

Example

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comparison between different levels of subjective well-being

Question

how comparisons between individuals (or groups) can be carried on by taking into account inter-individual (or inter-group) differences yielded by different contextual conditions (cultural traits and value orientations)?

Possible answers

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definition of "subjective weights"

Example

Satisfaction with life defined as a combination of satisfaction with family, work, income, ...

Combination has to take into account the importance that each individual assigns to each domain/ambit.

Comparison of satisfaction scores

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by taking into account the importance that individuals can assign to each ambit

income	Life as a whole
career	
family	
neighbors	
friends	
physical aspect	
financial independence	
ideals	
health	
partner	
...	

Past results

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Studies that have specifically compared weighted and unweighted scores in the field of quality of life has produced almost uniformly negative results.

(Andrews & Withey, 1976; Campbell et al., 1976; Cummins et al., 1994)

However,

many researchers urge the scientific community to explore this topic by more research that specifically compares weighted and unweighted scores in particular in assessing quality of life measures

(Russell et al., 2006)

Determining differential subjective weights

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solid conceptual framework helping in clarifying how

- to obtain importance weights at individual-subjective level through subjective judgments
- to assign weights to the corresponding subjective scores

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2. Underlying principles in obtaining weights

Preliminary statements

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$$AS_i = \sum_{j=1}^K x_{ij} \cdot w_j$$

x_{ij} sub-score j to be aggregated for individual i

K number of sub-scores

w_j weight j to be attribute to X_{ij} for individual i

AS_i aggregate score (synthetic score) for individual i

Preliminary statements

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In order to reproduce as accurately as possible the contribution of each sub-score to the construction of AS

a criterion has to be adopted to define a weighting system

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improvement and refinement of the adopted model of measurement.

Preliminary statements

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Identification of a weighting system needs to **take into account** :

- ⇒ **rationale and theoretical framework** on which the measurement of the complex characteristics is founded and that will consequently regard the synthetic score
- ⇒ **meaning and contribution of each sub-score** to the synthesis
- ⇒ **quality of data and statistical adequacy of indicators**

Preliminary statements

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Identification of a weighting system needs to **decide**:

- ⇒ **proportional size of weights**
 1. **equal** or **differential** weighting
- ⇒ **adopted aggregation technique**
 2. **compensatory** or **non-compensatory**
- ⇒ **level** at which weights are determined/applied
 3. **individual** or **group** weights

Preliminary statements

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N.B.

A whole set of weights able to express in **a perfect way** the contribution of each indicator **does not exist**

Preliminary statements

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2.1 Equal vs. differential weighting

Equal vs. differential weighting

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The **first decision** that needs to be made and that will be strongly influence the final results is between

Equal Weighting (EW) ↔ Different Weighting (DW)

Equal vs. differential weighting
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Equal weighting

Doubtful procedure mainly *when*

- **different components have to be aggregated by different numbers of indicators** (→ synthetic score = unbalanced structure);
- **indicators exist measuring the same component** (*double weighted o double counting*).

Equal vs. differential weighting
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Differential weighting

Doubtful procedure mainly *when not supported by*

- **theoretical reflections** on the meaning and impact of each indicator on the synthesis,
- **methodological concerns** aimed at identifying proper and consistent techniques.

Equal vs. differential weighting
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In order to make the decision about **subjective weights** we should explore

- psychometric properties of importance ratings (internal consistency and test-retest reliability),
- theoretical issue (importance and satisfaction are distinct constructs?)
- criteria used in assessing weighted scores.

2.2 Weights and aggregating techniques: compensatory and non-compensatory feature

Weights and aggregating techniques: compensatory and non-compensatory feature
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In order to avoid incoherencies between

theoretical meaning
of weights

↔

actual application
of weights

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a consistent aggregating technique is needed by considering **compensability** among the elementary indicators

Weights and aggregating techniques: compensatory and non-compensatory feature
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Compensatory aggregating approach

- **additive approach** (simple addition)
- **geometrical approach** (multiplicative technique)

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low values compensated by high values

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synthetic score does not allow us to return to the original individual profiles


Weights and aggregating techniques: compensatory and non-compensatory feature
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CAUTION

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problems of interpretation


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2.3 Subjective weights obtained at individual or group level



Subjective weights obtained at individual or group level
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The weights can be defined at


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- ⇨ **individual level:** individual data will be used in order to construct weights that will differ from each subject to another,
- ⇨ **group level:** individual data will be used in order to construct different weights for different groups of individuals.

We need to identify **methods supporting the two weighting perspectives.**



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2.4 Conditions for obtaining weights


Conditions for obtaining weights
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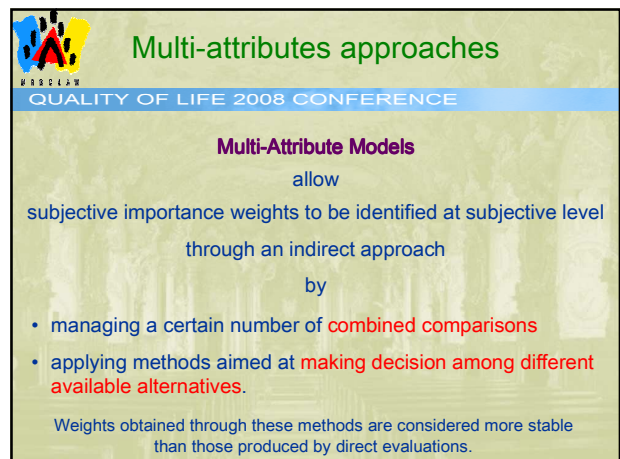
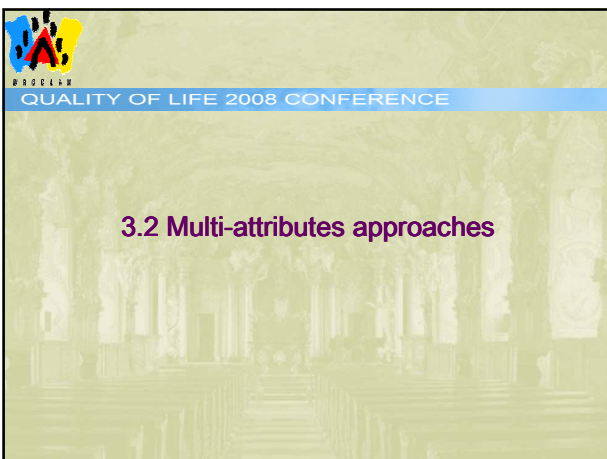
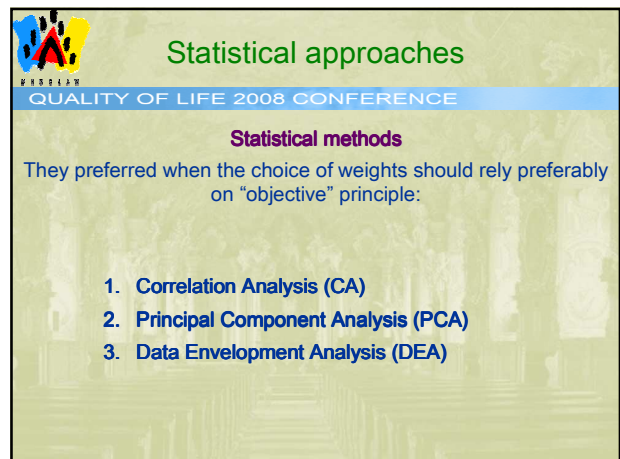
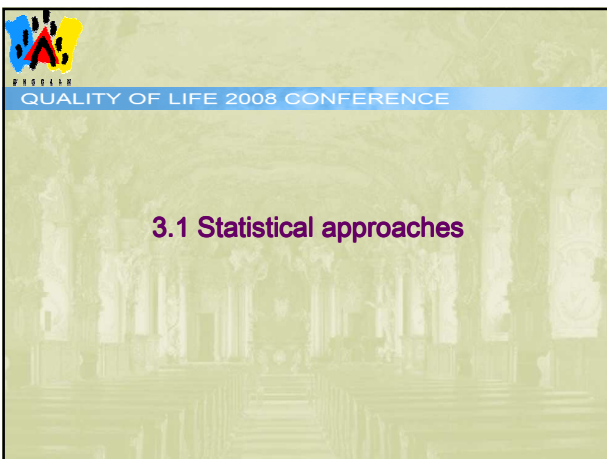
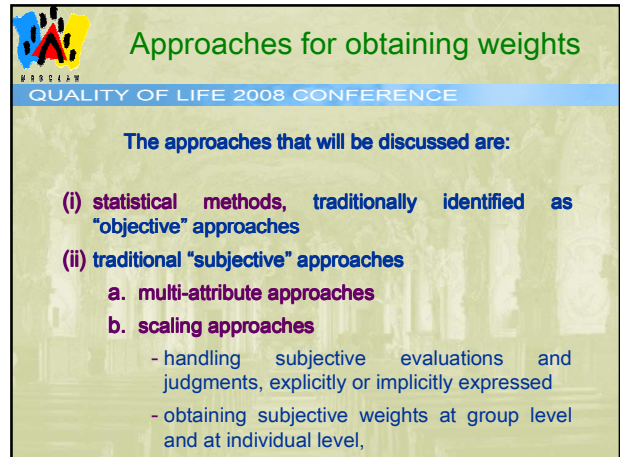
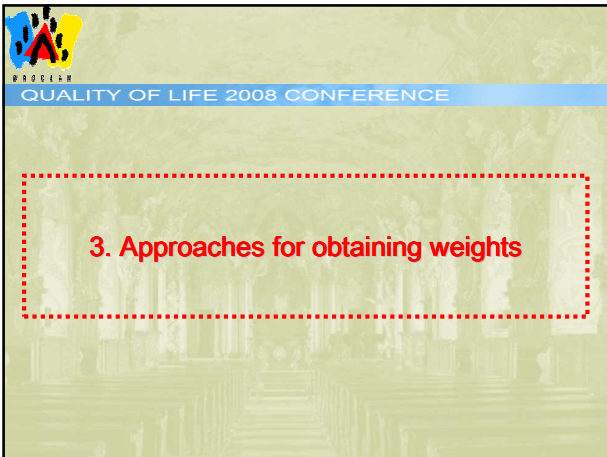
General basic conditions

- ⇨ weights are **non negative** numbers
- ⇨ weights **add up to unity**
- ⇨ weighted score is obtained by relating x to w in some way
- ⇨ weights may require to be rescaled in order to have an identical range (0; 1)


Conditions for obtaining weights
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Conditions required for obtaining subjective weights

- ⇨ identifying a criterion of importance or preference,
- ⇨ defining a model allowing
 - subjective evaluations and judgments to be collected at individual level (explicitly or implicitly)
 - subjective importance/preference continuum to be constructed



Multi-attributes approaches

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Among these models we can distinguish:

1. Multi-Attribute Decision Making:
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 - Analytic Hierarchy Process (AHP) (pairwise comparison of attributes).
2. Multi-Attribute Compositional Models:
 - ↓
 - Conjoint Analysis (CA).

3.3 Scaling approaches

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Scaling approaches

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Scaling models classification

As known, **scaling models** enable to deal with subjective evaluations and judgments. Features that can describe and characterize each scaling model are:

- Dimensionality
- Nature of data
- Scaling technique
- Criterion for testing the model
- Standard of measurement
- Contribution to the measurement of each multiple measures

Scaling approaches

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Scaling model	Dimensionality	Nature of data	Scaling technique	Criterion for testing the model	Standard of measurement: final (synthetic) score assigned to	
Additive	Uni-dimensional	Like	Single-stimulus	Not comparative	Intraconsistency	Cases
	Multidimensional	Multi	Single-stimulus	Not comparative	Dimensionality of the items	Cases
Thurstone model (differential scale)	Uni	Stimulus comparison	Comparative (pair comparison or rank-order)		Metrics between items	Items
	One methodology	Uni	Stimulus comparison	Comparative (rank-order or comparative rating)		Items
Empiric	Guttman	Uni		Scalogram analysis: reproducibility, scalability and ability to predict	Cases and items	
	Deterministic: Multidimensional Scalogram Analysis (MISA)	Bi	Single-stimulus	Not comparative	Regularity and contiguity	Cases and items
	Probabilistic: Partial Ordinal Scalogram Analysis (POSAS)	Bi			Correct representation	Cases and items
Respatial Mapping	Probabilistic: Multidimensional scaling	Multi	Single-stimulus	Not comparative	• parameters estimation (maximum likelihood) • goodness of fit (null and residuals analysis)	Cases and items (without condensation)
	Empirical	Uni & Multi	Preferential choice	Comparative (pair comparison)	Goodness of fit of distances to preferences (Stress, alternation)	Items
Complete model	Empirical	Uni & Multi	Preferential choice	Comparative (pair comparison)	Goodness of fit of distances to ordinal preferences	Cases and items
Complete model	Empirical	Multi	Preferential choice	Comparative (rank-order)	Goodness of fit of the model (not specific to the ranking)	Items at individual level

Scaling approaches

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Scaling models allowing subjective weights to be obtained

In our perspective, these models can be distinguished with reference to the possibility to define subjective weights at individual level or at group level (last column of the previous table), in particular:

- **group weighting:** *Thurstone model (differential scale), unfolding model*
- **individual weighting:** *conjoint model (see above)*

4. Conclusions

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Conclusions

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This work aims at
giving a systematic frame to the issue and
showing the possible approaches in order to obtaining
weights in a subjective perspective and
anticipating a case study we are going to accomplish by
applying and comparing all the practicable solutions

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We believe that we need more studies aimed at
clarifying many technical issues.



Conclusions

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However
↓
since developing and defining weights can be always
interpreted in terms of **judgment values**
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this topic is not simply a technical problem but become
part of a larger debate concerning how to construct
indicators by obtaining a larger **legitimacy**.



Conclusions

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One of the ways to obtaining this
is involving individuals' contributions
in attributing importance to different
domains in the process of
social indicators construction.



Conclusions

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In this perspective recent works can be set.

For example, in Hagerty and Land's (2007)
opinion, constructing composite indicators should
take into account the agreement among citizens
concerning the importance to be assigned to each
indicator.

Seen in this perspective, this topic can be placed in
the ambit of an improvement of democratic
participation to decisions ("res publica").



That's all folks!

Thank you for your attention

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