
EcoBe_Rec	0.1990*	0.2024*	0.0953	0.0636	1.0000						
	204	204	204	204	204						
EcoBe_En	0.4169*	0.4874*	0.1818*	0.0969*	-0.0872	1.0000					
	475	475	474	475	204	475					
EcoBe_SoBe	0.4546*	0.5241*	0.2626*	0.0722	-0.0734	0.1508*	1.0000				
	370	370	369	370	99	369	370				
EcoBe_Wa	0.2833*	0.3211*	0.1422*	0.0460	0.1480*	0.0687	0.2193*	1.0000			
	457	457	456	457	203	456	351	457			
Car yes/no	-0.0438	-0.0023	0.1287*	-0.1467*	0.2036*	0.0245	0.1721*	-0.1466*	1.0000		
	234	234	234	234	109	233	172	223	560		
Give up car	0.2745*	0.1697*	0.1369	0.3009*	0.0225	0.0280	-0.0716	0.0893	.	1.0000	
	177	177	177	177	83	177	125	168	417	417	
Buy organic	0.3737*	0.3363*	0.2905*	0.1270*	0.0909	0.1080	0.2990*	0.0575	.	.	1.0000
	292	292	291	292	117	291	239	282	139	0	

IV Descriptives

IV Descriptive: Age Groups

Age	Theta	EcoBe	EcoBe_Con	EcoBe_Mob
17-34	-0,1	1,7	1,5	1,7
35-49	0,0	1,8	1,8	1,7
50-64	0,2	1,9	2,0	1,8
65+	0,2	1,9	2,1	1,6
Total	0,1	1,9	1,9	1,7
Range	[-2,1 - 4]	[0,3- 4,1]	[0 – 5,2]	[0 – 4,1]

Age	Car yes/no	Give up car	Buy organic
17-34	0,6	2,8	2,3
35-49	0,8	2,6	2,7
50-64	0,8	3,0	2,4
65+	0,7	2,9	2,4
Total	0,8	2,8	2,4
Range	[0 - 1]	[1- 5]	[1 – 5]

IV Descriptive: Educationlevels

Education	Theta	EcoBe	EcoBe_Con	EcoBe_Mob
No degee	-0,3	1,4	1,0	1,9
Sec. Modern School	0,1	1,8	1,9	1,7
Middle School	0,0	1,8	1,8	1,7
A-Level	0,2	2,0	2,0	1,7
No vocational education	-0,0	1,7	1,5	1,8
Vocational training	0,1	1,8	1,9	1,7
University	0,4	2,1	2,3	1,6
Total	0,1	1,9	1,9	1,7
Range	[-2,1 - 4]	[0,3- 4,1]	[0 – 5,2]	[0 – 4,1]

IV Descriptive: Educationlevels

Education	Car yes/no	Give up car	Buy organic
No degee	0,4	3,0	1,7
Sec. Modern School	0,7	2,8	2,1
Middle School	0,8	2,8	2,5
A-Level	0,8	2,9	2,9
No vocational education	0,4	3,0	2,0
Vocational training	0,8	2,7	2,4
University	0,9	3,0	3,0
Total	0,8	2,8	2,4
Range	[0 - 1]	[1- 5]	[1 – 5]

V First Results: Characteristics

	Theta	EcoBe	EcoBe_Con	EcoBe_Mob
Sex [female]				
male	-0.0137	0.0226	-0.1678	0.1042
Age	0.0233	0.0109	0.0123	0.0082
Age²	-0.0002	-0.0001	-0.0000	-0.0000
Equiv. HH-Income (log)	-0.0483	0.0055	0.1780	-0.0807
Educ [sec. modern school]				
No degree	-0.1487	-0.2349	-0.4112	0.1475
Middle School	0.0001	0.0180	0.0010	0.0015
A-Level	0.0386	0.0748	-0.1522	0.1136
Vocational educ [vocational training]				
None	-0.0242	-0.0389	-0.2414	0.1440
University	0.2285+	0.1851+	0.4399*	-0.1877
Health [satisfying]				
bad	0.0887	0.0217	-0.0085	-0.0264
good	0.1831+	0.1164+	0.2446+	0.0910
Migration background [no]				
yes	-0.0445	-0.0862	-0.1860	0.0286
Origin [Westgermany]				
Eastgermany	-0.2501*	-0.3016***	-0.7113***	-0.1189

V First Results: Characteristics

	Theta	EcoBe	EcoBe_Con	EcoBe_Mob
Empl [part time]				
Full time	-0.2077	-0.1667	-0.1235	-0.2252
Others	-0.0983	-0.1361	-0.3270	-0.0161
Unemployed	-0.3599	-0.1990	-0.1023	-0.1508
Not working	-0.2063	-0.1911+	-0.0960	-0.2324
Kids in household [no]				
yes	-0.1899+	-0.1124	-0.0741	0.0391
Region [suburban]				
Urban	-0.1811+	-0.1175	-0.1099	-0.1555
Rural	-0.1153	-0.0343	0.0541	-0.0629
Constant	-0.0758	1.6172***	0.3352	2.1105*
R²	0.1011	0.1186	0.1570	0.0301
Adjusted R²	0.0569	0.0753	0.1155	-0.0175
N	428	428	427	428

V First Results: Characteristics

	Car yes/no	Give up car	Buy organic
Sex [female]			
male	1.1436***	-0.0005	-0.3735***
Age	0.1320**	0.0193	0.0199
Age²	-0.0011**	-0.0002	-0.0002
Equiv. HH-Income (log)	1.2700***	-0.3830*	0.2350*
Educ [sec. modern school]			
Others	-0.0744	-0.0215	-0.1403
Middle School	0.1511	0.1576	0.1959
A-Level	0.2074	0.1582	0.4307***
Vocational educ [vocational training]			
None	-0.9153**	0.4595+	-0.3322*
University	-0.3298	0.2616	0.1344
Health [satisfying]			
bad	0.3596	-0.1742	0.0995
good	0.3236	0.1064	0.1057
Migration background [no]			
yes	-0.5680	-0.0783	-0.1095
Origin [Westgermany]			
Eastgermany	-0.5920	-0.2047	0.1536

V First Results: Characteristics

	Car yes/no	Give up car	Buy organic
Empl [part time]			
Full time	0.6601	-0.2003	-0.0699
Others	0.1908	-0.2943	0.1015
Unemployed	-0.8420	-0.4627	-0.2894
Not working	-0.4636	-0.0346	0.1218
Kids in household [no]			
Yes	1.3361***	-0.4564*	-0.0267
Region [suburban]			
Urban	-0.5138	0.0330	-0.1025
Rural	0.1332	0.2118	-0.5590***
Constant	-11.8910***	5.2462***	0.4647
R²	Pseudo R²	0.0507	0.1525
Adjusted R²	0.2677	-0.0018	0.1248
N	508	383	633

V First Results – (Relations - Attitude)

Theta	m_Basic	m1_nep	m2_nepaut	m3_self-id
nep_balanc		-.0670319		
nep_limits		-.0636824		
nep_ecocri		-.0304921		
nep_aexemp		.1123692		
nep_aanthr		.0724184		
nep				
sdt_aut				
nep*aut				
Self-id 1				
Self-id 2				
Self-id 3				
Self-id 4				
Constant	-0.0758	-.2081974		
R ²	0.1011	0.1200		
Adjusted R ²	0.0569	0.0648		
N	428	425		

* p<0.05; ** p<0.01; *** p<0.001

(Basic Model: Socio-demographic/-economic characteristics + (In)eq.H-Inc.)

V First Results – (Relations - Attitude)

EcoBe	m_Basic	m1_nep	m2_nepaut	m3_self-id
nep_balanc		.0052199		
nep_limits		-.0558488		
nep_ecocri		-.0041227		
nep_aexemp		.0680096		
nep_aanthr		.0545		
NEP				
sdt_aut				
Nep*aut				
Self-id				
<i>Constant</i>	<i>1.6172***</i>	<i>1.368389*</i>		
<i>R</i> ²	0.1186	0.1374		
<i>Adjusted R</i> ²	0.0753	0.0834		
<i>N</i>	428	425		

* p<0.05; ** p<0.01; *** p<0.001

(Basic Model: Socio-demographic/-economic characteristics + (In)eq.H-Inc.)

V First Results – (Relations - Attitude)

EcoBe_Con	m_Basic	m1_nep	m2_nepaut	m3_self-id
nep_balanc		-.0508514		
nep_limits		-.0226393		
nep_ecocri		.0685142		
nep_aexemp		.0484095		
nep_aanthr		.0360089		
NEP				
sdt_aut				
Nep*aut				
Self-id				
<i>Constant</i>	0.3352	.0278345		
<i>R</i> ²	0.1570	0.1589		
<i>Adjusted R</i> ²	0.1155	0.1060		
<i>N</i>	427	424		

* p<0.05; ** p<0.01; *** p<0.001

(Basic Model: Socio-demographic/-economic characteristics + (In)eq.H-Inc.)

V First Results – (Relations - Attitude)

EcoBe_Mob	m_Basic	m1_nep	m2_nepaut	m3_self-id
nep_balanc		.0534931		
nep_limits		-.0641036		
nep_ecocri		-.06016		
nep_aexemp		.0584097		
nep_aanthr		.1143916		
NEP				
sdt_aut				
Nep*aut				
Self-id				
<i>Constant</i>	<i>2.1105*</i>	<i>1.900026*</i>		
<i>R</i> ²	0.0301	0.0470		
<i>Adjusted R</i> ²	-0.0175	-0.0128		
<i>N</i>	428	425		

* p<0.05; ** p<0.01; *** p<0.001

(Basic Model: Socio-demographic/-economic characteristics + (In)eq.H-Inc.)

V First Results – (Relations - Attitude)

Car yes/no	m_Basic	m1_nep	m2_nepaut	m3_self-id
nep_balanc		.0351277		
nep_limits		.0402581		
nep_ecocri		-.0334539		
nep_aexemp		-.0214935		
nep_aanthr		-.0354925		
NEP				
sdt_aut				
Nep*aut				
Self-id				
<i>Constant</i>	<i>3.0841***</i>	<i>3.072827***</i>		
<i>R</i> ²	0.2686	0.2752		
<i>Adjusted R</i> ²	0.2386	0.2373		
<i>N</i>	508	505		

* p<0.05; ** p<0.01; *** p<0.001

(Basic Model: Socio-demographic/-economic characteristics + (In)eq.H-Inc.)

V First Results – (Relations - Attitude)

Give up car	m_Basic	m1_nep	m2_nepaut	m3_self-id
nep_balanc		-.1268342		
nep_limits		-.1450734		
nep_ecocri		.1526062		
nep_aexemp		-.0085597		
nep_aanthr		.0357374		
NEP				
sdt_aut				
Nep*aut				
Self-id				
<i>Constant</i>	<i>5.2462***</i>	<i>5.537723***</i>		
<i>R</i> ²	0.0507	0.0589		
<i>Adjusted R</i> ²	-0.0018	-0.0070		
<i>N</i>	383	383		

* p<0.05; ** p<0.01; *** p<0.001

(Basic Model: Socio-demografic/-economic characteristics + (In)eq.H-Inc.)

V First Results – (Relations - Attitude)

Buy organic	m_Basic	m1_nep	m2_nepaut	m3_self-id
nep_balanc		.0362948		
nep_limits		-.1357946		
nep_ecocri		-.0224777		
nep_aexemp		.0275161		
nep_aanthr		.1894654*		
NEP				
sdt_aut				
Nep*aut				
Self-id				
<i>Constant</i>	0.4647	.1176587		
<i>R</i> ²	0.1525	0.1690		
<i>Adjusted R</i> ²	0.1248	0.1345		
<i>N</i>	633	628		

* p<0.05; ** p<0.01; *** p<0.001

(Basic Model: Socio-demografic/-economic characteristics + (In)eq.H-Inc.)



Thank you for your attention!

VI Resumé

- The Subsample of the German Innovation Sample (SOEP-IS) –as part of the longitudinal data infrastructure of the German Socio-economic Panel study (SOEP) provides in 2012 a new module on direct CA-measures and related concepts based on high level representative data.

General information

- From 2013 on, SOEP will determine the contents of SOEP-IS through a competitive refereed application process for the “best” research questions and their operationalizations, and will distribute the SOEP-IS data as part of its regular data releases.
(Richter/Schupp SOEPpapers 463, 2012)

II Kaiser-Skala

Vor- und Nachteile: Rasch-Modell

Nachteile:

- Das Rasch-Modell konnte die klassische Testtheorie jedoch nicht ablösen (nach Rost), da
- Die Ergebnisse häufig sehr stark übereinstimmen
- Geringe Zusatznutzen wird mit erheblichem Zusatzaufwand „erkauf“ (S. 212)

Quelle: Bortz, J. und Döring, N. (2006): Forschungsmethoden und Evaluation für Human- und Sozialwissenschaftler. 4. Auflage, Springer Medizin Verlag

26 [Auto]The next questions are about another subject.

Do you have a car?

Please choose **only one** of the following:

- Yes
- No

27 [Auto 2]How often did you cover distances in your hometown by bike, by foot or by public transport within the past 3 months? Did you do so never, rarely, sometimes, often or almost always?

Only answer this question if the following conditions are met:

°Answer was 'Yes' at question '26 [Auto]' (The next questions are about another subject. Do you have a car?)

Please choose **only one** of the following:

- Never
- Rarely
- Sometimes
- Often
- Almost always

39 [Häufigk. Biolebensm.] Let us talk about another subject.

How often did you buy certified organic food within the past 3 months? Did you do so never, rarely, sometimes, often or almost always?

Please choose **only one** of the following:

- Never
- Rarely
- Sometimes
- Often
- Almost always

III Attitudes

We measure and analyze the attitude with:

- the New Ecological Paradigm,
- the Self-Determination Theory and the questions about
- Self-identity

III Attitudes

(revised) NEP – New Ecological Paradigm

The NEP claims to determine the environmental attitude and the interaction of humans and nature.

The revised NEP-Scale (from Dunlap et al. 2000) is designed to measure the fundamental views of people. The central question is, to which amount do they rate humans to be part of the nature or rather see them separate from the nature? It consists of 15 Items whereby three items represent five hypothesized facets of an ecological worldview. Those subscales are the reality of limits to growth, anti-anthropocentrism, the fragility of nature's balance, rejection of exemptionalism and the possibility of eco crisis.

(Literature: Dunlap et al. 2000)

III Attitudes

SDT – Self Determination Theory

The Self-Determination Theory (SDT) claims that an understanding of human motivation requires a consideration of innate psychological needs for competence, autonomy, and relatedness. It is concerned primarily with explaining the psychological processes that promote optimal functioning and health.

One of the main concepts to measure SDT issues is the Basic Psychological Needs Scale from Deci/Ryan (2000). We use the general form of the scale in a reduced set of items (9 items in total, 3 items for each dimension). Further domain-specific SDT-scales refer to work and relationships.

(Literature i.a. Deci/Edward L., Ryan/Richard M. (2000))

III Attitudes

Self-Identiy

25 [Selbst-Bild] And to which extent do the following statements apply to your person?

Please choose the appropriate response for each item:

	1 totally disagree	2	3	4	5 totally agree
The gentle handling of the nature plays an important role to me.	<input type="radio"/>				
We often talk about environmental subjects within my personal environment.	<input type="radio"/>				
It is important to me that others know my opinion towards environmental protection.	<input type="radio"/>				
It is important to me that persons who I care about have a similar opinion towards environmental protection than me.	<input type="radio"/>				

VI Resumé (1/3)

- The Subsample of the German Innovation Sample (SOEP-IS) –as part of the longitudinal data infrastructure of the German Socio-economic Panel study (SOEP) provides in 2012 a new module on direct CA-measures and related concepts based on high level representative data.

General information

- From 2013 on, SOEP will determine the contents of SOEP-IS through a competitive refereed application process for the “best” research questions and their operationalizations, and will distribute the SOEP-IS data as part of its regular data releases.
(Richter/Schupp SOEPpapers 463, 2012)