

The Convergence of Positivity: Are Happy People All Alike?

Supplementary Materials

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1 Study 1: HILDA Personality

This study used data from the HILDA (Summerfield et al., 2017) survey, release 17. The survey is focused on longitudinal patterns in well-being among approximately 17,000 Australian adults. The 2017 HILDA edition contained data from 2001 to 2016. Personality measures were present only in three rounds of data collection: 2005, 2009 and 2013.

1.1 Data

1.2 Metrics

1. Proximity: Personality The personality metrics were based on the Big Five model and were included in the dataset as derived variables. For details, see Summerfield et al. (2017) page 71.
2. Hedonic Component: Well-being As a measure of the hedonic component of positivity we used the emotional well-being scale from the SF-36 questionnaire which was included in the original HILDA study. The scores were computed by the creators of the dataset as a derived variable.
3. Fitness Component: Income As an income fitness metric we used the “gross wages and salary” variable from the HILDA survey.
4. Fitness Component: Health As a health fitness metric we used the SF-36 general health scale which was directly provided in the dataset as a derived variable.

1.3 Analyses

First we scaled and mean-centered for each year all variables included in the analysis. Next, we averaged across the three years the three positivity metrics and the five personality dimensions. This resulted in averaged data for 21,864 unique participants. Then we tested each of the three positivity metrics separately. For each metric, we split the averaged data into two equally-sized groups, and computed the average distance between individuals in the high positivity and in the low positivity groups. We compared the average high positivity distance to the average low positivity distance using a permutation test with 1000 iterations. For each of the three positivity metrics, the convergence of positivity hypothesis was supported ($ps < .005$).

The error bars in Figure 1.A were computed via bootstrapping without replacement. For each of the 1000 iterations we took 75% of the existing sample, and computed the mean distance. The resampling technique we used is not popular in behavioral sciences, but was appropriate for the task since resampling with replacement would have artificially introduced 0 distances between identical individuals. To avoid

complications associated with non-independence and the problem of artificial 0-distances we used m out of n resampling without a replacement method (Bickel & Sakov, 2008).

2 Study 2: WVS Human Values

2.1 Data

The World Values Survey is a network of scientists who study stability and changes in values around the world (Inglehart et al., 2014). We used data from the 6th wave, which was the most recent publicly available dataset at the time of writing this paper. The data can be downloaded from www.worldvaluessurvey.org.

2.2 Metrics

1. Proximity: As research space in this study we used Schwartz’s theory of basic human values, which is based on the following 10 questions:
 - It is important to this person to be rich; to have a lot of money and expensive things
 - Living in secure surroundings is important to this person; to avoid anything that might be dangerous
 - It is important to this person to have a good time; to “spoil” oneself
 - It is important to this person to do something for the good of society
 - It is important to help people living nearby; to care for their needs
 - Being very successful is important to this person; to have people recognize one’s achievements
 - Adventure and taking risks are important to this person; to have an exciting life
 - It is important to this person to always behave properly; to avoid doing anything people would say is wrong
 - Looking after the environment is important to this person; to care for nature and save life resources
 - Tradition is important to this person; to follow the customs handed down by one’s religion or family
2. Hedonic Component: As a hedonic metric we used question V23 which measures life-satisfaction.
3. Fitness Component - Income: As an income metric we used question V239.
4. Fitness Component - Health: As a health metric we used question V11.

2.3 Analyses

The dataset contained records from 89,565 participants from 60 countries. Each variable used in this analysis was country-centered and standardized. For each country we created high and low positivity groups, based on each of the three positivity metrics and we computed the average within group distances. Next, we averaged the distances within countries, and computed the difference between the low positivity groups and the high positivity groups and tested if the difference is in the predicted direction. For all three metrics, hedonic ($t(59) = 2.95, p < .0005$), income ($t(59) = 4.73, p < .0001$), and health ($t(59) = 2.54, p < .05$), the difference was statistically reliable and in the predicted direction.

3 Study 3: HILDA Miscellaneous domains

3.1 Data

In addition to personality, analyzed in Study 1, we found the following two additional domains which met our criteria for a research space.

3.1.1 HILDA: Cognitive Ability Task

The dataset provided three dimensions, based on backwards digit score, word pronunciation score, and symbol-digit modalities score. For details, check Summerfield et al. (2017), p.72.

3.1.2 HILDA: Time Use

The HILDA researchers asked the amount of time participants spend in the following 9 activities:

- Paid employment
- Travelling to/from paid employment
- Household errands
- Housework
- Outdoor tasks
- Playing with your children
- Playing with other people's children
- Volunteer/charity work
- Caring for disabled/elderly relative

These data were available for the period 2002-2016. Each of these was treated as a dimension in the Time Use research space.

3.2 Analysis

The analyses were identical to the analyses in Study 1. We started with the Cognitive Ability Task. For each participant, we averaged the results of all metrics over time. Then we split the participants into high and low positivity groups based on their hedonic scores. For each of the groups, we computed the average distance between individuals within that group. Then we used a permutation test to check if the low positivity group had a greater average distance than the high positivity group. The results supported the positivity convergence hypothesis ($p < .005$, based on 1000 iterations). We repeated the same analyses for the health and income splits, and observed the same results ($ps < .005$).

4 Study 4: WVS Miscellaneous domains

4.1 Data

In the WVS we found the following 25 domains which met our criteria for a research space (the pattern [XXX]:... indicates a shared beginning of the questions in the scale):

<u>importance</u>	Important in life:...	6 items, 4-point scale
<u>jobs priorities</u>	Job priorities	4 items, 3-point scale
<u>gender equality</u>	Gender equality	5 items, 4-point scale
<u>life control</u>	Freedom of choice and life control	2 items, 10-point scale
<u>future changes</u>	Future changes:...	3 items, 3-point scale
<u>political action</u>	Political action:...	5 items, 3-point scale
<u>political scale</u>	Political attitudes	7 items, 10-point scale
<u>trust</u>	How much you trust:...	6 items, 4-point scale
<u>confidence</u>	Confidence:...	18 items, 4-point scale
<u>political system</u>	Political system:...	4 items, 4-point scale
<u>democracy</u>	Democracy:...	11 items, 10-point scale
<u>religion</u>	Attitudes towards religion	4 items, 4-point scale
<u>social position</u>	Social position:...	4 items, 10-point scale
<u>over 70</u>	People over 70:...	3 items, 4-point scale
<u>personality</u>	Big Five personality scores	
<u>neighborhood</u>	Neighbourhood conditions	6 items, 4-point scale
<u>worries</u>	Worries:...	6 items, 4-point scale
<u>last 12 months</u>	In the last 12 month:...	4 items, 4-point scale
<u>science</u>	Science and technology	6 items, 10-point scale
<u>political trust</u>	Justifiable:...	14 items, 10-point scale
<u>see myself</u>	I see myself as:...	4 items, 4-point scale
<u>info source</u>	Information source:...	8 items, 5-point scale
<u>often elect</u>	How often in country's elections:...	9 items, 4-point scale
<u>older people</u>	Older people:...	5 items, 4-point scale
<u>nature tasks</u>	Nature of tasks:...	3 items, 10-point scale

4.2 Analysis

First we analyzed the hedonic component of positivity. For each of the 60 countries, we split the participants in high and low positivity groups, and computed the average distance between the individuals in the same group for each of the 25 domains. Then we tested if the low positivity group distances are greater than the high positivity group distances using a mixed effect model, where group valence was entered as a fixed effect and country and domain were entered as random intercepts.

$$y_{ijk} = \beta_0 + \beta_1 X_{ijk} + u_{0i} + u_{1j} + e_{ijk} \quad (1)$$

where y_{ijk} is the average distance for the i^{th} country and j^{th} domain, which is in the k^{th} group (low or high positivity). u_0 represents the country-specific intercepts, and u_1 the domain-specific intercepts. There was a highly significant effect of group valence, where individuals in the high-positivity groups were significantly closer to each other than individuals in the low-positivity groups ($t(2780) = 5.49, p = 4E - 8$). The same result was observed for health ($t(2780) = 6.45, p = 1E - 10$) and for income ($t(2781) = 12.28, p < 2E - 16$) splits.

5 Study 5: Follow-up personality

5.1 Data

The data was collected by Lauriola & Iani (2015) and shared at <http://dx.doi.org/10.6084/m9.figshare.1285533>. The dataset consisted of records from 504 participants.

5.2 Analysis

We used the positivity metric, provided by the authors, to split the participants in high and low positivity groups. We computed the averaged distance in the Big Five space between the individuals in each of the two groups. We compared the two average distances using a permutation test, and found that individuals in the high positivity group were closer to each other than the individuals in the low positivity group ($p = .003$, 1000 iterations).

6 Statistical Analyses

The code for the statistical analyses and figure creation is available at osf.io.

References

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