Exam!

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(20 points) I’ve run crosstabs on a subset of the data (so you cannot replicate, just use these data as provided). These give verbose summary of vaxx choice by educational qualification and region. Form a hypothesis test of the form, “people with various educational qualifications in Region have different fraction vaxxed compared with other Region.” I expect that you will choose different ways to operationalize educational qualification (compare above some level with below that level, but what level?) and different regions (Census provides 4 – Northeast, Midwest, South, West, you might combine them). You can choose how to deal with NA responses to vaxx – perhaps count them as ‘no’? I expect that different people may choose different levels of significance. Please provide estimate, standard error, t-stat and a p-value for the hypothesis test and a confidence interval. Write a short paragraph explaining the test (carefully noting what is the null hypothesis) and explaining the results of that test.

load("C:/Homework EcoB2000/exam1/Household\_Pulse\_data.RData")  
attach(Household\_Pulse\_data)

```

xtabs(~ EEDUC + RECVDVACC + REGION)

## , , REGION = Northeast  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 0 31 16  
## some hs 1 107 19  
## HS diploma 27 1028 190  
## some coll 20 1576 222  
## assoc deg 15 928 120  
## bach deg 35 2901 162  
## adv deg 20 2961 99  
##

“people with various educational qualifications in Region Northeast have different fraction vaxxed compared with other Region.”

Ho: people in region northeast have different vaxxed impact

H1: people in region northeast have same vaxxed impact

Coeff -0.08816 t-stat 1.08 P value 5.04 T

he coefficient of the region northeast is insignificant at P<0 we cannot reject the null hypothesis. This means that in region northeast the different EEDUC has different impact on vaxx.

## , , REGION = South  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 0 103 48  
## some hs 5 211 107  
## HS diploma 32 2052 652  
## some coll 62 3868 858  
## assoc deg 30 1903 387  
## bach deg 63 5780 546  
## adv deg 76 5582 315  
##

Coeff -0.08816

t-stat 1.01

P value 5.32

The coefficient of the region south is insignificant at P<0 we cannot reject the null hypothesis. This means that in region northeast the different EEDUC has different impact on vaxx.

## , , REGION = Midwest  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 4 41 20  
## some hs 5 114 56  
## HS diploma 29 1326 370  
## some coll 35 2306 511  
## assoc deg 29 1352 269  
## bach deg 65 3598 343  
## adv deg 41 2977 160  
##

Coeff -0.13571

t-stat 0.987

P value 10.98

The coefficient of the region Midwest is insignificant at P<0 we cannot reject the null hypothesis. This means that in region northeast the different EEDUC has different impact on vaxx.

## , , REGION = West

##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 2 115 31  
## some hs 4 220 87  
## HS diploma 25 1691 435  
## some coll 61 4272 805  
## assoc deg 36 2083 356  
## bach deg 75 5993 514  
## adv deg 54 5207 239

(20 points) I’ve run crosstabs again, this time on vaxx choice by educational qualification and gender identification. Form a hypothesis test of the form, “people with various educational qualifications who are one or more gender ID have different fraction vaxxed compared with another gender ID.” I expect that you will choose different ways to operationalize educational qualification (as noted in Question 1) and different genders (including the NA response, perhaps it makes sense to combine some). Choose a level of significance. Please provide estimate, standard error, t-stat and a p-value for the hypothesis test and a confidence interval. Write a short paragraph explaining the test (carefully noting what is the null hypothesis) and explaining the results of that test.

people with various educational qualifications who are one or more gender ID have different fraction vaxxed compared with another gender ID.”

Ho: people with various educational qualifications who are one or more gender ID have same fraction vaxxed compared with another gender ID

H1: people with various educational qualifications who are one or more gender ID have different fraction vaxxed compared with another gender ID

xtabs(~EEDUC + RECVDVACC + GENID\_DESCRIBE)

## , , GENID\_DESCRIBE = NA  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 1 11 2  
## some hs 10 13 2  
## HS diploma 69 70 15  
## some coll 89 96 22  
## assoc deg 70 47 7  
## bach deg 160 139 20  
## adv deg 140 129 19  
##

Coeff -0.23614

t-stat -2.63

P value 0.021

The coefficient of the gender ID of NA described is significant at P<0 we cannot reject the null hypothesis. This means that in ID of NA described the RECVDVACC has same impact on vaxx.

## , , GENID\_DESCRIBE = male  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 4 120 34  
## some hs 1 275 103  
## HS diploma 16 2200 628  
## some coll 24 4665 880  
## assoc deg 10 2107 330  
## bach deg 30 7552 561  
## adv deg 21 6943 292  
##

Coeff 0.06097

t-stat -2.44

P value 0.032

The coefficient of the gender ID of male described is significant at P<0 we cannot reject the null hypothesis. This means that in ID of male described the RECVDVACC has same impact on vaxx.

## , , GENID\_DESCRIBE = female  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 0 142 62  
## some hs 3 344 158  
## HS diploma 28 3732 974  
## some coll 60 7078 1469  
## assoc deg 30 4027 778  
## bach deg 44 10401 956  
## adv deg 25 9494 458  
##

Coeff -0.01313

t-stat 2.63

P value 0.00

The coefficient of the gender ID of female described is significant at P<0 we cannot reject the null hypothesis. This means that in ID of male described the RECVDVACC has same impact on vaxx.

## , , GENID\_DESCRIBE = transgender  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 1 4 6  
## some hs 0 6 1  
## HS diploma 0 22 6  
## some coll 0 48 5  
## assoc deg 0 12 3  
## bach deg 1 43 2  
## adv deg 0 32 10  
##

Coeff -0.46437

t-stat 1.98

P value 0.04

The coefficient of the gender ID of transgender described is significant at P<0 we cannot reject the null hypothesis. This means that in ID of transgender described the RECVDVACC has same impact on vaxx.

## , , GENID\_DESCRIBE = other  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 0 13 11  
## some hs 1 14 5  
## HS diploma 0 73 24  
## some coll 5 135 20  
## assoc deg 0 73 14  
## bach deg 3 137 26  
##adv deg 5 129 34

Coeff -0.23614

t-stat 2.01

P value 0.03

The coefficient of the gender ID of other described is significant at P<0 we cannot reject the null hypothesis. This means that in ID of other described the RECVDVACC has same impact on vaxx.

xtabs(~EEDUC+ KIDS\_12\_17Y+ RECVDVACC)

## , , RECVDVACC = NA  
##   
## KIDS\_12\_17Y  
## EEDUC NA Yes children 12 - 17 in HH  
## less than hs 4 2  
## some hs 13 2  
## HS diploma 103 10  
## some coll 157 21  
## assoc deg 99 11  
## bach deg 222 16  
## adv deg 187 4  
##   
## , , RECVDVACC = yes got vaxx  
##   
## KIDS\_12\_17Y  
## EEDUC NA Yes children 12 - 17 in HH  
## less than hs 203 87  
## some hs 503 149  
## HS diploma 5213 884  
## some coll 10325 1697  
## assoc deg 5244 1022  
## bach deg 15691 2581  
## adv deg 14266 2461  
##   
## , , RECVDVACC = no did not get vaxx  
##   
## KIDS\_12\_17Y  
## EEDUC NA Yes children 12 - 17 in HH  
## less than hs 74 41  
## some hs 181 88  
## HS diploma 1204 443  
## some coll 1767 629  
## assoc deg 838 294  
## bach deg 1160 405  
## adv deg 592 221

summary(EEDUC)

## less than hs some hs HS diploma some coll assoc deg bach deg   
## 411 936 7857 14596 7508 20075   
## adv deg   
## 17731

summary(KIDS\_12\_17Y)

## NA Yes children 12 - 17 in HH   
## 58046 11068

summary(RECVDVACC)

## NA yes got vaxx no did not get vaxx   
## 851 60326 7937

xtabs(~ EEDUC + RECVDVACC + REGION)

## , , REGION = Northeast  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 0 31 16  
## some hs 1 107 19  
## HS diploma 27 1028 190  
## some coll 20 1576 222  
## assoc deg 15 928 120  
## bach deg 35 2901 162  
## adv deg 20 2961 99  
##   
## , , REGION = South  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 0 103 48  
## some hs 5 211 107  
## HS diploma 32 2052 652  
## some coll 62 3868 858  
## assoc deg 30 1903 387  
## bach deg 63 5780 546  
## adv deg 76 5582 315  
##   
## , , REGION = Midwest  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 4 41 20  
## some hs 5 114 56  
## HS diploma 29 1326 370  
## some coll 35 2306 511  
## assoc deg 29 1352 269  
## bach deg 65 3598 343  
## adv deg 41 2977 160  
##   
## , , REGION = West  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 2 115 31  
## some hs 4 220 87  
## HS diploma 25 1691 435  
## some coll 61 4272 805  
## assoc deg 36 2083 356  
## bach deg 75 5993 514  
## adv deg 54 5207 239

xtabs(~EEDUC + RECVDVACC + GENID\_DESCRIBE)

## , , GENID\_DESCRIBE = NA  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 1 11 2  
## some hs 10 13 2  
## HS diploma 69 70 15  
## some coll 89 96 22  
## assoc deg 70 47 7  
## bach deg 160 139 20  
## adv deg 140 129 19  
##   
## , , GENID\_DESCRIBE = male  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 4 120 34  
## some hs 1 275 103  
## HS diploma 16 2200 628  
## some coll 24 4665 880  
## assoc deg 10 2107 330  
## bach deg 30 7552 561  
## adv deg 21 6943 292  
##   
## , , GENID\_DESCRIBE = female  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 0 142 62  
## some hs 3 344 158  
## HS diploma 28 3732 974  
## some coll 60 7078 1469  
## assoc deg 30 4027 778  
## bach deg 44 10401 956  
## adv deg 25 9494 458  
##   
## , , GENID\_DESCRIBE = transgender  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 1 4 6  
## some hs 0 6 1  
## HS diploma 0 22 6  
## some coll 0 48 5  
## assoc deg 0 12 3  
## bach deg 1 43 2  
## adv deg 0 32 10  
##   
## , , GENID\_DESCRIBE = other  
##   
## RECVDVACC  
## EEDUC NA yes got vaxx no did not get vaxx  
## less than hs 0 13 11  
## some hs 1 14 5  
## HS diploma 0 73 24  
## some coll 5 135 20  
## assoc deg 0 73 14  
## bach deg 3 137 26  
## adv deg 5 129 34