



**RadoNorm**  
Managing risks from radon and NORM

*On-line, interactive training course  
The art of public opinion survey analysis:  
Surveying the public on Radon & NORM*

April 2021



## **Day 1: How to Design a questionnaire in line with research questions?**

**26 April 2021**

<https://zoom.us/j/92190920610?pwd=bGNlcmxUcSs3aTBVeFpOT2l4eWFFQT09>

<b>Time (CET)</b>	<b>Activity</b>	<b>Lead</b>
09:00-09:05	Course Opening and Welcome	Peter
09:05-09:30	Introduction of participants	Melisa and all
09:30-10:30	Conceptualization, indexing, operationalization (L)	Peter
10:30-10:45	<i>Break (15 minutes)</i>	
10:45-11:50	Do's and don'ts of questionnaire construction (L)	Peter
11:50-12:00	Boost Risk Barometer questionnaire (L)	Tanja
12:00-13:30	<i>Break (1 hour 30 minutes)</i>	
13:30-13:40	Instructions for individual and group work	Plenary
13:40-14:00	Make own nomological netw. based on boost Risk Barometer (IW)	Individual
14:00-15:00	Discussion nomological network (GW)	Break-out Group
15:00-15:45	Plenary presentation of results (GW)	Plenary

## Day 2: Lots of polls in the air: Sampling Design

27 April 2021

<https://zoom.us/j/92190920610?pwd=bGNlcmxUcSs3aTBVeFpOT2l4eWFFQT09>

Time (CET)	Activity	Lead
09:00-10:00	Sample – Population: response rate, bias (L)	Peter
10:00-10:45	Public Opinion Survey from idea to results (L)	Tanja
10:45-11:00	<i>Break (15 minutes)</i>	
11:00-11:20	Short Explorative Online Surveys (L)	Melisa
11:20-12:00	Commissioning a public opinion survey (L)	Catrinel
12:00-13:30	<i>Break (1 hour 30 minutes)</i>	
13:30-13:35	Instructions for individual and group work	Plenary
13:35-15:45	Choosing from polling firm offers (GW)	Tanja, Peter
15:45-16:00	Summary/Quiz	Melisa, Peter

**Day 3: Analysis of survey data: A statistical primer**

**28 April 2021**

<https://zoom.us/j/92190920610?pwd=bGNlcmxUcSs3aTBVeFpOT2l4eWFFQT09>

<b>Time (CET)</b>	<b>Activity</b>	<b>Lead</b>
09:30-10:30	Instructive Statistical Quiz (part 1)	Peter, Catrinel
10:30-10:45	<i>Break (15 minutes)</i>	
10:45-12:00	Instructive Statistical Quiz (part 2)	Peter, Catrinel
12:00-13:30	<i>Break (1 hour 30 minutes)</i>	
13:30-16:00	Q&A “statistical issues I always wanted to understand” (IW and GW)	Peter, Tanja, Melisa, Catrinel

#### **Day 4: Analysis of survey data: Exploratory Techniques**

**29 April 2021**

<https://zoom.us/j/92190920610?pwd=bGNlcmxUcSs3aTBVeFpOT2l4eWFFQT09>

<b>Time (CET)</b>	<b>Activity</b>	<b>Lead</b>
09:30-10:30	Exploratory measurement techniques; reliability	Peter
10:30-10:45	<i>Break (15 minutes)</i>	
10:45-12:00	Factor analysis, cluster analysis	Peter
12:00-13:30	<i>Break (1 hour 30 minutes)</i>	
13:30-13:35	Instructions for individual and group work	Plenary
13:35-15:45	Group 1: Testing latent constructs of own nomological network (SPSS)	Peter, Melisa
	Group 2: Evaluating national reports	Tanja, Peter
15:45-16:00	Summary/Quiz	

**Day 5: Analysis of survey data: Confirmatory techniques**

**30 April 2021**

<https://zoom.us/j/92190920610?pwd=bGNlcmxUcSs3aTBVeFpOT2l4eWFFQT09>

**Time (CET)**

**Activity**

**Lead**

09:30-10:30 Confirmatory measurement techniques; model fit, differences

Peter

10:30-10:45 *Break (15 minutes)*

10:45-12:00 Confirmatory measurement techniques; model fit, differences

Peter

12:00-13:30 *Break & Course Evaluation (1 hour 30 minutes)*

13:30-13:35 Instructions for individual and group work

Plenary

13:35-15:45 Group 1: Testing latent constructs in own nomological network (Mplus)

Peter, Melisa

Group 2: Evaluating research papers

Tanja, Peter

15:45-16:00 Wrap up of the course and closure

Peter, Tanja, Melisa



**RadoNorm**  
Managing risks from radon and NORM

*Conceptualization, indexing, operationalization  
& the do's and don'ts of survey questionnaire  
construction*

Peter Thijssen  
Monday 26 April 2021



## 7 deadly sins of survey research: 1 & 2

1. Thou shall not ask in a survey what one can better learn another way ... unless you are interested in response bias.
2. Thou shall not forget that the direction of an opinion (agree – disagree) is not so meaningful if the issue at hand is not salient for the respondent.





## 7 deadly sins of survey research: 3 & 4

3. Thou shall not blindly focus on behaviour because attitudes are the underbelly segment of the opinion iceberg.

4. Thou shall not blindly believe that newer survey data are per definition better than older ones. In this respect secondary analysis is not second-rate.



## 7 deadly sins of survey research: 5 & 6

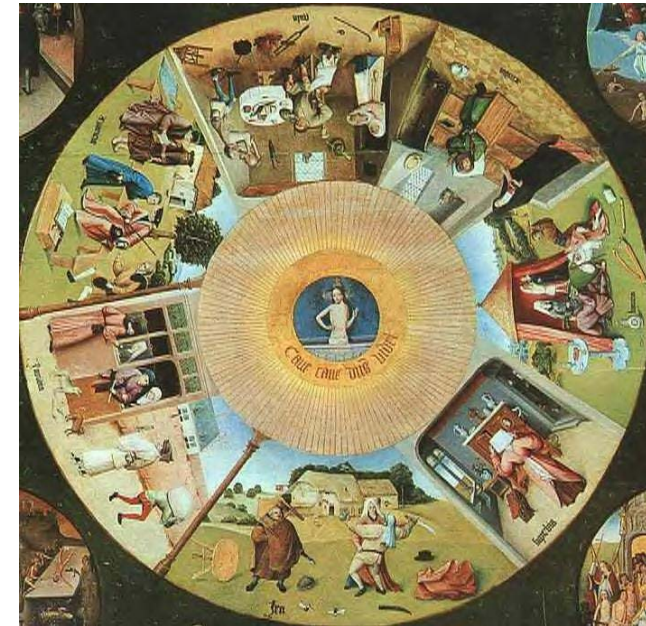
5. Thou shall not believe that respondents should have an opinion on everything. Democratic individualism in survey research often produces permissive consensus.

6. Thou shall be aware of the fact that the public may mean different things. Big N studies of the public at large are not necessarily superior.



## 7 deadly sins of survey research: 7

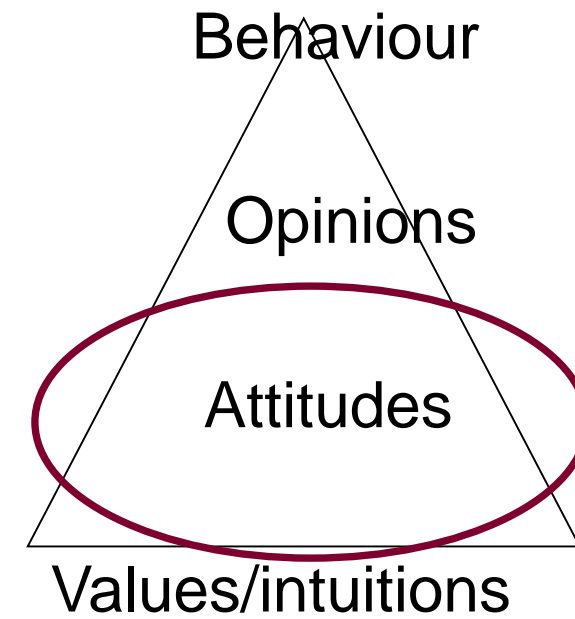
7. Thou shall not listen to answers without first scrutinizing the questions. Often you get what you asked for...



## Public Opinion Pyramid



THE VERY RARE, ICEBERG DUCK.



## Measurement – What's in a name?

‘measurement consists of rules for assigning symbols to objects in order to numerically represent quantities of variable attributes’

-> variable attribute (inter-subjective of inter-temporal) = **variable**

-> variables can be more or less abstract

**continuum from manifest to latent**

eg. sex versus individualism



## Examples of Radonorm attitudes and behaviour:

- Risk perception
- Internal efficacy
- External efficacy
- Risk awareness
- Attitude towards science and technology
- Intention to test
- Intention to take mitigating action
- Issue saliency of health
- Political cynicism
- Trust
- Social norms

# Attitudes

## What's in a name?

‘A learned predisposition to behave in a consistently favorable or unfavorable manner with respect to a given object’

(Fishbein & Ajzen, 1975)

Learned predisposition:

Mode of the attitude:

Consistency

Object:

Former experiences

cognition, affection, evaluation, conation

How consistent is the attitude?

Cf. Nonattitudes

Referent of the attitude

specific - diffuse

# Measuring in survey research

## Three crucial steps

- A. Conceptualization – nomological network
- B. Indexing – question wording
- C. Operationalization – answering form(at)



## Measurement: When is it adequate?

A measurement should be standardised, repeatable, valid, and reliable.

**Standardization** => formal rules, formal procedure

1) Procedure for **latent constructs**

A. Conceptualization B. Indexing and C. Operationalization

2) Procedure for **indexes**

A. Indexing B. conceptualization and C. operationalization

Measurement in survey research:  
Going through the three crucial steps

## A. Conceptualization

### 1. Construct validity - Attitudes

Example 'efficacy in reducing radiation risks'

Attitude **modus**: efficacy=power, other approach=powerless (+ of -)

**Locus of control**: internal or external

Attitude **referent**: very specific (Radon in house) or rather diffuse (all radiation risks – naturally occurring and other)

## A. Conceptualization

### 2. Nomological network

Primarily **theory-driven**

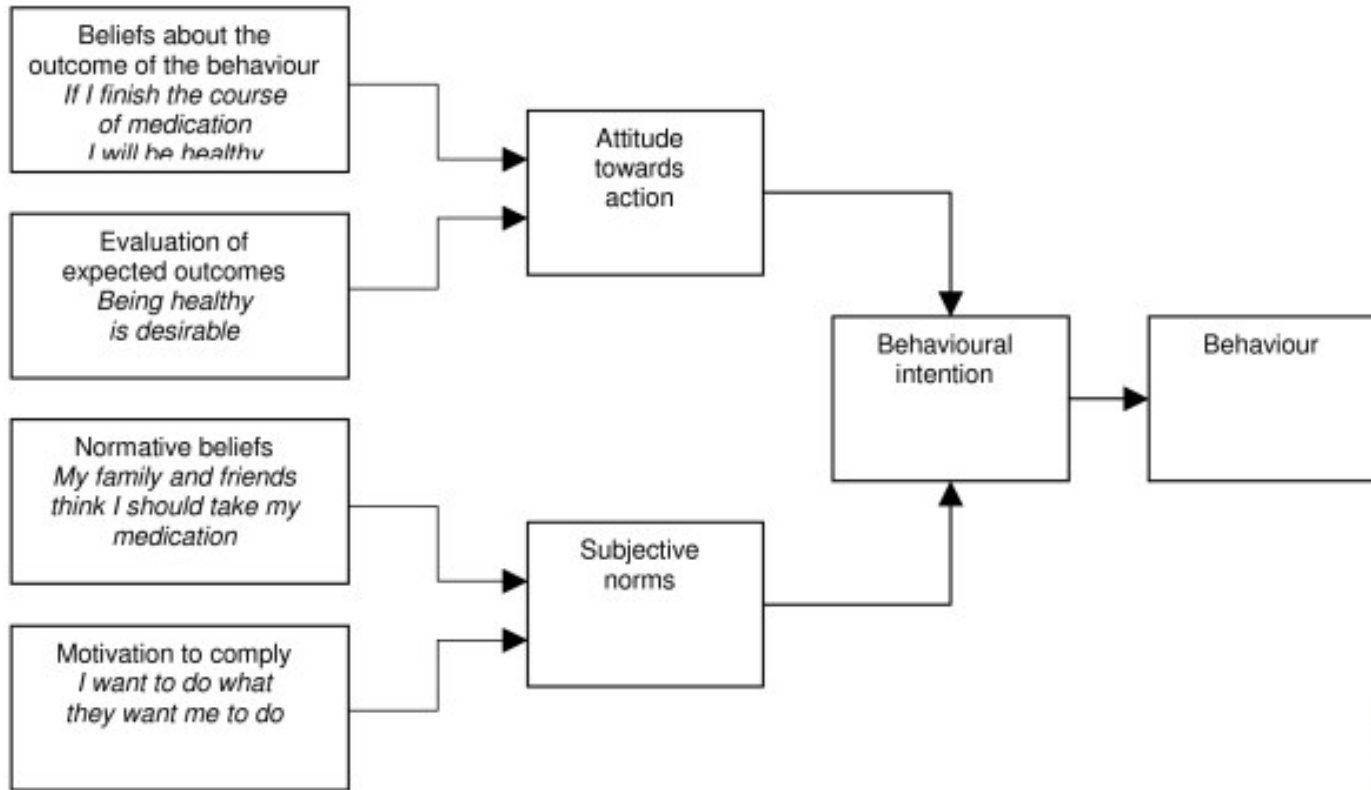
- > '*nomological network*' of the latent constructs
  - specifying causal and dimensional relationships
- funnel of causality: from more general to more specific
- from less context dependent to more context dependent
  
- > *dimensionality* of the latent construct
  - exploratory
  - confirmatory

Theoretical 'psychometric' models: from rational to bounded rational

## A. Conceptualization

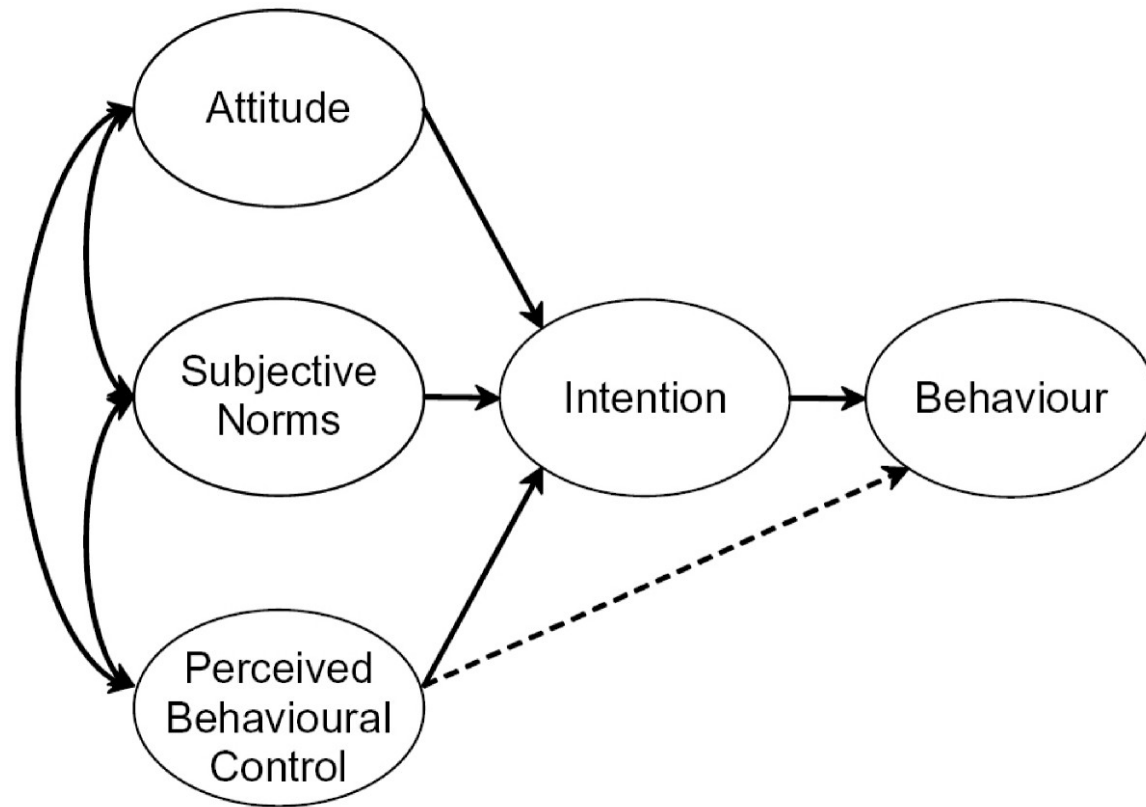
### 2. Nomological network

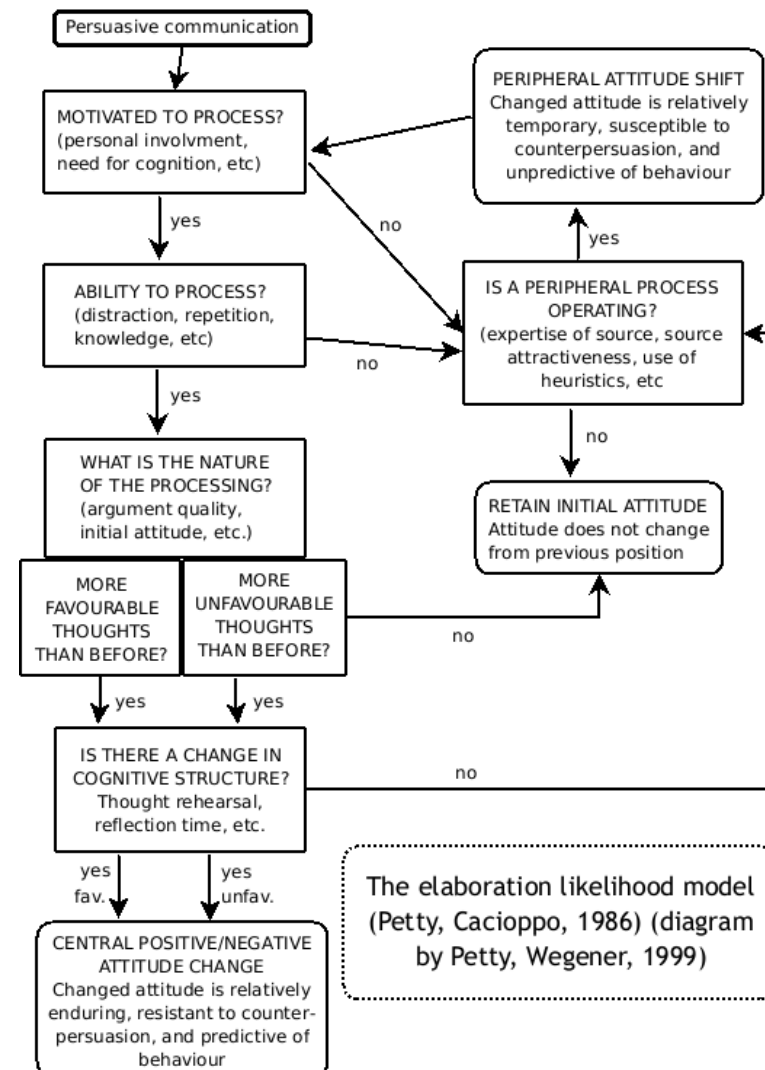
#### 2.1 Theory of reasoned action (Fishbein & Ajzen)



Adapted from Stroebe, 2000

A. Conceptualization  
2. Nomological network  
2.2 Theory of planned behaviour  
(Ajzen)





The elaboration likelihood model  
(Petty, Cacioppo, 1986) (diagram  
by Petty, Wegener, 1999)

## A. Conceptualization

### 2. Nomological network

#### 2.3 Elaboration likelihood model (ELM) (Petty & Cacioppo)



# A. Conceptualization

## 2. Nomological network

### 2.4 Receive Accept Sample model (RAS) (Zaller)

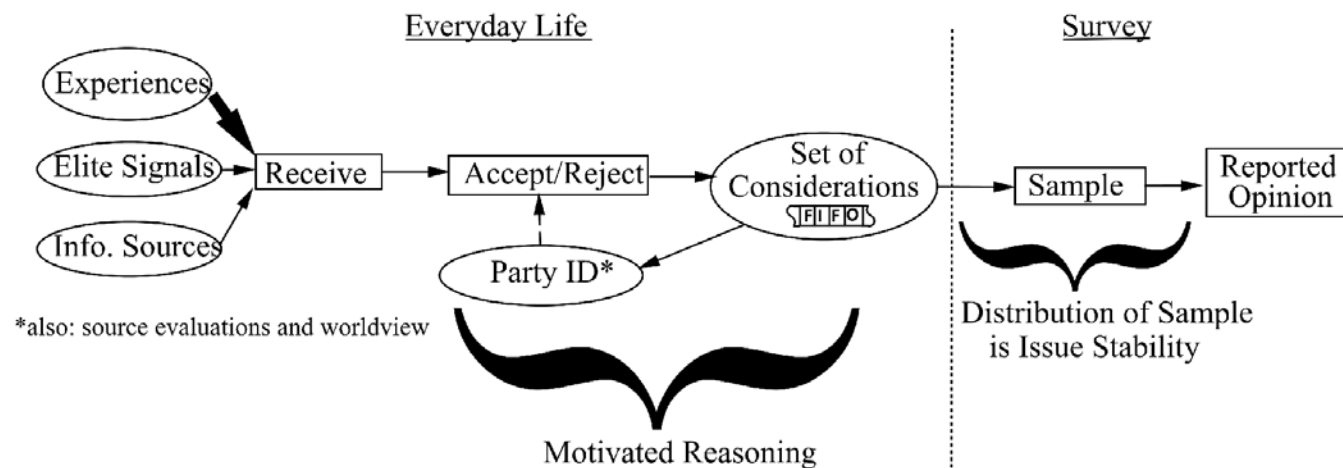


Figure 2.1: The flow of political information through the mind of an individual, based on Zaller's (1992) Receive-Accept-Sample (RAS) model. Rectangles represent ephemeral processes that information flows through; ovals represent stable stores of information (or sources of information). Solid arrows indicate information flow; the one dashed arrow indicates a cause and effect (i.e., partisan identification and worldview affect which pieces of information are accepted or rejected). The FIFO symbol under "Set of Considerations" represents the computer science term "First In-First Out" queue and is a simplistic representation of the human brain's memory capability.



A. Conceptualization  
2. Nomological network

2.5 The challenge of choice blindness experiments  
and intuitionism

- *Choice blindness* is the failure to detect a discrepancy between a choice and its outcome.
- Petter Johansson et al.
  - taste of jam or the smell of tea (2010)
  - political attitudes and vote intentions (2013)
- Jonathan Haidt 'The emotional dog and its rational tail', 2001)
  - Classical model: 1, Affect; 2, Reasoning; 3, Judgement
  - Social intuitionist model: 1, social intuition; 2, Judgement; 3, Reasoning

## A. Conceptualization

### 2. Nomological network

#### An introductory exercise: 'Brexit'

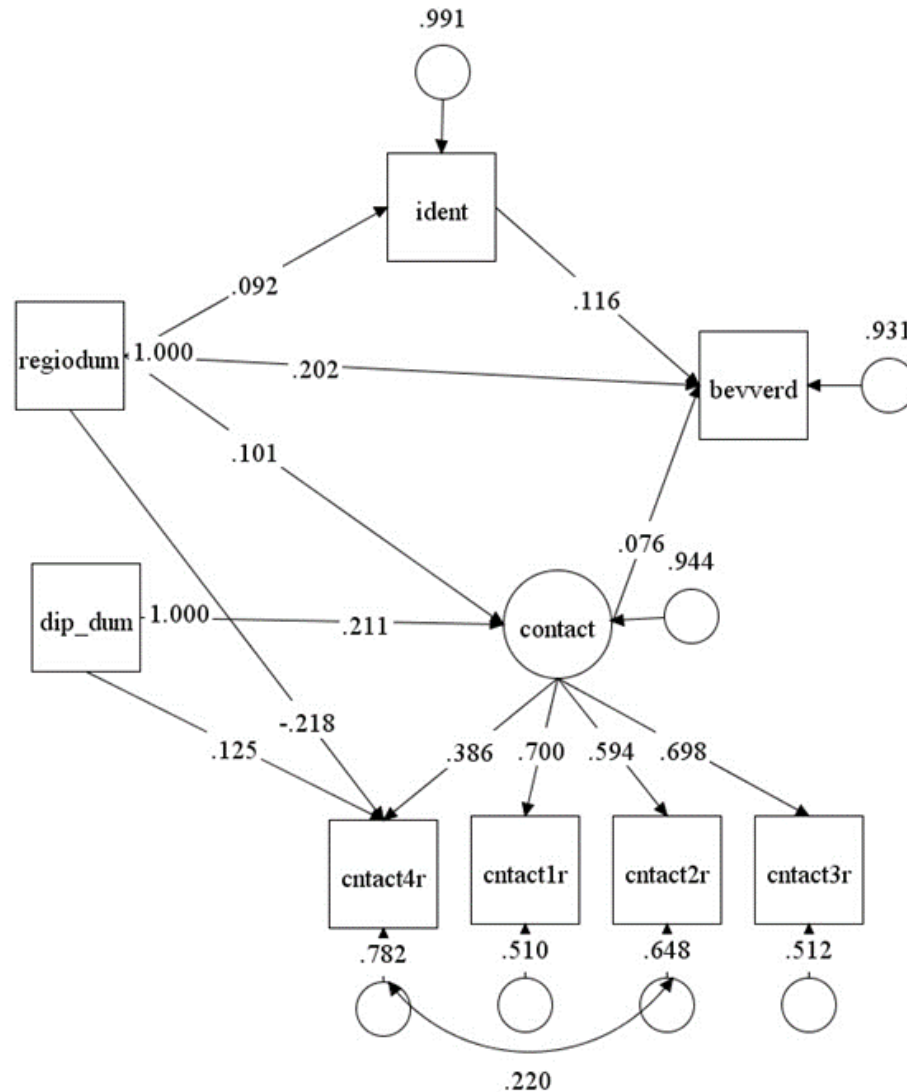
Suppose we have 8 variables: How would you link them conceptually?

- Bevervd = a single indicator with 11 categories, ranging from 0 ('Transfer all competencies to the European level' and 10 ('All competencies for the national state').
- Dip\_dum = educational level (1 = higher education, 0 = lower)
- Regiodum= lives in certain country/region (1 = UK, 0 = not in UK)
- Ident = Geographical or cultural identity you identify the most ?  
(1 = Europe; 0 = other entity => Recoded indicator with 9 entities)
- Cntact1r = frequency of going to other countries for pleasure/leisure during the last 5 years
- Cntact2r = frequency of visiting friends or relatives abroad during the last 5 years
- Cntact3r = frequency of going shopping abroad during the last 5 years
- Cntact4r = frequency of using/consulting media sources from other countries during the last 5 years  
(1 = weekly; 2= monthly; 3= annually; 4= less than annually; 5= never)

# A. Conceptualization

## 2. Nomological network

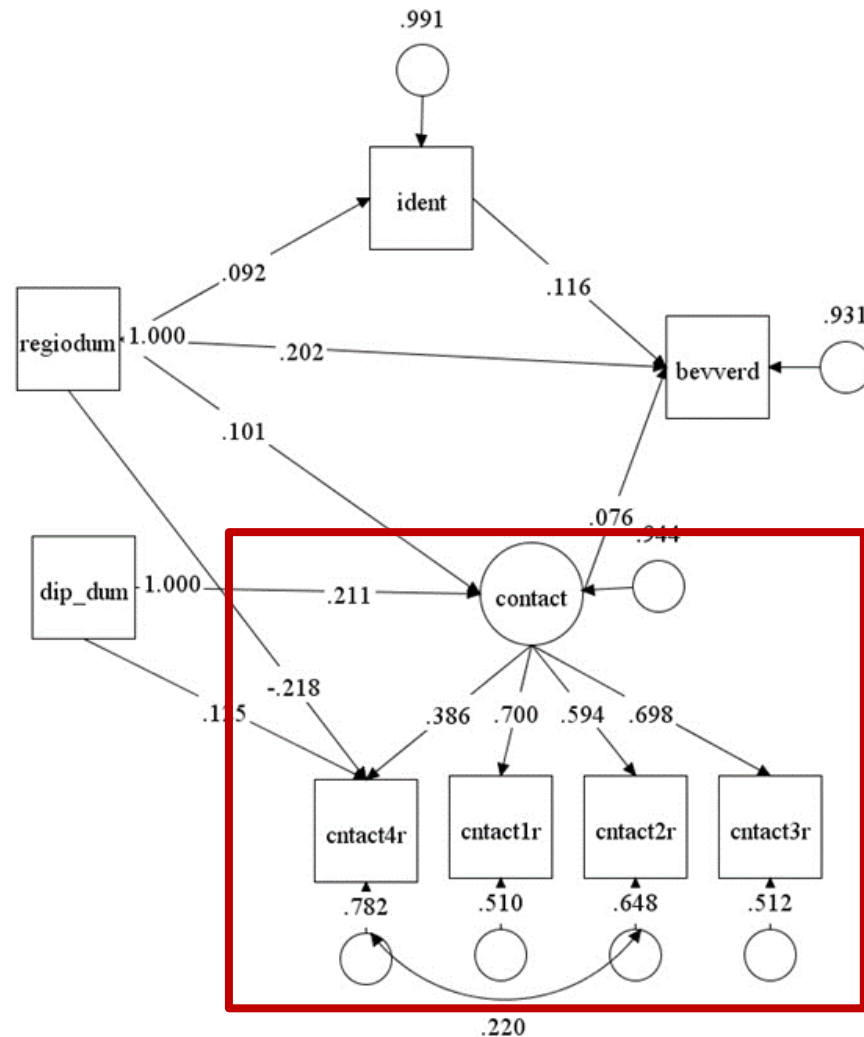
An introductory exercise: 'Brexit'  
Path diagram



## A. Conceptualization

### 2. Nomological network

An introductory exercise:  
'Brexit' – Path diagram

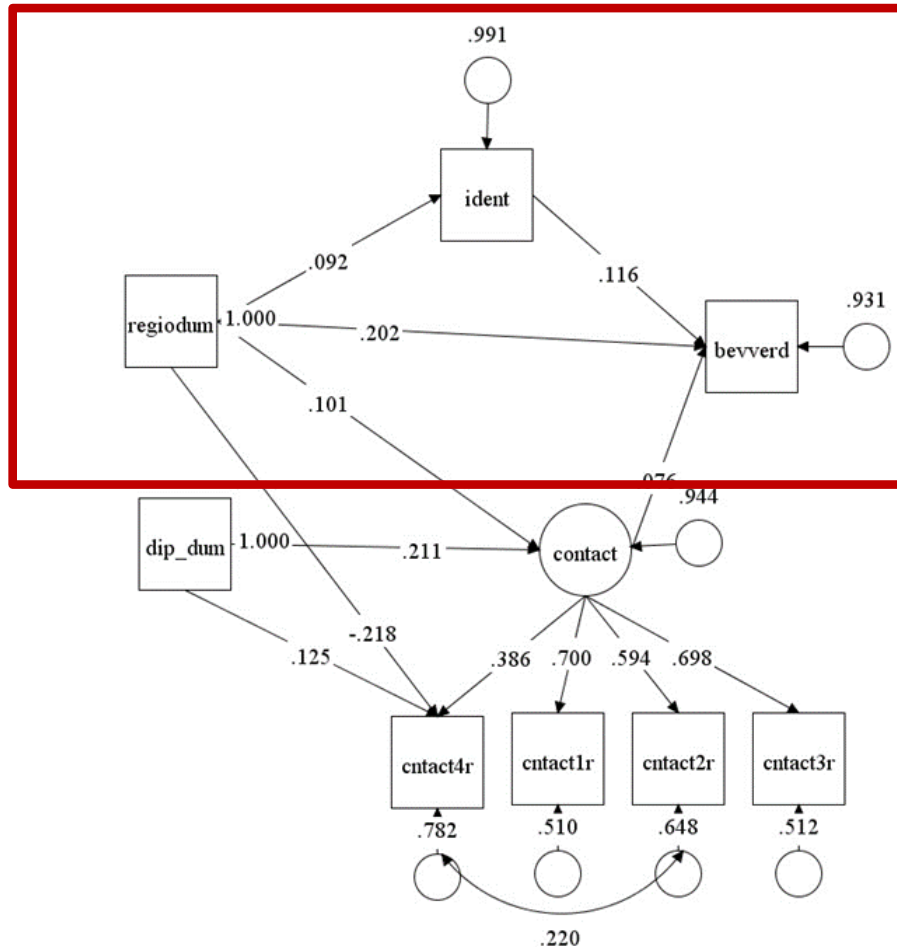


Measurement  
model

# A. Conceptualization

## 2. Nomological network

An introductory exercise: 'Brexit' – Path diagram



Explanatory causal model

## B. Indexing

### 1. Adequate indicators

Adequate indicators?

1. A question of **validity**

-> '*construct validity*'; 'do I measure what I intend to measure?'

content validity – face validity

criterion validity

(discriminant, convergent, known-group)

2; A question of **cumulativity**

-> '*incremental validity*'; 'quality of the measurement in terms of other existing instruments'

ESS, EVS, WVS, National Risk Barometers (SCK-CEN)

## B. Indexing

### 2a. Item wording: Problem solving

- *How do you evaluate the legislative work regarding Radon of the European Parliament and the Commission?*
  - *Problem: Double barreled question: evaluating two things at the same time*
  - *Solution: Two seperate questions*
  - *However sometimes it does not matter:*
  - *Value-norm question (Human value scale, Schwarz, 1997)*

*How much are you like this person?*

*Looking after the environment is important to him/her. He/she strongly believes that people should care for nature.*

B. Indexing  
2b. Item wording: Problem solving

- *What is the best book you read last year?*

Problem: Implicit assumption -> Respondents actually read books.

People don't want to appear stupid...

Solution: Add filter question

*Did you read books last year?*

If yes: *What is the best book you read last year?*



## B. Indexing

### 3a. Scale construction

**Scaling** implies the use of multiple indicators to measure one or more latent constructs

Why=

- 1) evaluating different levels of a latent construct
- 2) getting rid of measurement error

## B. Indexing

### 3b. Unidimensional Scale construction

Ideal?? A **unidimensional** scale

Easy

scale scores = sum of individual item scores

Alternative:

scale scores = individual item scores weighted with factor(regression)scores

Necessity: Assessing the dimensionality of a set of indicators => **factoranalyse**

B. Indexing  
3c. Scale construction  
example 'political efficacy' (NES)

Q61.a There's no sense in voting; the *parties* do what they want to do anyway.

No opinion= 5; missing= 1 - tone

Q61.b *Parties* are only interested in my vote, not in my opinion.

No opinion= 6; missing= 2 - tone

Q61.c If people like me let the *politicians* know what we think, then they will take our opinion into account.

No opinion= 52; missing= 1 + tone => balancing

Q61.d Most *politicians* promise a lot, but don't do anything.

No opinion= 0; missing= 2 - tone

Q61.e As soon as they are elected, *politicians* think they are better than people like me.

No opinion= 15; missing= 2 - tone

Q61.f Most of our *politicians* are competent people who know what they are doing.

No opinion= 11; missing= 1 + tone => balancing

B. Indexing  
4. Question order  
'priming' or 'anchoring' effect

- Example Kahneman (2011) *Thinking, fast and slow*
  - How happy are you these days?
  - How many dates did you have last month?
  - Problem: If you reverse the two questions, the answers would be strongly correlated. While now the correlation is very small.
  - Solution: Always have a close look at the questions preceding those that are most important for you in the questionnaire. First come, first served principle.



## C. Operationalization number of issues

- Open or closed questions: workload issues
- Measurement level: nominal, ordinal, interval, ratio
- How many categories: between 2 and 7
- Floor and ceiling effects: extremists can be rather extreme
- Middle category: neutrality: real or flight
- Don't know category: avoiding permissive consensus
- Response set – acquiescence: esp. relevant in technological surveys
- Missings & imputation: sorting; hot deck – cold deck