Death, Bereavement, and Creativity

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Abstract

Does creativity, on average, increase or decrease during bereavement? Dates of death of relatives and close friends of 33 French artists and 15 American artists were gathered from electronic sources and biographies, and information on over 15,000 paintings was collected from Blouin's Art Sales Index and the Metropolitan Museum of Art's online collection, including over 12,000 observations on price. To preview the results, an event study indicates that prices of paintings are significantly lower during the first year following the year of death of a friend or relative. Furthermore, paintings that were created during this bereavement period are less likely to be included in a major museum's collection.

I. Introduction

The death of a friend or relative is universally recognized as a painful experience. Whether the psychological pain resulting from the death increases or decreases creativity is not known. On the one hand, incidental observation of the history of art suggests that bereavement is correlated to the production of great art. For example, in 1901, Pablo Picasso's good friend, Carlos Casagemas, committed suicide. Many art historians believe that this event launched Picasso into his Blue Period of painting, in which Picasso painted somber monochromatic works. Picasso's Blue Period has in the past achieved record prices at auction.[1] On the other hand, questions remain as to the impact of bereavement on an artist's state of mind. In the field of psychology, state of mind has long been associated with creativity through the idea of being completely absorbed in an activity, named by Michael Csikszentmihalyi as a "flow state" (May [1959], Getzels and Csikszentmihalyi [1976], and Isen et al. [1987]). Bereavement can interupt flow and alter mood. The empirical question of whether the death of a relative or close friend on average increases or decreases creativity in the years immediately following the death is addressed by this research.

Dates of death for friends and relatives of the French artists used in this study were gathered from Oxford Art Online, reading both Grove Art Online

[1] In 2000, *Woman with Crossed Arms* broke a previous record for Picasso paintings by selling for 38 million pounds. This price pales, however, next to the recent sale of the *Women of Algiers (Version O)* for $179 million at Christie's during May of 2015.

and the Benezit Dictionary of Artists. For the American artists used in this study, dates of death were gathered primarily from biographies. Information on over 15,000 paintings was gathered from Blouin's Art Sales Index and the Metropolitan Museum of Art's online collection, including over 12,000 observations on price. As in Graddy [2013] and others, the basic premises of this research are that price reflects a painting's importance within an artist's oeuvre. Furthermore, an artist's most important paintings are likely to be included in the Met's collection. The attraction of using art in order to measure the effect of bereavement is that it is known when a painting is produced, and the importance of a creation can be measured by its price and inclusion in a museum's collection.

This study is in the spirit of work by Bennedsen et al. [2006] who show that CEO immediate family deaths are negatively correlated to firm performance. More recent work by Oswald et al. [2015] demonstrates that that people who say they have recently experienced a death or illness in the family perform less well on a simple numerical task designed to measure productivity, in an experimental setting. Anecdotes have linked bereavement to decreased productivity by artists. For example, after Edouard Manet's friend, Charles Baudelaire died in 1867, Manet started painting "The Funderal" but never finished. [2] In order to more directly measure producitivity by artists, as a final study, we look at whether an artist's producitivity, as

[2]http://www.npr.org/2016/05/31/479584758/you-gonna-finish-that-what-we-can-learn-from-artworks-in-progress.

measured by the number of paintings produced as documented by online catalogue raisonnes of a small number of artistis, has changed following a death of a close friend or relative. Artistic creativity is related to, but different, than productivity or managerial performance.

This paper proceeds as follows. In section II, the psychology literature on creativity is briefly reviewed. In section III the paper details the data collection procedures and regression methodology. In section IV, the price regression results are presented, and robustness of the price regressions is discussed in section V. Section VI analyses inclusion in the Metropolitan Museum of Art's collection, and section VII concludes the analysis.

II. Creativity and State of Mind

The concept of a "flow state" that people enter when being very creative has gained acceptance by psychologists. As described by Keith Sawyer (Sawyer [2012], p. 78), Rollo May was one of the first researchers to describe the experience of being in a creative state as experiencing intensity of awareness, heightened consciousness, and obvliousness to the environment and to the passage of time (May [1959]). Czikscentmihalyi continued this strand of research, and coined the term "flow state" (Getzels and Csikszentmihalyi [1976]). During flow, people are at their most creative. Csikszentmihalyi did further studies that showed that in all professions people feel at their peak when they are most creative, and therefore through flow individuals

can achieve happiness (Csikszentmihalyi [1990]).

Distraction is an enemy of flow and creativity. At best, it could take hours to regain the peace of mind to resume a creative endeavour. At worst, "More serious health, family, or financial problems could occupy the mind of a person so insistently that he or she is no longer able to devote enough attention to work. Then a long period of drought may follow, a writer's block, a burnout, which may even end a creative career" (Csikszentmihalyi [1997], p.120). Through interupting flow, death and bereavement can reduce creativity.

Psychologists then surmised that if the flow experience is correlated with enhanced creativity, then mood is related to creativity. Using experiements, researchers showed that mood is strongly related to problem solving by the induction of positive affect (Isen et al. [1987]),(Estrada et al. [1994]), (Subramaniam et al. [2009]). Death and bereavement are induced negative effects and often result in sadness and depression.

To date, there have been few if any empirical studies that have related mood to creativity, though economists and others have used empirical methods to document productivity over the life cycle. Galenson and Weinberg [2000] and Galenson and Weinberg [2001] have extensively studied the productivity of artists over the lifecycle, and Simonton [1990] presents a general study of other professions. The idea for this study came from a case study of three musicians by Karol Jan Borowiecki [2013] as presented at the Genius for Sale! conference in Oxford on May 8th, 2014.

Academic studies have related death to creativity through different venues. It is well documented that individuals deemed "geniuses" were more likely to have suffered a parental loss as a child or adolescent, Eisenstadt [1978] and Simonton [1984], though economists have also documented negative social effects from parental loss Corak [2001]. In a very interesting and original study, Azoulay et al. [2010] looked at unexpected deaths of "superstar" researchers and subsequent productivity of coauthors. They find a lasting decline of between 5% and 8% in quality adjusted publication output of the coauthors. They explain this lasting decline by the loss of an irreplaceable source of ideas.

The research in this paper is very different in spirit. All individuals experience loss through death of a close relative or friend at some point in their lives, geniuses and superstars included. This paper seeks to measure the effect of this loss on creative output. The hypothesis is that alteration in mood and inability to focus during bereavement may affect creative output.

III. Data and Methodology

The question of the effect of death on creativity is addressed with prices on over 10,000 paintings produced by 33 French impressionist artists and over 2,000 paintings by 15 modern American artists born between 1900 and 1920. The auction data were gathered online from Blouin's Art Sales Index.[3]

[3]The url for Blouin's Art Sales Index is http://artsalesindex.artinfo.com/asi/search.action. The data were downloaded during June of 2014.

The sale dates range from 1972 to 2014. In addition, information on 412 paintings in the Metropolitan Museum of Art's collection was downloaded from the Met's website.[4]

The artists chosen were those first analyzed in Galenson and Weinberg [2000] and Galenson and Weinberg [2001]. The French impressionists were originally chosen by Galenson and Weinberg according to importance to art history and connection to France. Galenson and Weinberg wanted to choose two different cohorts of American artists, with the first cohort, which is used in this paper, dominated by abstract expressionists.[5] The French artists used in this study are listed in Table 1, and the American artists used in this study are listed in Table 2, along with the number of deaths of friends and relatives that were found for each artist. All French impressionists and American abstract expressionists that were studied by Galenson and Weinberg [2001] and Galenson and Weinberg [2000] are included in this table, even those artists on whom we were unable to find death data for their friends or relatives. The death dates for the French artists were gathered from Oxford Art Online, reading both Grove Art Online and the Benezit Dictionary of Artists, and the death dates of American artists were gathered from websites and biographies. Appendix A includes the references used for American artists,

[4]The url for the Met's collection is http://www.metmuseum.org/collection/the-collection-online and the website was accessed on June 15, 2015.

[5]I had originally planned to gather death data on both cohorts of American artists. But, given the difficulty, relative to the French cohort, of gathering data on the first American cohort, and since most of the second cohort of artists are still alive, I stopped after the first American cohort.

and Appendix B includes the references used for French artists.

When gathering the data, Oxford Art Online was not useful for any of the American artists, and it was necessary to use a mixture of websites and biographies from the library to collect the data. Probably because of genealogy records, deaths of parents were much more assiduously recorded for the American artists, who lived more recently, than the French artists. A mythology has also likely grown around the lives of both sets of artists, perhaps more so around the French impressionists, that may affect the reporting of certain deaths.

Summary statistics for this dataset, broken up by French artists and American artists, are presented in Table 3. The prices presented are in 2010 dollars and are deflated by the CPI. The French artists were born earlier on average than the American artists. The price and age variables are similar to one another, but there are over twice as many paintings per French impressionist as there are paintings for each American artist included in the dataset.

An event study is used for the regression analysis. For the event study, each sale is an observation. As shown in equation 1 below, the dependent variable is the natural log of the price of painting i that was sold at time j. Zero-one variables were created that indicate whether the painting were produced in the third, second or first year prior to the death of the friend or relative, $Prior3_i$, $Prior2_i$, and $Prior1_i$. Unless the death was foreseeable, this variable should not have an effect. Another zero-one variable indicating

Table 1: French Artists

French Artists	Deaths
Jean Arp (b. 1886, d. 1966)	1
Roger Bissiere (b. 1884, d. 1964)	4
Pierre Bonnard (b. 1867, d. 1947)	2
Georges Braque (b. 1882, d. 1963)	1
Paul Cezanne (b. 1839, d. 1906)	3
Marc Chagall (b. 1887, d. 1985)	2
Maurice de Vlaminck (b. 1876, d. 1958)	0
Henri de Toulouse-Lautrec (b. 1864, d. 1901)	0
Edgar Degas (b. 1834, d. 1917)	2
Robert Delaunay (b. 1885, d. 1941)	0
Andre Derain (b. 1880, d. 1954)	0
Marcel Duchamp (b. 1887, d. 1968)	0
Raoul Dufy (b. 1877, d. 1953)	0
Paul Gauguin (b. 1848, d. 1903)	3
Juan Gris (b. 1887, d. 1927)	0
Henri Julien Felix Rousseau (b. 1844, d. 1910)	3
Fernand Leger (b. 1881, d. 1955)	2
Edouard Manet (b. 1832, d. 1883)	2
Andre Masson (b. 1896, d. 1987)	1
Henri Matisse (b. 1869, d. 1954)	1
Joan Miro (b. 1893, d. 1983)	2
Claude Monet (b. 1840, d. 1926)	5
Francis Picabia (b. 1879, d. 1953)	0
Pablo Picasso (b. 1881, d. 1973)	5
Camille Pissarro (b. 1830, d. 1903)	0
Odilon Redon (b. 1840, d. 1916)	1
Pierre-Auguste Renoir (b. 1841, d. 1919)	1
Georges Rouault (b. 1871, d. 1958)	2
Georges Seurat (b. 1859, d. 1891)	0
Chaim Soutine (b. 1893, d. 1943)	2
Yves Tanguy (b. 1900, d. 1955)	0
Vincent van Gogh (b. 1853, d. 1890)	1
Edouard Vuillard (b. 1868, d. 1940)	1

Table 2: American Artists

American Artists	Deaths
Willem de Kooning (b. 1904, d. 1997)	2
Arshile Gorky (b. 1904, d. 1948)	3
Adolph Gottlieb (b. 1903, d. 1974)	3
Philip Guston (b. 1913, d. 1980)	3
Franz Kline (b. 1910, d. 1962)	1
Morris Louis (b. 1912, d. 1962)	0
Agnes Martin (b. 1912, d. 2004)	1
Robert Motherwell (b. 1915, d. 1991)	2
Alice Neel (b. 1900, d. 1984)	3
Barnett Newman (b. 1905, d. 1970)	4
Jackson Pollock (b. 1912, d. 1956)	3
Fairfield Porter (b. 1907, d. 1975)	2
Ad Reinhardt (b. 1913, d. 1967)	0
Mark Rothko (b. 1903, d. 1970)	1
Clyfford Still (b. 1904, d. 1980)	2

whether the friend or relative died during the year the work was painted, $Current_i$, is also created. It is not possible to establish when in a year the painting was created or whether the death occurred before or after a particular work was created. Three more variables are created, $After1_i$, $After2_i$, and $After3_i$, indicating whether the work was produced in the 1st, 2nd or 3rd year following the death of a friend or relative. The coefficients on these variables are α_1 through α_7, as indicated in equation 1 below.

Five different cohorts, interacted with age, age^2, age^3, and age^4, are used for controls. Cohorts one through four coincide with the four cohorts for French painters used by Galenson and Weinburg (2001). That is, cohort 1 consists of French painters in the dataset born between 1820 and 1839, cohort

Table 3: Summary Statistics

	French	American	All
Year of birth	1872	1908	1878
	(19)	(5)	(22)
Painting date	1924	1962	1931
	(28)	(12)	(30)
Age of artist	53	54	53
	(18)	(12)	(17)
Year of sale	2002	2001	2002
	(9)	(10)	(9)
Price	1463567	1517807	1472652
	(4376458)	(5586213)	(4601108)
Observations	11752	2292	14044
Number of artists	33	15	48
Paintings per artist	545	223	492

*Note:*Standard deviations are in parentheses. Prices in 2010 dollars are deflated with the CPI.
Source: Blouin Art Sales Index; see text.

2 consists of those French painters born between 1840 and 1859, cohort 3 consists of those French painters born between 1860 and 1879, and cohort 4 consists of those French painters born between 1880 and 1900. Cohort 5 consists of American painters and coincides with Galenson and Weinberg's (2000) first cohort of American painters. The cohorts have coefficients β_1 through β_5. Artist fixed effects with coefficients ψ_k, year fixed effects with coefficients θ_y, and in the full specification, fixed effects for painting date, with coefficients ω_y, and an error term, ϵ_{ij} are also included in the regressions. These controls are similar to those used in Galenson and Weinberg [2000] and Galenson and Weinberg [2001].[6]

$$\begin{aligned} ln(Price)_{ij} = \alpha_1 Prior3_i + \alpha_2 Prior2_i + \alpha_3 Prior1_i \\ +\alpha_4 Current_i + \alpha_5 After1_i + \alpha_6 After2_i + \alpha_7 After3_i \\ + \sum_{c=1}^{4} [\beta_1^c Age_i + \beta_2^c Age_i^2 + \beta_3^c Age_i^3 + \beta_4^c Age_i^4] I(cohort_i = C) \\ + \sum_{k=1}^{48} \psi_k I(i=k) + \sum_{y=1972}^{2014} \theta_y I(Saleyear_j = y) \\ + \sum_{y=1840}^{y=1972} \omega_y I(Paintingdate_i) + \epsilon_{ij} \end{aligned} \tag{1}$$

[6] Area of work was used in these papers, but was not originally collected for this dataset. Section V.A. describes a specification that was used to test for robustness with respect to area.

IV. Results

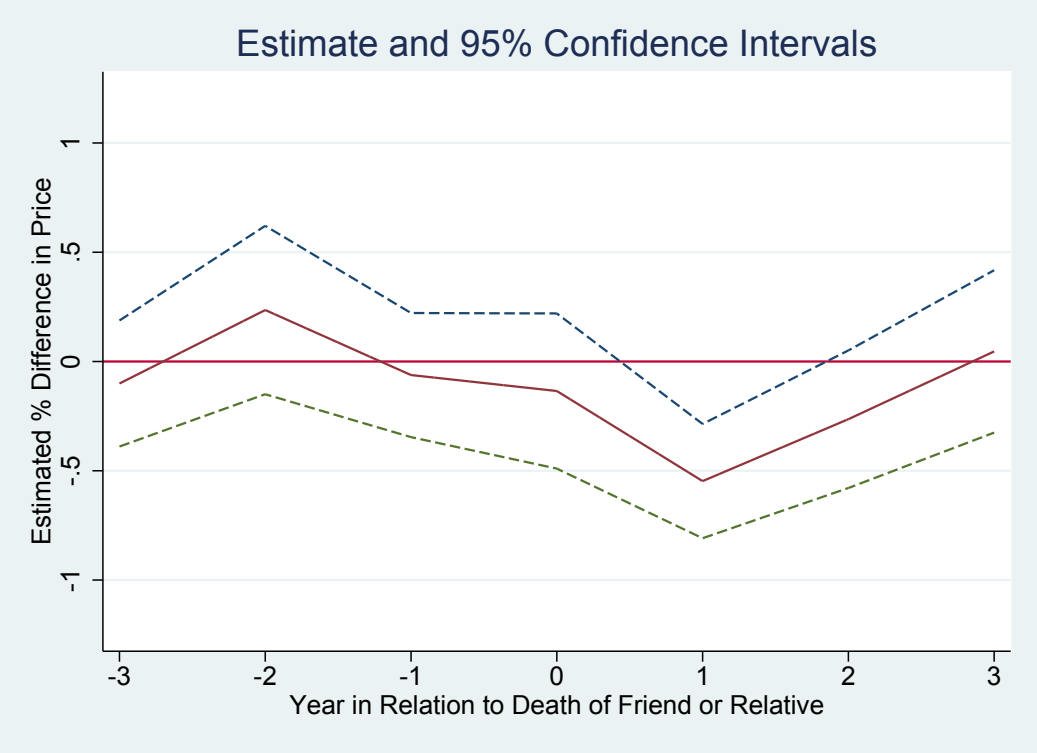
Of the 14,044 observations, a sale price was observed for 12,705 observations. The auction results included 164 paintings by American artists and 1,175 paintings by French artists that went unsold at auction because they did not meet the reserve price.[7] The results from estimating regression equation 1 are presented in Table 4.

Columns 1 and 3 present the results of unweighted regressions, and columns 2 and 4 present weighted regressions. Columns 3 and 4 include painting date fixed effects and columns 1 and 2 do not. To control for differences in the variability of different artists' sale prices, each artist's paintings are weighted by the mean square error for that artist. Unweighted regressions implicitly weight artists with more sales more heavily than artists with fewer sales. As the mean squared error takes into account both the number of works for sale and the variability in sale prices, the inverse of the mean squared error appears to be the correct weight. The results are similar when each work is weighted by the inverse of the number of paintings by an artist, so that each artist receives equal weight. Robust errors are calculated with the observations clustered by artist.

Results are consistent in both the weighted and unweighted regressions. The weighted regressions indicate that the value of a painting decreases by about 50% for paintings created in the year following the death of the artists'

[7]Note that the Blouin Art Sales Index does not include all unsold items from all auctions.

Figure 1: Event Graph of Bereavement Period



friend or relative. Figure 1 plots the coefficients and standard errors from Table 4, column 4. As is evident from both the table and the figure, there is a signiciantly negative bereavement effect two years after the death, but no significant effect in other years. These results are consistent with the psychology literature relating to mood and creativity, but not consistent with the popular idea that suffering necessarily increases artistic creativity.

In order to check that the results are consistent with the results of Galenson and Weinberg [2001], the peak age of earnings for each French Impressionist are estimated using regression equation 1, weighted by the

Table 4: Determinants of Sale Price

	(1)	(2)	(3)	(4)
Painted in 3rd year prior to death	-0.209	0.00430	-0.270	-0.101
	(0.143)	(0.148)	(0.152)	(0.144)
Painted in 2nd year prior to death	-0.0138	0.240	0.0236	0.236
	(0.192)	(0.191)	(0.196)	(0.193)
Painted in 1st year prior to death	-0.0549	0.00673	-0.0890	-0.0620
	(0.114)	(0.130)	(0.124)	(0.142)
Painted in year of death	-0.131	-0.188	-0.134	-0.135
	(0.121)	(0.234)	(0.135)	(0.177)
Painted in 1st year after death	-0.425***	-0.473**	-0.490***	-0.547***
	(0.0949)	(0.150)	(0.103)	(0.131)
Painted in 2nd year after death	-0.255*	-0.238	-0.381**	-0.264
	(0.118)	(0.169)	(0.133)	(0.157)
Painted in 3rd year after death	-0.0382	0.105	-0.106	0.0462
	(0.165)	(0.171)	(0.177)	(0.186)
Observations	12705	12705	12705	12705
Artist fixed effects	Yes	Yes	Yes	Yes
Year of sale fixed effects	Yes	Yes	Yes	Yes
Cohort fixed effects interacted with age, age^2, age^3, age^4	Yes	Yes	Yes	Yes
Painting date fixed effects	No	No	Yes	Yes

Standard errors in parentheses

Standard errors are robust, clustered by artist

Regressions in columns (1) and (3) are unweighted

Regressions in columns (2) and (4) are weighted

by the inverse of the sum of the mean squared error for each artist

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

inverse of the mean squared error and including painting date fixed effects. These estimated peak ages are presented in Table 5. The results are similar, with peak age of artist declining by year cohort.[8] This research supports their empirical analysis with a different dataset of sales. These sales took place from 1972 through 2014; the Galenson and Weinberg sales took place from 1980 to 1996.

Table 5: Estimated Peak Ages

	French Artists			
	1820-1839	1840-1859	1860-1879	1880-1900
Peak Age Estimates	53	49	30	27
Galenson and Weinberg Peak Age Estimates*	48	38	28	28

*Notes:*Galenson and Weinberg [2001]

V. Robustness Checks

This section checks for robustness in four ways. First, this section checks whether including size of painting changes the results. Second, random death dates for relatives and friends are assigned for each artist, to check whether or not the pattern persists. Third, this section checks whether the results differ in the dataset on French Impressionists from the results in the dataset on

[8]Galenson and Weinberg explain this decline by the hypothesis that artists in the latest cohort were "conceptualists," valuing new ideas above technique, and artists in the earlier cohort were "experimentalists," whose style developed slowly through trial-and-error experimentation. Conceptualists reach their peak production age earlier than experiementalists. Ginsburgh and Weyers [2006] provide a critique of this hypothesis.

American Modern painters. Finally, this section checks if the results depend upon whether a parent has died or whether a sibling or friend has died.

V.A. Size of Work

The dataset on prices and deaths put together for this research did not contain information on the size of a work. As the variable of interest is death, this omission could impact the results if size of work is correlated with mood. In order to check for this possibility, the average area (height times width) of work for each French Impressionist artist at each age of the artist was collected from the dataset used in Ashenfelter and Graddy [2003] and Beggs and Graddy [1997]. If an age was missing for a particular artist, the size was replaced with the average size painted at the previous age for that artist. If information on size was missing for the artist overall (the Modern American painters were not included in these datasets), the artist was dropped. Results are presented in Table 6, with the coefficients plotted in Figure 2.

Once the sample is taken into account, the inclusion of area has almost no effect: none of the coefficients in the regression models including area are statistically significantly different from any of the coefficients in the regression models not including area. However, in this change of sample, the coefficients on year of death, 1st year after death and 2nd year after death all become statistically significantly negative, strengthening the previous results.

Table 6: Determinants of Sale Price: Sample with Area

	(1)	(2)	(3)	(4)
ln Area	0.168*	0.150*		
	(0.0714)	(0.0530)		
Painted in 3rd year prior to death	-0.0600	-0.281	-0.0946	-0.333
	(0.229)	(0.172)	(0.244)	(0.176)
Painted in 2nd year prior to death	-0.107	-0.216	-0.164	-0.254
	(0.183)	(0.229)	(0.186)	(0.229)
Painted in 1st year prior to death	-0.170	-0.190	-0.179	-0.196
	(0.148)	(0.175)	(0.153)	(0.181)
Painted in year of death	-0.725*	-0.714**	-0.744*	-0.729**
	(0.293)	(0.200)	(0.289)	(0.200)
Painted in 1st year after death	-0.545*	-0.559**	-0.626*	-0.627**
	(0.241)	(0.166)	(0.237)	(0.167)
Painted in 2nd year after death	-0.467**	-0.554***	-0.508**	-0.588***
	(0.157)	(0.142)	(0.147)	(0.135)
Painted in 3rd year after death	-0.0780	-0.193	-0.0952	-0.222
	(0.206)	(0.208)	(0.197)	(0.200)
Observations	8035	8035	8035	8035
Artist fixed effects	Yes	Yes	Yes	Yes
Year of sale fixed effects	Yes	Yes	Yes	Yes
Cohort fixed effects interacted with age, age^2, age^3, age^4	Yes	Yes	Yes	Yes
Painting date fixed effects	No	Yes	No	Yes

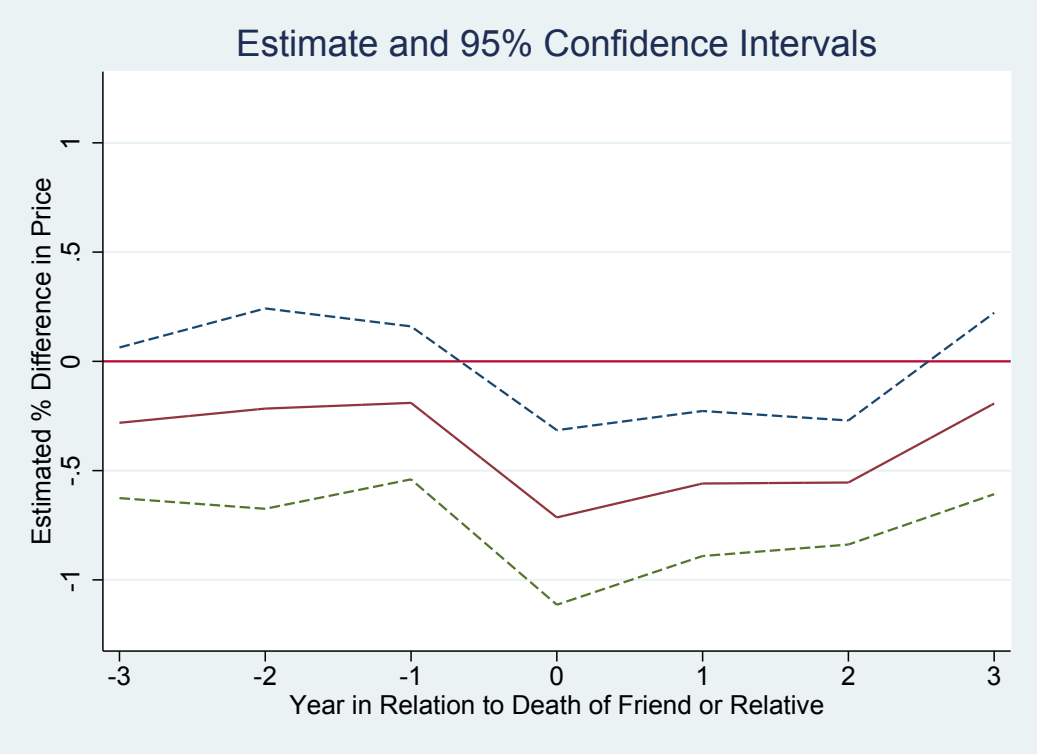
Standard errors in parentheses

Standard errors are robust, clustered by artist.

Regressions are weighted by the inverse of the mean squared error for each artist

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 2: Event Graph of Bereavement Period (with Area)



V.B. Random Death Assignments

In order to check that there is not something systematic about the data structure that was creating the dip in prices during the bereavement period, random death dates were assigned to the relatives and friends of each artist. The number of deaths for each artist was kept the same as in Tables 1 and 2. A random integer for each death was generated using a uniform distribution including endpoints 3 years prior to the first painting date a and three years after the last painting date for each artist. Equation 1 was then estimated with 10,000 draws. The specification included painting dates and was weighted by the mean squared error for each artist, which was the specification plotted in Figure 1 above. The average coefficient estimates and twice the standard deviations of the mean coefficient estimates are plotted in Figure 3. As is evident from the figure, while there does tend to be a very slight downward trend in price, nothing is significant and the bereavement pattern is not repeated.

V.C. French Impressionists Compared to Modern Americans

The next regression tests whether death effects in the sample of French Impressionist painters differ from death effects in the sample of Modern American painters. In Table 7, a set of new variables is created by interacting an indicator variable, equal to 1 if the artist is a French Impressionist and 0 if not, with painting dates relative to deaths.

The coefficients on the Modern American painters are not precisely es-

Figure 3: Event Graph of Random Death Asssignments

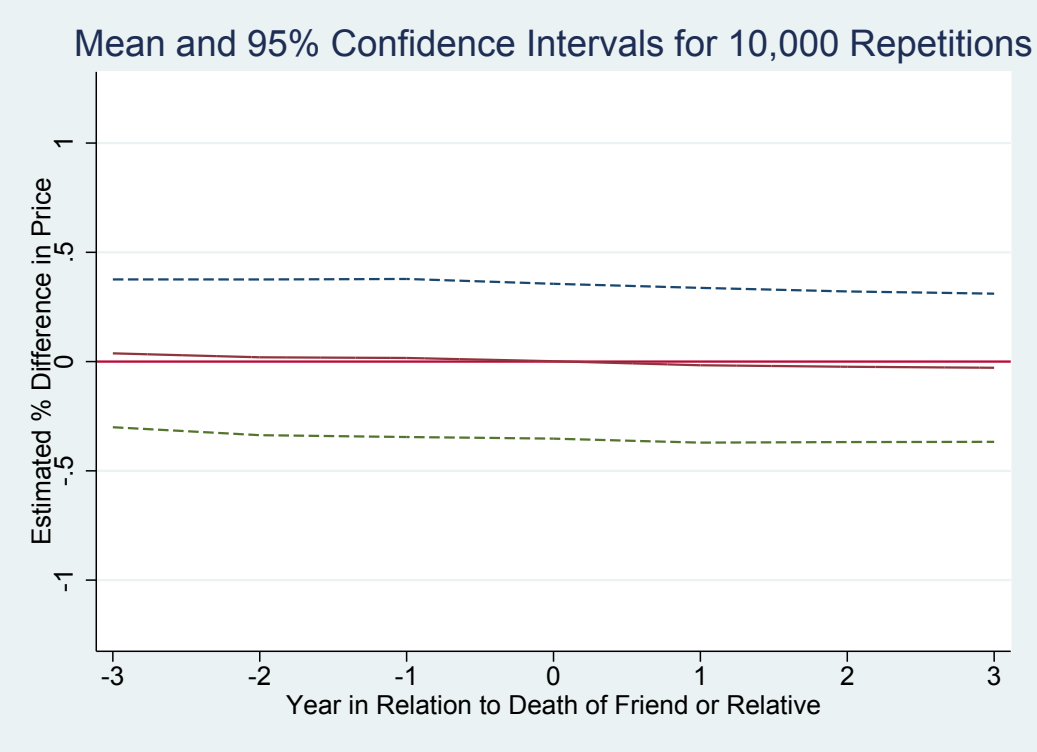


Table 7: Determinants of Sale Price

	(1)	(2)
Painted in 3rd year prior to death: French Impressionist	-0.0136	-0.118
	(0.162)	(0.151)
Painted in 2nd year prior to death: French Impressionist	-0.0491	-0.114
	(0.141)	(0.174)
Painted in 1st year prior to death: French Impressionist	-0.173	-0.130
	(0.115)	(0.146)
Painted in year of death: French Impressionist	-0.440	-0.277
	(0.245)	(0.198)
Painted in 1st year after death: French Impressionist	-0.517**	-0.553**
	(0.192)	(0.170)
Painted in 2nd year after death: French Impressionist	-0.532***	-0.468**
	(0.125)	(0.137)
Painted in 3rd year after death: French Impressionist	-0.109	-0.117
	(0.187)	(0.205)
Painted in 3rd year prior to death: Modern American	0.0360	-0.0788
	(0.267)	(0.263)
Painted in 2nd year prior to death: Modern American	1.047**	1.020***
	(0.323)	(0.287)
Painted in 1st year prior to death: Modern American	0.565	0.245
	(0.329)	(0.336)
Painted in year of death: Modern American	0.765*	0.295
	(0.313)	(0.376)
Painted in 1st year after death: Modern American	-0.393	-0.535*
	(0.263)	(0.246)
Painted in 2nd year after death: Modern American	0.514	0.214
	(0.419)	(0.374)
Painted in 3rd year after death: Modern American	0.698*	0.534
	(0.335)	(0.375)
Observations	12705	12705
Artist fixed effects	Yes	Yes
Year of sale fixed effects	Yes	Yes
Cohort fixed effects interacted with age, age^2, age^3, age^4	Yes	Yes
Painting date fixed effects	No	yes

Standard errors in parentheses

Standard errors are robust, clustered by artist.

Regressions are weighted by the inverse of the mean squared error for each artist

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

timated, which is not surprising given the smaller sample of only 15 Modern American painters. However, the point estimates for works created in the year after death are consistent with other results. Furthermore, the estimates of the coefficient on works painted one year after death are statistically significantly lower than the coefficients on works painted 1 or 2 years prior to the death of the artist. The coefficients on the French Impressionist artists are statistically significantly negative for works created in the 1st and 2nd year after death of a friend or relative.

V.D. Parent Death Compared to a Sibling or Friend Death

In Table 8, yet another set of new variables is created by interacting an indicator variable, equal to 1 if a parent has died, and 0 if a sibling or friend has died, with painting dates relative to these deaths.

The results indicate there is no statistically significant difference whether the death involved a parent, or whether the death involved a sibling or friend.

VI. Inclusion in the Met's Collection

Art historians and others often criticize price as not being a good measure of a painting's creativity or worth. It may be that more beautiful, but not necessarily more creative or important paintings, command higher prices. Another important concern is that the most creative paintings may not be on the market but are instead placed in a museum's collection.

Table 8: Determinants of Sale Price

	(1)	(2)
Painted in 3rd year prior to death of parent	0.677*	0.281
	(0.258)	(0.288)
Painted in 2nd year prior to death of parent	0.844*	0.801*
	(0.400)	(0.321)
Painted in 1st year prior to death of parent	-0.0336	-0.300
	(0.287)	(0.337)
Painted in year of death of parent	-0.188	-0.0930
	(0.583)	(0.319)
Painted in 1st year after death of parent	-0.609	-0.746*
	(0.351)	(0.296)
Painted in 2nd year after death of parent	-0.332	-0.596
	(0.399)	(0.393)
Painted in 3rd year after death of parent	0.0240	0.0144
	(0.466)	(0.435)
Painted in 3rd year prior to death of sibling or friend	-0.202	-0.207
	(0.148)	(0.172)
Painted in 2nd year prior to death of sibling or friend	-0.00305	0.0399
	(0.154)	(0.176)
Painted in 1st year prior to death of sibling or friend	0.0666	0.0825
	(0.119)	(0.124)
Painted in year of death of sibling or friend	-0.194	-0.115
	(0.220)	(0.238)
Painted in 1st year after death of sibling or friend	-0.374*	-0.395*
	(0.154)	(0.176)
Painted in 2nd year after death of sibling or friend	-0.204	-0.160
	(0.188)	(0.167)
Painted in 3rd year after death of sibling or friend	0.0970	0.0914
	(0.169)	(0.191)
Observations	12705	12705
Artist fixed effects	Yes	Yes
Year of sale fixed effects	Yes	Yes
Cohort fixed effects interacted with age, age^2, age^3, age^4	Yes	Yes
Painting date fixed effects	No	Yes

Standard errors in parentheses

Standard errors are robust, clustered by artist

Regressions are weighted by the inverse of the sum of the mean squared error for each artist

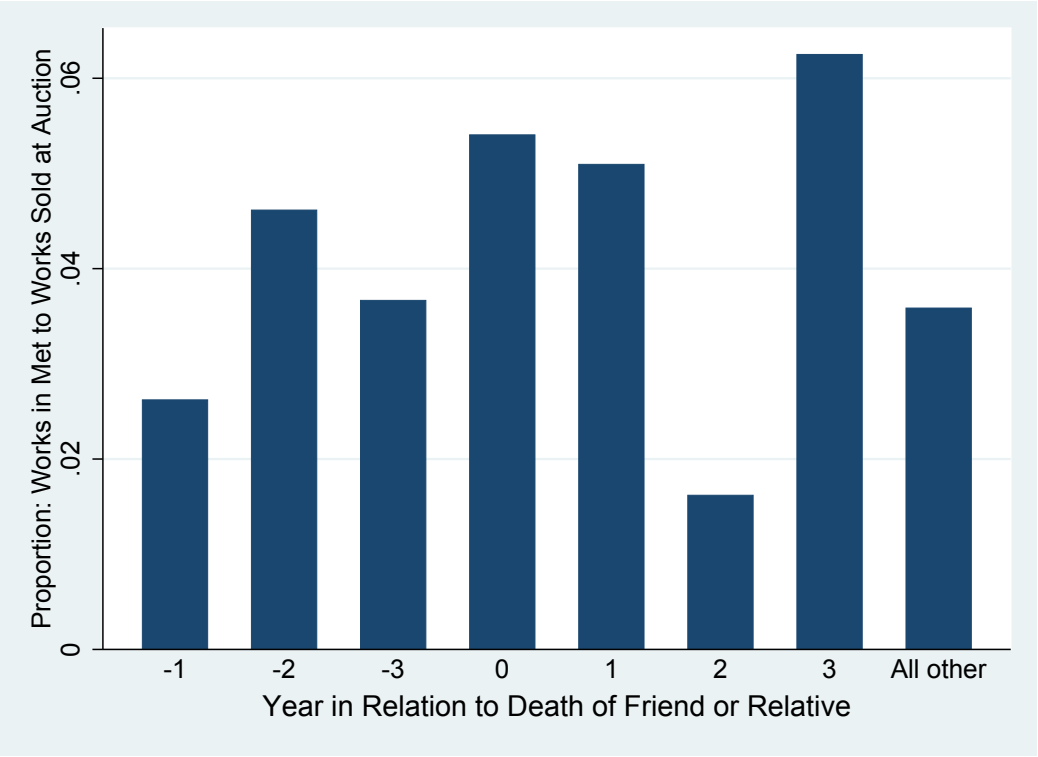
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Information on all paintings by the original 33 French Impressionist artists that are in the New York Metrolipitan Museum of Art's collection was collected and appended to the painting data in the original dataset. Paintings by 30 of the 33 artists were included in the online collection. Paintings by Marcel Duchamp, Roger Bissiere, and Andre Masson did not appear in the online data (though there was work in other media by Duchamp in the collection). In total, 412 paintings were appended; the artist with the most paintings is Picasso with 37, and the artists with the least number of paintings, but still included in the collection, are Jean Arp and Henri Rousseau, each with 2.

Figure 4 summarizes the data by looking at the proportion of the number of works in the Met's collection relative to the number of works sold at auction in each year, where the year is expressed relative to the year of death of the relative or friend. Figure 4 is striking because of the low proportion of works included in the Met's collection in the second year of bereavement. The absolute numbers are low also. In the dataset with this selection of artists, only 4 works produced in the second year after the death of a friend or relative were included in the Met's collection, in comparison to 15 in the year prior (1 year after the death of the artist's friend or relative) and 16 in the year following (3 years after the death of the artist's friend or relative).

The results of a probit analysis, where a one-zero variable indicating whether a painting is included in the Met's collection, is regressed on the independent variables described in equation 1 above, is presented in Table

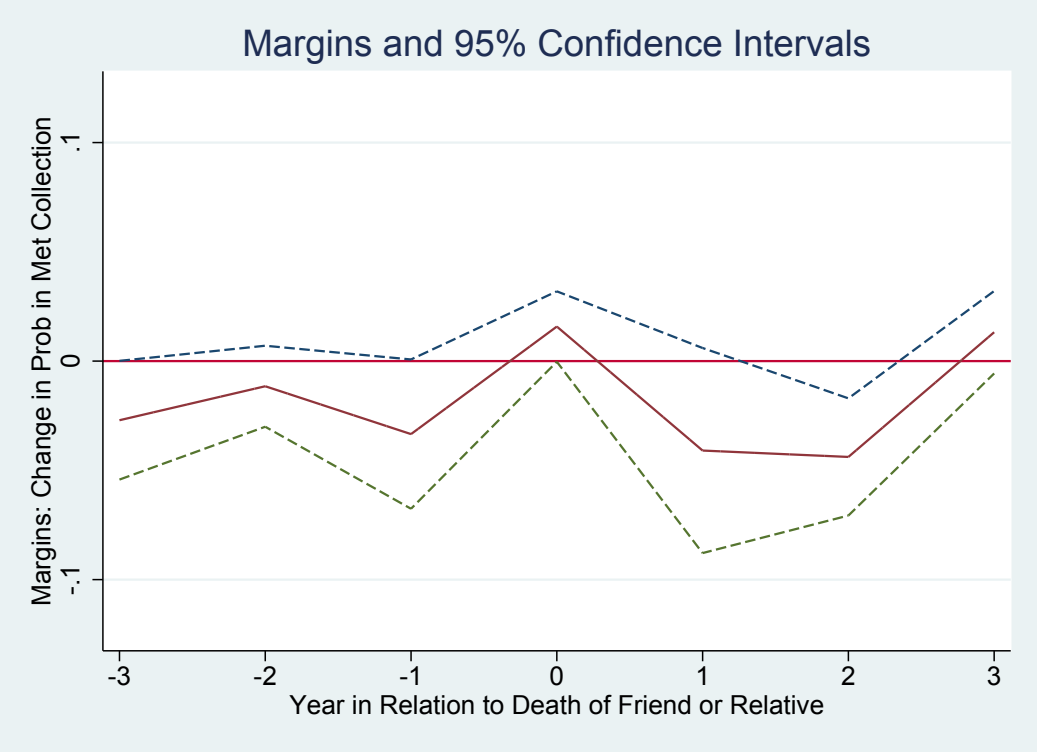
Figure 4: Inclusion in the Met's Collection



9. The original dataset started with 14,044 observations from the auction dataset collected from the Blouin Art Sales Index (including those without price). 3,364 observations were subtracted which included all American artists, Marcel Duchamp, Roger Bissiere, and Andre Masson, and then 412 observations were added from the Met's colection, ending with 11,092 observations. Column 1 of Table 9 reports the results without painting date fixed effects, and column 2 reports the results with painting date fixed effects. The results are consistent with the pattern shown in Figure 4: works that were painted in the second year after after the death of the artist were significantly

less likely to be included in the collection. These results are plotted in Figure 5. The pattern is not as striking as in the price regressions, but the pattern still exists.

Figure 5: "Event Graph of Inclusion in the Met's Collection"



VII. Interpretation and Conclusion

This research has used both prices of paintings, as determined by the auction mechanism years after the works have been executed, and inclusion in the Metropolitan Museum of Art's collection to infer the "creativity" of the

Table 9: Included in the Metropolitan Museum of Art's Collection (Probit)

	(1)	(2)
Painted in 3rd year prior to death	-1.294***	-0.869*
	(0.271)	(0.438)
Painted in 2nd year prior to death	-0.231	-0.370
	(0.187)	(0.297)
Painted in 1st year prior to death	-1.294	-1.074
	(0.760)	(0.551)
Painted in year of death	-0.385	0.508*
	(0.272)	(0.255)
Painted in 1st year after death	-1.439	-1.315
	(0.764)	(0.765)
Painted in 2nd year after death	-0.993***	-1.409**
	(0.215)	(0.442)
Painted in 3rd year after death	-0.166	0.424
	(0.516)	(0.302)
Observations	11092	9443
Artist fixed effects	Yes	Yes
Cohort fixed effects interacted with age, age^2, age^3, age^4	Yes	Yes
Painting date fixed effects	No	Yes

Standard errors in parentheses

Standard errors are robust, clustered by artist.

Regressions are weighted by the inverse of the number of paintings for each artist

1,649 observations were dropped with painting date fixed effects because of colinearity

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

artist at the time he worked on the painting. This use of prices relies on the assumption that, on average, prices are a valid measure of the artist's creativity at different points in his life. An exhibition of a painting in a museum is widely thought to be a signal of artistic merit.

The analysis has determined that artists, in the two years following the death of a friend or relative, are on average less creative than at other times of their lives. Paintings that were created in the year following a death fetch significantly less at auction than those created at other times in an artist's life. Paintings that were created two years after a death are significantly less likely to be included in the Met's collection. These findings coincide with the psychology literature on the effects of mood on creativity, and follow on Czikscentmihalyi's extensive work on "flow".

One potential problem with this research is that stories sometimes build around famous artists' lives, and these stories can affect which deaths are reported by biographers and other online sources. For example, all sources now cite Carlos Casagemas's death in relation to Picasso, because it is so well known. With other artists, it proved extremely difficult to find even the death dates of their parents. Only deaths that had a well-known and public impact on an artist's life may be the ones that are reported. It is difficult to know which way the potential bias may go from this sample selection, but it is certainly important to note that sample selection in death reporting could be a consideration.

Further research into the effects of death on creativity is called for.

Azoulay's seminal paper on co-author death and the resulting effect on scientific creativity is very much in this realm, though the mechanism through which death affects creativity, the loss of scientific ideas, is very different in Azoulay's work than in this research. The results in this paper are consistent with a change in the creator's mood that results in work that was later deemed less valuable or important.

Researching biographies is very time consuming. It becomes more difficult with the number of year's ago that an artist lived (for example, there is less information on Old Masters than on the Impressionists) and with relatively contemporary artists. Nonetheless, this detailed data collection can yield surprising insights. More work in this area is called for.

While we have used art to document this creativity, primarily because it is relatively easy to determine when an artist paints a work and to find the work's subsequent market value, this research could potentially extend to any area in which creativity plays a role. Notably, employers in creative industries should perhaps take note of this death effect and may wish to provide counseling.[9] Not only could this be good for a worker's psychological health, but it could perhaps counteract reduced creativity related to bereavement.

[9]Some organizations already do provide counseling. A list of employee benefits posted in the mailroom at Brandeis cite "Bereavement Counseling" as one benefit.

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