



Does Disability Reshape Who We Are?

Personality change following permanent disability onset

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Motivation

- ▶ Psychology traditionally viewed personality as largely fixed by age thirty.
- ▶ Applied work in economics often treats traits as predetermined inputs.
- ▶ Emerging evidence that adult traits may respond to sustained changes in roles and environments.
- ▶ Personality traits predict schooling, wages, health, crime, and longevity (Borghans et al. 2008).

The Big Five summarise broad patterns of thought and behaviour

Trait	Higher scores indicate
Extraversion	Sociability, energy, positive affect, and assertiveness
Agreeableness	Cooperation, empathy, trust, and concern for others
Conscientiousness	Organisation, persistence, self-discipline, and goal-directedness
Emotional stability	Calmness and resilience rather than anxiety and emotional volatility
Openness to experience	Curiosity, imagination, intellectual engagement, and receptiveness to new ideas

Prior evidence shows change is possible, but causality remains unclear

Life-course change

Personality becomes more stable with age, but mean levels continue to change across adulthood.

Environmental factors appear especially important for within-person change.

Adverse events

Employment, family, and health shocks are associated with relatively small personality changes over short observation windows.

Health conditions

Chronic disease onset predicts declines in several traits, but existing studies do not isolate the causal effect of lasting functional impairment.

Unresolved question: does a major health shock—permanent disability—cause personality change, and how does that change unfold over time?

This paper makes three contributions

1. **A distinct and consequential shock**

Studies permanent disability as a durable change in functioning and social participation—not simply the diagnosis of a health condition.

2. **A causal research design**

Uses staggered disability onset and the Callaway–Sant’Anna estimator to accommodate cohort-specific and dynamic treatment effects.

3. **Long-run dynamics and mechanisms**

Combines 24 HILDA waves with five personality measurements to trace effects from four years before to four years after onset, examine predetermined heterogeneity, and test health and participation pathways.

Permanent disability is a distinctive test of personality malleability

Health condition

Diagnosis and symptoms



Functional disruption

Activity limitations and restricted participation



Persistent role change

Work, social contact, independence, and daily routines

A permanent shift in the environment is precisely the setting in which adult personality should be most likely to change.

Three channels yield trait-specific predictions [Jokela et al. 2014]

Distress

Coping with diagnosis, uncertainty, and loss of control

Prediction: lower emotional stability

Energy depletion

Fatigue, pain, lethargy, and reduced positive affect

Prediction: lower extraversion and conscientiousness

Role disruption

Reduced work and social participation; adaptation to new constraints

Prediction: lower extraversion; openness may rise through reappraisal

Disability is measured as a lasting restriction on everyday activity in HILDA

1. **Screen for a long-term condition**

Respondents report whether “any long-term health condition, impairment or disability that restricts them in everyday activities and has lasted, or is likely to last, for six months or more.”

2. **Classify the impairment**

A show-card records the relevant conditions, used to identify sensory, physical, and psychosocial disability.

3. **Measure work limitation**

Respondents indicate whether the condition limits the type or amount of work they can do.

HILDA links annual disability histories to repeated personality measures

Panel

- ▶ 24 annual waves, 2001–2024
- ▶ Nationally representative Australian household panel
- ▶ 118,551 person-wave observations in the analysis sample

Outcomes

- ▶ Big Five measured every four years from 2005
- ▶ Original 1–7 scales
- ▶ Up to five personality observations per respondent

Permanent onset: no disability previously, first report in a later wave, and disability reported in every subsequent observed wave.

Disability types and included impairments

Sensory

Sight problems not corrected by glasses or lenses; hearing problems; speech problems.

Physical

Limited use of arms or fingers, or feet or legs; difficulty gripping; migraines; restrictions on physical activity or work; disfigurement or deformity; breathing difficulty; chronic or recurring pain.

Psychosocial

Nervous or emotional condition requiring treatment; mental illness requiring help or supervision.

Types are measured at permanent-disability onset and carried forward. Categories are not mutually exclusive.

Conditions not assigned to these types: blackouts or fits; learning difficulty; effects of head injury, stroke or brain damage; and other long-term conditions.

Six SF-36 domains capture different dimensions of health

▶ **Mental health**

Psychological distress and well-being.

▶ **Vitality**

Energy and fatigue.

▶ **Bodily pain**

Pain intensity and pain-specific interference with normal work.

▶ **Social functioning**

Interference of physical or emotional problems with social activities.

▶ **Role physical**

Broader limitations in work and daily activities caused by physical health.

▶ **General health**

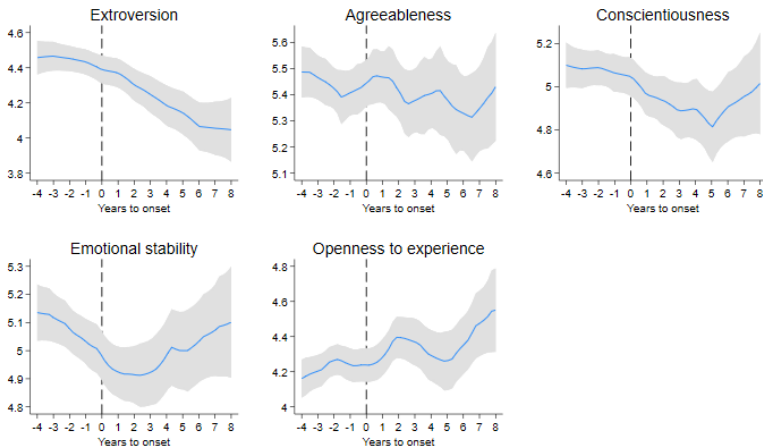
Overall health perceptions and expectations about future health.

Scores range from 0 to 100; higher scores indicate better health or functioning.

The analysis sample spans personality, disability, and health

Variable	N	Mean	SD	Min	Max
<i>Demographic characteristics</i>					
Age	18,551	37.60	12.02	18.00	64.00
Female	18,551	0.54	0.50	0.00	1.00
University degree	18,551	0.36	0.48	0.00	1.00
<i>Disability characteristics</i>					
Ever permanently disabled	18,551	0.09	0.29	0.00	1.00
Ever disabled: sensory	18,551	0.01	0.10	0.00	1.00
Ever disabled: physical	18,551	0.04	0.20	0.00	1.00
Ever disabled: psychosocial	18,551	0.02	0.13	0.00	1.00
<i>Personality traits (1–7)</i>					
Extroversion	18,551	4.47	1.08	1.00	7.00
Agreeableness	18,551	5.39	0.89	1.00	7.00
Conscientiousness	18,551	5.17	0.98	1.00	7.00
Emotional stability	18,551	5.20	1.02	1.00	7.00
Openness to experience	18,551	4.17	1.02	1.00	7.00
<i>SF-36 health measures (0–100)</i>					
Mental health	18,482	76.51	14.78	4.00	100.00
Role physical	17,808	95.79	14.13	25.00	100.00
Social functioning	18,504	89.66	17.07	12.50	100.00
Vitality	18,455	63.92	17.35	5.00	100.00
Bodily pain	18,420	83.09	17.44	10.00	100.00
General health	18,417	76.58	15.93	5.00	100.00

Trajectories already suggest persistent, trait-specific change



Staggered timing yields cohort-by-time comparisons

For onset cohort g and outcome year t :

$$ATT(g, t) = E[\Delta Y_{it} \mid G_i = g] - E[\Delta Y_{it} \mid i \in \mathcal{C}_t]$$

Who provides the comparison?

$\mathcal{C}_t$ contains people who are **not yet disabled** or **never disabled** at time t .
Already-treated people are excluded.

How are the results summarised?

At each event time, the relevant cohort-specific effects are combined.
Post_avg summarises the average effect across all post-onset comparisons.

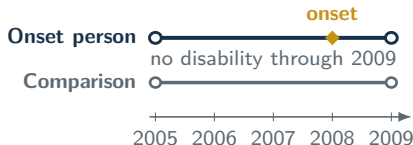
Each $ATT(g, t)$ is one group-level 2×2 difference-in-differences comparison.

Identification compares changes over the same calendar years

Personality is measured in 2005 and 2009; disability onset is observed annually.

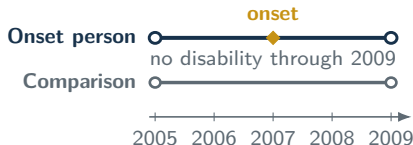
Onset in 2008

2009 is one year post-onset ($e = +1$)



Onset in 2007

2009 is two years post-onset ($e = +2$)



$$\widehat{ATT}(g, 2009) = \left(Y_{2009}^{\text{onset}} - Y_{2005}^{\text{onset}} \right) - \left(Y_{2009}^{\text{comparison}} - Y_{2005}^{\text{comparison}} \right)$$

Identification rests on comparable untreated trends

Required

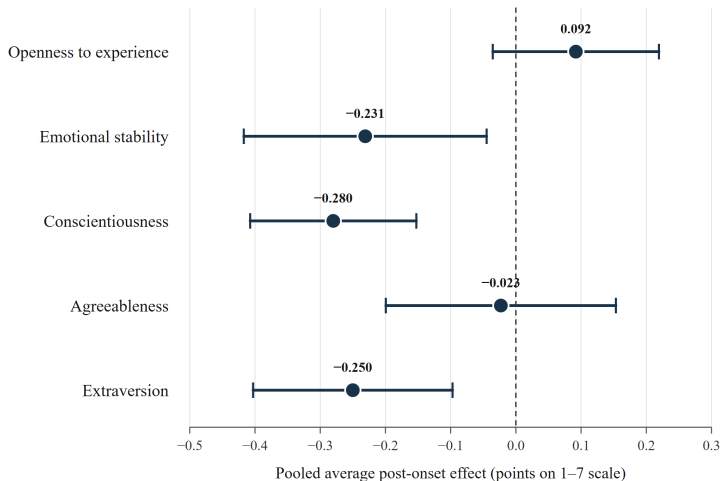
- ▶ Conditional parallel trends
- ▶ No anticipation
- ▶ Stable treatment definition

Robustness checks

- ▶ Pre-onset placebo coefficients
- ▶ Dynamic post-onset estimates
- ▶ Alternative staggered-DiD estimators

The design permits different baseline personality levels; it rules out different counterfactual changes.

Disability onset is followed by declines in three measured traits

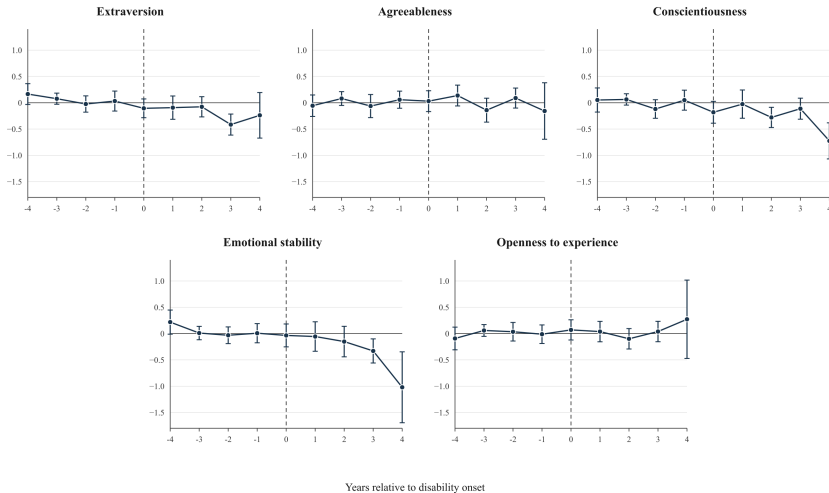


The average effect is selective, not a general downward shift

Trait	Pooled post-onset ATT	Interpretation
Extraversion	−0.250	Less sociability / positive affect
Conscientiousness	−0.280	Less goal-directedness / persistence
Emotional stability	−0.231	More distress / emotional volatility
Agreeableness	−0.023	Little average change
Openness	+0.092	Positive but imprecise

Disability lowers extraversion, conscientiousness, and emotional stability by about 0.23–0.28 points, with no clear average change in agreeableness or openness.

Flat pre-trends give way to gradual post-onset divergence



The timing is consistent with a sustained adaptation process

Before onset

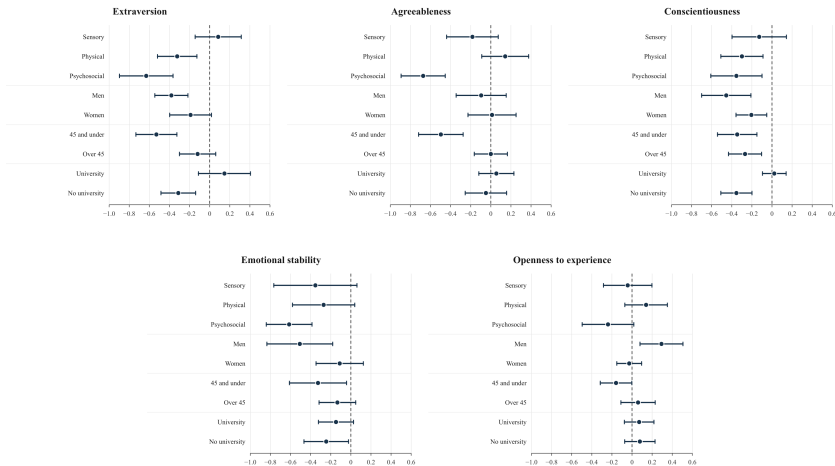
Coefficients fluctuate around zero, supporting the parallel-trends assumption.

After onset

Effects emerge and deepen unevenly over several years.

The gradual divergence is more consistent with an accumulating response to persistent constraints than with a one-off reaction at onset.

Average effects conceal systematic heterogeneity

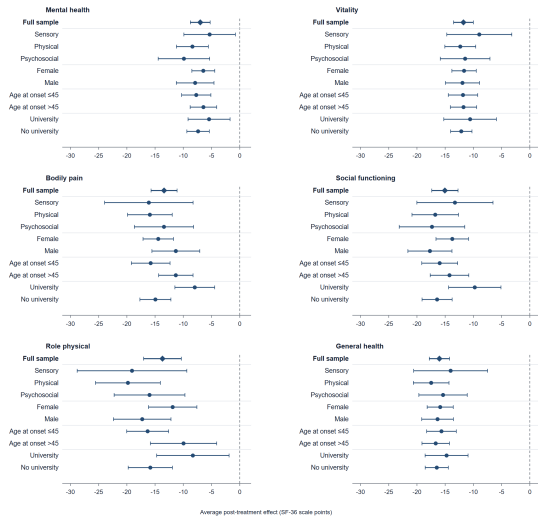


Pooled average post-onset effect (points on 1-7 scale)

Personality changes concentrate in particular contexts

- ▶ **Disability type:** psychosocial disability produces the broadest adverse pattern; physical disability lowers extraversion and conscientiousness, while sensory disability shows no clear personality effect.
- ▶ **Life stage:** onset at age 45 or younger is associated with changes across four traits; after age 45, only conscientiousness clearly declines.
- ▶ **Gender:** men's response is more adverse than women's yet experience an increase in openness to new experience.
- ▶ **Education:** non-graduates show declines in extraversion, conscientiousness, and emotional stability; graduates show no clear trait change.

Disability reduces health, energy, and participation



Heterogeneity points beyond health severity alone

- ▶ **What does not sort the groups:** mental health, vitality, and general health deteriorate broadly, including among groups with little measured personality change.
- ▶ **What aligns more closely:** men, younger-onset respondents, and non-graduates have larger losses in role physical and social functioning and broader personality effects.
- ▶ **What disability type adds:** psychosocial disability produces the largest mental health response.

Disruption to roles, routines, and social participation may translate a common health shock into personality change; impairment type also matters.

The main results are robust to alternative estimators

Personality trait	(1) CSA-post	(2) CSA-pre	(3) TWFE	(4) BJS	(5) dCDH
Extraversion	-0.252***	0.074*	-0.137***	-0.166***	-0.434***
Standard error	(0.078)	(0.045)	(0.048)	(0.050)	(0.088)
p-value	[0.001]	[0.096]	[0.004]	[< 0.001]	[< 0.001]
q-value	[0.003]	[0.482]	[0.011]	[0.002]	[< 0.001]
Agreeableness	-0.023	0.001	-0.024	-0.057	0.019
Standard error	(0.090)	(0.048)	(0.046)	(0.047)	(0.073)
p-value	[0.797]	[0.990]	[0.596]	[0.224]	[0.795]
q-value	[0.797]	[0.990]	[0.681]	[0.281]	[0.795]
Conscientiousness	-0.274***	0.013	-0.249***	-0.263***	-0.186*
Standard error	(0.066)	(0.050)	(0.051)	(0.051)	(0.109)
p-value	[< 0.001]	[0.791]	[< 0.001]	[< 0.001]	[0.088]
q-value	[< 0.001]	[0.990]	[< 0.001]	[< 0.001]	[0.146]
Emotional stability	-0.229**	0.036	-0.143**	-0.170***	-0.323***
Standard error	(0.095)	(0.048)	(0.057)	(0.058)	(0.108)
p-value	[0.016]	[0.450]	[0.012]	[0.004]	[0.003]
q-value	[0.027]	[0.990]	[0.020]	[0.006]	[0.007]
Openness to experience	0.094	0.001	0.020	0.011	0.031
Standard error	(0.065)	(0.047)	(0.048)	(0.048)	(0.099)
p-value	[0.147]	[0.985]	[0.681]	[0.822]	[0.753]
q-value	[0.184]	[0.990]	[0.681]	[0.822]	[0.795]

q-values adjust for testing five personality outcomes within each specification. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Takeaways

1. Permanent disability onset is followed by gradual, meaningful declines in extraversion, conscientiousness, and emotional stability.
 2. Because these traits shape participation, persistence, and emotional regulation, their decline may amplify later disadvantage across work, health, and social life. Personality change may be one mechanism through which the initial disability shock produces lasting social and economic disadvantage.
 3. Disrupted work roles, routines, and social participation may contribute to the personality response.
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Questions

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