

#### U-shaped life satisfaction U-shaped life satisfaction Introduction Introduction U-shape Assumption of Satisfaction Evolution U-shape Assumption of Satisfaction Evolution (Blanchflower and Oswald, 2008; Frijters and Beatton, 2012) SA indicators • U-shape assumption, generally studied by means of multilevel regression, is a controversial issue. For example: • Blanchflower and Oswald (2008) and Graham and Ruiz • Here, we do not use regression. Pozuelo (2017) confirm U-shape. • Instead, we look at satisfaction trajectories using SA tools. • Diener et al. (1999) assert flat (no trend) evolution. • Four sequence indicators of interest • Bartram (2021) asserts that conclusions of tenants of U-shape • Integrative capability (Integr): capability to integrate (reach assumption result from incorrect choice of control variables: and stay in) good satisfaction states. (Brzinsky-Fay, 2007) • Only confounding variables (causally prior to dependent and • Degradation (Degrad): tendency to have decreasing core independent variables) should be used. satisfaction. • Tenants of U-shape use non-confounding variables such as • Badness (Bad): general badness level. income and marital status, which are not prior to age. • Insecurity (Insec): tendency to complex degrading trajectory. • Using only confounding variables (sex, country, birth cohort), Bartram founds only a very light post-middle-age increase in satisfaction. UNIVERSITÉ DE GENÈVE ◆□▶ ◆□▶ ◆ □▶ ◆ □▶ → □ の へ() /6/2025gr 6/26 ・ロト ・四ト ・ヨト ・ヨト ・ヨー 4/6/2025gr 5/26 U-shaped life satisfaction U-shaped life satisfaction SHP trajectories of life satisfaction Introduction Outline Sequence undesirableness indicators Integrative capability in $s \subset \mathcal{A}$ (Brzinsky-Fay, 2007) Sum of positions of states of interest (time spent in state of interest if ignoring recency) 2 SHP trajectories of life satisfaction Degradation: Difference between proportion of downward and proportion of upward transitions, each weighted by potential to integrate following spell (by length of spell after transition if ignoring recency). Badness: Overall badness degree. Sum of tokens, each weighted by capacity to integrate it. Insecurity: Additive combination of sequence complexity, degradation, and undesirableness degree of initial spell ◆□▶ ◆□▶ ◆三▶ ◆三▶ ● ○ ○ ○ ○ 4/6/2025gr 8/26



### Life Satisf. trajectories: Mean unfavorableness values

	Integr	Degrad	Bad	Insec
Younger	0.29	-0.004	0.205	0.51
Middle-aged	0.28	-0.010	0.212	0.49
Older	0.36	-0.013	0.193	0.48
Young vs Middle				
t	1.11	2.222	1.762	3.41
<i>p</i> -value	0.13	0.013	0.039	0.00
Middle vs Old				
t	9.39	2.520	6.685	2.52
<i>p</i> -value	0.00	0.006	0.000	0.01

#### • Integr and Degrad show reversed-L shape (compatible with U-shape)

- Bad and Insec as expected in case of U-shape
- Small differences principally significant for post-middle-age (confirm findings by Bartram (2021))

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U-shaped life satisfaction

Visualizing with Self-Organizing-Map (SOM)

## Self-Organizing-Map (SOM) of satisfaction sequences

OM with substitution costs set as level difference





Visualizing with Self-Organizing-Map (SOM)

## Self-Organizing-Map (SOM)

- SOM (Kohonen, 1995) clustering method that groups data into grid cells (neurons) by respecting data topological structure.
- Works like k-means but, instead of grouping around means, groups around prototypes.
- Prototypes: linear combination of all data with weights decreasing with neighboring distance.
- Weights (and prototypes) iteratively adjusted.
- At end: close cells resemble each others and distant cells have greater differences.

Own package based on SOMbrero (Vialaneix et al., 2025)

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#### U-shaped life satisfaction

Outline

4 Conclusion

Visualizing with Self-Organizing-Map (SOM)

## SOM of life satisfaction trajectories

Chronograms and mean birth year



# U-shaped life satisfaction Conclusion Conclusion assumption: 3 Visualizing with Self-Organizing-Map (SOM) findings. UNIVERSITÉ DE GENÈVE

U-shaped life satisfaction

Visualizing with Self-Organizing-Map (SOM)

## SOM of life satisfaction trajectories

Chronograms and cell size



- Our (covariate-free) results weakly support the U-shape
  - small but statistically significant cohort differences.
- L-shaped form for Integr and Degrad confirm Bertram's
- SOM shows that results should be nuanced: Many elders have good and improving satisfaction but most worst satisfaction trajectories also belong to older cohort.



U-shaped life satisfaction References

## Sequence undesirableness indicators I

Integrative capability in  $s \subset \mathcal{A}$  (Brzinsky-Fay, 2007)

$$I_{\text{integr}}(x,s) = \frac{\sum_{i=1}^{\ell} is(x_i \in s) i^{\omega}}{\sum_{i=1}^{\ell} i^{\omega}}$$

Degradation: difference between proportion of upward and proportion of downward transitions, each weighted by potential to integrate following spell.

$$I_{\text{degrad}}(x) = q^-(x) - q^+(x)$$

Badness: Overall badness degree.  $\pi(s)$  undesirableness of token *s* normalized s.t. min  $\pi(s) = 0$  and max  $\pi(s) = 1$ .

$$I_{\text{bad}}(x) = \sum_{s \in \mathcal{A}} \pi(s) I_{\text{integr}}(x, s)$$

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Beforences Sequence undesirableness indicators II Insecurity: Combines complexity and degradation easily interpretable additive form  $l_{insec}(x) = \pi(x_1)l_{integr}(x, sp(x_1)) + l_{degrad}(x) + c(x)$ where c(x) is the complexity of the sequence (geometric mean between normalized entropy and proportion of transitions) Gabadinho et al. (2010)