

Statistical Supplement to: *Mental Health Care and Average Happiness: Strong Effect in Developed Nations*

by Giorgio Touburg and Ruut Veenhoven

For our computations and analyses, we used *IBM SPSS Statistics 20*. The data-file we used is the 2013B-version of the data-file *States of Nations* (Veenhoven 2013b), that can be obtained from the *World Database of Happiness*.

1. VARIABLES AND DESCRIPTIVE STATISTICS

| Name | Code in data-file 'States of Nations' (Veenhoven 2013b) | Additional information | Source | N | Mean | SD |
|---|---|--|-------------------------------------|-----|--------|-------|
| 2000-2009 0-10 Life Satisfaction completed with adjusted Best-Worst | HappinessLSBW_2000sb | | (Veenhoven 2013a) | 153 | 5.901 | 1.29 |
| 2005 Number of psychiatrists per 100,000 population | Psychiatrists_2005 | | (World Health Organization 2005) | 169 | 4.214 | 5.94 |
| 2005 Number of psychologists working in mental health care per 100,000 population | PsychologistsMHcare_2005 | | (World Health Organization 2005) | 95 | 11.456 | 21.46 |
| 2005 % of the total health budget spent on mental health | MentalHealthExpense_ShareHealthBudget_2005 | | (World Health Organization 2005) | 75 | 4.610 | 3.32 |
| 2009 Classes of human development: | HDI_Class_2009 | Index score based on indicators of health, education, and living standards | (UNDP 2011) | 172 | 2.53 | 0.99 |
| -Low human development | HDI_Class_2009 = 1 | HDI score of .535 or lower | | | | |
| -Medium human development | HDI_Class_2009 = 2 | HDI score from .536 to .710 | | | | |
| -High human development | HDI_Class_2009 = 3 | HDI score from .711 to .800 | | | | |
| -Very high human development | HDI_Class_2009 = 4 | HDI score of .801 or higher | | | | |
| 2004 Public health expenditure in % GDP | HealthExpensePrivate_2004 | | (UNDP 2007) | 165 | 3.61 | 2.08 |
| 2006 Government Effectiveness, Worldbank | GovEffectiveness_2006 | | (Kaufmann, Kraay, & Mastruzzi 2008) | 171 | .726 | 0.07 |

| Name | Code in data-file ‘States of Nations’ (Veenhoven 2013b) | Additional information | Source | N | Mean | SD |
|---|--|-------------------------------|---------------|----------|-------------|-----------|
| 2010 ISD index of gender equality | GenderEqualIndex5_2010 | | (ISS 2013) | 175 | -.026 | 1.02 |
| 2005 % aged 15 and under ¹ | AgeComposition2_2005 | | (UNDP 2007) | 168 | 30.19 | 10.83 |
| 2000-2005 Fertility rate ¹ | FertilityRate_2000.05 | | (UNDP 2007) | 174 | 3.11 | 1.73 |
| 2009 Human Development Index ¹ | HDI_2009 | | (UNDP 2011) | 172 | .736 | 0.18 |

1: not included in the final paper.

2 ANALYSES

Step 1

First, we calculated the correlations (using the Pearson product-moment correlation coefficient) between Average Life Satisfaction and the three mental healthcare indicators:

| | Number of psychiatrists per 100.000 inhabitants | Number of psychologists per 100.000 inhabitants | % of the total health budget spent on mental health |
|----------------------------------|--|--|--|
| Average Life Satisfaction | + .506 | + .574 | + .277 |
| 95% CI | + .373 to + .619 | + .419 to + .696 | + .035 to + .488 |
| N | 143 | 93 | 65 |

Step 2

Next, we grouped the data file by level of human development; after that, we re-calculated the correlations, this time for each subgroup separately:

Level of development: (unknown)

| | Number of psychiatrists per 100.000 inhabitants | Number of psychologists per 100.000 inhabitants | % of the total health budget spent on mental health |
|----------------------------------|--|--|--|
| Average Life Satisfaction | - .186 | (not enough cases) | (not enough cases) |
| 95% CI | (not enough cases) | (not enough cases) | (not enough cases) |
| N | 3 | 1 | 0 |

Level of development: low

| | Number of psychiatrists per | Number of psychologists per | % of the total health budget spent on |
|--|------------------------------------|------------------------------------|--|
|--|------------------------------------|------------------------------------|--|

| | 100.000 inhabitants | 100.000 inhabitants | mental health |
|----------------------------------|----------------------------|----------------------------|----------------------|
| Average Life Satisfaction | -.325 | -.229 | -.288 |
| 95% CI | -.679 to +.152 | -.975 to +.939 | (not enough cases) |
| N | 19 | 4 | 3 |

Level of development: medium

| | Number of psychiatrists per 100.000 inhabitants | Number of psychologists per 100.000 inhabitants | % of the total health budget spent on mental health |
|----------------------------------|--|--|--|
| Average Life Satisfaction | -.026 | +.260 | -.248 |
| 95% CI | -.287 to +.239 | -.091 to +.554 | -.574 to +.146 |
| N | 56 | 33 | 27 |

Level of development: high

| | Number of psychiatrists per 100.000 inhabitants | Number of psychologists per 100.000 inhabitants | % of the total health budget spent on mental health |
|----------------------------------|--|--|--|
| Average Life Satisfaction | -.037 | +.393 | -.112 |
| 95% CI | -.386 to +.322 | -.003 to +.682 | -.590 to +.425 |
| N | 31 | 25 | 15 |

Level of development: very high

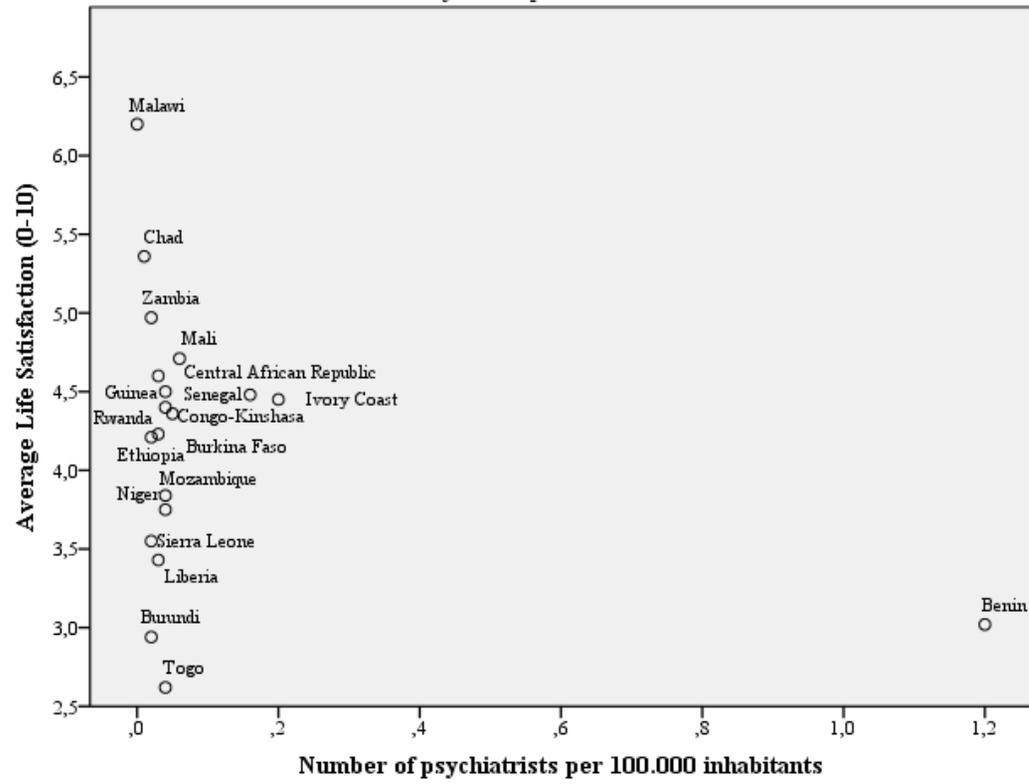
| | Number of psychiatrists per 100.000 inhabitants | Number of psychologists per 100.000 inhabitants | % of the total health budget spent on mental health |
|---------------------|--|--|--|
| Average Life | +.583 | +.742 | +.754 |

| | | | |
|--|-----------------------|-----------------------|-----------------------|
| Satisfaction 95% CI N | + .305 to +.769 34 | + .521 to +.870 30 | + .467 to +.897 20 |
|--|-----------------------|-----------------------|-----------------------|

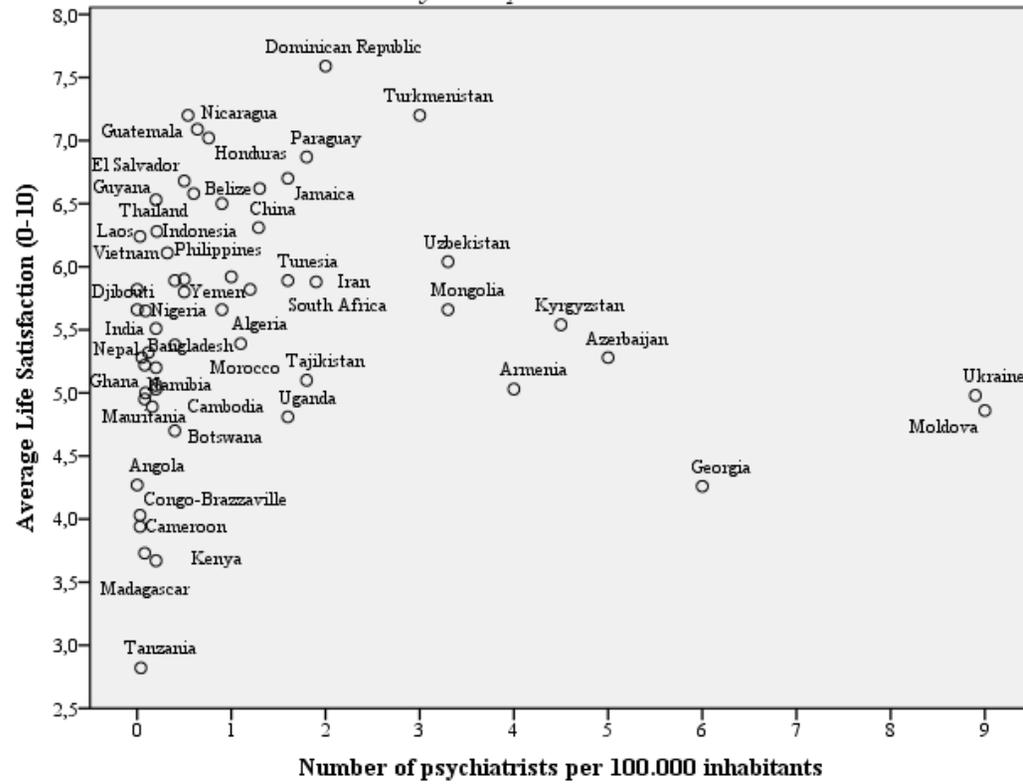
Step 3

Next, we made scatter graphs in which we plotted each mental healthcare variable against the average life satisfaction, labeling the countries so that we were better able to identify possible patterns; we already split the data file according to level of development, so each graph is plotted for the different levels of development, resulting in (three different mental healthcare indicators times four different levels of development) 12 different graphs:

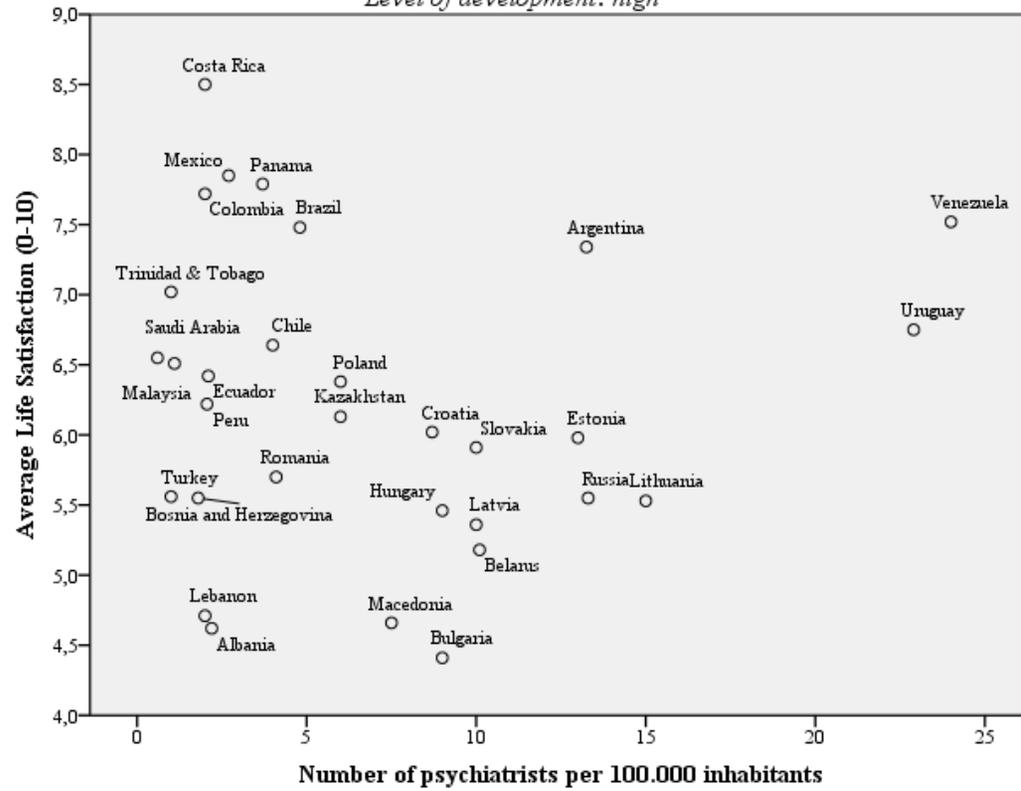
Level of development: low



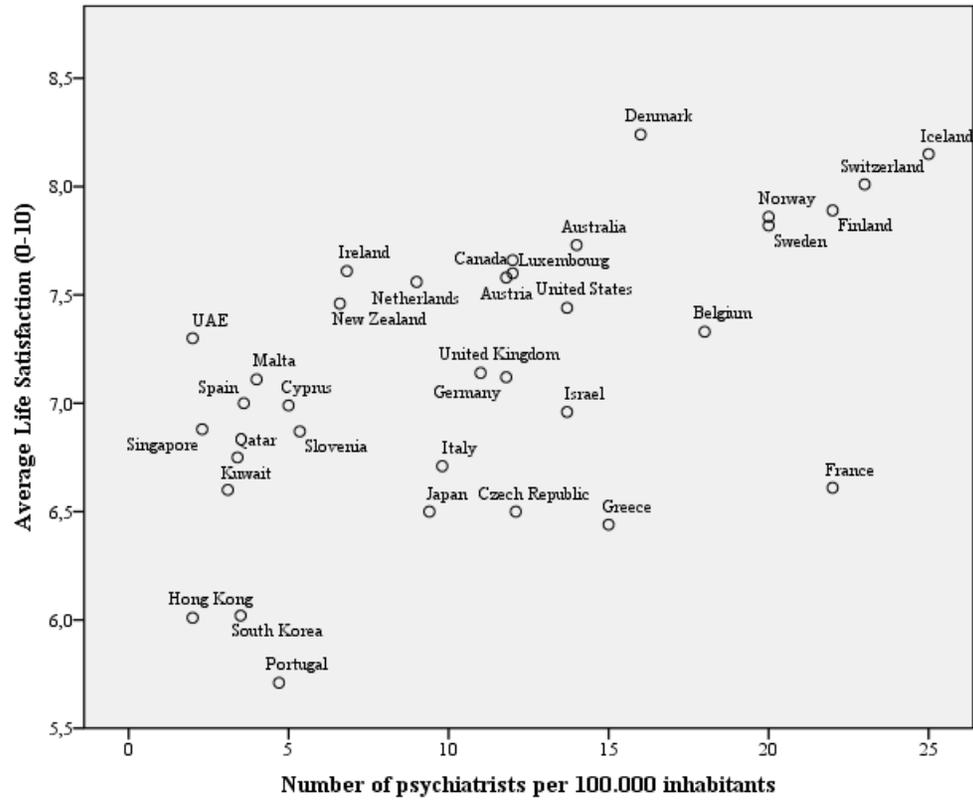
Level of development: medium



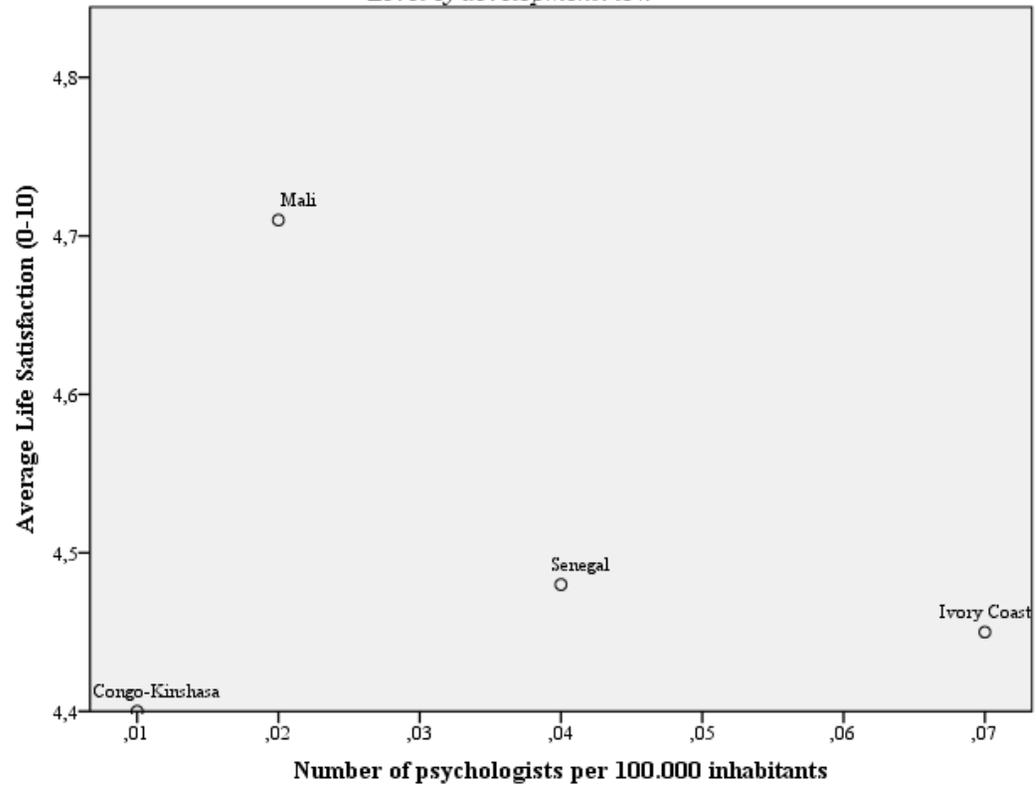
Level of development: high



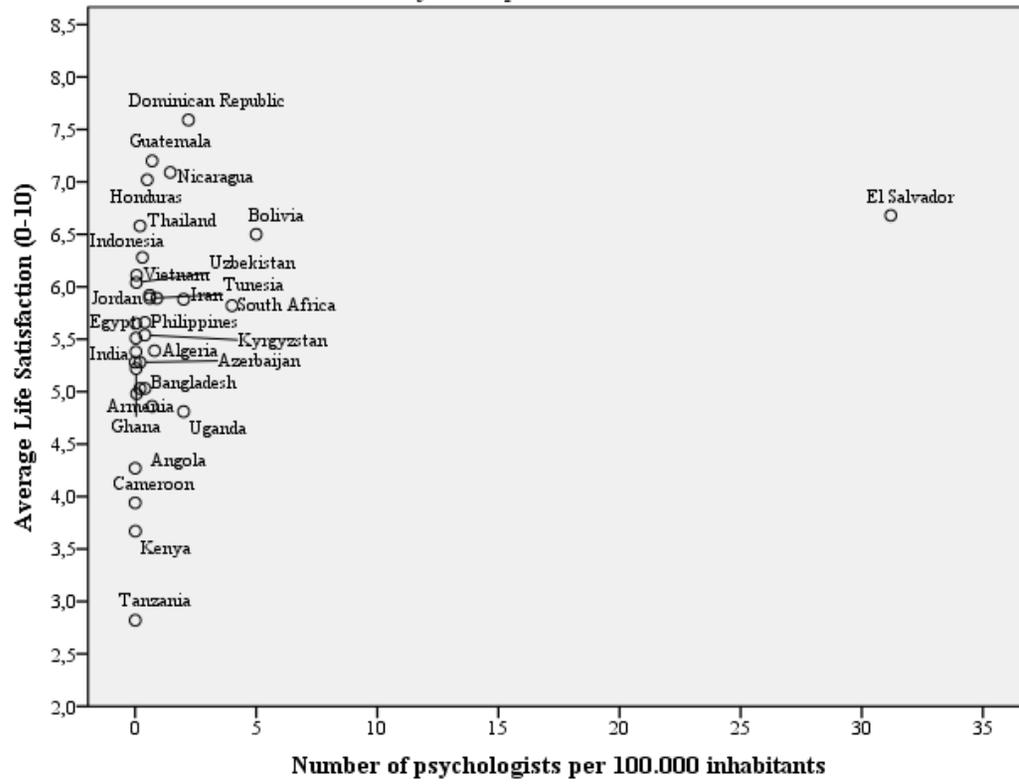
Level of development: very high



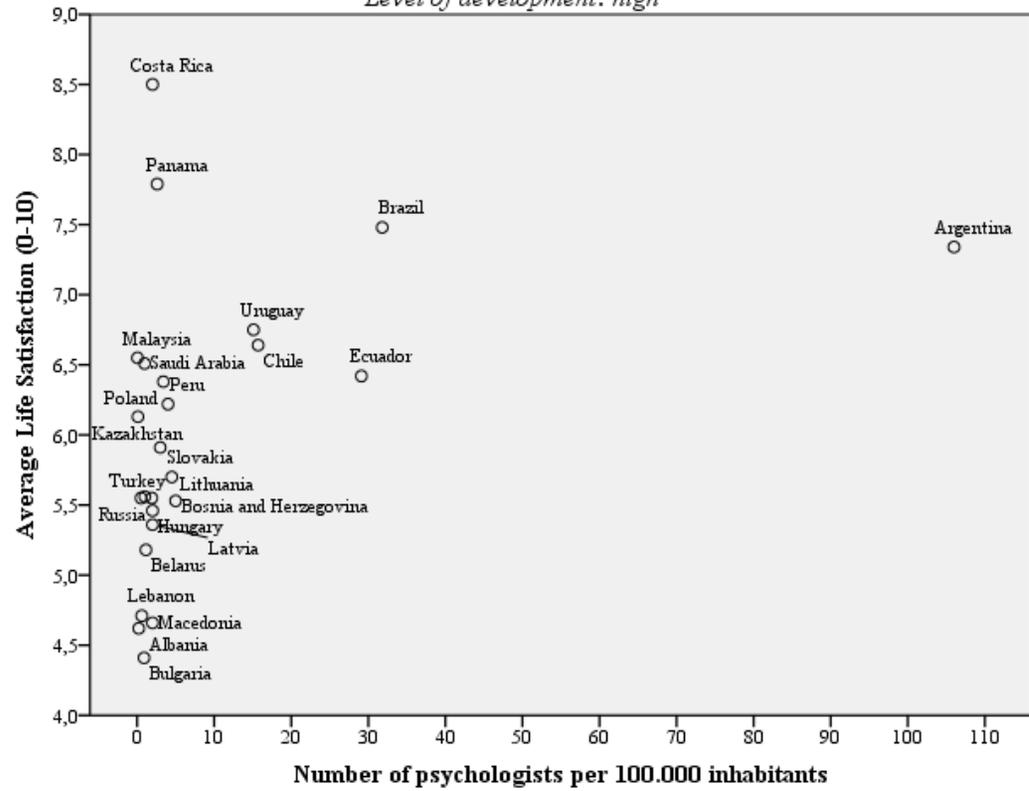
Level of development: low



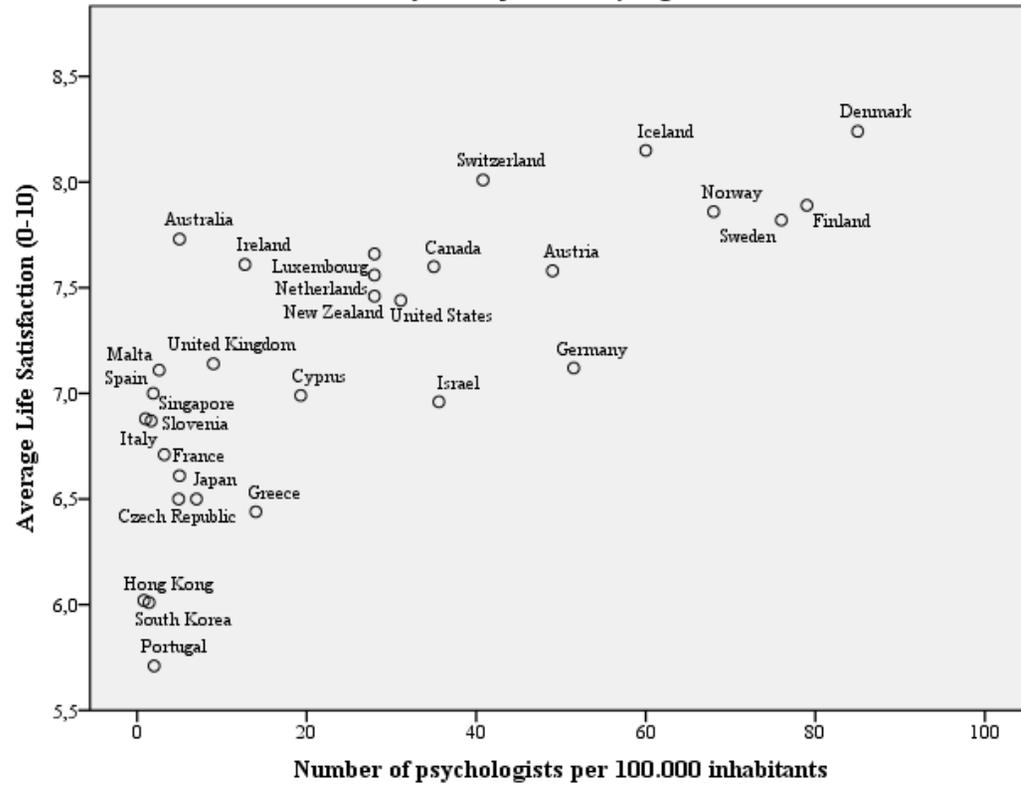
Level of development: medium



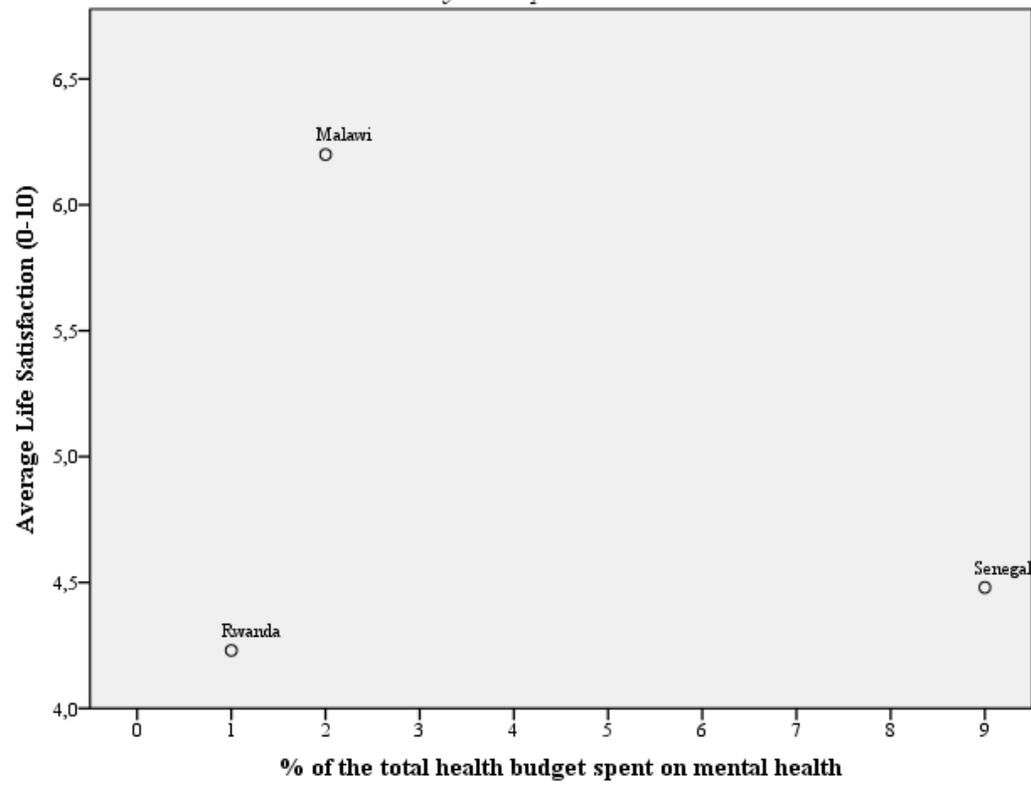
Level of development: high



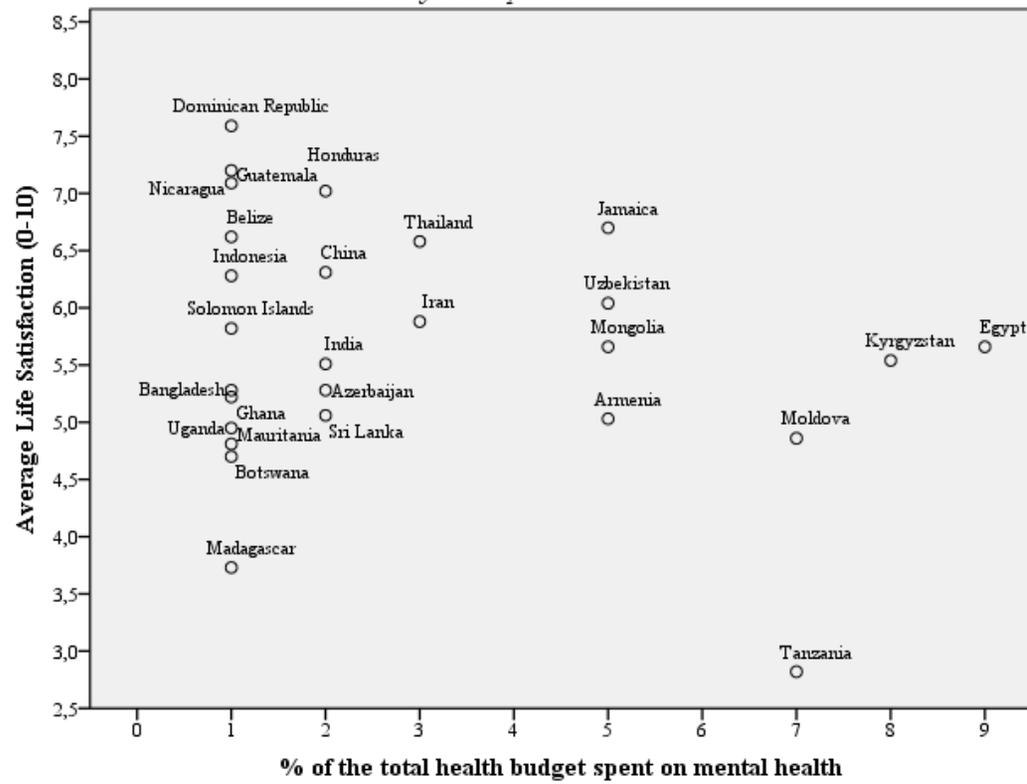
Level of development: very high



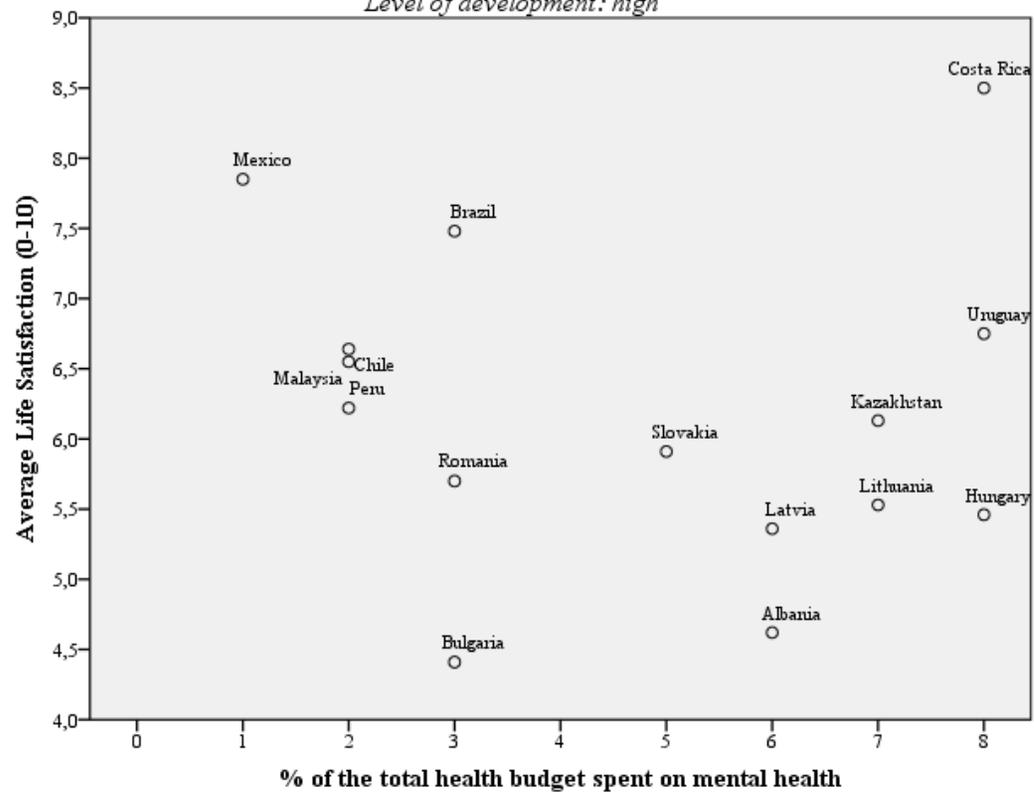
Level of development: low



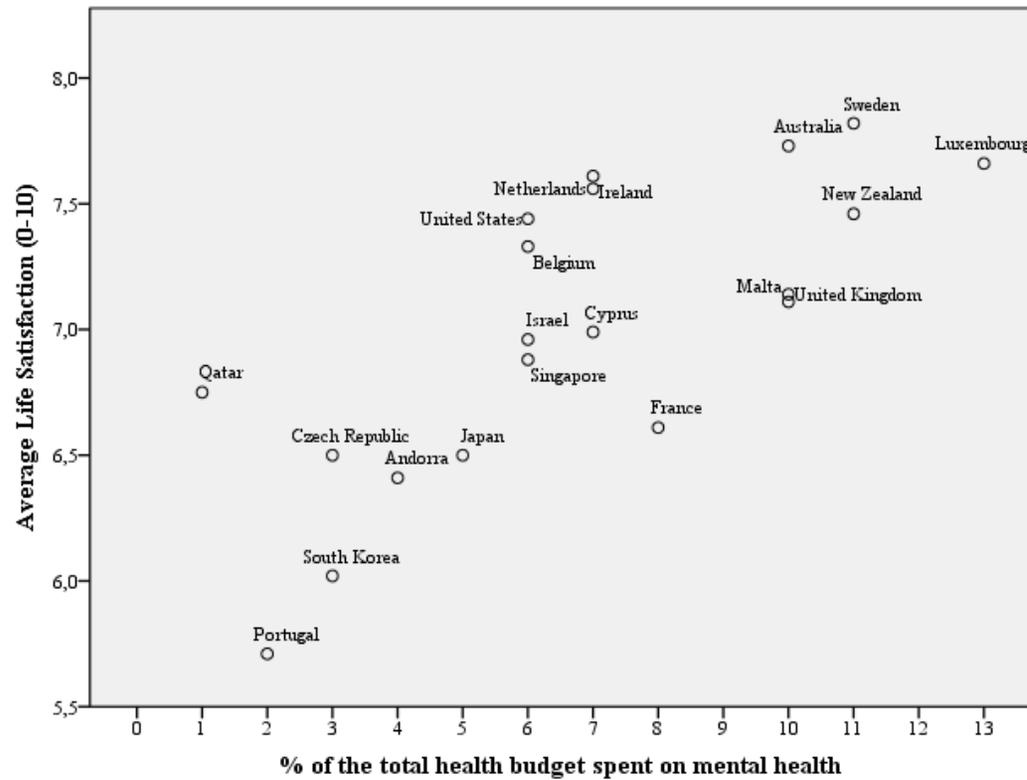
Level of development: medium



Level of development: high



Level of development: very high



Step 4

We then removed all former communist nations in the database and re-computed the correlations as at step 2:

Level of development: (unknown)

| | Number of psychiatrists per 100.000 inhabitants | Number of psychologists per 100.000 inhabitants | % of the total health budget spent on mental health |
|---------------------|--|--|--|
| Average Life | -.186 | (not enough cases) | (not enough cases) |

| | | | |
|---------------------|--------------------|--------------------|--------------------|
| Satisfaction | (not enough cases) | (not enough cases) | (not enough cases) |
| 95% CI | 3 | 1 | 0 |
| N | | | |

Level of development: low

| | Number of psychiatrists per 100.000 inhabitants | Number of psychologists per 100.000 inhabitants | % of the total health budget spent on mental health |
|----------------------------------|--|--|--|
| Average Life Satisfaction | -.325 | -.229 | -.288 |
| 95% CI | -.679 to +.152 | -.975 to +.939 | (not enough cases) |
| N | 19 | 4 | 3 |

Level of development: medium

| | Number of psychiatrists per 100.000 inhabitants | Number of psychologists per 100.000 inhabitants | % of the total health budget spent on mental health |
|----------------------------------|--|--|--|
| Average Life Satisfaction | +.396 | +.252 | -.223 |
| 95% CI | +.126 to +.611 | -.142 to +.577 | -.589 to +.219 |
| N | 48 | 27 | 22 |

Level of development: high

| | Number of psychiatrists per 100.000 inhabitants | Number of psychologists per 100.000 inhabitants | % of the total health budget spent on mental health |
|----------------------------------|--|--|--|
| Average Life Satisfaction | +.186 | +.256 | +.369 |
| 95% CI | -.341 to +.624 | -.373 to +.724 | -.532 to +.878 |
| N | 16 | 12 | 7 |

Level of development: very high

| | Number of psychiatrists per 100.000 inhabitants | Number of psychologists per 100.000 inhabitants | % of the total health budget spent on mental health |
|----------------------------------|--|--|--|
| Average Life Satisfaction | +0.595 | +0.733 | +0.726 |
| 95% CI | +0.311 to +0.782 | +0.495 to +0.869 | +0.392 to +0.891 |
| N | 32 | 28 | 18 |

Step 5

Next, we computed the correlations between average life satisfaction and % of the total health budget spent on mental health and health expenditure/GDP for the *19 highly developed nations that have a value on both variables (former communist countries included)*:

| | % of the total health budget spent on mental health | Health expenditure/GDP |
|----------------------------------|--|-------------------------------|
| Average Life Satisfaction | +0.742 | +0.264 |
| 95% CI | +0.434 to +0.895 | -0.216 to +0.641 |
| N | 19 | 19 |

Step 6

Subsequently, we computed the correlations between average life satisfaction and quality of government and gender equality for the *34 very highly developed nations of which we know the number of psychiatrists per 100.000 inhabitants (former communist countries included)*:

| | Quality of government | Gender equality |
|---------------------|------------------------------|------------------------|
| Average Life | +0.661 | +0.296 |

| | | |
|--|-----------------------|----------------------|
| Satisfaction 95% CI N | + .416 to +.817 34 | -.053 to +.580 33 |
|--|-----------------------|----------------------|

Step 7 (not in paper)

Finally, as requested by the reviewers and indicated in our letter to the editor, we performed a stepwise regression of multiple variables on average happiness. We first regressed demographic control variables on average happiness. In the next step, we added the level of human development. Subsequently, we added the mental health care indicator. Finally, we added the interaction term of the mental health care indicator and the level of human development. We made a different model for each mental health care indicator. In the text we explained why this analysis is not appropriate for the data at hand here.

Regression model 1^a

| | B (se) | β | 95% CI of B | VIF |
|---|---------------|---------|-------------------|-------|
| % aged 15 and under | + .093 (.017) | + .017 | + .059 to +.126 | 8.688 |
| Fertility rate | - .191 (.102) | - .254 | - .393 to +.011 | 7.847 |
| (control variables) | | | | |
| HDI | +9.829 (.905) | +1.371 | +8.308 to +11.620 | 6.740 |
| Number of psychiatrists per 100,000 inhabitants | - .050 (.031) | - .247 | - .112 to +.011 | 9.800 |
| HDI×psychiatrists | + .422 (.148) | + .337 | + .130 to +.714 | 5.858 |

Model summary

Adjusted R² .673***

a: usually, with regression analysis, 'model' means a separate step within one analysis, adding or excluding one or more variables with each step; in this analysis, however, each model represents the final step of a separate analysis, hence the different values under the 'model summary' header.

* p < .10; ** p < .05; *** p < .01; dependent variable: average life satisfaction.

Regression model 2

| | B (se) | β | 95% CI of B | VIF |
|---|----------------|---------|-------------------|--------|
| % aged 15 and under | + .102 (.023) | + .875 | + .056 to + .147 | 10.934 |
| Fertility rate | - .248 (.159) | - .306 | - .565 to + .069 | 11.037 |
| (control variables) | | | | |
| HDI | +8.939 (1.176) | +1.155 | +6.600 to +11.277 | 6.572 |
| Number of psychologists per 100,000 inhabitants | + .003 (.012) | + .048 | - .021 to + .026 | 13.306 |
| HDI \times psychologists | + .067 (.059) | + .227 | - .050 to + .184 | 11.220 |
| Model summary | | | | |
| Adjusted R ² | | | .680*** | |
| df | | | 91 | |

* p < .10; ** p < .05; *** p < .01; dependent variable: average life satisfaction.

Regression model 3

| | B (se) | β | 95% CI of B | VIF |
|--|--------|---------|-------------|-----|
|--|--------|---------|-------------|-----|

| | | | | |
|--|-----------------|--------|---------------------|-------|
| % aged 15 and under | +0.115 (.024) | +0.977 | +0.066 to +0.163 | 6.895 |
| Fertility rate | -0.166 (.126) | -0.201 | -0.419 to +0.086 | 3.795 |
| (control variables) | | | | |
| HDI | +10.443 (1.206) | +1.342 | +8.030 to +12.857 | 3.928 |
| % of the total health budget spent on mental health | -0.014 (.035) | -0.040 | -0.084 to +0.056 | 1.656 |
| HDI×MH-budget | +0.374 (.186) | +0.176 | +0.002 to +0.745 | 1.250 |
| Model summary | | | | |
| Adjusted R ² | | | .615 ^{***} | |
| df | | | 63 | |

* p < .10; ** p < .05; *** p < .01; dependent variable: average life satisfaction.

References

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