

Behavioral and Conduct Problems in Children

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DSC 680 Applied Data Science

GitHub Portfolio URL: https://github.com/Holly-E/Conduct_Behavioral_Problems_Study

Which Domain?

What domain is this data going to come from? Please list 10 references (with a brief annotation) to use to make sense of what you're doing with these data.

The domain will be conduct and behavioral problems in children under 18 years old.

References:

1. Centers for Disease Control and Prevention. (March 30, 2020). *"Behavior or Conduct Problems in Children."* Retrieved from <https://www.cdc.gov/childrensmentalhealth/behavior.html#:~:text=Children%20sometime%20argue%2C%20are%20aggressive,over%20time%2C%20or%20are%20severe>.

Overview of externalizing disorders in children, such as Oppositional Defiant Disorder and Conduct Disorder. Also covers treatment and prevention practices.

2. Ogundele M. O. (2018). *"Behavioural and emotional disorders in childhood: A brief overview for paediatricians."* World journal of clinical pediatrics, 7(1), 9–26. Retrieved from <https://doi.org/10.5409/wjcp.v7.i1.9>

A review of relevant published literature, including published meta-analyses and national guidelines. The paper is based on articles indexed by Ovid, PubMed, PubMed Medical Central, CINAHL, the Cochrane Database of Systematic reviews and other online sources. The searches were conducted using a combination of search expressions including "childhood", "behaviour", "disorders" or "problems".

3. healthychildren.org. (Nov 21, 2015). *"Disruptive Behavior Disorders."* Retrieved from <https://www.healthychildren.org/English/health-issues/conditions/emotional-problems/Pages/Disruptive-Behavior-Disorders.aspx>.

Behaviors typical of disruptive behavior disorders can closely resemble ADHD—particularly where impulsivity and hyperactivity are involved—but ADHD, ODD, and CD are considered separate conditions that can occur independently. A discussion of the relationship between these three disorders in children.

4. Morin, A. (Oct 13, 2019). *"The Warning Signs of Conduct Disorder in Children."* Retrieved from <https://www.verywellmind.com/signs-of-conduct-disorder-in-children-4127239>.

Discusses signs and potential causes of conduct disorder in children, as well as how it impairs functioning and impacts their daily life.

5. Mental Health America. *"PARENT TEST."* Retrieved from <https://screening.mhanational.org/screening-tools/parent>.

Mental health screening is one of the quickest and easiest ways to determine whether a child is experiencing symptoms of a mental health condition. This site offers a Pediatric Symptom Checklist - a questionnaire that can be used to see if a child is having emotional, attentional, or behavioral difficulties.

6. Committee to Evaluate the Supplemental Security Income Disability Program for Children with Mental Disorders; Board on the Health of Select Populations; Board on Children, Youth, and Families; Institute of Medicine; Division of Behavioral and Social Sciences and Education; The National Academies of Sciences, Engineering, and Medicine; Boat TF, Wu JT, editors. (Oct 28, 2015). *"Mental Disorders and Disabilities Among Low-Income Children - Prevalence of Oppositional Defiant Disorder and Conduct Disorder."* Retrieved from: <https://www.ncbi.nlm.nih.gov/books/NBK332874/>.

Includes prevalence estimates of ODD and CD in the general population, as well as data on trends in the rates of ODD and CD in the SSI program for children from 2004 to 2013 and in Medicaid from 2001 to 2010.

7. Christian, R. Frazer, D. Frick, P. Hill, N. Tyler, L. (1997). *"Psychopathy and Conduct Problems in Children: II. Implications for Subtyping Children With Conduct Problems."* Journal of the American Academy of Child & Adolescent Psychiatry, Volume 36, Issue 2, Pages 233-241, ISSN 0890-8567, Retrieved from <https://doi.org/10.1097/00004583-199702000-00014>.

A study on whether the presence of callous and unemotional (CU) traits designates a unique subgroup of children with conduct problems that corresponds more closely to adult conceptualizations of psychopathy.

8. Wertz, J. et al. (Jan, 2018). *"From Childhood Conduct Problems to Poor Functioning at Age 18 Years: Examining Explanations in a Longitudinal Cohort Study."* Journal of the American Academy of Child & Adolescent Psychiatry. Volume 57 / Number 1. Retrieved from <http://www.louise-arseneault.com/CMSUploads/2018-From-childhood-conduct-disorder-to-adult-poor-functioning.pdf>.

Childhood conduct problems are associated with poor functioning in early adulthood. This study tests a series of hypotheses to understand the mechanisms underlying this association. Uses data from the Environmental Risk (E-Risk) Longitudinal Twin Study, a birth cohort of 2,232 twins born in England and Wales in 1994 and 1995, followed up to age 18 years with 93% retention. Poor functioning at age 18 years, including cautions

and convictions, daily cigarette smoking, heavy drinking, and psychosocial difficulties, was measured through interviews with participants and official crime record searches.

9. López-Romero, L. Romero, E. Andershed, H. (2015). *“Conduct Problems in Childhood and Adolescence: Developmental Trajectories, Predictors and Outcomes in a Six-Year Follow Up.”* Child Psychiatry and Human Development. 46. 762-773.
10.1007/s10578-014-0518-7. Retrieved from
https://www.researchgate.net/publication/267624547_Conduct_Problems_in_Childhood_and_Adolescence_Developmental_Trajectories_Predictors_and_Outcomes_in_a_Six-Year_Follow_Up.

In this study, conduct problems in children showed five distinctive trajectories which were grouped into three major pathways in further analyses: Stable low, Stable high, and Decreasing. Associations with early personality and psychopathic traits, as well as with a wide range of adolescent behavioral and psychosocial outcomes were examined.

10. Sharp, C. (2008). *“Theory of Mind and conduct problems in children: Deficits in reading the ‘emotions of the eyes’.”* Cognition and Emotion, 22:6, 1149-1158, DOI: 10.1080/02699930701667586. Retrieved from
<https://www.tandfonline.com/doi/abs/10.1080/02699930701667586>.

Preadolescent and young adolescent children were required to identify emotions from photographic stimuli depicting the eye region of the face only. Findings suggested a generalised impairment in children with conduct problems, as indicated by a significant relationship between poor Eyes Test performance and conduct problems, even when IQ, sex and age were controlled for.

Which Data?

What is the dataset you'll be examining? Please provide a codebook if there is one or a link to the dataset as well as a detailed description.

Data Source. 2016 - 2018 National Survey of Children's Health:
<https://www.census.gov/programs-surveys/nsch/data.html>

The questionnaire used in the survey can be found here:
<https://mchb.hrsa.gov/data/national-surveys/questionnaires-datasets-supporting-documents>

Codebook for 2016: <https://www.census.gov/data-tools/demo/nsch2016/#/>

Codebook for 2017: <https://www.census.gov/data-tools/demo/nsch/#/>

Codebook for 2018: <https://www.census.gov/data-tools/demo/nsch2018/#/>

This survey is conducted by the United States Census Bureau, Associate Director for Demographic Programs on behalf of the United States Department of Health and Human Services (HHS), Health Resources and Services Administration's (HRSA) Maternal and Child

Health Bureau(MCHB). Data is collected on children aged 0 to 17 years in the U.S. and in each state and the District of Columbia who live in housing units.

The data was provided by a parent or other caregiver with knowledge of the health and health care of the sampled child in the household. For the 2018 NSCH detailed topical questionnaires, 63% of respondents were mothers (biological, step, foster, or adoptive), 28% were fathers (biological,step, foster, or adoptive), and 6% were other relatives or caregivers; the remaining respondents were not identified by the relationship to the child.

Starting in 2016, the NSCH is fielded annually. The previous iterations of this survey were conducted every 4 years. Data across multiple years of the redesigned NSCH (2016 and later) can be combined to increase the analytic sample size (I will be examining years 2016, 2017, and 2018).

For 2018, 71,335 child records contain general demographic information and special health care needs status for the resident children in sampled households. Of the eligible households, 30,530 households completed a detailed topical questionnaire for the selected child. In 2017, 21,599 detailed topical questionnaires were completed. In 2016, 50,212 detailed topical questionnaires were completed.

Survey topics include:

- Child and family demographics
- Physical and mental health status
- Health insurance status, type, and adequacy
- Preventive medical and dental care, and specialty services received
- Family health and activities
- Impact of child's health on family
- Parental health status
- Parent's perceptions of neighborhood characteristics
- Access to community-based services

Research Questions? Benefits? Why analyze these data?

How are you proposing to analyze this dataset?

I will be creating models to predict a 1 ("yes") or 0 ("no") for question K2Q34A. I will also be looking at CDC Surveys over time, as the questions do fluctuate and evolve year-to-year. It will be interesting to see if the questions they are using are allowing us to get better models over time.

K2Q34A question: "Has a doctor, other health care provider, or educator ever told you that this child has behavioral or conduct problems? (Examples of educators are teachers and school nurses.)"

I thought it would be interesting to flip things a little and do the second project on a model that predicts a child exhibiting behavioral and conduct problems (they are the Target). In my first project, children diagnosed with ADHD were the target and I removed the subset of children

with conduct problems. This second project allows me to explore the internal variables (i.e. ADHD) of a child with behavioral problems, but will also give me a chance to look at some of the external variables predicting conduct problems and do more research on this topic. This would be important for the CDC to examine as these children are at higher risk of serious issues in life such as jail.

What Method?

What methods will you be using? What will those methods provide in terms of analysis? How is this useful?

I will begin with exploratory data analysis, including a correlation matrix with other variables in the dataset. This will help us visualize potential relationships among the variables. I will prepare a model that includes a binary classification algorithm such as Random Forest Classification, Logistic Regression or Support Vector Machines to predict K2Q34A. I would also like to prepare an ensemble model that combines different algorithms.

I will prepare models for years 2012, 2016, 2017 and 2018 to analyze performance over time and how the CDC's choice of questions impacts the performance.

Potential Issues?

What challenges do you anticipate having? What could cause this project to go off schedule?

The biggest challenge I face is not getting lost in the research and modelling. For my first project, I found it so fascinating and kept thinking of more ideas that I wanted to test. I will need to draw the line at some point in the research to prepare the final paper and presentation.

Concluding Remarks

Tie it all together. Think of this section as your final report's abstract.

This project examines the subset of children who have been told they have behavioral or conduct problems. We know there is a high correlation with ADHD. What other factors influence this behavior, and to what extent? What impact does sex of the child have?

The binary classification model will predict a positive response for this target, and will be tested across four years of data. Each model will be slightly different based on changes in the CDC survey questions. We will determine whether or not the small changes in the survey are correlated with improved models over time.