

Hong, G., & Raudenbush, S. W. (in press). Evaluating kindergarten retention policy: A case study of causal inference for multi-level observational data. *Journal of the American Statistical Association*.

List of Pretreatment Covariates

Student-level covariates

Demographic characteristics

1. Age at kindergarten entry (P1AGEENT)
2. Gender (FEMALE)
3. Hispanic (HISPANIC)

Assessment scores

4. C4 reading IRT scale score (C4RRSCAL)
5. C4 math IRT scale score (C4RMSCAL)
6. C1 reading IRT scale score (C1RSCALE)
7. C1 math IRT scale score (C1MSCALE)
8. C1 general knowledge IRT scale score (C1GSCALE)
9. C2 reading IRT scale score (C2RSCALE)
10. C2 math IRT scale score (C2MSCALE)
11. C2 general knowledge IRT scale score (C2GSCALE)

Home SES/Home language/Home size and structure

12. SES (WKSESL)
13. Poverty (WKPOVRTY)
14. Mother's education (MOMED)
15. Mother worked between child birth and kindergarten (MOMWK1)
16. English as home language (HOMELANG)
17. Number of siblings (P1NUMSIB)
18. Single parent family (SGPARENT)
19. Two-parent family (TWPARENT)

Home literacy environment and other activities

20. Amount of books at home (P1CHLBOO)
21. Fall, K parent report of child's frequency of reading books outside school (P1CHRBK1)
22. Spring, K parent report of child's frequency of reading books outside school (P2CHRBK1)
23. Home computer for child use (P2HOMECEM)
24. Extracurricular lessons (P2EXTR)

Parent involvement in school and parenting

- 25. Current school chosen (P1SCHCHC)
- 26. Tuition paid for education (P2TUITIO)
- 27. Parent educational expectation (P1EXPCTN)
- 28. Parent attending school activities (P2NATTEN)
- 29. Parents' negative attitude toward parenting (NEGAPRT)

Day care/Preschool/Head Start learning experience/Special services for the child

- 30. Child ever in center-based care (P1CENTER)
- 31. Child with reduced/free lunch (P2FRELCH)
- 32. Child receiving special service/education (P2SPECND)

Child physical and mental health

- 33. Spring, K child fell behind due to health (T2FLBHND)
- 34. Child with disability (P1DISABL)

Teacher assessment of student status at the beginning and by the end of the kindergarten year

- 35. Fall, K child literacy ARS score (T1ARSLIT)
- 36. Fall, K child math ARS score (T1ARSMAT)
- 37. Fall, K child general knowledge ARS score (T1ARSGEN)
- 38. Fall, K teacher rating on child approaches to learning (T1LEARN)
- 39. Fall, K teacher rating on child self control (T1CONTRO)
- 40. Fall, K teacher rating on child interpersonal skills (T1INTERP)
- 41. Fall, K teacher rating on child externalizing problem behaviors (T1EXTERN)
- 42. Fall, K teacher rating on child internalizing problem behaviors (T1INTERN)
- 43. Spring, K child literacy ARS score (T2ARSLIT)
- 44. Spring, K child math ARS score (T2ARSMAT)
- 45. Spring, K child general knowledge ARS score (T2ARSGEN)
- 46. Spring, K teacher rating on child approaches to learning (T2LEARN)
- 47. Spring, K teacher rating on child self control (T2CONTRO)
- 48. Spring, K teacher rating on child interpersonal skills (T2INTERP)
- 49. Spring, K teacher rating on child externalizing problem behaviors (T2EXTERN)
- 50. Spring, K teacher rating on child internalizing problem behaviors (T2INTERN)
- 51. Spring, K teacher rating on child language skills (T2RTLNG)
- 52. Spring, K teacher rating on child science/social studies skills (T2RTSCI)
- 53. Spring, K teacher rating on child math skills (T2RTMTH)
- 54. Spring, K teacher report on child not working at best ability (T2ABIL)

Teacher report on instructional services for child

- 55. Spring, K teacher report on child receiving individual tutored reading (T2TTRRD)

56. Spring, K child in pull-out small group in reading (T2SGRDG)
57. Spring, K child receiving individual tutored mathematics (T2TTRMTH)
58. Spring, K child in pull-out small group in math (T2SGMTH)
59. Spring, K child in in-class ESL program (T2INCESL)
60. Spring, K child in gifted/talented program (T2GFTTAL)
61. Spring, K child in program for behavioral problems (T2BEHPRB)
62. Spring, K child in Title I reading (T2TT1RD)
63. Spring, K child being active in structured play (T2STRPLY)
64. Spring, K child being active in unstructured play (T2UNPLAY)
65. Spring, K number of achievement reading groups in class (T2NORDGP)
66. Spring, K child in the lowest reading group (T2RDGPLO)
67. Spring, K child moving to a higher reading group (T2GPMVHI)

Parent assessment of student status at the beginning and by the end of the kindergarten year

68. Fall, K parent rating on child approaches to learning (P1LEARN)
69. Fall, K parent rating on child self control (P1CONTRO)
70. Fall, K parent rating on child social interaction (P1SOCIAL)
71. Fall, K parent report on child being sad/lonely (P1SADLON)
72. Fall, K parent report on child being impulsive/overactive (P1IMPULS)
73. Spring, K parent rating on child approaches to learning (P2learn)
74. Spring, K parent rating on child self control (P2CONTRO)
75. Spring, K parent rating on child social interaction (P2SOCIAL)
76. Spring, K parent report of child being sad/lonely (P2SADLON)
77. Spring, K parent report of child being impulsive/overactive (P2IMPULS)

Teacher report on parent involvement in school

78. Spring, K teacher report on parent attending conferences (T2REGCON)
79. Spring, K teacher report on parent coming for informal meetings (T2INFMTS)
80. Spring, K teacher report on parent volunteering in school (T2VOLUNT)
81. Spring, K teacher report on having other communications with parent (T2TCHCNF)

Classroom-level covariates

Kindergarten learning experience

82. Full-day kindergarten in Fall, K (A1HLFDAY)
83. Full-day kindergarten in Spring, K (A2HLFDAY)
84. Number of class hours per day in Fall, K (A1HRSDA)
85. Days per week in Fall, K (A1DYSWK)
86. Number of class hours per week in Fall, K (A1TIMEWK)
87. Less than five days per week in Fall, K (A1SHRTWK)
88. Time on teacher-directed whole class activity in Fall, K (B1TDWCLS)
89. Time on reading and language arts instruction per day in Spring, K (A2RDLHR)
90. Content coverage in reading and language arts curriculum in Spring, K (RDCURR)
91. Encouraging invented spelling in Spring, K (A2INVSPE)
92. Instructional activities with math symbols in Spring, K (SYMBLMTH)
93. Content coverage in math curriculum in Spring, K (MTHCURR)
94. Teacher frequency of borrowing books from library in spring, K (A2BORROW)
95. Fall, K teacher report of unpaid preparation hours per week (B1NOPAYP)
96. Fall, K teacher having different standards based on talent

Kindergarten class composition/assignment

97. Percentage of Hispanics in Fall, K class (A1PHIS)
98. Proportion of 3 and 4 year olds in Fall, K class (A1PR34)
99. Proportion of boys in Fall, K class (A1PRBOYS)
100. Percentage of children in Fall, K class with preschool records (A1PCPRE)
101. Class enrollment in Fall, K (A1TOTAG)
102. Number of children in Fall, K class repeating kindergarten (A1REPK)
103. Proportion of children in Fall, K class repeating kindergarten (A1PRREPK)
104. Number of children in class recognizing letters at the start (A1LETTTC)
105. Teacher rating of behavior from the teacher in fall, K (A1BEHVR)
106. Number of LEP students in Fall, K class (A1NMLEPC)
107. Proportion of LEP students in Fall, K class (A1PRLEP)
108. Number of students classified as gifted in Spring, K class (A2GIFT)
109. Number of students taking part in gifted/talented program in Spring, K class (A2PRTGF)
110. Number of students with disabilities in Spring, K class (A2DISAB)
111. Kindergarten assignment in Fall, K based on preschool experience (A1PRESC)

Kindergarten teacher characteristics

112. Fall, K teacher holding different standards based on students' capability (B1DIFSTD)
113. Fall, K teacher spending unpaid preparation hours per week (B1NOPAYP)
114. Fall, K teacher being Hispanic/Latino (B1HISP)
115. Spring, K teacher being Hispanic/Latino (B2HISP)

116. Fall, K teacher years of experience of teaching preschool (B1YRSPRE)
117. Spring, K teacher years of experience of teaching preschool (B2YRSPRE)
118. Fall, K teacher years of experience of teaching kindergarten (B1YRSKIN)
119. Spring, K teacher years of experience of teaching kindergarten (B2YRSKIN)
120. Fall, K teacher years of experience of teaching first grade (B1YRSFST)
121. Spring, K teacher years of experience of teaching first grade (B2YRSFST)
122. Fall, K teacher years of experience of teaching ESL (B1YRSESL)
123. Spring, K teacher years of experience of teaching ESL (B2YRSESL)
124. Spring, K teacher years of experience of teaching bilingual education
(B2YRSBIL)
125. Fall, K teacher years of teaching experience at the school (B1YRSCH)
126. Spring, K teacher years of teaching experience at the school (B2YRSCH)
127. Fall, K teacher's educational degree beyond the Bachelor's (B1DEGREE)
128. Spring, K teacher's educational degree beyond the Bachelor's (B2DEGREE)
129. Fall, K teacher having taken ESL courses (B1ESL)
130. Spring, K teacher having taking ESL courses (B2ESL)
131. Fall, K teacher speaking other language (A1OTHLNG)

School-level covariates

School poverty level and student composition

- 132. Spring, K total school enrollment (S2KENRLS)
- 133. Spring, K percentage of minority students enrolled (S2KMINOR)
- 134. Spring, K school percentage of gifted/talented students (S2KGFTED)
- 135. Spring, K school percentage of Hispanic students (S2PCTHSP)

School type

- 136. School enrollment as of 10/1/1998 (S2ANUMCH)
- 137. Spring, K school instructional level (S2KSCLVL)
- 138. Spring, K school average daily attendance (S2ADA)
- 139. Spring, K school with ungraded classroom or transitional grade (S2UNGRAD, S2TRANS)
- 140. Spring, K school with Kindergarten (S2KINDER)
- 141. Spring, K school with grade levels between grade 1 – 5 (S2GRDLV1)
- 142. Spring, K school with grade levels beyond grade 5 (S2GRDLV6)
- 143. Spring, K school being public (S2PUBLIC)
- 144. Spring, K school enrollment requiring academic records (S2ACADRC)
- 145. Spring, K school Title 1 funding used for professional development (S2TT1PD)
- 146. Spring, K school Title 1 funding used for other Title 1 purposes (S2TT1OTH)
- 147. Spring, K school percentage of LEP children (S2LEPSCH)
- 148. Spring, K school percentage of LEP children in K, transitional K, and transitional first grade (S2LEPKND)
- 149. Spring, K special education students on IEP and 504 plan (S2IEP504)
- 150. Spring, K children with disability receiving special services (S2DSBNO)
- 151. Spring, K school with gifted/talented program in transitional K (S2GFTR)
- 152. Spring, K school with gifted/talented program in grade 4 and 5 (S2GFT4TH S2GFT5TH)
- 153. Spring, K school number of FTE classroom teachers (S2TCHFTE)
- 154. Spring, K school number of FTE bilingual-ESL teachers (S2ESLFTE)
- 155. Spring, K school lowest annual teacher salary (S2LOSLRY)
- 156. Spring, K school highest annual teacher salary (S2HISLRY)
- 157. Spring, K school percentage of Hispanic teachers (S2ETHNIC)
- 158. Spring, K school percentage of Asian teachers (S2Q62ASN)

School climate

- 159. Spring, K principal report of school emphasis on language and number skills goals (S2GOAL1)
- 160. Spring, K principal report of school emphasis on behavioral goals (BHVGOAL)
- 161. Spring, K principal report of school being successful in providing help to low achievers (S2SUCC7)
- 162. Spring, K principal report of school being successful in being open to new

- ideas/methods (S2SUCC10)
163. Spring, K principal report of teacher union and administration working together (S2TOGTHR)
 164. Spring, K principal report of standardized scores influencing evaluation of principal performance (S2SCORES)
 165. Spring, K principal report of raising performance level of low-achieving students influencing evaluation of principal performance (S2PRFLVL)
 166. Spring, K principal report of teacher and staff support influencing evaluation of principal performance (S2STFSPP)
 167. Spring, K principal report of other factors influencing evaluation of principal performance (S2OTHINF)

Principal characteristics

168. Spring, K principal gender (S2GNDER)
169. Spring, K principal years of experience in teaching prek/Head start and K (S2YRPRKK)
170. Spring, K principal years of experience in teaching the 2nd grade or above (S2YR2ABV)
171. Spring, K number of courses principal having taken in early childhood education or child development(S2CRSECD)
172. Spring, K number of courses principal having taken having taken courses in ESL (S2CRSCDV)
173. Spring, K number of courses principal having taken having taken courses in administration (S2CRSADM)
174. Spring, K principal spending number of hours per week teaching (S2TEEECH)
175. Spring, K principal spending number of hours per week with required paperwork (S2PPRWRK)
176. Spring, K principal estimated percentage of children's names known (S2KNWNME)

School/teacher outreach to parent

177. Fall, K teacher report of emphasizing importance of home-assisted kindergarten learning (B1KLRN)
178. Fall, K parent report of school outreach to parents (P1OUTRCH)
179. Spring, K parent report of school outreach to parents (P2OUTRCH)
180. Spring, K teacher report of number of conferences with parents (A2NUMCNF)
181. Spring, K teacher report of parent often seeing child's work (A2SHARED)
182. Fall, K teacher report of giving parents orientation at the beginning of the year (B1PRNTOR)
183. Spring, K teacher report of giving parents orientation at the beginning of the year (B2PRNTOR)
184. Spring, K school report of offering orientation programs (S2ORIENT)
185. Spring, K teacher report of visiting students' homes before the beginning of the year (B2HMEVST).

186. Spring, K school report of frequency of PTA/PTO meetings (S2PTAMT)
187. Spring, K school report of frequency of sending report cards (S2RPRTCD)
188. Spring, K school report of frequency of parent-teacher conference (S2PTCONF)
189. Spring, K school report of frequency of performances for parents (S2INVITE)
190. Spring, K school report of frequency of classroom programs for parents (S2CLASPR)
191. Spring, K school report of frequency of fundraisers (S2FUNDRS)
192. Spring, K school report of assistance/outreach to LM-LEP families (S2LEPHLP)

Instructional resources

193. Spring, K teacher's use of instructional resources (A2RSRUSE)
194. Spring, K school accommodation size (S2CHLDNM)
195. Spring, K school number of instructional rooms (S2RMNUM)
196. Spring, K school number of instructional computers (S2INSTCM)
197. Spring, K teacher report of using computer equipment (A2COMP1)
198. Spring, K teacher report of using software (A2SOFTW1)
199. Spring, K teacher report of using heating/air conditioning (A2HTAC1)
200. Spring, K school adequacy of facility (S2FACLT)

Neighborhood environment and school safety

201. Spring, K school having problem with gangs (S2GANGRC)
202. Spring, K children with weapons in school (S2WEAPON)
203. Spring, K visitors being required to sign in (S2SIGNIN)
204. Spring, K school taking more security measures (K2Q2SCRT)
205. Spring, K school safety rating (K2Q3)
206. Spring, K school with decorated hallways (K2Q6_A)