One of the interesting findings of our research would have to be how little influence a parent’s education actually affects how their child performs in tests and assessments like the students whose parents have some high school education tend to do worse in math while the students whose parents have a master’s degree tend to better in math which are few and the rest of the students have an average of 60%

**def** gradeSec(grade):

**if** grade**>=**90:

**return** "[90,100]"

**elif** grade **>=** 80:

**return** "[80,90)"

**elif** grade **>=** 70:

**return** "[70,80)"

**elif** grade **>=** 60:

**return** "[60,70)"

**elif** grade **>=** 50:

**return** "[50,60)"

**else**:

**return** "[0,50)"

*#Comparing student's math grade with their parent's level of education*

dfSnippet **=** df[['parental level of education','math score']]

math **=** dfSnippet['math score']**.**apply(**lambda** x: pd**.**Series([gradeSec(x), x], index**=**['math grade', 'math score']))

math['parent edu'] **=** dfSnippet['parental level of education']

math**.**drop(columns**=**['math score'], inplace**=True**)

math**.**set\_index('math grade', inplace**=True**)

x **=** ['[0,50)','[50,60)','[60,70)','[70,80)','[80,90)','[90,100]']

y1 **=** []

y2 **=** []

y3 **=** []

y4 **=** []

y5 **=** []

y6 **=** []

**for** i **in** x:

y **=** math**.**loc[math**.**index**.**str**.**startswith(i)]

y1**.**append(y['parent edu']**.**value\_counts()['some college'])

y2**.**append(y['parent edu']**.**value\_counts()['associate\'s degree'])

y3**.**append(y['parent edu']**.**value\_counts()['high school'])

y4**.**append(y['parent edu']**.**value\_counts()['some high school'])

y5**.**append(y['parent edu']**.**value\_counts()['bachelor\'s degree'])

y6**.**append(y['parent edu']**.**value\_counts()['master\'s degree'])

ind **=** np**.**arange(6)

plt**.**title('Student’s math grade based on parent\'s education');

plt**.**ylabel('num students');

plt**.**xlabel('Math grade');

p1 **=** plt**.**bar(ind**-**0.25, y1, width**=**0.1,label **=** 'some C');

p2 **=** plt**.**bar(ind**-**0.15, y2, width**=**0.1,label **=** 'Ad');

p3 **=** plt**.**bar(ind**-**0.05, y2, width**=**0.1,label **=** 'Hs');

p4 **=** plt**.**bar(ind**+**0.05, y4, width**=**0.1,label **=** 'some Hs');

p5 **=** plt**.**bar(ind**+**0.15, y5, width**=**0.1,label **=** 'Bd');

p6 **=** plt**.**bar(ind**+**0.25, y6, width**=**0.1,label **=** 'Md');

plt**.**xticks(ind, ('[0,50)','[50,60)','[60,70)','[70,80)','[80,90)','[90,100]'));

plt**.**legend();

Chart, bar chart

Description automatically generated

Another interesting finding in our research was that in cases in which the students ate the same amount of lunch and participated in a test preparation course even with there parents’ education level don’t play a factor in the parent’s level of education which is surprising because one would imagine that a parent with a higher level of education would encourage their child to take the test preparation course and a suitable lunch.

*#Comparing student's parent's education with weather or not the student ate lunch*

dfSnippet **=** df[['parental level of education’, ‘lunch']]

x **=** dfSnippet['parental level of education']**.**unique()

print(x)

dfSnippet**.**set\_index('parental level of education', inplace**=True**)

y1 **=** []

y2 **=** []

**for** i **in** x:

y **=** dfSnippet**.**loc[dfSnippet**.**index**.**str**.**startswith(i)]

y1**.**append(y['lunch']**.**value\_counts()['standard'])

y2**.**append(y['lunch']**.**value\_counts()['free/reduced'])

ind **=** np**.**arange(6)

plt**.**title('Students that ate a proper lunch');

plt**.**ylabel('num students');

plt**.**xlabel('parent\'s education');

p1 **=** plt**.**bar(ind, y1, width**=**0.3, );

p2 **=** plt**.**bar(ind, y2, width**=**0.3, bottom**=**y1);

plt**.**xticks(ind, ('Bd', 'Some C', 'Md', 'Ad', 'Hs', 'Some Hs'));

plt**.**legend((p1[0],p2[0]),('standard', 'free/reduced'));

Chart, bar chart

Description automatically generated

One more interesting finding in our research was how much lunch affects both the writing and reading of the students and how the students who have a reduced lunch usually have a lower grade on there tests while the students who have a standard lunch tend to do better in the test because they a full of energy from a good meal and the students with a reduced meal didn’t get enough lunch to fully concentrate on the tests

*#Comparing student's writing grade with weather or not they eat a proper lunch*

dfSnippet **=** df[['lunch','writing score']]

writing **=** dfSnippet['writing score']**.**apply(**lambda** x: pd**.**Series([gradeSec(x), x], index**=**['writing grade', 'writing score']))

writing['r/e'] **=** dfSnippet['lunch']

writing**.**drop(columns**=**['writing score'], inplace**=True**)

writing**.**set\_index('writing grade', inplace**=True**)

x **=** ['[0,50)','[50,60)','[60,70)','[70,80)','[80,90)','[90,100]']

y1 **=** []

y2 **=** []

**for** i **in** x:

y **=** writing**.**loc[writing**.**index**.**str**.**startswith(i)]

y1**.**append(y['r/e']**.**value\_counts()['standard'])

y2**.**append(y['r/e']**.**value\_counts()['free/reduced'])

ind **=** np**.**arange(6)

plt**.**title('Students writing grade based on lunch');

plt**.**ylabel('num students');

plt**.**xlabel('Writing grade');

p1 **=** plt**.**bar(ind**+**0.15, y1, width**=**0.3,label **=** 'Standard');

p2 **=** plt**.**bar(ind**-**0.15, y2, width**=**0.3,label **=** 'Free/Reduced');

plt**.**xticks(ind, ('[0,50)','[50,60)','[60,70)','[70,80)','[80,90)','[90,100]'));

plt**.**legend();

Chart, bar chart

Description automatically generated

*#Comparing student's reading grade with weather or not they eat a proper lunch*

dfSnippet **=** df[['lunch','reading score']]

reading **=** dfSnippet['reading score']**.**apply(**lambda** x: pd**.**Series([gradeSec(x), x], index**=**['reading grade', 'reading score']))

reading['r/e'] **=** dfSnippet['lunch']

reading**.**drop(columns**=**['reading score'], inplace**=True**)

reading**.**set\_index('reading grade', inplace**=True**)

x **=** ['[0,50)','[50,60)','[60,70)','[70,80)','[80,90)','[90,100]']

y1 **=** []

y2 **=** []

**for** i **in** x:

y **=** reading**.**loc[reading**.**index**.**str**.**startswith(i)]

y1**.**append(y['r/e']**.**value\_counts()['standard'])

y2**.**append(y['r/e']**.**value\_counts()['free/reduced'])

ind **=** np**.**arange(6)

plt**.**title('Students reading grade based on lunch');

plt**.**ylabel('num students');

plt**.**xlabel('Reading grade');

p1 **=** plt**.**bar(ind**+**0.15, y1, width**=**0.3,label **=** 'Standard');

p2 **=** plt**.**bar(ind**-**0.15, y2, width**=**0.3,label **=** 'Free/Reduced');

plt**.**xticks(ind, ('[0,50)','[50,60)','[60,70)','[70,80)','[80,90)','[90,100]'));

plt**.**legend();

Chart, bar chart

Description automatically generated