Adolescent Academic Achievement and Accelerated Aging

Introduction

It is well-established that the health returns to educational attainment are not as great for black and Hispanic individuals in the US, compared to white peers. One potential explanation is that the process of achieving greater education is physiologically taxing or costly, particularly for disadvantaged race/ethnic minorities. Researchers documented this pattern among young adults with respect to college completion. It remains unclear when in the educational career these costs first manifest.

We investigated the association between early life disadvantage, academic achievement, and the pace of methylation aging in adolescence in the Fragile Families and Child Wellbeing Study.

Data

- Disadvantage at birth
- GPA at Year 15
- Horvath method for calculating methylation age (mAge) at Years 9 and 15
- Chronological age (cAge) at time of Year 9 and 15 interview

1. Low cross-sectional correlation between cAge and mAge, and no cross-sectional association with academic achievement.

2. Faster methylation aging among adolescents who are beating the odds of academic achievement given disadvantage.

3. The pace of methylation aging is accelerated for adolescents performing better than expected in school.

4. Methylation age acceleration associated with academic achievement concentrated among black adolescents.

Conclusions and Next Steps

We find evidence of accelerated methylation aging among adolescents who perform better than expected in school given exposure to disadvantage at birth. This is the first documentation of such a pattern at this early stage of the life course. The findings are consistent with a biological wear and tear interpretation, but may also reflect advanced development. Exploring race/ethnic differences with greater sample sizes is an important next step.

Acknowledgements

1. Vanderbilt University
2. University of Michigan
3. Princeton University
5. Miller et al. 2009 PNAS.
6. Gaydosh et al. 2018 PNAS.

Fragile Families is funded by Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD): R01 HD076592, R01HD36916, R01HD39135, and R01HD40421; National Institute of Mental Health (NIMH): R01MH103761; Consortium of private foundations

Adolescent Academic Achievement and Accelerated Aging

Lauren Gaydosh, Colter Mitchell, Lisa Schneper, Daniel Notterman, and Sara McLanahan

It is well-established that the health returns to educational attainment are not as great for black and Hispanic individuals in the US, compared to white peers. One potential explanation is that the process of achieving greater education is physiologically taxing or costly, particularly for disadvantaged race/ethnic minorities. Researchers documented this pattern among young adults with respect to college completion. It remains unclear when in the educational career these costs first manifest.

We investigated the association between early life disadvantage, academic achievement, and the pace of methylation aging in adolescence in the Fragile Families and Child Wellbeing Study.

Data

- Disadvantage at birth
- GPA at Year 15
- Horvath method for calculating methylation age (mAge) at Years 9 and 15
- Chronological age (cAge) at time of Year 9 and 15 interview

1. Low cross-sectional correlation between cAge and mAge, and no cross-sectional association with academic achievement.

2. Faster methylation aging among adolescents who are beating the odds of academic achievement given disadvantage.

3. The pace of methylation aging is accelerated for adolescents performing better than expected in school.

4. Methylation age acceleration associated with academic achievement concentrated among black adolescents.

Conclusions and Next Steps

We find evidence of accelerated methylation aging among adolescents who perform better than expected in school given exposure to disadvantage at birth. This is the first documentation of such a pattern at this early stage of the life course. The findings are consistent with a biological wear and tear interpretation, but may also reflect advanced development. Exploring race/ethnic differences with greater sample sizes is an important next step.

Acknowledgements

1. Vanderbilt University
2. University of Michigan
3. Princeton University
5. Miller et al. 2009 PNAS.
6. Gaydosh et al. 2018 PNAS.

Fragile Families is funded by Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD): R01 HD076592, R01HD36916, R01HD39135, and R01HD40421; National Institute of Mental Health (NIMH): R01MH103761; Consortium of private foundations