Double-Majoring in the Arts: Cohort and Related Effects

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- Draft, not to be quoted -

The Focus of This Study

- In our previous research on arts majors, we have found that
 - Compared to other college graduates, the earnings of arts majors are low. This is true especially when compared to the earnings of other "creative" majors.
 - Compared to other college graduates, unemployment rates of arts majors are high. This is also true when compared to the unemployment rates of other creative majors.
 - Arts majors have low earnings regardless of whether they work in artistic occupations or non-artistic occupations.
- Is it possible that arts majors can/will enhance their earnings by double-majoring?
 - If so, does it matter what the second major is or the art major's occupation?
 - Has the changing technical nature of the arts major or second major effected its impact on artists' earnings?
 - Does majoring in the arts significantly enhance the creativity of workers in the STEM occupations as reflected in their earnings?
- Is there a difference in the impact of the artist's gender or race across age cohorts and is it similar to the impacts on STEM workers' earnings?

Literature Review: Growth in Double Majors

- Graduating with a baccalaureate degree having two majors is reported as becoming increasingly common.
- Earlier estimates:
 - In the early 2000s almost one-quarter of college graduates graduated with two majors (Rossi and Hersch [2008], from NCES data).
 - The percent of Vanderbilt University's students who are graduating with double majors has recently risen to 40 percent (Pitt and Tepper [2012]).
 - UC-Davis has seen an increase of 50 percent in the number of double majors (Pitt and Tepper [2012]).
 - MIT has seen a doubling of double majors since 1993 (Pitt and Tepper [2012]).

Literature Review: Earnings Impact of Double Majoring

- Significant premia seem to be associated with the double major. This was found in some recent studies, two using the NSF's 2003 National Survey of College Graduates.
 - Rossi and Hersch (2008):
 - Earnings of double majors 2.3% higher than the earnings of a graduate with a single major
 - The benefit is greatest for double majors that are a combination across two different categories of majors rather than within the same category (e.g., an arts major combined with business major rather than two arts majors)
 - Hemelt (2010):
 - Double majors earn 3.2 % more than graduates with a single major
 - The earnings of graduates with a 'first major' that's either: biological/life sciences, computer sciences, physical sciences or mathematics/statistics significantly increases earnings regardless of the second major
 - Health sciences 'first majors' regardless of second major earn 15 percent less than health sciences majors with only one major
 - Pitt and Tepper, 'Double Majors: Influences, Identities & Impacts' (2012)
 - An arts major in combination with a natural science major enhances earnings by about nine
 (9) percent relative to having only an arts major

Literature Review: Relationship Between Artistic Creativity and Scientific Productivity

- Root-Bertnstein, et. al. (2008)
 - Studied Nobel Laureates (in the sciences), members of the U.S. National Academy of Sciences, the Royal Society (scientists) and Sigma Xi
 - Found 'very significant relationships between success as a scientist and evidence of adult arts and crafts avocations' (p.53)

Our Methodology

- We focus on double-majoring by arts majors, STEM majors and a few others.
- We use data from the 2009-2013 American Community Survey combined public use samples.
- Using the ACS, we are able to identify every college graduate's major field(s) of study (undergraduate only).
- In the first part, we summarize information from the ACS on doublemajoring.
- In the second part, we construct Mincerian earnings functions to enable us to address the questions of interest.
- We utilize the following broad groups of college majors: arts, engineering, computer science, science, social science, arts education, non arts education and business/economics. They are included as both single and double majors.
- The arts major is also paired with each of the non-arts majors and with the art education major and the non-art education major.

Why the ACS?

- Good:
 - It is the only large-scale survey for the U.S. that reports on undergraduate college majors
 - It provides information on as many as two undergraduate majors
 - It provides information on post-baccalaureate degrees earned
 - It's representative of the U.S. population
- Not so good:
 - It doesn't include measures of ability
 - The order of the two majors reported in the ACS does not reflect a hierarchical ordering of those majors by the individual
 - Graduate degree fields are not identified
 - Reported earnings are annual earnings and wage rates are not available (and cannot be calculated)

Preliminary Observations from the ACS

- We find that 10.66 percent of college graduates report two or more majors. The most popular choices of first majors and second majors tend to be the same.
- Differences in choice of major are greater between genders, but consistent between first and second major by gender.
- For all college grads, we find that the simple premium from double-majoring is a positive \$123 (0.2 percent of earnings), and is statistically significant. This is without adjusting for other personal characteristics.
- The frequency of double-majoring varies with the field of the first major.
- The assertion that double-majoring has increased over time does not seem to hold up, as the table on the following slide shows.
- Not all majors benefit financially from double-majoring, and when they do benefit, it may depend on the field of the second major.

Double-Majoring by Age

Age Range	% Double Major	
21-30	11.81	
31-40	9.63	
41-50	8.93	
51-60	9.22	
>60	9.60	

Frequency Differences

Major Group	# of majors	% single majors	% double majors	% second major inside group	% second major outside group
Art	2,213,345	80.46%	19.54%	13.66%	86.34%
Art Education	608,104	82.69%	17.31%	3.59%	96.41%
Other Education	5,461,430	88.38%	11.62%	27.35%	72.65%
Business/Economics	11,786,825	86.73%	13.27%	43.48%	56.52%
Computer Science	2,533,859	79.18%	20.82%	15.73%	84.27%
Engineering	3,929,441	92.94%	7.06%	25.43%	74.57%
Science	4,186,412	82.05%	17.95%	26.15%	73.85%
Social Science	5,451,458	60.04%	39.96%	9.54%	90.46%
All	48,929,140	89.34%	10.66%		

Earnings Differences

Major Group	Earnings of single majors	Earnings of double majors	Earnings: second major inside group	Earnings: second major outside group	Significant Difference: Single vs. Double (alpha = .05)	Significant Difference: Major In vs. Major Out (alpha = .05)	
Art	\$47,088	\$50,485	\$41,848	\$51,851	Yes (+)	Yes (out>in)	
Art Education	\$44,632	\$44,603	\$36,674	\$44,928	No	Yes (out>in)	
Other Education	\$46,321	\$49,228	\$48,310	\$49,573	Yes (+)	Yes (out>in)	
Business/Econo mics	\$77,125	\$80,722	\$83,060	\$78,923	Yes (+)	Yes (in>out)	
Computer Science	\$78,420	\$84,516	\$88,257	\$83,818	Yes (+)	Yes (in>out)	
Engineering	\$93,779	\$95,529	\$96,407	\$95,230	Yes (+)	Yes (in>out)	
Science	\$91,071	\$83,753	\$90,484	\$81,370	Yes (-)	Yes (in>out)	
Social Science	\$77,886	\$74,576	\$69,039	\$75,605	Yes (-)	Yes (out>in)	
All	\$68,862	\$68,985			Yes (+)		

Observations on Double- Majoring in the Arts

- We examine the pattern of double-majoring by nine arts majors in the next slide.
- In the following slide, we show the earnings effect of having a double major, and how it differs depending on whether it is an "inside" or an "outside" major.

Arts: Frequency Differences

Artistic Major: Distribution of Single and Double Majors										
Major	# of majors	% single majors	% double majors	% second major inside arts	% second major outside arts					
Fine Arts	609,426	83.63	16.37	20.98	79.02					
Drama and Theatre Arts	254,370	69.30	30.70	21.04	78.96					
Music	415,666	79.75	20.25	11.45	88.55					
Visual and Performing Arts	77,142	65.85	34.15	41.80	58.20					
Commercial Art & Graphic Design	509,551	83.37	16.63	25.56	74.44					
Film, Video & Photographic Arts	162,041	70.54	29.46	28.35	71.65					
Art History	131,438	69.34	30.66	26.94	73.06					
Studio Arts	102,611	73.78	26.22	45.70	54.30					
Misc. Fine Arts	9,791	67.01	32.99	43.99	56.01					

Arts: Earnings Differences

Major	Earnings of single majors	Earnings of double majors	Earnings: second major inside arts	Earnings: second major outside arts	Significant Difference: Single vs. Double (alpha = .05)	Significant Difference: Major In vs. Major Out (alpha = .05)
Fine Arts	\$47,400	\$50,867	\$42,449	\$53,102	Yes (+)	Yes (out>in)
Drama and Theatre Arts	\$44,508	\$48,600	\$40,538	\$50,749	Yes (+)	Yes (out>in)
Music	\$46,739	\$52,085	\$40,060	\$53 <i>,</i> 639	Yes (+)	Yes (out>in)
Visual and Performing Arts	\$40,763	\$42,424	\$39,024	\$42,424	Yes (+)	Yes (out>in)
Commercial Art & Graphic Design	\$48,305	\$46,106	\$42,613	\$47,306	Yes (-)	Yes (out>in)
Film, Video & Photographic Arts	\$49,329	\$49,643	\$43,098	\$52,232	No (+)	Yes (out>in)
Art History	\$53,566	\$58,545	\$47,063	\$62,778	Yes (+)	Yes (out>in)
Studio Arts	\$39,085	\$43,074	\$39,783	\$45,844	Yes (+)	Yes (out>in)
Misc. Fine Arts	\$43,326	\$39,661	\$36,201	\$42,379	Yes (-)	Yes (out>in)

The Earnings Functions: Methodology

- We investigate how having the previously identified majors, single and double, influence earnings in the following arts occupational groups: actors, artists and entertainers not elsewhere classified, designers, musicians, photographers, producers and directors, writers and visual artists. Dancers are not included as very few have college degrees.
- We do the same for the following STEM occupational groups: computer scientists, engineers, mathematicians and statisticians, and scientists. Also for several other occupational groups: business operations specialists, educators, financiers, managers and social scientists.
- The general structure of the earnings function is the same regardless of which occupational group is being analyzed.
- In the earnings function, demographic characteristics include a person's gender, race, ethnicity, nativity, marital status, presence of young children, and whether s/he had a disability.
- The individual's human capital is accounted for by including the highest degree earned and the individual's bachelor's degree major or double major combination.

Methodology II

- Experience is estimated by age in the quadratic form as the more traditional proxy (age minus years of schooling minus five) is not available since the ACS does not report years of schooling completed.
- The nature of the individual's employment status is accounted for with a variable that indicates whether s/he is an employee of a for-profit business, a non-profit business or self-employed (being a government employee is the excluded category).
- Other included employment related characteristics are: place of employment (region of the U.S.), weeks worked and hours worked.
- Year is entered as a fixed effect.
- The model is estimated twice with and without industry of employment.
- Age cohorts are: 22-31, 32-41, 42-51, 52-61 and 62+.

Results

- The results are summarized in the tables below.
- The first set of tables presents the results for all workers: regardless of degree; who have a bachelor's degree or higher; and whose highest degree is a graduate degree (master's, professional or doctorate).
- The next set of tables present the results for artists, in total and by occupation, for those who only have completed a bachelor's degree.
- The model is first estimated to determine whether having two undergraduate majors significantly impacts earnings. This is undertaken for males and females combined and separately.
- The model is then re-estimated including additional controls for industry of employment.

Summary of Findings: Are Two Majors Better Than One?

- All Workers
 - Two majors significantly increase earnings for all workers combined by approximately 2% regardless of gender
 - Two majors do not significantly impact male workers' earnings
 - Two majors significantly increase female workers' earnings by 2%
 - Two majors in the arts significantly decrease earnings regardless of gender though not more than a single arts major
 - Two arts majors significantly lower earnings for males
 - Two arts majors don't significantly impact females' earnings
 - Combining an arts major with a non-arts major doesn't significantly impact earnings, except for males with a science major (+)
 - Combining an arts major with an education major significantly decreases earnings for females with an arts education major
- Workers with Bachelor's Degrees and Beyond
 - Two majors significantly increase earnings for all workers combined by approximately 1% regardless of gender
 - Two majors do not significantly impact male workers' earnings
 - Two majors significantly increases female workers' earnings by 1%

- Two majors in the arts significantly decreases earnings regardless of gender more than a single arts major
 - Two arts majors significantly lowers earnings for males
 - Two arts majors significantly lowers earnings for females
- Combining an arts major with a non-arts major doesn't significantly impact earnings, except for males with a science major (+) and females with a science major (-)
- Combining an arts major with an education major significantly decreases earnings for females with an arts education major
- Workers with Graduate Degrees
 - Two majors don't significantly impact earnings for all workers combined
 - Two majors significantly decreases male workers' earnings by 1%
 - Two majors don't significantly impact female workers' earnings
 - Two majors in the arts significantly decreases earnings regardless of gender more than a single arts major
 - Two arts majors significantly lowers earnings for males, three times as much as for a single arts major
 - Two arts majors significantly lowers earnings for females, almost twice as much as for a single arts major

- Combining an arts major with a non-arts major doesn't significantly impact earnings, except for males with a business/economics major or a science major (+)
- Combining an arts major with an education major doesn't significantly impact earnings
- Artists (by occupation) Bachelor's Degree Only
 - Core Artists
 - Two majors don't significantly impact earnings for all artists combined
 - Two majors significantly decreases male artists' earnings by 8%
 - Two majors don't significantly impact female artists' earnings
 - Two arts majors don't significantly impact earnings for all artists combined
 - Two arts majors don't significantly impact male artists' earnings
 - Two arts majors don't significantly impact female artists' earnings
 - Combining an arts major with a non-arts major doesn't significantly impact earnings, except for males and females with an engineering major (+) and females with a science major (+)
 - Combining an arts major with an education major doesn't significantly impact earnings

Are Two Majors Better Than One? $_{| \lor}$

- Artists NEC
 - Two majors significantly increases earnings for all artists nec combined by 6%
 - Two arts majors significantly increase earnings for all artists nec combined (52%)
 - Two arts majors don't significantly impact male artists' earnings
 - Two arts majors significantly increase female artists' earnings (41%)
 - Combining an arts major with a non-arts major has a significant negative impact on earnings for male and female artists nec combined with a science major (47%) and a computer major (25%). Female artists nec with a second business/economics major have significantly lower earnings (53%).
 - Combining an arts major with a non-arts education major significantly increases the earning for female artists (1.18%).

Actors

- Two majors don't significantly impact earnings for all actors combined
 - Two majors do significantly decrease the earnings for male actors
- Two arts majors significantly increases earnings for all actors combined (72%)

- Combining an arts major with a non-arts major doesn't significantly impact earnings except for male and female actors together when the major is combined with an arts education major (220%) and a non-arts education major (82%)
 - Male actors earn significantly more when the arts major is combined with an art education major (58%), and female actors earn significantly more when the art major is combined with either of the education majors (112% for art education and 254% with non-arts education)
- Designers
 - Two majors don't significantly impact earnings for all designers combined
 - Two arts majors don't significantly impact earnings for all designers combined but they do significantly increase the earnings of female designers
 - Combining an arts major with a non-arts major doesn't significantly impact earnings except for male and female designers together when the major is combined with an engineering major (40%)
 - Male designers earn significantly more when the arts major is combined with an engineering major (30%), and with a non-arts education major
 - Combining an arts major with other majors doesn't significantly impact the earnings of female designers

Musicians

- Two majors significantly decreases earnings for all musicians combined (19%)
 - Female musicians with two majors have earnings that are significantly decreased (23%) while male musicians' earnings are not significantly impacted by two majors
- Two arts majors don't significantly impact earnings for all musicians combined but they do significantly increase the earnings of female musicians (40%)
- Combining an arts major with a non-arts major for male and female musicians combined leads to increased earnings if the second major is in: engineering (48%); business/economics (53%); or art education (37%) and decreased earnings if the second major is social science (132%)
 - Male musicians' earnings are significantly increased if the second major is either engineering (43%) or business/economics (44%), while female musicians' earnings are increased if the second major is either business/economics (84%) or art education (61%)
 - Male musicians' earnings are significantly decreased if the second major is social science (188%)

• Photographers

- Two majors don't significantly impact earnings for all photographers combined
 - Male photographers with two majors have earnings that are significantly decreased (24%) while female photographers' earnings are not significantly impacted by two majors
- Two arts majors don't significantly impact earnings for all photographers combined or males and females separately
- Combining an arts major with an engineering major or a non-arts education major for male and female photographers combined leads to increased earnings (62% and 176% respectively), and decreased earnings if the second major is business/economics (197%) or art education (50%)
 - Male photographers' earnings are significantly increased if the second major is engineering (82%)
 - Female photographers' earnings are significantly increased if the second major is engineering (35%) or non-art education (157%), and decreased if the second major is business/economics (307%), science (27%) or art education (48%)

- Producers and Directors
 - Two majors don't significantly impact earnings for all producers and directors combined, nor for males or females separately
 - Two arts majors don't significantly impact earnings for all producers and directors combined, it significantly reduces earnings for males (59%)
 - Combining an arts major with an engineering major or business/economics major for male and female producers and directors combined leads to increased earnings (31% and 46% respectively)
 - Female producers' and directors' earnings are significantly increased if the second major is engineering (79%) or business/economics (58%), and decreased if the second major is science (26%) or art education (57%); males' earnings are not significantly impacted by a second major
- Visual Artists
 - Two majors don't significantly impact earnings for all visual artists combined
 - Two majors do significantly decrease the earnings for female visual artists (21%)
 - Combining an arts major with a computer science major or an arts education major for male and female visual artists combined leads to increased earnings (20% and 50% respectively)
 - Male visual artists' earnings are significantly increased if the second major is computer science (28%)
 - Female visual artists' earnings are significantly increased if the second major is art education (77%)

• Writers

- Two majors don't significantly impact earnings for all writers combined
- Two arts majors don't significantly impact earnings for all writers combined
- Combining an arts major with a science major or social science major for male and female writers combined leads to increased earnings (129% and 88% respectively); it leads to decreased earnings when combined with an arts education major (76%)
 - Male writers' earnings are significantly increased if the second major is science (179%) or social science (110%); their earnings are reduced when the art major is combined with arts education (81%)
 - Female writers' earnings are significantly increased if the second major is science (82%)

All

All (n)	ВА	MA	Prof	2 BA majors	BA Art	R ²
All (3,920,912)	.59***	.76***	1.16***	.02***	26***	.33
Male (2,034,647)	.60***	.75***	1.15***	.01	28***	.36
Female (1,886,265)	.57***	.77***	1.14***	.02***	21***	.29

All (n)	BA	MA	Prof	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art
All (3,920,912)	.40***	.62***	.93***	.10***	08***	.22***	.09***	.004	.16***	.25***	.17***	07***
Male (2,034,647)	.36***	.57***	.92***	.14***	06***	.23***	.13***	.03***	.20***	.27***	.21***	10**
Female (1,886,265)	.41***	.65***	.91***	.05***	07***	.24***	.04***	01**	.13***	.30***	.13***	05

2 Science	2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R ²
.09***	.24***	.01	01	004	06	02	03	07*	.06	.59
.12***	.28***	.03*	.01	02	.14*	02	04	.02	.11	.58
.05***	.19***	.001	02	.02	19	.01	02	10*	.04	.58

Bachelor's Degree and Beyond

BA + (n)	MA	Prof	2 BA majors	BA Art	R ²
All (2,473,947)	.22***	.62***	.01**	28***	.19
Male (1,229,968)	.19***	.60***	001	31***	.21
Female (1,243,979)	.25***	.63***	.01**	23***	.13

BA + (n)	MA	Prof	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art
All (2,473,947)	.21***	.51***	.09***	07***	.20***	.07***	.01***	.14***	.24***	.15***	08***
Male (1,229,968)	.19***	.50***	.12***	05***	.20***	.10***	.03***	.16***	.25***	.18***	08***
Female (1,243,979)	.23***	.49***	.05***	06***	.20***	.03***	01**	.13***	.28***	.11***	07***

2 Science	2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R ²
.06***	.20***	01	.01	.01	.01	03	02	06**	.03	.49
.09***	.22***	.02	.04	.01	.18***	003	08	.002	.04	.46
.01	.19***	03*	02	.02	12*	05	.01	08**	.02	.49

Graduate Degree

Grad Degree (n)	2 BA majors	BA Art	<i>R</i> ²
All (933,420)	002	34***	.17
Male (468,292)	01*	37***	.18
Female (465,128)	.01	28***	.11

Grad Degree (n)	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art	2 Science
All (933,420)	.11***	07***	.19***	.13***	.05***	.11***	.21***	.17***	12***	.11***
Male (468,292)	.14***	05***	.20***	.13***	.08***	.17***	.22***	.19***	15**	.11***
Female (465,128)	.06***	07***	.19***	.10***	.03***	.15***	.21***	.14***	11*	.08***

2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R^2
.19***	.04***	.05	.10**	.02	04	05	02	.06	.46
.20***	.05***	.10	.15***	.20***	01	17	.01	.13	.43
.19***	.03*	01	.06	14	05	01	03	.02	.45

Core Artists Bachelor's Degree Only

Core Artists (n)	2 BA majors	BA Art	R^2
All (45,529)	03	.03**	.18
Male (22,657)	08***	02	.17
Female (22,872)	.004	.08***	.16

Core Artists (n)	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art	2 Science
All (45,529)	02	.04***	.13***	11**	.02	.06*	09	08	04	13
Male (22,657)	.01	.02	.14***	15*	.02	.05	.17	07	07	23
Female (22,872)	06*	.05***	.05	08	.02	.12**	62	12	01	.02

2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R^2
.39**	.10	.34***	06	.16	003	.12	.08	.04	.43
.36	.12	.28**	04	.04	.06	06	04	13	.39
.48**	.06	.49**	07	.25*	05	.26	.20	.15	.43

Actors Bachelor's Degree Only

Actors (n)	2 BA majors	BA Art	R ²
All (1024)	24	.25**	0.15
Male (506)	44**	.41***	0.23
Female (518)	.06	.16	0.19

Actors (n)	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art	2 Science
All (1024)	.43**	.34***	29	12	.15	.56*		.78	.72***	1.74***
Male (506)	.02	.32**	03	08	01	.31		.27	.78	.98**
Female (518)	.65*	.33**	-4.84***	.56	.001	1.02***		1.03	.36	3.12***

2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R^2
	.71		.23	.36	.12	.82***	2.20**		.38
			.39	91*	07		.58***		.42
	.70				.30	1.12***	2.54***		.44

Artists NEC Bachelor's Degree Only

Artists NEC (n)	2 BA majors	BA Art	R ²
All (14,621)	.06**	10**	.19
Male (6,704)	.06	11**	.23
Female (7,917)	.05	10*	.17

Artists NEC (n)	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art	2 Science
All (14,621)	.02	06	10	08	.09***	.03	22	06	.52**	.04
Male (6,704)	.05	01	14	01	.09***	.004	25	.06	.77	.20
Female (7,917)	02	13**	.04	12*	.10**	.13		18	.41*	05

2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R ²
.08	.20*		22	47**	25**	1.25**	.18	14	.48
.12	.24		.12	57*	27		.27	06	.17
.10	.14		53**	27	18	1.18**	17	22	.50

Designers Bachelor's Degree Only

Designers (n)	2 BA majors	BA Art	<i>R</i> ²
All (18,379)	04	.07***	0.15
Male (7,657)	06	06*	0.15
Female (10,722)	03	.16***	0.13

Designers (n)	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art	2 Science
All (18,379)	.04	.06***	.28***	05	.002	.13***	.30***	27**	.07	.13
Male (7,657)	.05	.01	.23***	04	01	.13**	.37**	38***	05	.001
Female (10,722)	.02	.08***	.38***	11	.02	.11*	.13	19	.12*	.16

2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R ²
05	18	.40**	06	.25	.05	.26	29	.08	.42
01	13	.30*	19	.36	.003	.75**	.12	14	.39
14	18	.54	02	.21	.12	.19	46	.18	.41

Musicians Bachelor's Degree Only

Musicians (n)	2 BA majors	BA Art	<i>R</i> ²
All (3232)	19**	.40***	.19
Male (1,765)	11	.35***	.17
Female (1,467)	23*	.41***	.16

Musicians (n)	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art	2 Science
All (3232)	02	.31***	24	.33*	02	11	-3.35***	.03	.15	14
Male (1,765)	03	.25***	29	.20	05	25		.02	05	14
Female (1,467)	14	.37***	79**	.59***	.03	.57**	-3.21***	31	.40*	37

2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R^2
82***	.25	.48**	.53***	08	05	.15	.37**	-1.32*	.42
	.39	.43*	.44**	.02	.15	.17	.07	-1.88***	.38
81***	13		.84*	.11	40	.25	.61**	.39	.16

Photographers Bachelor's Degree Only

Photographers (n)	2 BA majors	BA Art	R^2
All (3,150)	06	.22***	.13
Male (1,705)	24**	.24***	.12
Female (1,445)	.10	.16	.08

Photographers (n)	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art	2 Science
All (3,150)	02	.18***	04	44	0001	.12		.43	10	48
Male (1,705)	.17	.28***	.08	68	15	01		.92**	.15	-1.75***
Female (1,445)	26**	.08	37	04	.17	.58**		.13	39	.21

2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R ²
.99***	.18	.62***	-1.97**	17	32	1.76***	50**	.14	.36
1.01***	27	.82***	33	02	.003			30	.08
	.61	.35*	-3.07**	27*	70	1.57***	48**	.35	0.38

Producers and Directors

Bachelor's Degree Only

Prod. + Dir. (n)	2 BA majors	BA Art	<i>R</i> ²
All (4,157)	.01	14***	.19
Male (2,440)	05	07	.21
Female (1,717)	.07	26***	.20

Prod. + Dir. (n)	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art	2 Science
All (4,157)	.10**	04	19	.16	.11*	.11*	19	.20	24	33*
Male (2,440)	.10**	.02	.03	.22*	.04	.11	.03	12	59*	18
Female (1,717)	.13	16**	-1.54*	.10	.21**	.20*		.48***	03	44

2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R ²
.45	.03	.31*	.46**	.53	06	91	.06	.07	.38
60	.19	.18	.34	.75	12	86	.04	.17	.38
.68***	32	.79***	.58**	26*	.15		57***	.05	.42

Visual Artists Bachelor's Degree Only

Visual Arts (n)	2 BA majors	BA Art	<i>R</i> ²
All (4,683)	09	.23***	.29
Male (2,425)	.01	.15**	.23
Female (2,258)	21**	.27***	.29

Visual Arts (n)	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art	2 Science
All (4,683)	18*	.17***	.19	.06	.15	04		.06	06	.46**
Male (2,425)	28**	.03	.02	10	.13	09		18	.10	
Female (2,258)	12	.28***	.66***	.23	.14	.003		.23	27	.42*

2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R ²
.55	.76	08	.14	.20	.20*	45	.50**	18	.45
0.52	004	29	12	.10	.28**	75	42	26	.40
.45	.92	.22	.35	.15	.12	.10	.77***	22	.44

Wassall-Alper Arts Double Majors

Writers Bachelor's Degree Only

Writers (n)	2 BA majors	BA Art	<i>R</i> ²
All (5,807)	.05	.04	.17
Male (2,454)	.004	04	.19
Female (3,353)	.08	.08	.16

Writers (n)	Bus. + Econ.	Art	Engineering	Science	Social Science	Computer	2 Engin.	2 Bus./Econ.	2 Art	2 Science
All (5,807)	09	01	09	17	.08	15	-1.77***	12	16	49**
Male (2,454)	03	02	.18	12	.19**	08	-1.75***	.50	40	55***
Female (3,353)	14*	.002	50*	16	03	17		64	.14	16

2 Computer	2 Social Science	Art + Engin.	Art + Bus/Econ.	Art + Science	Art + Computer	Art + Non Art Ed.	Art + Art Ed.	Art + Social Science	R ²
.20*	.39*		.16	1.29***	02	.14	76***	.88**	.42
.29**	.32		21	1.79***	.12		81***	1.10***	.43
	.64***		.45	.82***	-1.02	.08		11	.16

Summary of Findings Double Majors - Cohort Results

- Artist Occupations
 - The single art major doesn't have a consistent relationship with artists' earnings over their careers.
 - Not significant at any age for –producers and directors and writers
 - Positive, significant and increasing in value across the cohorts for musicians and visual artists
 - The double arts major doesn't have a consistent relationship with artists' earnings over their careers.
 - Positive and significant impact for three artists NEC cohorts, more than in any other arts occupation.
 - Negative and significant in two cohorts for the photographers and writers.
 - Arts STEM double majors don't have consistent relationships with artists' earnings over their careers.
 - Arts-engineering double majors has a positive impact throughout the designers' careers that is significant for the entry cohort and for the two oldest cohorts. Its largest impact is for designers in the 52-61 year old cohort leading to almost a doubling of their earnings.
 - Arts-science double major mostly has a positive impact on earnings when significant, but not a consistent impact across cohorts for any occupation.

- Arts-computer double majors don't significantly impact earnings at any point in the careers of actors, designers or producers and directors. They have a positive and significant impact relatively early in the careers of visual artists (32-41), at mid career (42-51) for visual artists, and late in the careers of musicians and photographers.
- Arts other disciplines (non arts/non STEM) double majors don't have consistent relationships with artists' earnings over their careers.
 - Arts-business/economics double major doesn't significantly impact the earnings at any
 point in the careers of actors and producers and directors. It has a significant impact
 early in the careers of musicians and visual artists, and mid to late career for artists NEC,
 designers, photographers, and writers.
 - Art-non art education double major has a significant positive impact then a significant negative impact, but not consistently across age cohorts for the different arts occupations.
 - Art-art education double major has a consistently positive impact on the earnings of musicians, except at the start of their careers when it doesn't have a significant impact. Its impact is inconsistent or non existent for the remaining arts occupations.
 - Art-social science double major has a growing and significant positive impact on the earnings of producers and directors starting at mid career (42-51), enhancing earnings by almost 90% for those in the oldest cohort. It has significant negative effects at the beginning and the end of the career for visual artists, and no significant impact throughout the careers of the NEC artists and the designers.

- STEM Occupations
 - The single major in the arts has a consistent negative relationship, for the most part, with STEM workers' earnings over their careers.
 - Engineers with only a single major in the arts had earnings that started out 15% lower and ended almost 40% lower.
 - Computer scientists with only a single major in the arts start their careers (22-31, 32-41) with significantly lower earnings but by mid-career the impact is no longer significant.
 - Single arts majors have little or mixed impacts on the earnings of the mathematicians and scientists.
 - The double arts major doesn't have a consistent relationship with STEM workers' earnings over their careers.
 - Engineers with two arts majors earn significantly less relatively early in their careers (32-41, 42-51) while scientists earn significantly more for most of the same period in their careers (22-31, 42-51).
 - Arts STEM double majors don't have a consistent relationships with the STEM workers' earnings over their careers.
 - Arts-engineering double major is only found among the computer scientists and engineers. Its impact is significantly negative initially for the engineers, turning positive and significant for the 32-41 year old cohort and for the oldest cohort. For computer scientists it is significantly positive at mid career and significantly negative shortly thereafter.
 - Art-science double major, when significant, has a positive impact on STEM workers' earnings. This is true for engineers from the beginning of their careers through mid career (42-51), computer scientists relatively late in their careers (52-61) and scientists over most of their careers.
 - Arts-computer double major only significantly impacts the earnings of the engineers and scientists. It has a positive impact early (22-31) and late (52-61) in the careers of engineers, and early (22-31, 32-41) in the careers of scientists.

- Arts other disciplines (non arts/non STEM) double majors don't have consistent relationships with STEM workers' earnings over their careers.
 - Arts-business/economics double major is not significant in determining STEM workers' earnings with one exception, scientists at mid career.
 - Arts-non art education and art-art education double majors are present only for computer scientists and engineers. These double majors significantly increase and decrease earnings for both occupations at different points in workers' careers.
 - Arts-social science double major significantly decreases engineers earnings starting at mid career. For the other STEM occupations, the impact of these majors is not consistent.
- Non arts non STEM Occupations
 - The single major in the arts has a consistent negative relationship with non arts-non STEM workers' earnings over their careers when it is significant.
 - Managers with a single major in the arts see their earnings significantly reduced by between 6% and 15% throughout their careers.
 - For the most part, a single major in the arts significantly reduces earnings for those in the other occupations early in their careers and has no significant impact beyond then.
 - The double arts major rarely has a significant relationship with non arts-non STEM workers' earnings over their careers.

- Managers' earnings are not significantly impacted by having a double arts major at any time during their careers.
- The double arts major significantly impacts the earnings in the other occupations only at one point in their careers and it not consistently positive or negative.
- Arts STEM double majors don't have consistent relationships with the non arts-non STEM workers' earnings over their careers.
 - Arts-engineering double major doesn't significantly impact managers' earnings at any time during their careers. It has a significant positive relationship for the financial specialists early to mid career (32-41, 42-51) and then is significantly negative (52-61).
 - Arts-science double major initially has a significant positive impact and then becomes negative for workers in the business operations occupation and the educators occupation. In the other occupations it is only significant at one point in their careers and it is negative for the social scientists (22-31) and positive for the financial specialists (52-61) and the managers (22-31).
 - Arts-computer double major has both significant positive and negative effects on the earnings of those in the business operations occupations and for the financial specialists. Its only impact on educators is a significant positive effect for those in the oldest cohort. For the managers its impact is significantly negative for those 32-41 years old and those in the oldest cohort.
- Arts other disciplines (non arts/non STEM) double majors don't have consistent relationships with the non arts-non STEM workers' earnings over their careers.

- Arts-business/economics double major has a significant negative impact on the business
 operations occupations at mid career and for the oldest cohort. Educators receive
 significant positive benefits at the beginning of their careers (22-31) but significant
 negative benefits late in their careers (52-61). Financial specialists don't receive any
 significant benefits from an arts-business/economics double major, while managers
 obtain significant positive benefits at mid career (42-51). Social scientists obtain
 significant positive benefits early in their careers (22-31, 32-41).
- Arts-non art education double major does not significantly impact the earnings of either the educators or the financial specialists at any point in their careers. In the other occupations its impact on earnings is both significantly positive and significantly negative but at different times in their careers.
- Arts-art education major, when it is significant, has a negative impact on earnings. This is true for business operations specialists early in their careers (22-31, 32-41), educators late in their careers (62+) and managers at two points in their careers, at the start (22-31) and at mid-career (42-51). It has a significant positive impact for educators toward the end of their careers (51-62) and for financial specialists early in their careers (32-41).
- Arts-social science double major does not significantly impact the earnings of the educators or the managers at any point in their careers. It has a significant negative impact at the end of the business operations specialists careers and at the beginning of the social scientists' careers. It has a significant positive relationship for the financial specialists early in their careers (22-31, 32-41) and for the social scientists (32-41).

Artists I Bachelor's Degree Only

			Actors			Artists NEC				
	22-31	32-41	42-51	52-61	62+	22-31	32-41	42-51	52-61	62+
Art only	0.166	0.303	0.457	0.640***	0.425	-0.020	-0.005	-0.070	-0.155*	-0.592***
Art-Art	0.134	1.130*				0.060	0.968***	0.493*	-0.143	1.302***
Art- Engineer										
Art- Bus/Econ	-0.597			0.288	1.339	0.052	-0.101	0.194	-1.049***	
Art-Science			-0.716				-0.445	-1.529***	-0.200	
Art- Computer	0.138	0.516				-0.067	-0.113	0.046	-1.439***	
Art – non Art Ed				1.583***				-0.280***	0.352*	1.893***
Art-Art Ed		0.585				1.102***		1.001***	-0.385***	0.025
Art-Social Science						-0.426	0.231	0.201	0.022	0.184
R ²	0.47	0.47	0.43	0.68	0.60	0.53	0.41	0.40	0.46	0.51
n	313	246	195	143	118	4259	3412	3083	2599	1205

Artists II Bachelor's Degree Only

			Designe	rs		Musicians				
	22-31	32-41	42-51	52-61	62+	22-31	32-41	42-51	52-61	62+
Art only	0.046	0.086**	0.026	0.019	0.171*	0.117	0.253**	0.222*	0.376***	0.476***
Art-Art	0.120	-0.046	0.234*	-0.009	-0.380	0.663**	-0.097	0.089	0.383	-0.955**
Art- Engineer	0.496***	0.125	0.389	0.944***	0.362**	0.642	0.824*		-0.050	
Art- Bus/Econ	-0.156	-0.363	0.570**	-0.234	0.129	0.645**	0.093	0.244	-0.329	
Art-Science	-0.176	0.439*	0.542	0.206	1.799***	0.172	-0.459*	-0.054	-0.056	-0.745
Art- Computer	0.180	-0.074	-0.004	-0.260	0.547	0.019	-1.068***	0.713	0.795***	-0.818
Art – non Art Ed	0.935***	-0.052	0.186	0.208	0.440	0.525**	-0.991***		1.446**	0.746
Art-Art Ed	-0.094	-0.545	-0.505	0.067	-1.338***	-0.356	0.684***	0.042	0.641**	0.840*
Art-Social Science	-0.006	0.382	0.178	0.210	-0.412	-0.214		0.23	-2.256***	-1.241***
R ²	0.47	0.41	0.39	0.42	0.47	0.49	0.43	0.42	0.42	0.40
n	5618	4866	3938	2713	1200	621	530	577	729	768

Artists III Bachelor's Degree Only

		Ph	otograpł	ners			Produ	cers + Dii	rectors	
	22-31	32-41	42-51	52-61	62+	22-31	32-41	42-51	52-61	62+
Art only	0.230***	0.107	0.128	0.169	-0.129	-0.034	-0.077	-0.142	0.066	-0.247
Art-Art	0.015	0.227	-0.917**	-0.645*	0.005	-0.037	-0.664***	0.307	0.102	0.469
Art- Engineer		0.902**	0.298			0.305				
Art- Bus/Econ	-0.568	-0.705*	-6.382***	0.117		0.388	0.420			0.357
Art-Science	-1.342**	0.011		-0.025	0.989*		0.002		1.655***	
Art- Computer	-0.585	-0.232	-0.220		1.793***	-0.118	-0.396	0.269	-0.388	0.149
Art – non Art Ed		1.773***								-1.561
Art-Art Ed		-0.402			-0.708	0.490***			-0.054	
Art-Social Science	0.277	0.202	-0.515*	1.209***	-1.200	-0.441	0.211	0.335**	0.687***	0.855*
R ²	0.44	0.36	0.42	0.42	0.45	0.47	0.36	0.28	0.31	0.51
n	867	811	624	564	268	1210	1232	952	590	164

Artists IV Bachelor's Degree Only

		Vi	isual Arti	sts				Writers		
	22-31	32-41	42-51	52-61	62+	22-31	32-41	42-51	52-61	62+
Art only	0.007	0.197**	0.206*	0.206*	0.382***	0.003	0.148	-0.167	-0.013	-0.130
Art-Art	0.036	0.402**	-0.672	-0.219	-0.328	0.064	-1.989***	-0.865**	0.269	1.097*
Art- Engineer		-0.340	0.316							
Art- Bus/Econ	0.536**	0.398**	-0.289	-0.435	-0.303		0.314	-0.705***	0.886***	
Art-Science	0.315	-0.123	0.115	-0.133	1.698***		0.539***		1.453***	
Art- Computer	0.002	0.317*	0.822***	0.236		-0.071	0.403	0.391	-0.063	-2.945***
Art – non Art Ed	0.390	1.771***	-1.637***	0.029	-1.306*				0.188	
Art-Art Ed		0.704*	0.643	0.161	0.671			-0.700***		
Art-Social Science	-0.584**	0.642	0.011	-0.091	-1.402**	-0.071***	0.511		1.850***	0.291
R ²	0.48	0.52	0.49	0.42	0.34	0.56	0.40	0.41	0.37	0.45
n	960	1087	990	983	657	1299	1250	1318	1208	714

STEM I Bachelor's Degree Only

		Comp	outer Sci	entists			l	Engineers	5	
	22-31	32-41	42-51	52-61	62+	22-31	32-41	42-51	52-61	62+
Art only	-0.085**	-0.103***	-0.100	-0.064	0.063	-0.156***	-0.215***	-0.122*	-0.218***	-0.381**
Art-Art	0.001	-0.198	-0.557**	-0.102	0.905***	-0.101	-0.232*	-1.517***		-0.128
Art- Engineer	-0.033	-0.054	0.391*	-0.807*	0.547	-0.622*	0.407*	0.104	0.145	0.473***
Art- Bus/Econ	-0.121	0.113	-0.398	0.475		-0.411	-0.025	-0.168	-0.438	
Art-Science	0.087	-0.908	-0.163	0.198***		0.266***	0.233***	0.434***	-0.258	
Art- Computer	0.083	-0.031	0.123	0.076	-0.283	0.502***	0.173	-0.190	0.819***	
Art – non Art Ed	0.491***	-0.589	-0.409***	-0.322***						0.224*
Art-Art Ed	-0.298***		-0.034	0.170**		-1.213			0.809***	
Art-Social Science	0.245	0.178	-0.979**	0.143**		-0.556		-0.305***	-0.364***	
R ²	0.49	0.34	0.33	0.37	0.43	0.53	0.32	0.30	0.30	0.40
n	16046	18176	15844	9752	2361	13082	11521	13158	11412	4462

STEM II Bachelor's Degree Only

	N	lathemat	icians + S	Statistici	ans			Scientists	;	
	22-31	32-41	42-51	52-61	62+	22-31	32-41	42-51	52-61	62+
Art only	-0.053	0.197	0.008	-0.160	0.662*	0.292**	-0.211**	-0.119	-0.474	0.114
Art-Art		0.119	-0.130			0.718***		0.677***		
Art- Engineer										
Art- Bus/Econ	-0.037	0.106				0.078	-0.139	0.150**		
Art-Science						0.373*	-0.196	0.688***		1.228***
Art- Computer	-0.054		0.046	0.100		0.822***	0.157**			
Art – non Art Ed										
Art-Art Ed										
Art-Social Science				-0.009			-0.443***		0.150	
R ²	0.51	0.41	0.50	0.49	0.65	0.53	0.42	0.37	0.40	0.53
n	1181	981	1081	817	259	3963	2629	2321	2200	789

Other Occupations I Bachelor's Degree Only

	В	usiness O	peration	s Special	lists	Educators				
	22-31	32-41	42-51	52-61	62+	22-31	32-41	42-51	52-61	62+
Art only	-0.130***	-0.082	-0.050	-0.027	-0.039	-0.073***	-0.019	0.026	-0.049	0.053
Art-Art	-0.058	-0.078	-0.337***	0.284	0.264	-0.065	0.155*	0.129	0.023	0.202
Art- Engineer	-0.400	-0.323***	0.114*	0.039		0.197	-0.550	0.225***	-0.374***	
Art- Bus/Econ	-0.001	-0.097	-0.346*	-0.080	-0.483***	0.257**	-0.068	-0.076	-0.676***	0.232
Art-Science		0.203***	0.071	-0.800***	-0.739***	0.066	-0.065	-0.209	0.457***	-2.653***
Art- Computer	0.331**	-0.180	0.610*	-0.223**	1.087*	-0.186	-0.015	-0.213	-0.187	0.351***
Art – non Art Ed		-0.151	0.429***	0.098	-1.173***	0.078	0.157	0.135	0.087	-0.098
Art-Art Ed	-0.189***	-0.276***	0.092	-0.283	0.090	-0.047	-0.152	0.020	0.277***	-0.698*
Art-Social Science	-0.174	-0.158	0.315	0.172	-2.215***	0.142	0.255	-0.376	0.170	0.418
R ²	0.49	0.38	0.35	0.34	0.35	0.51	0.50	0.52	0.47	0.46
n	17921	17065	16112	13074	5812	48970	36132	36768	36035	15719

Other Occupations II Bachelor's Degree Only

	Financial Specialists					Managers				
	22-31	32-41	42-51	52-61	62+	22-31	32-41	42-51	52-61	62+
Art only	-0.082	-0.111*	0.072	0.080	-0.035	-0.149***	-0.062***	-0.090***	-0.150***	-0.098*
Art-Art	0.276	0.103	-0.431	-0.477**	0.622***	-0.044	-0.032	-0.042	-0.141	0.129
Art- Engineer		0.217**	1.111***	-0.816***		0.027	0.018	0.031	0.183	0.584
Art- Bus/Econ	-0.021	0.172	-0.022	-0.040	-0.492	-0.109	-0.079	0.238**	0.150	0.325
Art-Science	-0.040	-0.300		0.649***		0.727***	-0.101	0.092	0.297	
Art- Computer	0.201	1.043*	-0.418***	0.328**	0.286***	0.075	-0.216*	0.118	-0.024	-0.816**
Art – non Art Ed				0.333	0.211	0.533***	-0.537**	-0.308	-0.165	0.031
Art-Art Ed	0.128	0.986***		-0.115		-0.698**	0.222	-0.352*	0.079	0.154
Art-Social Science	0.798***	0.362**	0.107	-0.370		0.082	0.019	-0.073	-0.176	-1.243
R ²	0.44	0.36	0.39	0.35	0.43	0.42	0.32	0.29	0.29	0.32
n	19700	20374	22564	18504	8892	36899	57159	68896	57216	23137

Other Occupations III Bachelor's Degree Only

		Soc	ial Scien	tists	
	22-31	32-41	42-51	52-61	62+
Art only	-0.233*	0.414	0.344	0.196	-1.049*
Art-Art	-0.082			-0.469**	0.901
Art- Engineer					
Art- Bus/Econ	0.691***	0.947***		0.113	
Art-Science	-0.781***		0.045		
Art- Computer				0.408	
Art – non Art Ed		0.223		-1.307***	
Art-Art Ed			0.299		
Art-Social Science	-0.703***	0.606***	0.156		
R ²	0.58	0.54	0.53	0.54	0.65
n	943	688	517	411	173

Summary of Findings Gender Earnings Differences - Cohort Results

- Artist Occupations
 - No significant gender impact on earnings for most artist occupations at the start of career.
 - Exception is for musicians and photographers.
 - By mid career (42-51 years old), male artists earn significantly more in all arts occupations except for producers and directors.
 - Male earnings premium ranges from 20%, for artists NEC, to almost 50% for both actors and photographers.
 - Male earnings premium peaks at mid career for musicians, photographers, visual artists and writers.
 - Peak male earnings premium is reached for actors, designers, and producers and directors when they are 52-61 years old.
 - At peak, the male artists have earnings that range from 21% to 112% higher than their female peers. The largest difference is for male actors who earn, on average, more than double what female actors earn.

• STEM Occupations

- Male earnings premiums are significant for two of the four STEM occupations (computer scientists and mathematicians and statisticians) at the start of their careers.
 - Males earn 10% more than females working in these occupations.
- Peak male earnings premium tend to be reached at age 42-51 for the natural scientists, 52-61 for the computer scientists and mathematicians, and 62 and older for the engineers.
 - At peak males in the STEM occupations have earnings that range between 10% and almost 30% more than their female peers.

Other Occupations

- Significant male earnings premiums for three of the five non-arts, non-STEM occupations studied exist at the start to their careers.
 - Males earn between 5% and 10% more than females in these occupations.
- Males earn significantly more in all five occupations at mid career, 42-51 years of age.

- Males earn between 18% and 30% more than their female peers.
- Peak male earnings premiums range from 18% for social scientists, to 30% for financial specialists.
- Male social scientists earn significantly more than their female colleagues only at mid-career, while in all the other occupations males earn significantly more throughout their careers.

Male Earnings Premium: Artists Bachelor's Degree Only

	Actors	Designers	Artists NEC	Musicians	Photographers	Producers + Directors	Visual Artists	Writers
22-31	-0.076	0.028	0.018	0.268***	0.187**	-0.004	0.073	-0.029
32-41	-0.053	0.170***	0.114***	0.392***	0.229*	0.046	0.288***	0.137*
42-51	0.487**	0.292***	0.199***	0.430***	0.497***	0.072	0.431***	0.274***
52-61	1.127***	0.326***	0.138***	0.351***	0.435***	0.210**	0.366***	0.253***
62+	0.308	0.268	0.315***	0.091	0.224	-0.008	0.423***	0.41***

Wassall-Alper Arts Double Majors

Bachelor's Degree Only											
		STEM O	occupations		Other Occupations						
	Computer Scientists	Engineers	Mathematicians + Statisticians	Natural Scientists		Business Operations Specialists	Educators	Financial Specialists	Managers	Social Scientists	
22-31	0.100***	0.019	0.113**	-0.003		0.052***	0.004	0.091***	0.098***	0.074	
32-41	0.106***	0.098***	0.045	0.028		0.149***	0.184***	0.248***	0.185***	0.092	
42-51	0.118***	0.119***	0.135***	0.101***		0.177***	0.236***	0.296***	0.238***	0.184***	
52-61	0.128***	0.163***	0.272***	0.042		0.152***	0.172***	0.301***	0.254***	0.147	
62+	-0.005	0.248***	0.131	0.105		0.220***	0.185***	0.295***	0.279***	0.129	

Male Earnings Premium:

STEM and Other Occupations

Summary of Findings Racial Earnings Differences - Cohort Results

- Artist Occupations
 - No significant racial impact on earnings for all artist occupations at the start of career except for designers.
 - Black designers start their careers (22-31 years of age) earning 25% less than their nonblack colleagues.
 - It is only the Black designers, photographers and producers and directors in the 32-41 year old cohort who earn significantly less than their non-Black colleagues. Otherwise race doesn't have a significant negative impact on earnings regardless of age.
 - The oldest Black actors (62 or older) earn significantly more than their nonblack colleagues.
 - The earnings of the oldest Black actors and photographers are, on average, approximately double their non-Black colleagues' earnings.

- STEM Occupations
 - Black computer scientists and mathematicians start their careers (22-31 years of age) earning significantly less than their non-Black peers and there is no racial difference for the other STEM occupations at the start of their careers.
 - Black computer scientists earn approximately 10% less than non-Blacks in this occupation.
 - For mathematicians the earnings difference is almost 20%.
 - Starting with the 32-41 year old cohort and continuing throughout the remainder of their careers, Black engineers earn significantly less than non-Black engineers.
 - The largest racial difference among the engineers is approximately 16 percent for those who are 62 or older.
 - Black computer scientists earn significantly less than non-Blacks throughout their careers with the peak difference for those in the 62+ cohort at approximately 27%.
 - There is some evidence that Black natural scientists earn more than their non-Black colleagues with a significant difference of almost 10% for those in the 32-41 age cohort.

- Other Occupations
 - Blacks earn significantly less throughout their careers in the business operations specialists, financial specialists and managerial occupations.
 - Business operations specialists
 - Black business operations specialists start their careers (22-31) earning almost nine (9%) less than their non-Black peers.
 - For most of the remainder of their careers (32-61) Black business operations specialists earn almost 16% less than their non-Black peers.
 - At the end of their careers (62+) race is not a significant determinant of earnings.
 - Financial specialists
 - Blacks in the financial specialist occupation earn significantly less than their non-Black colleagues starting their careers earning approximately 15% less and ending their careers earning 20% less.
 - Managers
 - Black managers start their careers earning 12% less than their non-Black peers.
 - The difference in earnings increases during their careers reaching a peak of 18% at midcareer (42-51) and then decreasing to 13% at the end of their careers (62+).
 - Black educators earn significantly less than their non-Black peers at one point in their careers, and social scientists at one point and more at one point.
 - Educators
 - Black educators earn significantly less, six percent (6%), late in their careers (52-61).
 - Social scientists
 - Black social scientists earn significantly less (21%) at mid-career (42-51) and significantly more (120%) at the end of their careers.

Black Earnings Premium: Artists Bachelor's Degree Only

	Actors	Designers	Artists NEC	Musicians	Photographers	Producers + Directors	Visual Artists	Writers
22-31	0.081	-0.250***	-0.06	0.098	-0.122	0.028	-0.008	0.182
32-41	-0.296	-0.204***	-0.094	0.042	-0.536*	-0.273***	-0.044	0.231
42-51	0.231	-0.082	-0.073	0.241	-0.232	0.025	0.207	-0.105
52-61	0.249	-0.156	0.022	-0.289	0.314	-0.189	-0.005	0.069
62+	1.226**	-0.084	0.028	0.155	0.974**	0.227	-0.012	0.085

Black Earnings Premium: STEM and Other Occupations Bachelor's Degree Only

		STEM O	ccupations						
	Computer Scientists	Engineers	Mathematicians + Statisticians	Natural Scientists	Business Operations Specialists	Educators	Financial Specialists	Managers	Social Scientists
22-31	-0.100***	-0.047	-0.183**	0.006	-0.087***	-0.003	-0.154***	-0.124***	-0.114
32-41	-0.134***	-0.050*	-0.128	0.090*	-0.160***	0.019	-0.161***	-0.145***	-0.218
42-51	-0.122***	-0.082**	-0.080	0.028	-0.153***	-0.024	-0.177***	-0.181***	-0.214**
52-61	-0.109***	-0.119***	0.042	-0.023	-0.156***	-0.060***	-0.178***	-0.126***	0.054
62+	-0.271*	-0.162*	0.073	0.171	-0.013	-0.052	-0.197***	-0.131***	1.202**