

## Research Methods Festival 5/07

# Happiness, Income and Personality Theory

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- It is known that Personality traits affect directly the level of happiness;
- We find that Personality traits influence income and the way happiness depends on income
- Higher Neuroticism is associated with a decline of happiness at high income
- Higher Neuroticism is associated with an increase in happiness at low income

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- Simple model: Openness, Extraversion and Conscientiousness provide motivation, which increases aspiration and hence income; with higher aspiration higher gap is possible, hence higher disappointment, hence higher sensitivity to Neuroticism

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- The simple model finds support in the data and provides a parsimonious explanation of the findings
- Gap Between aspiration and income increases with the income, positive for lower incomes negative for higher incomes
- Disappointment produced by higher gap may induce no change in happiness at high income;

# Outline

## 1 Background

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  - Neuroticism** Sensitivity to negative rewards (Loss aversion)

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- Personality traits are heritable around 50 per cent; the shared environment explains around 10 per cent; 40 per cent is idiosyncratic component
- Personality traits and economic preferences have comparable effect size.

# The "Big Five" in the SOEP and BHPS datasets

I see myself as someone who:

- 1 (A) Is sometimes rude to others (*reverse-scored*).
- 2 (C) Does a thorough job.
- 3 (E) Is talkative.
- 4 (N) Worries a lot.
- 5 (O) Is original, comes up with new ideas.
- 6 (A) Has a forgiving nature.
- 7 (C) Tends to be lazy (*reverse-scored*).
- 8 (E) Is outgoing, sociable.
- 9 (N) Gets nervous easily.
- 10 (O) Values artistic, aesthetic experiences.
- 11 (A) Is considerate and kind to almost everyone.
- 12 (C) Does things efficiently.
- 13 (E) Is reserved (*reverse-scored*).
- 14 (N) Is relaxed, handles stress well (*reverse-scored*).
- 15 (O) Has an active imagination.

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- Kahneman and Deaton (2010) argue that a maximum is reached around 75K USD; relation flat for higher values
- Time series: Easterlin Paradox (1974): substantial real income growth in Western countries over the last fifty years but without any corresponding rise in reported happiness levels.

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- **Not known:** how personality traits correlate with income

# Data Summary: UK, panel, 1996-2008

**Table:** UK: BHPS dataset years 1996-2008, Main Variables used in the regressions

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>	<b>N</b>
Life Satisfaction	5.143	1.267	1	7	117041
Income	6.44	3.702	0.433	20.774	136582
Age	41.213	12.801	18	65	136582
Male	0.466	0.499	0	1	136581
Agreeableness*	5.45	0.985	1	7	10484
Conscientiousness*	5.344	1.045	1	7	10463
Extraversion*	4.523	1.148	1	7	10475
Neuroticism*	3.737	1.299	1	7	10493
Openness*	4.502	1.167	1	7	10457
Agreeableness	0.558	0.121	0	0.774	105485
Conscientiousness	0.558	0.129	0.007	0.828	105320
Extraversion	0.559	0.142	0.078	0.899	105433
Neuroticism	0.557	0.16	0.203	0.985	105599
Openness	0.559	0.144	0.106	0.931	105231
Hours worked	25.949	18.739	0	99	132846

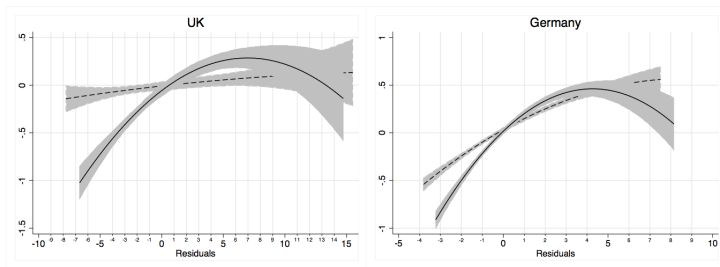
# Data Summary: Germany, panel, 1984-2009

**Table:** Germany: SOEP dataset years 1984-2009, Main Variables used in the regressions

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>	<b>N</b>
Life Satisfaction	5.187	1.088	1	7	324354
Income	3.749	1.822	0.728	11.49	309166
Age	41.762	12.827	18	65	325313
Male	0.492	0.5	0	1	325313
Agreeableness*	5.419	0.971	1	7	15389
Conscientiousness*	5.95	0.9	1	7	15364
Extraversion*	4.857	1.129	1	7	15407
Neuroticism*	3.959	1.212	1	7	15393
Openness*	4.516	1.181	1	7	15332
Agreeableness	0.618	0.117	0.082	0.813	219832
Conscientiousness	0.618	0.108	0.008	0.832	219250
Extraversion	0.613	0.135	0.134	0.904	219981
Neuroticism	0.621	0.144	0.236	0.999	219955
Openness	0.609	0.144	0.19	0.92	218995
Hours worked	28.715	20.226	0	80	304634

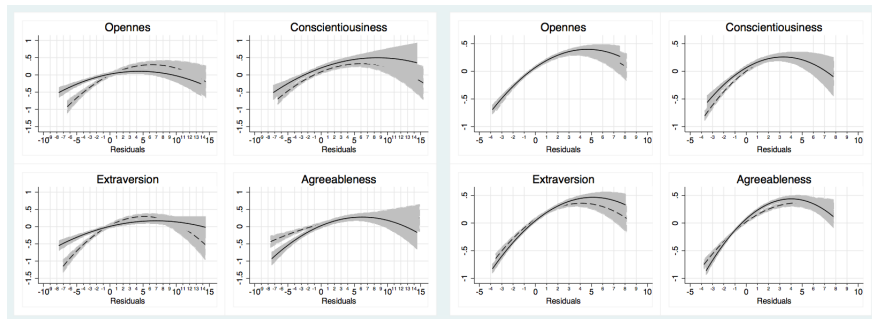
# Personality and Income: estimation

**Figure: Life Satisfaction Income and Personality Traits in UK and Germany.** Quadratic Interpolations. Bold line = Individuals in the top 5 percentile in Neuroticism score. Dashed line = Individuals in the bottom 5 percentile in Neuroticism score



# Personality and Income: estimation

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## Life satisfaction, Household Income, Personality Traits

Table: Life Satisfaction Income and Personality Traits in UK and Germany. Panel Data with Individual Random Effects.

	Germany 1984-09 b/se	Germany 1984-09 b/se	UK 1996-08 b/se	UK 1996-08 b/se	UK 1996-08 b/se
Income	0.0225 (0.0233)	-0.0933* (0.0541)	-0.0020 (0.0157)	-0.0020 (0.0047)	0.0116 (0.0115)
Income <sup>2</sup>	0.0022 (0.0021)	0.0105** (0.0051)	0.0001 (0.0008)		
Neur*Inc	0.1287*** (0.0379)	0.1453*** (0.0388)	0.0864*** (0.0286)	0.0434*** (0.0110)	0.0505** (0.0234)
Neur*Inc <sup>2</sup>	-0.0128*** (0.0035)	-0.0139*** (0.0036)	-0.0036** (0.0015)	-0.0016*** (0.0004)	-0.0022* (0.0012)
Ext*Inc		0.0624 (0.0449)			-0.0507* (0.0301)
Ext*Inc <sup>2</sup>		-0.0028 (0.0041)			0.0025 (0.0016)
Cons*Inc		0.1648*** (0.0524)			-0.0289 (0.0367)
Cons*Inc <sup>2</sup>		-0.0130*** (0.0049)			0.0015 (0.0020)
Open*Inc		-0.0463 (0.0428)			0.0050 (0.0307)
Open*Inc <sup>2</sup>		0.0044 (0.0039)			-0.0003 (0.0017)
Agr*Inc		-0.0079 (0.0502)			0.0399 (0.0370)
Agr*Inc <sup>2</sup>		-0.0011 (0.0046)			-0.0029 (0.0020)
Neuroticism	-1.2911*** (0.0939)	-1.3320*** (0.0954)	-2.2545*** (0.1258)	-1.9095*** (0.0852)	-1.9142*** (0.1106)
Extraversion	0.2595*** (0.0383)	0.2734*** (0.1108)	0.4035*** (0.0548)	0.4683*** (0.0614)	0.5540*** (0.1357)
Conscientiousness	0.2688*** (0.0487)	-0.1194 (0.1310)	1.0748*** (0.0750)	0.9551*** (0.0716)	1.0532*** (0.1605)
Openness	0.2385*** (0.0364)	0.3357*** (0.1056)	-0.1040 (0.0662)	-0.1333** (0.0649)	-0.1444 (0.1360)
Agreeableness	0.4528*** (0.0443)	0.5056*** (0.1260)	0.6498*** (0.0780)	0.6926*** (0.0747)	0.5993*** (0.1639)
Wave effects	Yes	Yes	Yes	Yes	Yes
Region effects	Yes	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	No	Yes	Yes
Education	Yes	Yes	No	Yes	Yes
Employment status	Yes	Yes	No	Yes	Yes
Occupation type	Yes	Yes	No	Yes	Yes
Health Status	Yes	Yes	No	Yes	Yes
Worked Hours	Yes	Yes	Yes	Yes	No
Worked Hour <sup>2</sup>	Yes	Yes	Yes	Yes	No
N	177562	177562	90026	89961	91085

# Gender Differences

**Table: Life Satisfaction Income and Personality Traits in UK and Germany.** Panel Data with Individual Random Effects.

	Germany 1984-09 b/se	UK 1996-08 b/se	UK 1996-08 b/se
Income	0.0115 (0.0260)	-0.0100 (0.0162)	-0.0035 (0.0049)
Income <sup>2</sup>	0.0035 (0.0023)	0.0005 (0.0008)	
Neur*Inc	0.1397*** (0.0416)	0.0874*** (0.0286)	0.0362*** (0.0125)
Neur*Inc <sup>2</sup>	-0.0139*** (0.0038)	-0.0036** (0.0015)	-0.0011** (0.0005)
Male*Neur*Inc	0.0531*** (0.0192)	0.0341** (0.0163)	0.0272* (0.0153)
Male*Neur*Inc <sup>2</sup>	-0.0043** (0.0018)	-0.0016* (0.0009)	-0.0012 (0.0008)
Neuroticism	-1.3586*** (0.1070)	-2.2462*** (0.1329)	-1.8628*** (0.0972)
Male*Neuroticism	-0.2462*** (0.0847)	-0.1601 (0.1309)	-0.1690 (0.1246)
Extraversion	0.2784*** (0.0421)	0.4041*** (0.0648)	0.4688*** (0.0614)
Conscientiousness	0.3818*** (0.0538)	1.0746*** (0.0750)	0.9537*** (0.0716)
Openness	0.2576*** (0.0400)	-0.1031 (0.0662)	-0.1328** (0.0649)
Agreeableness	0.4703*** (0.0488)	0.6486*** (0.0780)	0.6904*** (0.0747)
Wave effects	Yes	Yes	Yes
Region effects	Yes	Yes	Yes
Number of children	Yes	Yes	Yes
Marital status	Yes	No	Yes
Education	Yes	No	Yes
Employment status	Yes	No	Yes
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Health Status	Yes	No	Yes
Worked Hours	Yes	Yes	Yes
Worked Hours <sup>2</sup>	Yes	Yes	Yes
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N	177562	90026	88961

# Neuroticism

- Neuroticism is linked to higher sensitivity to negative emotions like anger, hostility or depression (e.g. Clark and Watson, 2008),
- associated with structural features of the brain systems associated with sensitivity to threat and punishment (DeYoung et Al. 2010)
- with low levels of serotonin in turns associated with aggression, poor impulse control, depression, and anxiety (Spoont 1992).
- Neuroticism associate with sensibility to negative outcomes, threats and punishments (see DeYoung and Gray (2010) for a recent survey).
- It is therefore possible to argue that Neurotic people experience higher sensitivity to distance between aspiration and realization.



# Neuroticism, cont'd



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Neuroticism

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- Realized income depends on Aspiration
- Aspiration is affected by motivation (Openness, Extraversion, Conscientiousness)
- Income increases with aspiration
- Ex-post happiness depends on income, and (negatively) on the gap between aspired and realized income
- Individual specific sensitivity to the gap is modulated by Neuroticism

# Structural Model: idea

- Endogenous variables Aspiration, Income and Happiness



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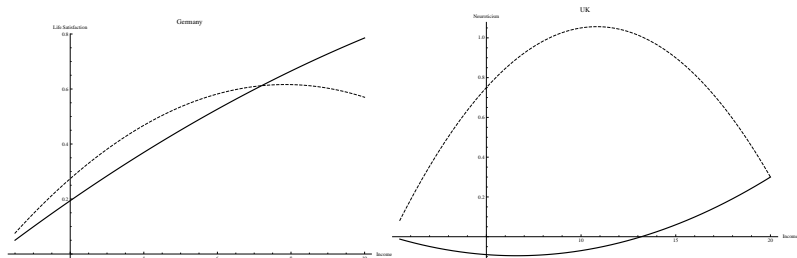
- Endogenous variables Aspiration, Income and Happiness
- Aspiration is a latent variable, Income and Happiness are observed
- Personality and other control variables are taken as exogenous

## 3SLS: Life Satisfaction equation, 2005 data

	Germany 2005 b/se	Germany 2005 b/se	UK 2005 b/se	UK 2005 b/se
lfato				
Income	0.039* (0.022)	0.030 (0.100)	-0.027* (0.015)	-0.095* (0.056)
Income <sup>2</sup>		0.001 (0.010)		0.004 (0.003)
Neur. × Income	0.283*** (0.048)	0.297* (0.160)	0.214*** (0.036)	0.331*** (0.098)
Neur. × Income <sup>2</sup>	-0.017*** (0.004)	-0.019 (0.016)	-0.007*** (0.002)	-0.014** (0.006)
Neuroticism	-2.632*** (0.160)	-2.652*** (0.337)	-3.451*** (0.187)	-3.790*** (0.329)
Extraversion	0.706*** (0.064)	0.708*** (0.064)	1.031*** (0.085)	1.027*** (0.085)
Age	-0.072*** (0.005)	-0.072*** (0.005)	-0.068*** (0.007)	-0.068*** (0.007)
Age <sup>2</sup>	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Male	-0.152*** (0.017)	-0.152*** (0.018)	-0.223*** (0.024)	-0.223*** (0.024)
nhinc				
Agreeableness	-0.260*** (0.063)	-0.245*** (0.062)	-0.268* (0.156)	-0.253* (0.153)
Conscientiousness	-0.122* (0.069)	-0.121* (0.068)	0.071 (0.154)	0.049 (0.151)
Openness	0.117** (0.054)	0.115** (0.054)	0.344** (0.137)	0.353*** (0.135)
Extraversion	0.013 (0.056)	0.012 (0.055)	0.579*** (0.131)	0.598*** (0.129)
Neuroticism	-0.250*** (0.064)	-0.240*** (0.064)	-0.794*** (0.146)	-0.809*** (0.144)
Age	0.002*** (0.001)	0.002*** (0.001)	-0.009*** (0.001)	-0.008*** (0.001)
Male	0.031** (0.015)	0.032** (0.015)	0.145*** (0.040)	0.134*** (0.039)
Income at t-1	0.772*** (0.004)	0.770*** (0.004)	0.715*** (0.005)	0.715*** (0.005)
Education	0.068*** (0.003)	0.068*** (0.003)	0.116*** (0.006)	0.114*** (0.006)
region effects	Yes	Yes	Yes	Yes
number of children	Yes	Yes	Yes	Yes
marital status	Yes	Yes	Yes	Yes
education	Yes	Yes	Yes	Yes
N	13655	13655	9829	9829

# Life satisfaction, Household Income and Neuroticism

**Figure: Income effect on Life satisfaction** Bold line = Less Neurotic, Dashed line = Top Neurotic



# Conclusions

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- Higher Neuroticism is associated with a decline of happiness at high income and an increase at lower income
- Simple model: Openness, Extraversion and Conscientiousness provide motivation, which increases aspiration and hence income; with higher aspiration higher gap is possible. Higher disappointment follows if individual has higher sensitivity to Neuroticism
- The simple model finds support in the data and provides a parsimonious explanation of the findings



## Conclusions, cont'd

*I remember when I was younger and made half the salary I do now. I kept thinking, "If I could just make twice as much money, things would be perfect." I got lucky. I now make twice as much money. So these days I think, "If I could just make twice as much MORE ..."*

*Woody Allen*