SESSION 2:

3. Child development (Symposium) – Relations between childhood self-control and later life health and labour market outcomes

CHAIR: Heather Joshi (CBE) (UCL Institute of Education)
Associations between childhood self-regulation and adult socio-economic status: evidence from the British Cohort Study

Fionnuala O’Reilly, Dr Michael Daly & Prof Liam Delaney
Overview

• Previous work
• Hypotheses
• Data, methods and measurement
• Results
• Summary
• Strengths and Limitations
Previous work

- Studies examining how constructs related to self-control predict later life SES outcomes:
  - Time discounting (Golsteyn, Gronqvist & Lindahl, 2014),
  - Delay of gratification (Mischel, Schoda & Rodriguex, 1989)
  - Conscientiousness (Judge, Higgins, Thoresen & Barrick, 1999)

- Key study: Moffitt et al., (2011)
  - Investigates the relationship between childhood self-control and adult outcomes in health (physical health, substance dependence), wealth (financial planfulness, income, financial struggles) and crime incidence at age 32.
Filling the gaps

Moffitt et al., (2011)

1. Does not examine how self-regulation relates to SES beyond the early career stages (i.e. age 32).

2. Uncertain whether the associations would remain robust to the inclusion of a set of parental SES variables and other traits such as conduct problems.

3. Does not address the prospect of within-person changes in SES over the life course.
Hypotheses

**Hypothesis 1:** Childhood self-regulation will positively predict each of six SES outcomes at age 30 and again at age 42.

**Hypothesis 2:** Childhood self-regulation will positively predict SES outcomes at age 42, independent of SES outcomes at age 30 (testing the possibility of within-person social mobility).
The Role of Education

Self-control predicts a number of education related outcomes:

• Hours spent doing homework
• Final grades
• School attendance (Duckworth & Seligman, 2005)

Education is linked to many socioeconomic outcomes:

• Income (Becker, 1975)
• Occupation (Cohn & Addison, 1998)
Hypotheses

• **Hypothesis 3:** Educational attainment will account for a significant proportion of the association between childhood self-regulation and adult SES.
Data, Measurement and Methods

**Data:** British Cohort Study (N = 6,700)
• 3 waves; age 10, 30 and 42.

**Main Predictor: Self-regulation (age 10)**
• 11 item Disorganised Activity scale derived from the Child Development Behaviours Questionnaire
• Cronbach alpha = 0.93
• Convergent validity
  • Brief Self-Control Scale (Tangney et al., 2004) \( r = .75, p < .01 \)
  • Domain-Specific Impulsivity Scale (Tsukayama et al., 2013) \( r = .75, p < .01 \)
• Discriminant validity:
  • SDQ (Goodman, 1997) emotional (\( r = -.35, p < .01 \)) and peer problems (\( r = -.40, p < .01 \))
## Outcome Variables

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Description</th>
</tr>
</thead>
</table>
| Self-rated Financial Position            | How well the participant feels they are performing financially (Scale 1-5)  
(Age 30: $M = 3.98$, $SD = 0.95$. Age 42: $M = 3.85$, $SD = 0.96$)                                                                        |
| Age at completion of education           | Age at which the participant left full-time continuous education (Age 30: $M = 17.36$, $SD = 2.22$. Age 42: $M = 18.00$, $SD = 2.95$) |
| Highest Academic Qualification          | Highest National Vocational Qualification (NVQ) – academic or vocational (Scale 1-5)  
(Age 30: $M = 2.5$, $SD = 1.41$. Age 42: $M = 2.76$, $SD = 1.46$)                                                                        |
## Outcome Variables

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Income</td>
<td>Participant net pay + Partner net pay (Age 30: 6.9 (SD = 1.97) (£15,800 p/a). Age 42: 11.55 (SD = 3.39) (£37,000 p/a)</td>
</tr>
<tr>
<td>Social Class</td>
<td>British Registrar General’s Scale; based on participant occupation (Scale 1-5) Age 30: M = 3.39, SD = 0.78. Age 42: M = 4.27, SD = 0.96</td>
</tr>
<tr>
<td>Home Ownership</td>
<td>Binary variable 1 = Property Ownership (Age 30: 65.10%. Age 42: 74.66%)</td>
</tr>
</tbody>
</table>
Covariates

• Cognitive ability (age 10) – British Ability Scales
• Mental health (age 10) – visit to psychiatrist/psychologist/counsellor
• Conduct, behavioural and emotional problems (age 10)
• Gender
• Parental SES
  • Social Class at Birth (British Registrar General’s Scale)
  • Mother’s age at completion of education
  • Property ownership (at birth)
Model Specification

Socio Economic Status (Age 30/42) = β0 + β1 (Self-Regulation; age 10)i + β2 (Cognitive Ability; age 10)i + β3 (Mental Health; age 10)i + β4 (Conduct problems; age 10)i + β5 (Behavioural problems; age 10)i + β6 (Emotional problems; age 10) i + β7 (Gender)i + β8 (Social Class; Birth)i + β9 (Age Mother finished Educ.)i + β10 (Property ownership; Birth)i + εi

* All outcomes variables at age 30 and 42 are standardised (mean = 0, SD = 1)
## Results (Age 30)

<table>
<thead>
<tr>
<th></th>
<th>Self-rated financial position</th>
<th>Age finished education</th>
<th>Highest academic qualification</th>
<th>Household income</th>
<th>Social Class</th>
<th>Property ownership</th>
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</thead>
<tbody>
<tr>
<td><strong>Self-regulation</strong></td>
<td><strong>0.090</strong>*</td>
<td><strong>0.127</strong>*</td>
<td><strong>0.126</strong>*</td>
<td><strong>0.104</strong>*</td>
<td><strong>0.141</strong>*</td>
<td><strong>1.278</strong>*</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.014)</td>
<td>(0.014)</td>
<td>(0.017)</td>
<td>(0.016)</td>
<td>(1.196 - 1.365)</td>
</tr>
<tr>
<td><strong>Cognitive Ability</strong></td>
<td><strong>0.071</strong>*</td>
<td><strong>0.205</strong>*</td>
<td><strong>0.250</strong>*</td>
<td><strong>0.114</strong>*</td>
<td><strong>0.202</strong>*</td>
<td>1.040</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.014)</td>
<td>(0.014)</td>
<td>(0.017)</td>
<td>(0.016)</td>
<td>(0.973 - 1.112)</td>
</tr>
</tbody>
</table>

- p-values/confidence intervals in parentheses. *** p<0.01, ** p<0.05, * p<0.1
## Results (Age 42)

<table>
<thead>
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<th>Self-rated financial position</th>
<th>Age finished education</th>
<th>Highest academic qualification</th>
<th>Household income</th>
<th>Social Class</th>
<th>Property Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-regulation</strong></td>
<td>β</td>
<td>β</td>
<td>β</td>
<td>β</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td><strong>Cognitive Ability</strong></td>
<td>0.101***</td>
<td>0.117***</td>
<td>0.120***</td>
<td>0.117***</td>
<td>0.145***</td>
<td>1.254***</td>
</tr>
<tr>
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<td>(0.017)</td>
<td>(0.0150)</td>
<td>(0.015)</td>
<td>(0.019)</td>
<td>(0.017)</td>
<td>(1.159 - 1.356)</td>
</tr>
<tr>
<td><strong>Cognitive Ability</strong></td>
<td>0.072***</td>
<td>0.214***</td>
<td>0.232***</td>
<td>0.176***</td>
<td>0.183***</td>
<td>1.208***</td>
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<tr>
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<td>(0.017)</td>
<td>(0.0151)</td>
<td>(0.015)</td>
<td>(0.019)</td>
<td>(0.017)</td>
<td>(1.115 - 1.309)</td>
</tr>
</tbody>
</table>

- p-values/confidence intervals in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$
Results: Within-person social mobility

<table>
<thead>
<tr>
<th>Social Class</th>
<th>Household Income</th>
<th>Self-rated financial position</th>
<th>Property ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-regulation</td>
<td>β 0.072*** (0.017)</td>
<td>β 0.095*** (0.019)</td>
<td>β 0.062*** (0.017)</td>
</tr>
<tr>
<td>Cognitive ability</td>
<td>β 0.114*** (0.018)</td>
<td>β 0.121*** (0.020)</td>
<td>β 0.052*** (0.017)</td>
</tr>
</tbody>
</table>

• p-values/confidence intervals in parentheses. *** p<0.01, ** p<0.05, * p<0.1
## Results: The role of Education (Age 30)

<table>
<thead>
<tr>
<th></th>
<th>Social Class</th>
<th>Household Income</th>
<th>Self-rated financial position</th>
<th>Property Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Without Education</strong></td>
<td>β</td>
<td>β</td>
<td>β</td>
<td>Exp β</td>
</tr>
<tr>
<td>β</td>
<td>0.141***</td>
<td>0.104***</td>
<td>0.090***</td>
<td>1.278***</td>
</tr>
<tr>
<td>(0.016)</td>
<td>(0.017)</td>
<td>(0.015)</td>
<td>(0.015)</td>
<td>(1.196 - 1.365)</td>
</tr>
<tr>
<td><strong>With Education</strong></td>
<td>0.087***</td>
<td>0.071***</td>
<td>0.072***</td>
<td>1.256***</td>
</tr>
<tr>
<td>(0.015)</td>
<td>(0.017)</td>
<td>(0.015)</td>
<td>(0.015)</td>
<td>(1.174 - 1.344)</td>
</tr>
<tr>
<td><strong>% Change</strong></td>
<td>38.3%</td>
<td>31.7%</td>
<td>20%</td>
<td>7.9%</td>
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</table>

- p-values/confidence intervals in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Results: The role of Education (Age 42)

<table>
<thead>
<tr>
<th></th>
<th>Social Class</th>
<th>Household Income</th>
<th>Self-rated financial position</th>
<th>Property ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>With education</strong></td>
<td>β</td>
<td>β</td>
<td>β</td>
<td>β</td>
</tr>
<tr>
<td>β</td>
<td>0.145***</td>
<td>0.117***</td>
<td>0.101***</td>
<td>1.254***</td>
</tr>
<tr>
<td>(0.017)</td>
<td>(0.019)</td>
<td>(0.017)</td>
<td>(1.159 - 1.356)</td>
<td></td>
</tr>
<tr>
<td><strong>Without education</strong></td>
<td>0.101***</td>
<td>0.087***</td>
<td>0.082***</td>
<td>1.211***</td>
</tr>
<tr>
<td>(0.016)</td>
<td>(0.019)</td>
<td>(0.017)</td>
<td>(1.118 - 1.311)</td>
<td></td>
</tr>
<tr>
<td><strong>% Change</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>30.3%</td>
<td>25.6%</td>
<td>18.8%</td>
<td>16.9%</td>
</tr>
</tbody>
</table>

- p-values/confidence intervals in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Results: Summary

I. 1SD increase in self-regulation at age 10 is associated with a 0.12 increase in SES (across all variables) at age 30 and age 42; an effect 76% the strength of cognitive ability.

II. Strongest associations between self-regulation at age 10 and social class and education.

III. Associations robust to the inclusion of three parental SES variables (inter-generation social mobility).

IV. Associations remain robust at age 42 after controlling for equivalent outcomes at age 30 (within-person social mobility).

V. Associations robust to the inclusion of conduct problems.

VI. Education accounts for 24% approx. of the association between childhood self-regulation and adult SES.
Strengths & Limitations

**Strengths**
- Measure outcomes at two time-points in adulthood
- Comprehensive set of socioeconomic indicators (6 in total)
- Longitudinal design and large population sample (N = 6,700)

**Limitations**
- Self-regulation measure is teacher reported
- Generalizability: UK sample
- Only partially measure the subjective component of SES
- Income: self-reported net pay
Thank you
Poor childhood self-control predicts physiological dysregulation in midlife

Dr Michael Daly\textsuperscript{a,b}, Prof Liam Delaney\textsuperscript{a,b}, & Prof. Roy Baumeister\textsuperscript{c}

\textsuperscript{a}Stirling Behavioural Science Centre, University of Stirling
\textsuperscript{b}UCD Geary Institute, University College Dublin
\textsuperscript{c}Department of Psychology, Florida State University
Why self-discipline?

- **Self-Discipline:**
  - “The capacity to begin tasks and follow through to completion despite boredom or distractions” (NEO-PI-R)
  - Basic dimension of temperament (Zenter & Bates, 2008), antecedent of conscientiousness (Eisenberg et al., 2012)
  - “The ability to control one’s feelings and overcome one’s weaknesses” (OED)
  - Evidence of health benefits of self-discipline largely based on:
    - (i) laboratory studies (e.g. Hagger et al., 2010)
    - (ii) cross-sectional studies (e.g. de Ridder et al., 2012)
Established link between childhood conscientiousness & mortality (Friedman et al., 1993; Roberts et al., 2007)
Emerging link between child self-discipline & objectively assessed physical health
Self-discipline & subsequent overweight, poor health, substance use (Duckworth et al., 2010; Moffitt et al., 2011; Hampson et al., 2013)
Life span studies

- Objective health outcomes
- Avoids endogeneity / health => personality? (e.g. Sutin et al., 2013; Stephan et al., 2014)
- Medium sized samples:
  Moffitt et al. = 892; Hampson et al. = 753
- Small set of control variables:
  Moffitt et al. = gender, social class, intelligence
  Hampson et al. = gender, ethnicity, parental home ownership, adult C, other childhood personality traits
- Childhood self-control could be acting as a proxy for an adverse childhood environment or for poor child health
National Child Development Study (N = 6,878)

Childhood

**Self-discipline** (teacher rated)
- Gender (49.4% female)
- Ethnicity (98% Caucasian)
- Social class (class I to V)
- Intelligence (80-item)

+ Extensive early environment & health controls

Physiological dysregulation
- Cardiovascular
- Metabolic
- Inflammatory
- Respiratory functioning

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Birth: 1958
7 yrs: 1965
11 yrs: 1969
45 yrs: 2003
<table>
<thead>
<tr>
<th>Current study (α = .76):</th>
<th>Hampson et al (2013):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic and diastolic BP</td>
<td>Systolic and diastolic BP</td>
</tr>
<tr>
<td>measurements),</td>
<td>(mean of two measurements),</td>
</tr>
<tr>
<td>HDL cholesterol (reversed)</td>
<td>HDL cholesterol (reversed)</td>
</tr>
<tr>
<td>total cholesterol/HDL ratio</td>
<td>total cholesterol/HDL ratio</td>
</tr>
<tr>
<td>triglycerides</td>
<td>triglycerides</td>
</tr>
<tr>
<td>HbA1c</td>
<td>blood glucose</td>
</tr>
<tr>
<td>body mass index (BMI; kg/m2)</td>
<td>body mass index (BMI; kg/m2)</td>
</tr>
<tr>
<td>waist/hip ratio</td>
<td>waist/hip ratio</td>
</tr>
<tr>
<td>C-reactive protein</td>
<td>urine protein (log transformed)</td>
</tr>
<tr>
<td>Fibrinogen</td>
<td>taking medications for cholesterol or blood</td>
</tr>
<tr>
<td>Von Willebrand factor antigen</td>
<td>pressure</td>
</tr>
<tr>
<td>Tissue Plasminogen activator</td>
<td></td>
</tr>
<tr>
<td>activator antigen</td>
<td></td>
</tr>
<tr>
<td>Peak flow</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Each measure was standardized and summed to produce the index score
Self-discipline measure

- Age 7 & 11: 13-item scale designed to evaluate “impulsive acting out without regard for consequences” (Stott, 1969)
- Items assess aspects of self-discipline including **attentional control, persistence, & impulsive behavior**:
  - 1. Cannot attend or concentrate for long
  - 2. Too restless to remember for long
  - 3. Doesn’t know what to do with himself, can never stick at anything long
  - 4. Sometimes eager, sometimes doesn’t bother
  - 5. Constantly needs petty correction
  - 6. Misbehaves when teacher is out of room….

- Cronbach’s $\alpha = 0.87$ (validation study)
- Correlates 0.74 with Brief Self-Control Scale (Tangney et al. 2004), 0.71 with Domain-Specific Impulsivity Scale (Tsukayama et al. 2013)
Parental & home characteristics

- Mother & father age
- Marital status
- Mother education
- Mother’s first language is English
- Family difficulties (13 including death of a parent, parental disability, divorce/separation, domestic tension, unemployment, alcoholism)
- Number of people in the household
- Number of persons per room
- Region at birth (9 geographic areas)
Childhood health (infancy / age 7)

- Birth weight, breast fed
- BMI (objectively recorded)
- Diabetes
- Asthma
- Heart condition
- Emotional maladjustment
- Epileptic condition
- Motor handicap
- Intellectual disability
- Cerebral palsy
- Other C.N.S. condition
- Disfiguring condition
1) Show self-discipline is **not acting as a proxy** for adverse experiences, home environment, or health
2) If these diminish the self-control – health link we would consider the variable to be affected by **confounding**
3) Distal effects of early life conditions on health will be diminished in a regression model by the inclusion of a ‘downstream’ or ‘intermediary’ variable such as self-discipline
4) Similar to **mediation analysis**
Predictions

- Childhood self-regulation will be negatively associated with **physiological dysregulation** (age 45)
- Robust to adjustment for sex, socioeconomic status, ethnicity, and intelligence
- Robust to further adjustment for family difficulties, parental & home characteristics, geographic locations, baseline medical conditions including emotional maladjustment and relative weight at age 7
Self-discipline & dysregulation

Males:
\[ r (3,448) = -0.13, p < 0.001 \]

Females:
\[ r (3,431) = -0.13, p < 0.001 \]
### Physiological dysregulation: Model 1

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Std. coeff.</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>.175</td>
<td>.064</td>
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<tr>
<td></td>
<td>Self-control</td>
<td>-.073</td>
<td>.013</td>
<td>-.073</td>
</tr>
<tr>
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<td>-.342</td>
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<td></td>
<td>Social class (I – V)</td>
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Physiological dysregulation: Model 1

<table>
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<th>Unstandardized Coefficients</th>
<th>Std. coeff.</th>
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<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
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### Physiological dysregulation: Model 2

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<td>(Constant)</td>
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<td>.072</td>
<td>.047</td>
<td>1.536</td>
<td>.125</td>
</tr>
<tr>
<td>Social class (I – V)</td>
<td>.062</td>
<td>.014</td>
<td>4.500</td>
<td>.000</td>
</tr>
<tr>
<td>Social class missing</td>
<td>.016</td>
<td>.078</td>
<td>.201</td>
<td>.841</td>
</tr>
</tbody>
</table>

Model adjusted for family difficulties, parental & home characteristics, geographic locations, baseline medical conditions including emotional maladjustment and relative weight at age 7.
Physiological dysregulation: Model 2

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Std. coeff.</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>(Constant)</td>
<td>-.875</td>
<td>.280</td>
<td>-3.122</td>
</tr>
<tr>
<td></td>
<td>Self-control</td>
<td>-.068</td>
<td>.013</td>
<td>-5.388</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>-.356</td>
<td>.024</td>
<td>-14.837</td>
</tr>
<tr>
<td></td>
<td>Caucasian</td>
<td>-.013</td>
<td>.062</td>
<td>-.215</td>
</tr>
<tr>
<td></td>
<td>Caucasian missing</td>
<td>-.001</td>
<td>.068</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Intelligence</td>
<td>-.099</td>
<td>.013</td>
<td>-7.658</td>
</tr>
<tr>
<td></td>
<td>Intelligence missing</td>
<td>.072</td>
<td>.047</td>
<td>1.536</td>
</tr>
<tr>
<td></td>
<td>Social class (I – V)</td>
<td>.062</td>
<td>.014</td>
<td>4.500</td>
</tr>
<tr>
<td></td>
<td>Social class missing</td>
<td>.016</td>
<td>.078</td>
<td>.201</td>
</tr>
</tbody>
</table>

Model adjusted for family difficulties, parental & home characteristics, geographic locations, baseline medical conditions including emotional maladjustment and relative weight at age 7.
Conclusions

- Childhood self-discipline is negatively associated with long-run objective health measures in a large-scale representative cohort (N = 6,878)

- Comparable to intelligence or socioeconomic status in predictive effect

- Independent of psychological factors like intelligence or emotional problems or to initial environmental conditions or health
Future directions

- ESRC funded Future Leaders project ‘Childhood self-control & adult health’
- Explore mediating factors (health behaviour, stress, educational attainment, & socioeconomic events)
- Examine disability & mortality across cohort studies
- Examine latent ‘allostatic load’ measure
- Sibling fixed effects models
- Include self-discipline measures in ongoing cohort studies & intervention studies
Thank you for your attention!

Acknowledgements: We are grateful to The Centre for Longitudinal Studies, Institute of Education for permitting the use of these data and to the UK Data Archive and Economic and Social Data Service for making them available. However, they bear no responsibility for the analysis or interpretation of these data.
Childhood self-control & unemployment throughout the lifespan: evidence from two British cohort studies.

Liam Delaney
Professor of Economics, Stirling University,
Stirling Behavioural Science Centre,
with
Michael Daly, Mark Egan (Stirling)
& Roy Baumeister (Florida State)
March 16th 2015
Self-Control & Unemployment

- Self-Control: linked to school and career success (Borghans et al. 2008) and may outperform IQ in predicting academic performance (Duckworth & Seligman 2005).
- Contributor to higher work performance (Kaur, Kremer, & Mulainathan 2010), potentially valuable during job search (Kanfer et al. 2001).
- Potentially higher returns during tough macroeconomic conditions (e.g. a recession).
STUDY 1

- 17,000 born in Britain in a week in 1970.
- Self-control measured at 10y.
- Employment data 16-38y.
- N = 6,836
Data & Method

**British Cohort Study**

Birth 1970

- 10y ‘80
- 21y ‘91
- 26y ‘96
- 30y ‘00
- 34y ‘04
- 38y ‘08
- 42y ‘12

**Childhood**
- Self-control at 10y
- Intelligence at 10y
- Gender
- SES

**Adult Unemployment**

(i) Current employment status
0 = Employed
1 = Unemployed

(ii) Months unemployed 16-38y
(0 – 269 months, 75% have 0 mths)
## Probit marginal effects coefficients

<table>
<thead>
<tr>
<th></th>
<th>21y</th>
<th>26y</th>
<th>30y</th>
<th>34y</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unemployed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>782</td>
<td>4,451</td>
<td>5,505</td>
<td>4,809</td>
</tr>
<tr>
<td><strong>Self-Control</strong></td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td><strong>Intelligence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td><strong>Controlling for parental SES.</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*** p<0.01, **p<0.05, *p<0.1
<table>
<thead>
<tr>
<th>Probit marginal effects coefficients</th>
<th>NB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unemployed</strong></td>
<td></td>
</tr>
<tr>
<td>38y</td>
<td>42y</td>
</tr>
<tr>
<td>16-38y</td>
<td></td>
</tr>
<tr>
<td><strong>N</strong></td>
<td></td>
</tr>
<tr>
<td>4,513</td>
<td>4,941</td>
</tr>
<tr>
<td>6,836</td>
<td></td>
</tr>
</tbody>
</table>

| **Self-Control**                   |    |

| Intelligence                       |    |

| Female                             |    |

| Controlling for parental SES.      |    |

| *** p<0.01, **p<0.05, *p<0.1       |
Results

The graph depicts the relationship between childhood self-control and the probability of unemployment across different age groups (21y, 26y, 30y, 34y, 38y, 42y). The x-axis represents the levels of childhood self-control (Low, Medium, High), and the y-axis represents the probability of unemployment. The lines show a decreasing trend in the probability of unemployment as childhood self-control increases, across all age groups.
Predicted months of unemployment 16-38y

Childhood Self-Control

- Low: 6.3 months
- Medium: 4.9 months
- High: 3.9 months

Daly, Egan, Delaney & Baumeister (2015)
STUDY 2

- 18,000 born in Britain in a week in 1958.
- Self-control measured at 7 & 11y.
- Employment data 16-50y.
- N = 10,105
- Extensive control variables.
National Childhood Development Study

Birth 1958
7y 1965
11y 1969
16y 1974
23y 1981
33y 1991
42y 2000
50y 2008

Childhood
Self-control at 7 & 11y
Intelligence at 11y
Gender
SES
Extensive controls

Adult Unemployment
Current employment status
0 = Employed
1 = Unemployed

Months unemployed 16-50y
(0 – 341 months, 61% 0mths)
Data & Method – Extended Controls I

Extensive controls

Demographic & Regional Controls

Family difficulties in childhood home

Childhood health
## Probit marginal effects coefficients

<table>
<thead>
<tr>
<th>Unemployed</th>
<th>23y</th>
<th>23y</th>
<th>33y</th>
<th>33y</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>7,616</td>
<td>4,207</td>
<td>6,938</td>
<td>3,840</td>
</tr>
<tr>
<td>Self-Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intelligence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Controlling for parental SES.

*** $p<0.01$, **$p<0.05$
### Results

<table>
<thead>
<tr>
<th>Probit marginal effects coefficients</th>
<th>NB coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unemployed</strong></td>
<td></td>
</tr>
<tr>
<td>Unemployment</td>
<td>42y</td>
</tr>
<tr>
<td>N</td>
<td>7,247</td>
</tr>
<tr>
<td><strong>Self-Control</strong></td>
<td></td>
</tr>
<tr>
<td>Intelligence</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>Controlling for parental SES.</td>
<td></td>
</tr>
</tbody>
</table>

*** p<0.01, **p<0.05, *p<0.1
Results

The graph shows the relationship between childhood self-control and the probability of unemployment at different ages: 23y, 33y, 42y, and 50y. The probability of unemployment decreases as the level of childhood self-control increases, with a notable trend that becomes more pronounced with age.
Results

Childhood Self-Control and Unemployment 16-50y

Predicted months of unemployment 16-50y

- Low: 6.4
- Medium: 7.9
- High: 10.3
Results – Recession

probability of unemployment

- Low self-control
  - 3.4 pp
  - 2 pp

High self-control

1974-79 Pre-recession
1980-82 Post-recession

Daly, Egan, Delaney & Baumeister (2015)
Evidence from two British cohort studies (N=16,772) finds that **self-control** has a significant association with:

(i) unemployment from 16-50 years.

(ii) who becomes unemployed during a recession (generalizability unclear).

After controlling for gender, intelligence & SES:

- **+ 1 SD in self-control reduced the probability of unemployment by 25% (1.4 pct pts)** across both data-sets.
- **→ Low self-control group (-1SD) spent 1.7 times as many months unemployed than high self-control (+1SD) group across both data-sets.**
Questions?

Contact
liam.Delaney@stir.ac.uk
@LiamDelaneyEcon

Acknowledgements
Centre for Longitudinal Studies, ESRC, UK Data Archive, Skills Development Scotland, EC Marie Curie Initiative.
Lunch and postgraduate poster session

LOCATION: Morris Room/Arnold Room/
Brewer & Smith Room

Time: 13.30-14: 20
SESSION 3

4. Health and wellbeing

CHAIR: Emla Fitzsimons (UCL Institute of Education)
Explaining variation in children’s subjective well-being using Wave 5 of the Millennium Cohort Study

Gwyther Rees & Jonathan Bradshaw
CLS Conference
Institute of Education
16/17 March 2015
Subjective well-being

- How a person evaluates / feels about their own life

Diagram:

- Subjective well-being
  - Cognitive
    - Life satisfaction
  - Affective
    - Positive affect
    - Negative affect
Previous research on variation in children’s subjective well-being

- A number of
  - Between country studies based on HBSC, Children’s Worlds
  - Within-country studies including the UK, US, Germany, Spain

- Almost exclusively using child-reported data

- Demographic and household economic variables tend only to explain 5% to 10% of the variation in SWB

- Personality appears to explain more than 20% of variation, (although more research needed on conceptual overlap)

- Other important factors identified include bullying, family relationships, choice and autonomy

- However, limitations in relying primarily on self-reported data

- MCS provides a valuable source of information from different perspectives
## Child SWB measures in Wave 5 of MCS

<table>
<thead>
<tr>
<th>Cognitive SWB</th>
<th>Affective SWB</th>
</tr>
</thead>
<tbody>
<tr>
<td>On a scale from 1 to 7 where ‘1’ means completely happy and ‘7’ means not at all happy, how do you feel about the following parts of your life?</td>
<td>In the last four weeks, how often did you</td>
</tr>
<tr>
<td>How do you feel about</td>
<td>... feel happy</td>
</tr>
<tr>
<td>... your school work</td>
<td>... laugh</td>
</tr>
<tr>
<td>... the school that you go to</td>
<td>... feel sad</td>
</tr>
<tr>
<td>... your family</td>
<td>... feel afraid or scared</td>
</tr>
<tr>
<td>... your friends</td>
<td>... get angry</td>
</tr>
<tr>
<td>... the way that you look</td>
<td>... get worried about what would happen to you</td>
</tr>
<tr>
<td>... your life as a whole</td>
<td>Answers on a five-point scale – ‘Never’, ‘Almost never’, ‘Sometimes’, ‘Often’, ‘Always’</td>
</tr>
</tbody>
</table>
Options for dependent variables

- Exploratory factor analysis supports the idea of a three-component model – cognitive SWB, positive affect, negative affect
- Five cognitive domains form a reliable scale (alpha = .776)
- However, questions about make-up of this scale – heavy weighting of school-related issues and absence of key aspects of life
- Affective domains not so straightforward – only two positive items and both sets of items not clearly conceptualised
Our approach re: dependent variables

- Individual examination of eight single-item variables:
  - Happiness with life as a whole, school work, school, family, friends and appearance
  - Frequency of feeling happy and sad in last four weeks

- Construction of two composite variables:
  - Cognitive SWB: Sum of first set of six items above. Some conceptual problems
  - Overall SWB: Sum of happiness with life as a whole plus combined score of affect balance (positive – negative)

- All ten variables transformed onto a scale from 0 to 10 where higher scores represent higher SWB
Moderate to strong correlations between cognitive variables (.37 to .68)
Weak correlations between affective variables (.28)
Weak correlations between affective and cognitive variables (.17 to .23)
Five domain variables ‘explain’ 57% of variation in happiness with life as a whole:
- Family is much the strongest explanatory variable
- Then in descending order of influence:
  - Appearance
  - Friends
  - School
  - School work
## Independent variables

### Demographics
<table>
<thead>
<tr>
<th>Domains</th>
<th>Parent-reported</th>
<th>Child-reported</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender, Ethnicity, Country within UK, Household structure</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Domains

<table>
<thead>
<tr>
<th>Domains</th>
<th>Parent-reported</th>
<th>Child-reported</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relationships</strong></td>
<td>Family relationships ✓</td>
<td>Family relationships ✓</td>
</tr>
<tr>
<td></td>
<td>Peer relationships ✗</td>
<td>Peer relationships ✓</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>Child experience of school ✓</td>
<td>Experiences and views about school ✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Problems ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aspirations ✓</td>
<td></td>
</tr>
<tr>
<td><strong>Money</strong></td>
<td>Household income ✓ ✓</td>
<td>Subjective ✓</td>
</tr>
<tr>
<td></td>
<td>Deprivation ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Subjective ✓</td>
<td></td>
</tr>
<tr>
<td><strong>Time use</strong></td>
<td>Daily/weekly activities ✓ ✓</td>
<td>Daily/weekly activities ✓ ✓</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>Housing ✓</td>
<td>Housing ✗</td>
</tr>
<tr>
<td></td>
<td>Local area ✓</td>
<td>Local area ✓</td>
</tr>
<tr>
<td><strong>Health</strong></td>
<td>Health behaviours ✓</td>
<td>Health behaviours ✓</td>
</tr>
<tr>
<td></td>
<td>Physical health ✓ ✓ ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mental health ✓ ✓</td>
<td></td>
</tr>
</tbody>
</table>

- ✓ Very good coverage
- ✓ ✓ Some coverage
- ✗ No coverage
Analytical approach

- Identification of relevant dependent and independent variables
- Bivariate analysis of associations between each independent variable and each dependent variable
- Basic regression model for each dependent variable, using demographic characteristics and household economic variables
- Introduction of blocks of parent-reported variables relating to each domain
- Final model including all blocks of parent-reported variables
- Introduction of blocks of child-reported variables relating to each domain
- Final model including all blocks of child-reported variables
Basic regressions: Composite SWB
Demographics and economics

Cognitive SWB

- No gender difference
- Some minority ethnic groups have higher SWB
- Higher SWB in N Ireland, Scotland and Wales
- Lower SWB in some ‘non-intact’ family forms
- Lower SWB in families with deprivation / struggling
- Adjusted $R^2 = .027$

Overall SWB

- Boys have higher SWB
- Some minority ethnic groups have higher SWB
- Higher SWB in N Ireland, Scotland and Wales
- Lower SWB in some ‘non-intact’ family forms
- Lower SWB in families with deprivation / struggling
- Adjusted $R^2 = .021$
### Regression models: Composite SWB: Parent-reported variables

<table>
<thead>
<tr>
<th>Domains</th>
<th>Details</th>
<th>Cognitive SWB</th>
<th>Overall SWB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationships</td>
<td>Parent-child relationships</td>
<td>+1.7%</td>
<td>+2.3%</td>
</tr>
<tr>
<td>Education</td>
<td>School engagement</td>
<td>+5.5%</td>
<td>+4.1%</td>
</tr>
<tr>
<td>Money</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Time use</td>
<td>Frequency of exercise</td>
<td>+0.7%</td>
<td>+0.8%</td>
</tr>
<tr>
<td>Environment</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Health</td>
<td>Mental and physical</td>
<td>+5.0%</td>
<td>+6.0%</td>
</tr>
<tr>
<td>All of above</td>
<td></td>
<td>+7.8%</td>
<td>+7.8%</td>
</tr>
<tr>
<td>Full model</td>
<td>Adjusted R²</td>
<td>10.5%</td>
<td>9.7%</td>
</tr>
</tbody>
</table>
## Regression models: Composite SWB: Child-reported variables

<table>
<thead>
<tr>
<th>Domains</th>
<th>Details</th>
<th>Cognitive SWB</th>
<th>Overall SWB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationships</td>
<td>Family</td>
<td>unavailable</td>
<td>unavailable</td>
</tr>
<tr>
<td></td>
<td>Friendships</td>
<td>+3.5%</td>
<td>+5.1%</td>
</tr>
<tr>
<td></td>
<td>Being bullied</td>
<td>+7.8%</td>
<td>+13.8%</td>
</tr>
<tr>
<td>Education</td>
<td>Views of school</td>
<td>+17.3%</td>
<td>+14.2%</td>
</tr>
<tr>
<td>Money</td>
<td>Subjective</td>
<td>+4.8%</td>
<td>+7.1%</td>
</tr>
<tr>
<td>Time use</td>
<td>Daily / Weekly activities</td>
<td>+3.2%</td>
<td>+2.1%</td>
</tr>
<tr>
<td>Environment</td>
<td>Local area safety</td>
<td>+2.4%</td>
<td>+2.6%</td>
</tr>
<tr>
<td>Health</td>
<td>None available</td>
<td>unavailable</td>
<td>unavailable</td>
</tr>
<tr>
<td>All of above</td>
<td></td>
<td>+21.6%</td>
<td>+24.7%</td>
</tr>
<tr>
<td>Full model</td>
<td>Adjusted $R^2$</td>
<td>24.3%</td>
<td>26.8%</td>
</tr>
</tbody>
</table>
Implications for practice based on the analysis of the National Child Measurement Study (NCMS) Wave 5 and the Longitudinal Study of Young Adults (LSYA) Wave 4 were presented. The results indicated that:

- Importance of conceptual clarity in measuring SWB
- Demographic and economic variables explain relatively little of variation in child SWB
- Parent-reported variables explain some additional variation
- Child-reported variables explain much more but there are measurement issues to resolve
- Shortage of data on quality of family relationships in MCS Wave 5
- Bullying emerges as a key issue in the analysis and effective action on this issue could substantially improve children’s SWB in the UK
- School engagement (as reported by parents and children) also has substantial associations with child SWB
Contact details

- Gwyther Rees, Honorary Research Fellow
  - Social Policy Research Unit, University of York
  - gwyther.rees@york.ac.uk

- Professor Jonathan Bradshaw
  - Social Policy Research Unit, University of York
  - Jonathan.bradshaw@york.ac.uk
Affective symptoms across the life course and midlife cortisol: prospective birth cohort study

Darya Gaysina
School of Psychology
University of Sussex
D.Gaysina@sussex.ac.uk
Affective disorders

- Depression and anxiety are the most common forms of psychopathology in adolescents and adults.
- Depression is the 2\textsuperscript{nd} leading cause of disability by 2020 (WHO, 2001).
- The prevalence rate is rising among young people (WHO, 2014).
- Associated with age-related conditions: e.g., faster cognitive decline, obesity, the metabolic syndrome, and type 2 diabetes.
- The hypothalamic-pituitary-adrenal (HPA) axis represents one possible brain circuit that may mediate the relationship between affective disorders and various age-related problems.
The function of the HPA axis can be altered early in life with long-term effects on cortisol secretion (Glover et al., 2010; Phillips and Jones, 2006) that affects human health (Reynolds et al., 2001).

- Cortisol typically follows a **diurnal rhythm**, with a peak soon after waking in the morning and a gradual decline throughout the day.
- Other patterns have been observed: absence, or prolongation of the high awakening level; or rises later in the day.
In children and adolescents, hyperactivity of the HPA-axis (e.g., higher morning cortisol and higher cortisol awakening response) has been shown to predict onset and recurrence of affective disorders (Cicchetti and Rogosch, 2001; Goodyer et al., 1997; Kalmijn et al., 1998; Kaufman, 1991; Kuningas et al., 2007; Ruttle et al., 2011); although in the most recent and largest study this association was not confirmed (Carnegie et al., 2014).

In adults, reported associations between affective disorders and cortisol are less consistent, with both cortisol hyper- and hypo-secretion being associated with affective disorders (Bremmer et al., 2007; Power et al., 2011; Wardenaar et al., 2011).
There is a variation in salivary collection protocols;

Different measures of cortisol are used (e.g., a single morning cortisol measure, CAR, or response to a stressor);

The complexity of cortisol regulation is not always considered;

Modest sample sizes combined with a wide range of potential ways to analyse cortisol may have increased type I errors;

The timing of symptoms (i.e., adolescence or adulthood) and recurrence of affective symptoms across the life course need to be taken into account:

- HPA-axis dysregulation may follow a natural history so that initially hyper-responsiveness (heightened CAR) may, with greater chronicity, evolve into hypo-responsiveness; attenuated CAR and smaller diurnal variability over the day (Ben-Shlomo et al., 2013).
The aims of the present study:

1) to investigate whether affective symptoms at different ages across the life course were associated with cortisol levels and patterns at age 60-64 years

2) to explore the cumulative effect of affective symptoms on midlife cortisol levels and patterns
Present study: sample

- MRC National Survey of Health and Development (British 1946 birth cohort): 2547 women and 2815 men

http://www.nshd.mrc.ac.uk/
Present study: measures

- **Affective symptoms**

<table>
<thead>
<tr>
<th>Rutter B2 teacher questionnaire</th>
<th>PSE</th>
<th>PSF</th>
<th>GHQ-28</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 15</td>
<td>36</td>
<td>43</td>
<td>53</td>
</tr>
</tbody>
</table>

Age, years

PSE = Present State Examination; PSF = Psychiatric Symptom Frequency; GHQ-28 = General Health Questionnaire
Present study: measures

- Cortisol levels and patterns

Saliva samples collected:
- at waking (T1)
- 30 minutes after wakening (T2)
- 2100h – 21.30h the same evening (T3)

Plus:
- cortisol awakening response, CAR = (T2 - T1).
- diurnal drop, DD = (T1 - T3)
  = (T1 + T2)/2

Gaysina et al, PNEC, 2013
Present study: measures

- **Covariates**
  - Sex
  - SEP at age 53:
    - manual
    - non-manual
  - Life-course smoking status:
    - lifelong smoker,
    - predominantly smoker,
    - predominantly non-smoker,
    - never smoker
  - BMI at age 53: weight kg/height m²
Cortisol measures, nmol/L

- **T1**: Women (30 nmol/L) vs. Men (20 nmol/L) - ***p < 0.001***
- **T2**: Women (25 nmol/L) vs. Men (20 nmol/L) - ns
- **T3**: Women (5 nmol/L) vs. Men (10 nmol/L) - ns
- **CAR**: Women (15 nmol/L) vs. Men (20 nmol/L) - ***p < 0.001***
- **DD**: Women (20 nmol/L) vs. Men (20 nmol/L) - ***p < 0.001***
Results: descriptives

- Affective caseness at different ages, %

<table>
<thead>
<tr>
<th>Age, years</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>8.3</td>
<td>9.6</td>
</tr>
<tr>
<td>15</td>
<td>7.5</td>
<td>8.7</td>
</tr>
<tr>
<td>36</td>
<td>3.5</td>
<td>4.3</td>
</tr>
<tr>
<td>43</td>
<td>4.3</td>
<td>5.3</td>
</tr>
<tr>
<td>53</td>
<td>15.2</td>
<td>26.7</td>
</tr>
<tr>
<td>60-64</td>
<td>8.3</td>
<td>12.4</td>
</tr>
</tbody>
</table>

**p < 0.01; ***p < 0.001
Results: descriptives

- Affective caseness cumulative score, %

***p < 0.001
Results: Question 1

- Waking cortisol (T1) and affective caseness across the life course

![Graph showing β values for different age groups with significance marked at *p < 0.05]
30 minutes after wakening cortisol (T2) and affective caseness across the life course

† $p < 0.10$
Results: Question 1

- Evening cortisol (T3) and affective caseness across the life course

* $p < 0.05$
Cortisol awakening response (CAR) and affective caseness across the life course
Results: Question 1

- Diurnal drop (DD) and affective caseness across the life course

![Graph showing β values across different age groups with significance levels. **p < 0.01.]
## Results: Question 2

### Cumulative score of caseness and midlife cortisol

<table>
<thead>
<tr>
<th>Affective caseness cumulative score</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>CAR</th>
<th>DD</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0.07 (1.06)</td>
<td>0.01 (0.97)</td>
<td>0.00 (0.97)</td>
<td>-0.05 (1.03)</td>
<td>0.08 (1.01)</td>
</tr>
<tr>
<td>1</td>
<td>-0.07 (0.90)</td>
<td>0.04 (1.03)</td>
<td>0.11 (1.06)</td>
<td>0.06 (1.03)</td>
<td>-0.08 (0.95)</td>
</tr>
<tr>
<td>2</td>
<td>-0.29 (0.89)</td>
<td>-0.20 (1.03)</td>
<td>-0.22 (1.04)</td>
<td>0.10 (0.90)</td>
<td>-0.23 (0.90)</td>
</tr>
<tr>
<td>3+</td>
<td>-0.13 (1.01)</td>
<td>0.27 (1.22)</td>
<td>0.23 (1.00)</td>
<td>0.23 (0.84)</td>
<td>-0.11 (1.06)</td>
</tr>
<tr>
<td>p for trend</td>
<td>***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < 0.05; **p < 0.01; ***p < 0.001
Results: Question 2

- **Cumulative score of caseness and midlife cortisol**

  - **T1 cortisol**
    - Beta values for different categories with significance levels:
      - **p for trend**: *
      - Beta values for different categories:
        - 0: **-0.5**
        - 1: **-0.4**
        - 2: **-0.3**
        - 3+: **-0.2**
        - *p < 0.05*

  - **CAR**
    - Beta values for different categories with significance levels:
      - **p for trend**: NS
      - Beta values for different categories:
        - 0: **-0.5**
        - 1: **-0.4**
        - 2: **-0.3**
        - 3+: **-0.2**
        - *p < 0.05*

  - **DD**
    - Beta values for different categories with significance levels:
      - **p for trend**: †
      - Beta values for different categories:
        - 0: **-0.5**
        - 1: **-0.4**
        - 2: **-0.3**
        - 3+: **-0.2**
        - †p < 0.10

Models adjusted for sex, SEP, smoking status, and adult BMI;
†p < 0.10; *p < 0.05; **p < 0.01
Conclusions

- There was the weak and inconsistent evidence for associations between affective symptoms across the life course and cortisol in midlife.
- Those with case-level affective symptoms at one or more-time points had lower waking cortisol and flatter diurnal drop than those with no symptoms.
- The effects of cortisol on affective symptoms in midlife can depend on lifetime psychological health, in particular, on adult repeated symptoms.
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