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Pricing Revolution: From Abstract Expressionism to Pop Art

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Abstract

Abstract Expressionism famously shifted the center of the advanced art world from Paris to New York. The triumph of Abstract Expressionism, and its subsequent abrupt decline in the face of Pop Art, are familiar tales in the literature of art history. Econometric analysis of evidence from auction markets now provides a basis for dating precisely the greatest innovations of the leading Abstract Expressionists, and of the leaders of the cohort that succeeded them. These data demonstrate how fundamentally each of these revolutions affected the nature of painting, by showing how greatly the creative life cycles of the experimental old masters of Abstract Expressionism differed from those of the conceptual young geniuses who followed them. The innovations of the Abstract Expressionists were based on extended experimentation, as they searched for novel visual images; Pop artists rejected this open-ended search for personal forms, and instead treated painting as the impersonal transcription of preconceived ideas. Accumulation of experience was critical for the Abstract Expressionists, who produced their most valuable art late in their lives, whereas lack of experience allowed the next generation the freedom to imagine radically new approaches, and they produced their most valuable art early in their careers.

The Triumph of New York

> New York artists have begun to feel themselves the leaders and bearers of the artistic tradition of Europe instead of, as heretofore, only its reflection. The longstanding inhibiting position that made New York a mirror of Paris disappeared in 1940, and suddenly, the artists of New York had to stand on their own feet.
>
> Barnett Newman, 1945[1]

In 1945, Jackson Pollock told an interviewer that "I accept the fact that the important painting of the last hundred years was done in France. American painters have generally missed the point of modern painting from beginning to end." Yet he also said that he had no desire to study in Europe: "I don't see why the problem of modern painting can't be solved as well here as elsewhere."[2]

Remarkably, Pollock and a small group of his peers created a revolution that shifted the center of the advanced art world from Paris to New York. In 1946, the American critic Clement Greenberg observed that "The School of Paris remains still the creative fountainhead of modern art." Less than two years later, however, Greenberg cautiously offered "the impression – but only the impression – that the immediate future of Western art…depends on what is done in this country." His conviction continued to grow, and early in 1948 Greenberg declared that with the recent achievements of American artists, "the conclusion forces itself, much to our own surprise, that the main premises of Western art have at last migrated to the United States."[3]

Pollock was a leader of what became known as Abstract Expressionism, and he maintained that its revolution was not merely geographic, for he told a critic in 1956 that "we've changed the nature of painting."[4] Pollock and his colleagues could legitimately feel that they had established abstraction as the dominant idiom of their epoch, and they believed its hegemony would be durable: in the early 1950s, Mark Rothko told a friend that he and his peers were

"producing an art that would last for a thousand years," and a few years later Adolph Gottlieb similarly predicted that "We're going to have perhaps a thousand years of nonrepresentational painting."[5]

The Abstract Expressionists were greater painters than prophets. Far from lasting a millennium, the supremacy of abstract art was seriously challenged before the decade was over, and was overthrown by the middle of the next decade, by yet another revolution. Qualitative accounts of these two revolutions abound in the literature of art history. Yet it is possible to go beyond these accounts, for the attitudes and practices of those who made these revolutions produced distinct patterns in their careers. Systematic quantitative analysis can reveal underlying differences in the creative life cycles of the Abstract Expressionists and their successors, and yield deeper insight into the basic changes in the nature of painting that occurred in New York in the decades after World War II.

Experimental Revolution

> To us art is an adventure into an unknown world, which can be explored only by those willing to take the risks.
>
> Adolph Gottlieb and Mark Rothko, 1943[6]

The Abstract Expressionists were unified not by a style, but by a desire to reject existing methods of painting, and to discover novel images in the process of making their works. Their emphasis on the importance of the working process to their art prompted one of their most influential supporters, the critic Harold Rosenberg, to suggest in 1952 that they should properly be called "action painters," on the grounds that their paintings were records of the act of their own making: "What was to go on the canvas was not a picture but an event."[7] Mark Rothko expressed

a typical attitude for the group when he compared his paintings to dramas: “Neither the action nor the actors can be anticipated, or described in advance. They begin as an unknown adventure in an unknown space.” The artist’s initial ideas served only as a point of departure: “Ideas and plans that existed in the mind at the start were simply the doorway through which one left the world in which they occur.” A successful painting would be a discovery: “The picture must be for him, as for anyone experiencing it later, a revelation, an unexpected and unprecedented resolution.”[8]

One of the basic tenets of Abstract Expressionism was the absence of planning. Barnett Newman declared that he was “an intuitive painter, a direct painter. I have never worked from sketches, never ‘thought out’ a painting.”[9] Harold Rosenberg explained that the hostility to drawing was a corollary of the rejection of theory: “A sketch is the preliminary form of an image the *mind* is trying to grasp. To work from sketches arouses the suspicion that the artist still regards the canvas as a place where the mind records its contents – rather than itself the ‘mind’ through which the painter thinks by changing a surface with paint.”[10] A painting based on a preliminary drawing was effectively the transcription of a previously formulated idea; the Abstract Expressionists disdained ideas in favor of vision, and preconception in favor of spontaneity. The experimental artist wanted to have a dialogue with the work in progress. Pollock wrote that “the painting has a life of its own. I try to let it come through,” and Newman stated that “as I work…the work itself begins to have an effect on me. Just as I affect the canvas, so does the canvas affect me.”[11] Arshile Gorky’s widow recalled that he “did not always know what he intended and was surprised as a stranger at what the drawing became after an hour of work. It seemed to suggest itself to him constantly.”[12] Rosenberg explained that each painting was an accumulation: “Each stroke had to be a decision and was answered by a new question.”[13]

In the history of art, revision in the process of painting often had a negative connotation: *pentimento*, for example – the term art scholars use to refer to alterations in a painting's composition in the course of its execution – is the Italian word for repentance. For the Abstract Expressionists, however, revision was not an occasion for contrition, but for celebration. Because the painting had no predetermined goal, Pollock declared that he had "no fears about making changes, destroying the image," and Gorky explained that "I like to change my mind," so "Sometimes I paint a picture, then I paint it all out."[14] Willem de Kooning remembered that Gorky "had a peculiar way of torturing himself, coat after coat after coat of paint. And the paintings became so thick. 'Lift it,' he would say. And it was with difficulty that I was able to, because they were so heavy."[15] Mark Rothko spent long periods examining his works in progress, and was rarely satisfied with what he saw: an assistant recalled that "It could be a perfectly magnificent black or deep wine surface, but after a few days he might decide no, it's not right, beautiful as it is." Rothko's canvases were often built up with "fifteen or twenty layers of paint."[16] Elaine de Kooning remembered her husband repeatedly painting over his canvases: "I saw hundreds of images go by. I mean, paintings that were masterpieces. I would come in at night and find they had been painted away."[17]

The same impulse for trial-and-error experimentation that produced extended revision of individual works prompted the Abstract Expressionists frequently to work in series, with a succession of related paintings. Rothko defended his production of images of stacked rectangles over more than two decades by asserting that "If a thing is worth doing once, it is worth doing over and over again – exploring it, probing it."[18] Clyfford Still described his own oeuvre as orchestral: "My work in its entirety is like a symphony in which each painting has its part."[19] Anna Chave noted a consequence of this behavior, that it has been common "to write or speak

about Rothkos, Pollocks, or Newmans in generic terms, as if singling out any given painting would be an idle or irrelevant gesture. In the three most widely read books on the New York School, by Dore Ashton, Irving Sandler, and Serge Guilbaut, the authors rarely or never focus on specific works of art."[20] David Sylvester pointed out the absence of individual landmark works, observing that Abstract Expressionism produced "legendary hopes, legendary deeds, legendary battles, legendary rags to riches, legendary drinking and, alas, legendary deaths." But "It did not produce many legendary masterpieces, for it flourished at a moment in art history when the masterpiece had given way to the series."[21]

It should be emphasized that the seriality of the Abstract Expressionists never involved exact replication of identical images, but rather constant experimental variations. So for example Rothko never ceased changing the colors and sizes of his stacked rectangles, and he frequently changed the dimensions of his canvases. The result was that each artist's work evolved over time: thus Thomas Hess described the development of de Kooning's style as a "continuous process – a gradual, logical, steady development, marked by hundreds of insights, but no blinding revelation."[22] The artists considered these evolutions to be quests: in 1945 Rothko wrote to Newman that his recent work had been difficult but exhilarating, and commented that "Unfortunately one can't think these things out with finality, but must endure a series of stumblings toward a clearer issue."[23] A decade later, he reported that when he had recently looked at a group of his older pictures, "it seemed to me that the paintings had greater meaning to me than they possibly could have when they were painted," because he could now see how they had pointed toward his recent art. He reflected that "Unfortunately that understanding can be achieved only backwards, for while at this time they seem so logical as a prelude for the present work, it

would have been impossible to imagine then, the present resolution to which the pictures have arrived, just as at this moment, I can have no prescience of the things which yet will come."[24]

Because the Abstract Expressionists did not begin with a specific goal, they were rarely sure of what they had accomplished, and it was difficult for them to determine when a painting was finished. Hess observed that de Kooning "did not want to finish his pictures because they always could be improved."[25] Gorky declared that "I never finish a painting – I just stop working on it for a while."[26] Newman rejected the very idea that a painting could be completed: "I think the idea of a 'finished' painting is a fiction."[27] In practice, the artists did of course let many paintings go, and were often pleased with the results. When de Kooning was asked whether he had a criterion for stopping, he replied, "I just stop…I sometimes get rather hysterical and because of that I find sometimes a terrific picture."[28]

By 1955, Abstract Expressionism dominated the world of advanced art: in that year, the scholar William Seitz declared that it had "become a universal style," in that "little painting remains which is modern and not in some way affected by Abstract Expressionist characteristics."[29] Yet a cohort of younger artists were already at work, creating new approaches to art that would displace Abstract Expressionism, and in the process would yet again change the nature of painting.

Conceptual Revolution

> I do think that a good pictorial idea is worth more than a lot of manual dexterity.
>
> Frank Stella, 1966[30]

The younger artists made paintings that varied greatly in appearance, but they shared a set of conceptual attitudes and practices. Prominent among these was preconception. When Jasper

Johns was asked why he had chosen to paint flags, targets, maps, numbers, and letters, he replied that "they seemed to me preformed, conventional, depersonalized, factual, exterior elements."[31] Frank Stella explained that "The painting never changes once I've started to paint on it. I work things out beforehand in the sketches."[32] Roy Lichtenstein's images of comic strips appeared to have little in common with Stella's black stripes, but Lichtenstein told a critic that the central concern of his art was "the same kind of thing you find in Stella…where the image is very restricted. And I think that is what's interesting people these days: that before you start painting the painting, you know exactly what it's going to look like."[33]

The younger artists were deliberately reacting against Abstract Expressionism. Rauschenberg and Johns together initiated the conceptual revolution, and Rauschenberg explained that when they started out, "Even though our ideas were very far apart, the thing we had in common was that we were not in the Abstract Expressionist movement." Recalling the attitude that dominated the art world at the time – "people whining about their condition, and then glorifying it in extravagant language" – Rauschenberg remarked that "I hated all that metaphoric suffering."[34] Johns commented that "There was this idea associated with Abstract Expressionism that the work was a primal expression of feeling, and I know that was not what I wanted my work to be like."[35] Lichtenstein observed that "Abstract Expressionism was very human looking. My work is the opposite."[36] In 1962, when a journalist asked Andy Warhol about Abstract Expressionism, he replied that he loved it, "but I never did any. I don't know why, it's so easy."[37]

In deliberate contrast to the personal gestures of Abstract Expressionism, a common feature of the new art was impersonality. Johns explained that he chose subjects that had "no characteristics of a personality having made it."[38] Lichtenstein wanted his painting "to look as if it had been programmed. I want to hide the record of my hand."[39] Stella described his own paint

handling as "pedestrian in the sense that it's closely related to, say, a house-painting technique."[40] The desire for impersonality led Warhol to mechanical production: one of his early assistants explained that "Andy wanted to keep the human element out of his art, and to avoid it he had to resort to silkscreens, stencils, and other kinds of automatic reproduction."[41] The same desire prompted Warhol to have assistants make his paintings, declaring publicly in 1963 that "I think somebody should be able to do all my paintings for me."[42] Less openly, Stella followed suit, as a critic noted that in the late '60s he "became a sort of secret mastermind behind his own paintings: assistants built them and did most, if not all of the work. The 'hand of the artist,' barely visible since the early black paintings, virtually disappeared."[43]

With preconception, the problem of deciding when works were finished disappeared. Stella explained that "The Abstract Expressionists always felt the painting's being finished was very problematical. We'd more readily say that our paintings were finished and say, well, it's either a failure or it's not, instead of saying, well, maybe it's not really finished."[44] Johns confessed he didn't feel anxiety, but relief, when he had covered a canvas: "by the time a painting is finished, it has usually got quite boring to look at for me."[45]

The conceptual revolution brought a change in the role of style. For the Abstract Expressionists, a personal style was a holy grail, to be pursued patiently throughout a lifetime. Each artist sought to create a trademark gesture that would allow him to express his personality, and serve as a signature to make his art instantly recognizable. In contrast, for the young conceptual artists a consistent style was often a matter of indifference, or even something to be actively avoided. From their vantage point, a trademark style was a constraint that restricted the artist's creativity, and led to monotony and repetition. Rauschenberg explained that he tried to clear his mind before he began to work: "Everything I can remember, and everything I know, I

have probably already done, or somebody else has."[46] Warhol asked, "How can you say one style is better than another? You ought to be able to be an Abstract Expressionist next week, or a Pop artist, or a realist, without feeling like you've given up something." Warhol's goal was to eliminate style altogether: thus he declared that "style isn't really important," and once explained that he often used a rubber stamp to sign his paintings, because "I feel an artist's signature is part of style, and I don't believe in style. I don't want my art to have a style."[47]

The younger artists attacked their predecessors directly, not only verbally but with specific works of art. In 1953, Rauschenberg asked de Kooning for a drawing he could erase. De Kooning was initially reluctant, but eventually agreed, and Rauschenberg spent a month, and dozens of erasers, removing the lines. When he finished, he framed the sheet of paper, and placed a label on it: "Erased de Kooning Drawing, Robert Rauschenberg, 1953."[48] Harold Rosenberg explained that the work explicitly dramatized a "transition from one mode to another," and became the cornerstone of a new approach "dedicated to replacing the arbitrary self of the artist with predefined processes and objectives."[49] Four years later, Rauschenberg produced *Factum I* and *Factum II*, two paintings with collage elements, done in an Abstract Expressionist style, that were nearly identical. These were generally interpreted as an ironic comment on Abstract Expressionist spontaneity.[50] Lichtenstein pursued the same idea in his *Brushstroke* paintings of 1964-65, in which he used benday dots to reproduce magnified versions of the kind of brushstrokes used by de Kooning. Kirk Varnedoe commented: "Everything that is supposed to be ethereal, ineffable, ambiguous, or soulful about abstract expressionism is rendered as die-cut, stamped form, reduced literally to comic formulae."[51] Warhol was the most satirical of the younger artists, and made a number of works parodying the abstraction of his predecessors. The most insulting of these were the *Oxidation* paintings of 1978. Large canvases, up to 25 feet long, were spread on the floor of

his studio and coated with copper paint. Warhol and his assistants then urinated on the canvases, producing abstract images where the acid in the urine oxidized the metallic base, turning it from copper to shades of brown and green. The finished works were immediately recognizable as references to Pollock's drip paintings.

Unlike Abstract Expressionism, which had emerged slowly, the innovations of the conceptual revolution arrived quickly: new ideas can occur suddenly, in flashes of insight, and they can arrive fully formed, in discrete leaps. Thus Rauschenberg's three-dimensional combine-paintings, Johns' paintings of targets and flags, Lichtenstein's cartoon images, and Warhol's silkscreened photographs all exploded on the art world fully developed. The painter Ed Ruscha was an art student when he first saw the new art, and he described Jasper Johns' targets as "an atomic bomb in my training." His teachers denied that Johns' work was even art, but Ruscha "knew that I had seen something truly profound." He immediately understood the implication: "Everything should be preplanned."[52]

Ruscha's experience illustrates another important aspect of the conceptual revolution, the extreme speed of its diffusion and influence. Although Ruscha was a student in Los Angeles, and did not go to the New York galleries where the new art was unveiled, he didn't have to: "I saw a reproduction in some obscure magazine of Jasper Johns' *Target with Four Faces* and Robert Rauschenberg's painting, the combine painting with the chicken," and this was enough for him to understand the new art.[53] Larry Bell, another young artist, noted that "Modern means of communication and Pop Art are a romance that must have been made in heaven."[54] The new conceptual art privileged final images rather than materials and techniques, so reproductions were sufficient: Pop's images were taken from magazines and newspapers, so as Bell recognized, they were readily transmitted by these same means. The pop artist Robert Indiana bluntly declared that

"Pop is Instant Art…Its comprehension can be as immediate as a Crucifixion."[55] Those in the art world quickly recognized that tracing the diffusion of innovations had become more complicated. Thus in 1963 Alan Solomon, the curator of Rauschenberg's first museum exhibition, observed that "It has become increasingly difficult in recent years to determine very precisely how influences operate on artists because the modern press transmits ideas so rapidly and extensively that a photograph in a picture magazine may have a profound effect on a painter."[56]

Sophisticated critics also quickly understood the basic nature of the conceptual revolution. Comparing Johns and Rauschenberg with the Abstract Expressionists, Harold Rosenberg observed that "The adventurer or autobiographer in paint has been replaced by the strategist of ends and means."[57] In similar terms, David Sylvester gave a more detailed analysis:

> Some artists like to think they are working in the dark, others that they are firmly in control. The preference seems almost more a matter of generation than of individual temperament. Most of the artists whose styles were formed in the 1940s subscribed to the idea that making art meant feeling one's way through unknown territory…This common ethical ideal led to a generally shared attribute of style: the way in which the work was made was more or less visible in the end-product.
>
> The typical art of the Sixties is as different from this as Colonel Borman's journey to the moon is from Levi-Strauss's journey into the tropics. It is carefully planned, tightly organized, precise in execution…It is sure of itself, and has an air of certainty and decision. The artist, like a good executive, makes up his mind what he will do and does it, or gets it done to his specifications.[58]

Pricing Creativity

> You ask how I got started in the direction which I am now following…But alas, when one looks at this past how many distractions, how many dark alleys, and how much wandering.
>
> Mark Rothko, 1954[59]

I was the "charlatan" of the art world…And now, "We like your old things better."

Robert Rauschenberg, 1970[60]

Art history is the story of innovators: the most important artists are those who change the course of the discipline, and their most important works are those that announce their innovations. The auction market carefully values vast numbers of individual paintings. The prices it generates can be used to make systematic measurements of an artist's creative life cycle. Harold Rosenberg explained that "Each stylistic portion of an artist's total time span constitutes a separate sum of artifacts, and this is recognized by the art market in the values it places upon certain 'periods' of an artist's work in contrast to others."[61] Regression analysis of auction outcomes can permit us to trace out an age-price profile for an individual artist, to identify the artist's most innovative period. This will be done for the leaders of the two revolutions described above.

The expected age-price profiles for members of these two groups differ sharply. The innovations of the Abstract Expressionists were based on extended experimentation, as each artist worked by trial and error to develop distinctive gestures that would yield novel images. These artists temperamentally distrusted rapid change and believed that real achievement could result only from long periods of painstaking research. Their innovations generally arrived incrementally, late in their careers.

In contrast, the innovations of the conceptual artists arrived suddenly and quickly, as the result of the formulation of new ideas. It might be thought that these could arrive at any time, but the most important innovations of conceptual artists tend to arrive early in their careers. This is because the most radical departures from existing practices generally occur before the artist has developed the habit of working in any particular way. Experience thus has opposite effects on experimental and conceptual creativity: whereas the accumulation of knowledge and skill is

critical for experimental creativity, the absence of substantial knowledge and skill is what gives many conceptual innovators the freedom to imagine radically new approaches.

For most successful artists, the relationship between age and experience is similar, for in most cases, the artist begins work in his chosen discipline immediately or shortly after completing his education. For these typical cases, the predictions for the age-price relationships are straightforward: the profiles of experimental innovators should peak at older ages than those of their conceptual counterparts. In exceptional cases, however, a more complicated career path can cause the relationship between age and experience in the relevant discipline to be very different. Age-price profiles can then depart from these simple predictions. Two significant examples appear among the artists considered here.

Andy Warhol did not begin his career as a painter until he had spent more than a decade working as a successful commercial illustrator. His experience as a fine artist therefore did not begin until he began making paintings in 1960, at the age of 32. When he arrived at his major artistic innovations he was in his mid-30s, but he had less than three years of experience as a painter.[62]

Unlike Warhol, Roy Lichtenstein studied painting in college, and got an MFA at Ohio State. During the following decade, he successively taught art at his alma mater, worked as a draftsman for a steel company in Cleveland, and taught art at the State University of New York at Oswego. In 1960, at the age of 37, he moved to Rutgers University, where his colleagues included Allan Kaprow, a young conceptual artist who had already invented a new genre of art, the Happening, that he had conceived as a challenge to Abstract Expressionism.[63] Through Kaprow, Lichtenstein quickly discovered the recent work of many other young conceptual artists in New York, including Johns, Rauschenberg, Stella, and Claes Oldenburg: he later recalled, “Suddenly I

found myself in the stream of an entirely new and exciting creative outlook."[64] Within a year of arriving at Rutgers, Lichtenstein's art was transformed, as he abandoned abstraction in favor of the mechanical cartoon images for which he would become known. Lichtenstein described the change as "a complete break" in his art, and recalled that it happened "within a period of a month or so."[65]

Lichtenstein's career demonstrates that the experience relevant to creativity is not merely working at an activity, but instead working after gaining a knowledge of the current state of advanced work in that discipline: thus Clement Greenberg observed that the ambitious artist "has to assimilate the best new art of the moment…just before his own."[66] Lichtenstein's innovative paintings of cartoons, made with simulated Ben Day dots, do not resemble the works of any of the young artists he met after moving to Rutgers, but they parallel these artists' work in the rejection of abstraction and the use of real objects. Lichtenstein later reflected that his departure into cartoon images was not directly influenced by any of the art he saw in New York – "I didn't really relate the cartoons to anybody" – but that it was indirectly affected: "Of course, I was influenced by it all."[67] Uncertain as he was about what prompted him to adopt the particular forms he did, he was nonetheless definite about the role of his relocation: "I am sure that if I had stayed in Oswego nothing would have happened."[68]

The relationship between the value of an artist's work and the artist's age at the time of its execution can be estimated by hedonic regression analysis of auction data. This study will examine this relationship for the five leading Abstract Expressionists and the five leading painters of the following cohort, as determined by the frequency with which these artists' work was reproduced in textbooks of art history.[69] These artists are listed in Table 1.

Pollock and Warhol were the subjects of a recent study, and their regression results will be taken from that study.[70] For the other eight artists, all auction sales from 2000-16 were collected from the Artnet web site. For each of four artists, this period yielded less than 300 observations, and for these – Rothko, Gorky, Newman, and Johns – all auction results from 1980-99 were added to the data set.

For seven artists, Tables 2-8 present estimates of non-parametric hedonic regressions that specify the natural logarithm of the auction price of a painting as a function of the artist's age when the painting was executed, the painting's size and support, and the painting's sale date. Age is specified as a series of binary variables; as indicated, small cell sizes sometimes caused grouping of several ages. For Newman, the number of auction sales was too small to yield statistically significant results for a non-parametric regression, so Table 9 presents estimates of a parametric regression in which the artist's age is specified as a second-degree polynomial. Table 10 summarizes the ages at peak value implied by the regressions. To compare these estimates to the opinions of art scholars, the table also includes the age from which each artist's work was most frequently reproduced in 50 textbooks of art history published since 2000.

The two sources yield similar results. The difference in the peak ages is two years or less for all the artists except Rauschenberg, for whom the difference is four years. This study therefore supports the same conclusion as earlier studies, that there is close agreement between the auction market and scholarly judgments as to when important painters have produced their best work.[71]

The evidence of Table 10 generally confirms the predictions made earlier concerning the creative life cycles of the two cohorts. Two of the Abstract Expressionists made their most valuable art in their late thirties, and three made theirs in their late forties and their fifties. In contrast, three of the second cohort made their most valuable art from 23-30, one in his mid-

thirties, and one in his late thirties and early forties. It should be noted, however, that the latter two – Warhol and Lichtenstein – were the two cases in which age and experience were least closely related. Overall, these econometric results support the conclusion that experience increased the creativity of the Abstract Expressionism, and decreased that of their conceptual successors. The evidence from textbooks equally supports the same conclusion, as the median peak age of 46 for the Abstract Expressionists is 12 years greater than the median of 34 for the second cohort.

From Old Masters to Young Geniuses

> The young master is a new phenomenon in American art.
>
> Harold Rosenberg, 1970[72]

Table 11 shows the dates that correspond to the peak ages of Table 10. These neatly identify the high points of these two revolutions. The leading Abstract Expressionists were at their most innovative from 1943 through 1962, and the leaders of the cohort that followed made their greatest contributions from 1953 through 1964. The heyday of Abstract Expressionism – the creative peaks of its greatest members – began with Pollock's masterpieces of the late 1940s, and continued with the full development of de Kooning and Rothko in the early '50s.

But the next generation's attack on Abstract Expressionism began almost immediately. Rauschenberg's assault began in 1954, when he began making his radical new combine-paintings, a hybrid genre that melded painting with sculpture, by incorporating commonplace objects.[73] Just as Pablo Picasso's invention of collage in 1912 had prompted an outpouring of new hybrid art

forms, as a succession of young conceptual artists were inspired to create synthetic innovations that deliberately violated the boundaries of existing genres of art, so Rauschenberg's invention of combines first inspired Rauschenberg's partner, Jasper Johns, then a succession of other young conceptual artists to create novel images that violated centuries of tradition in Western painting.[74] With the shared theme of impersonality, these young artists not only challenged Abstract Expressionism, but decisively deposed it. The conceptual revolution reached its peak with the startling creation of Pop Art by Lichtenstein and Warhol in 1961-62. Abstract Expressionism did not disappear, as de Kooning, Rothko, and a number of their contemporaries continued to work, and they were also joined by a number of second-generation American abstractionists who embraced their aesthetic. But gestural abstraction was overshadowed, as talented young conceptual artists created new forms of art based on preconception, with increasing importance of mechanical production, use of manufactured products, and images derived from photography.

The contrast between the gradual development of the Abstract Expressionists and the precipitous arrival of the younger conceptual innovators is apparent in Table 12, which shows the proportions of each artist's total textbook illustrations that represent work done before and after the artist's single peak year. The Abstract Expressionists generally produced significant bodies of work prior to their peak years: for four of the five, at least 30% of their illustrations are of paintings done before their peaks. In contrast, for four of the five conceptual innovators, less than 20% of their illustrations are of work done before their peaks, and for three of these, this share is negligible, less than 5%. For these three – Johns, Warhol, and Stella – the work of their peak year was effectively the first significant art they made. In contrast, for three of the Abstract Expressionists, the share of their illustrations accounted for by work done prior to their peaks is actually greater than the share from after those peaks.

The quantitative evidence underscores the drama of the careers of the conceptual young geniuses. Table 11 shows that Johns' peak year for textbook illustrations was 1955, when he was 25. Just the year before that, in 1954, Johns destroyed all the work he had done up to that point. A friend explained that Johns wanted to make a completely new start: "It seemed as if his whole new conception was created in his mind." He immediately began working with encaustic: "It was as though the whole thing were already created in his head before he did it."[75] In 1955 he painted *Flag* and *Target with Plaster Casts* – two of his three most frequently illustrated works – both of which were included in his first solo exhibition, at Leo Castelli's gallery, and both of which hang today in New York's Museum of Modern Art.

Frank Stella was the youngest of the young geniuses considered here, with his peak age for illustrations at just 23. In 1970, when Stella was given a retrospective exhibition at the Museum of Modern Art at the age of 33, Harold Rosenberg was indignant. He declared that it was "inconceivable that Cézanne, Matisse, or Miro could have qualified for a retrospective in a leading museum after their first dozen years of painting; certainly Gorky, Hoffmann, Pollock, and de Kooning did not." Rosenberg protested that "For a coherent body of significant paintings to spring directly out of an artist's early thoughts, a new intellectual order had to be instituted in American art."[76] Though Rosenberg deplored this situation, his analysis of it was precisely correct. The conceptual revolution had replaced the aesthetic values of the Abstract Expressionists with new critical values that privileged ideas above execution. The value of artistic experience had declined sharply, and the age at which important artists produced their greatest innovations consequently also declined precipitously. Stella's later career underscores this point. At the end of his catalogue essay for Stella's 1970 show, William Rubin, director of the painting department at the Museum of Modern Art, predicted that "His endurance faces many challenges."[77] Art scholars

have not been impressed by Stella's response to these: only 5 of the total of 46 illustrations of his work in the textbooks, or 11%, represent work he has done in nearly five decades since 1970. Nor has the Museum of Modern Art been any more impressed. When he was asked in 2003 why the museum had shown little interest in Stella's recent work, John Elderfield, Rubin's successor, replied that "The moment in Frank's career which is of particular interest to MOMA is what happened in the '60s, because that was the moment when he entered and transformed painting."[78]

Conclusion

> When I was a younger man, art was a lonely thing: no galleries, no collectors, no money. Yet it was a golden time, for then we had nothing to lose and a vision to gain. Today, it is not quite the same. It is a time of tons of verbiage, activity, and consumption. Which condition is better for the world at large I will not venture to discuss.
>
> Mark Rothko, 1969[79]

In the fall of 1962, Sidney Janis presented a group show titled "The New Realism" at his New York gallery, that included paintings by Lichtenstein, Warhol, and other Pop artists. The show drew large crowds, but four Abstract Expressionists, including Rothko, quit Janis' gallery in protest. The dealer was surprised: "Here we had been showing Pollock cheek-by-jowl with Léger, and de Kooning with Mondrian, and Kline with Klee, but when we took up the next generation our artists were furious. They didn't want to be associated with these people who became artists overnight." But the critic Calvin Tomkins understood. He explained that the Abstract Expressionists "had struggled for many years in total obscurity, their achievements recognized only by one another…The recognition they had so recently and so arduously won was now being

usurped, or so they believed, by a new generation of brash youngsters who had become 'artists overnight,' who had not earned anything the hard way, and whose most apparent common bond seemed to be mockery and rejection of all serious art, especially Abstract Expressionism."[80]

During the late 1940s and early '50s, a small group of American painters made a revolution by creating bold new forms of abstract art, and in the process succeeded in making New York the center of Western art. Their innovations were the result of extended experimentation, as they searched for novel and distinctively personal techniques and images to satisfy their aesthetic goals.

But almost as soon as their revolution had been achieved, the Abstract Expressionists were challenged by a group of younger artists, who rejected their visual approach in favor of new forms of art based on ideas. These artists repudiated the conception of a painting as an open-ended search for a personal image, and instead treated the production of a painting as the transcription of an idea that was completely formulated before the work was executed. This second revolution swept through the advanced art world, and began an era of conceptual art that has persisted to the present.[81]

Abstract Expressionism was a highly personal form of art: each painter's distinctive technique called attention to the processes by which his paintings were created, thus making the presence of the painter a feature of the art.[82] The next generation found this personal content oppressive, and through a variety of means produced new forms of art based on impersonality and objectivity. This contrast between these two cohorts is well known. Yet artists, critics, and scholars have all believed these revolutions to be beyond the reach of systematic quantitative analysis. That belief has been shown to be mistaken. For this paper has provided a systematic basis for dating these two revolutions, using quantitative evidence from both auction outcomes

and the narratives of art historians. In the process, it has also given us a precise picture of the contrasting life cycles of creativity of the experimental old masters of Abstract Expressionism and the conceptual young geniuses of Pop Art.

Footnotes

I thank Jenny Li and Alparslan Tuncay for excellent research assistance.

1. Barnett Newman, *Selected Writings and Interviews* (Berkeley: University of California Press, 1992), p. 150.

2. Pepe Karmel, ed., *Jackson Pollock* (New York: Museum of Modern Art, 1999), pp. 15-16.

3. Clement Greenberg, *The Collected Essays and Criticism*, Vol. 2 (Chicago: University of Chicago Press, 1986), pp. 87, 193, 215.

4. Selden Rodman, *Conversations with Artists* (New York: Capricorn Books, 1961), p. 84.

5. James Breslin, *Mark Rothko* (Chicago: University of Chicago Press, 1993), p. 431; Rodman, *Conversations with Artists*, p. 91.

6. Mark Rothko, *Writings on Art* (New Haven: Yale University Press, 2006), p. 36.

7. Harold Rosenberg, *The Tradition of the New* (New York: Da Capo Press, 1994), p. 25.

8. Rothko, *Writings on Art*, pp. 58-59.

9. Newman, *Selected Writings and Interviews*, p. 248.

10. Rosenberg, *The Tradition of the New*, p. 26.

11. Karmel, *Jackson Pollock*, p. 18; Newman, *Selected Writings and Interviews*, p. 184.

12. Arshile Gorky, *Goats on the Roof* (London: Ridinghouse, 2009), p. 395.

13. Rosenberg, *The Tradition of the New*, p. 33.

14. Karmel, *Jackson Pollock*, p. 18; William Seitz, *Arshile Gorky* (New York: Museum of Modern Art, 1962), p. 43.

15. Karlen Mooradian, *The Many Worlds of Arshile Gorky* (Chicago: Gilgamesh Press, 1980), p. 131.

16. Breslin, *Mark Rothko*, p. 468.

17. Elaine de Kooning, *The Spirit of Abstract Expressionism* (New York: George Braziller, 1994), p. 228.

18. Breslin, *Mark Rothko*, p. 526.

19. E.A. Carmean and Eliza Rathbone, *American Art at Mid-Century* (Washington, D.C.: National Gallery of Art, 1978), p. 37.

20. Anna Chave, *Mark Rothko* (New Haven: Yale University Press, 1989), pp. 11-12.

21. David Sylvester, *About Modern Art* (New York: Henry Holt, 1997), p. 353.

22. Thomas Hess, *Willem de Kooning* (New York: Museum of Modern Art, 1968), p. 46.

23. Breslin, *Mark Rothko*, p. 232.

24. Rothko, *Writings on Art*, p. 111.

25. Hess, *Willem de Kooning*, p. 22.

26. Seitz, *Arshile Gorky*, p. 43.

27. Newman, *Selected Writings and Interviews*, p. 240.

28. David Sylvester, *Interviews with American Artists* (New Haven: Yale University Press, 2001), p. 57.

29. William Seitz, *Abstract Expressionist Painting in America* (Cambridge: Harvard University Press, 1983), p. 165.

30. William Rubin, *Frank Stella* (New York: Museum of Modern Art, 1970), p. 32.

31. Jasper Johns, *Writings, Sketchbook Notes, Interviews* (New York: Museum of Modern Art, 1996), p. 113.

32. Caroline Jones, *Machine in the Studio* (Chicago: University of Chicago Press, 1996), p. 90.

33. Sylvester, *Interviews with American Artists*, p. 224.

34. John Gruen, *The Artist Observed* (Chicago: A Cappella Books, 1991), p. 268.

35. Johns, *Writings, Sketchbook Notes, Interviews*, p. 256.

36. Gruen, *The Artist Observed*, p. 225.

37. Tony Scherman and David Dalton, *Pop* (New York: Harper Collins, 2009), p. 132.

38. Sylvester, *Interviews with American Artists*, p. 151.

39. Steven Madoff, ed., *Pop Art* (Berkeley: University of California Press, 1997), p. 198.

40. Sylvester, *Interviews with American Artists*, p. 194.

41. David Bourdon, *Warhol* (New York: Abrams, 1995), p. 138.

42. Madoff, *Pop Art*, p. 104.

43. Jones, *Machine in the Studio*, p. 183.

44. Gregory Battcock, ed., *Minimal Art* (Berkeley: University of California Press, 1995), p. 161.

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46. David Galenson, *Painting Outside the Lines* (Cambridge: Harvard University Press, 2001), p. 141.

47. Kenneth Goldsmith, ed., *I'll Be Your Mirror* (New York: Carroll and Graf, 2004), pp. 17, 19, 196.

48. Calvin Tomkins, *Off the Wall* (New York: Penguin, 1981), pp. 96-97.

49. Harold Rosenberg, *Art and Other Serious Matters* (Chicago: University of Chicago Press, 1985), p. 245.

50. Tomkins, *Off the Wall*, p. 156; Galenson, *Painting Outside the Lines*, p. 142.

51. Kirk Varnedoe, *Pictures of Nothing* (Princeton: Princeton University Press, 2006), p. 194.

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53. Ruscha, *Leave Any Information at the Signal*, p. 116.

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56. Alan Solomon, *Robert Rauschenberg* (New York: Jewish Museum, 1963), not paginated.

57. Harold Rosenberg, *The Anxious Object* (Chicago: University of Chicago Press, 1982), p. 178.

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59. Rothko, *Writings on Art*, p. 111.

60. Emile de Antonio, *Painters Painting* (New York: Abbeville Press, 1984), p. 88.

61. Harold Rosenberg, *Art on the Edge* (Chicago: University of Chicago Press, 1983), p. 80.

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64. Gruen, *The Artist Observed*, p. 222.

65. John Coplans, ed., *Roy Lichtenstein* (New York, Praeger, 1972), p. 51; Graham Bader, ed., *Roy Lichtenstein* (Cambridge, MIT Press, 2009), p. 21.

66. Clement Greenberg, *Homemade Esthetics* (New York: Oxford University Press, 1999), p. 117.

67. Joan Marter, ed., *Off Limits* (New Brunswick, NJ: Rutgers University Press, 1999), p. 137; Gruen, *The Artist Observed*, p. 222.

68. Marter, *Off Limits*, p. 138.

69. David Galenson, *Artistic Capital* (New York: Routledge, 2006), p. 48.

70. Galenson and Lenzu, "Pricing Genius," p. 233.

71. E.g. David Galenson, *Old Masters and Young Geniuses* (Princeton: Princeton University Press, 2006), Chapter 2.

72. Harold Rosenberg, *The De-definition of Art* (Chicago: University of Chicago Press, 1983), p. 130.

73. Paul Schimmel, ed., *Robert Rauschenberg Combines* (Los Angeles: Museum of Contemporary Art, 2005).

74. David Galenson, *Conceptual Revolutions in Twentieth-Century Art* (Cambridge: Cambridge University Press, 2009), Chapter 6.

75. Kirk Varnedoe, *Jasper Johns* (New York: Museum of Modern Art, 1996), p. 124.

76. Rosenberg, *The De-definition of Art*, p. 131.

77. Rubin, *Frank Stella*, p. 149.

78. Galenson, *Old Masters and Young Geniuses*, pp. 41-42.

79. Rothko, *Writings on Art*, p. 157.

80. Tomkins, *Off the Wall*, p. 185.

81. Galenson, *Conceptual Revolutions in Twentieth-Century Art*, Chapter 16.

82. David Rosand, *The Meaning of the Mark* (Lawrence: University of Kansas, 1988), p. 51; Rosenberg, *The Tradition of the New*, p.27.

Table 1: Artists Included in This Study

Artist	Year of birth	Year of death	No. of textbook illustrations
Cohort 1: born 1900-19			
Mark Rothko	1903	1970	91
Arshile Gorky	1904	1948	66
Willem de Kooning	1904	1997	94
Barnett Newman	1905	1970	63
Jackson Pollock	1912	1956	135
Cohort 2: born 1920-39			
Roy Lichtenstein	1923	1997	93
Robert Rauschenberg	1925	2008	106
Andy Warhol	1928	1987	114
Jasper Johns	1930	-	124
Frank Stella	1936	-	71

Source: Galenson, *Artistic Capital*, Table 3.2, p. 48.

Table 2: Non-Parametric Regression Analysis of Auction Prices for Mark Rothko

Age	D[Age=j]	Robust SE	D[Age=j] - D[Age=49]	N[Age=j]
22-31	7.442	0.567	-3.02***	6
34-35	8.403	0.605	-2.06***	6
36-38	7.576	0.462	-2.89***	6
39-41	7.861	0.418	-2.60***	5
42	8.337	0.54	-2.13***	5
43	8.92	0.46	-1.54***	9
44	8.736	0.403	-1.73***	7
45-46	8.456	0.312	-2.01***	8
47-48	10.45	0.278	-0.016	6
49	10.46	0.725	--	5
50	9.923	0.232	-.545**	7
51	9.835	0.27	-.632**	10
52	10.03	0.433	-0.432	5
53	9.92	0.383	-.548*	5
54	10.04	0.239	-.421*	12
55	10	0.249	-.462*	15
56	9.853	0.285	-.615**	10
57	9.903	0.27	-.565**	6
58	9.89	0.291	-.578**	8
59	10.15	0.326	-0.308	5
60-61	9.561	0.353	-.906**	6
62-64	9.455	0.446	-1.01**	7
65	9.695	0.275	-.773***	33
66-67	9.266	0.263	-1.20***	29
Paper	-0.34	0.169		
Other	-0.496	0.372		
Support				
Size	0.85	0.08		
Sale year	Yes			
Adj. R^2	0.904			
Observations	221			

Notes: Dependent variable is natural log of sale price. Prices are in constant 2016 dollars, adjusted with the CPI. Size is the natural log of the surface area of the work in square inches. The sale-year variables are five-year periods, except for the excluded category, which is 2010-16. Canvas is the omitted support group. Age variables are categorized, as indicated; where necessary, ages are combined to yield cell sizes of at least five observations. For age variables, the fourth column is the difference between the estimated age coefficient and that of the peak age, with associated statistical significance. *** denotes significance at the 1% level, ** at 5%, and * at 10%. Robust standard errors are in parentheses. Source: Artnet.

Table 3: Non-Parametric Regression Analysis for Arshile Gorky

Age	D[Age=j]	Robust SE	D[Age=j] - D[Age=39]	N[Age=j]
23-25	5.114	0.465	-2.67***	11
26	5.367	0.477	-2.42***	12
27	5.292	0.36	-2.5***	18
28	5.843	0.519	-1.94***	9
29	5.765	0.533	-2.02***	7
30	5.797	0.41	-1.99***	14
31	5.55	0.498	-2.24***	14
32	5.492	0.401	-2.29***	18
33	5.448	0.45	-2.34***	9
34	6.065	0.475	-1.72***	10
35-36	6.199	0.557	-1.59***	10
37	6.603	0.599	-1.18**	7
38	6.33	0.538	-1.46***	10
39	7.792	0.706	-	10
40	6.966	0.397	-.826**	11
41	6.273	0.417	-1.51***	23
42	6.762	0.386	-1.03***	28
43-44	6.831	0.433	-.96**	18
Paper	-0.984	0.266		
Other	-0.952	0.215		
Support Size	1.069	0.085		
Sale Year	Yes			
Adj. R^2	0.648			
Observations	239			

Notes: See Table 2.

Table 4: Non-Parametric Regression Analysis for Willem de Kooning

Age	D[Age=j]	Robust SE	D[Age=j] - D[Age=48]	N[Age=j]
20-34	5.795	0.742	-3.17***	6
35-38	6.054	0.637	-2.91***	8
39-42	6.66	0.836	-2.30***	8
43	7.887	0.767	-1.07*	7
44-45	7.584	0.882	-1.38*	7
46-47	7.931	0.609	-1.03*	13
48	8.965	0.681	-	10
49	8.316	0.593	-0.648	9
50-51	6.459	0.756	-2.50***	10
52-53	7.021	0.963	-1.94**	6
54	6.692	0.619	-2.27***	20
55	5.237	0.689	-3.72***	11
56	5.313	0.671	-3.65***	15
57-58	5.958	0.638	-3.00***	10
59	6.1	0.569	-2.86***	7
60	5.63	0.576	-3.33***	30
61	5.729	0.559	-3.23***	44
62	6.544	0.552	-2.42***	28
63	5.17	0.565	-3.79***	21
64	5.035	0.561	-3.93***	29
65	4.169	0.562	-4.79***	39
66	5.094	0.576	-3.87***	25
67	4.339	0.618	-4.62***	7
68	5.018	0.603	-3.94***	11
69	4.82	0.594	-4.14***	6
70	5.047	0.618	-3.91***	8
71	5.525	0.6	-3.44***	18
72	5.39	0.589	-3.57***	19
73	5.433	0.565	-3.53***	31
74	4.561	0.598	-4.40***	13
75	4.938	0.568	-4.02***	20
76	5.22	0.626	-3.74***	8
77-78	5.475	0.566	-3.48***	10
79	4.943	0.588	-4.02***	9
80	4.778	0.646	-4.18***	8
81-82	4.817	0.562	-4.14***	10
83	4.536	0.626	-4.42***	5
85	3.964	0.7	-5.00***	5
Paper	-0.836	0.163		
Other	-1	0.15		
Support				
Size	1.187	0.056		
Sale year	Yes			
Adj. R^2	0.753			
Observations	551			

Notes: See Table 2.

Table 5: Non-Parametric Regression Analysis for Roy Lichtenstein

Age	D[Age=j]	Robust SE	D[Age=j] - D[Age=41]	N[Age=j]
24-27	7.746	0.503	-4.11***	7
28	7.226	0.433	-4.63***	9
29	7.536	0.425	-4.32***	5
30-31	7.226	0.382	-4.63***	8
32-33	7.614	0.485	-4.24***	6
34-35	6.547	0.418	-5.31***	6
38	11.78	0.399	-0.071	6
39	11.39	0.418	-0.458	11
40	11.07	0.559	-.785*	10
41	11.85	0.543	-	31
42	10.33	0.377	-1.51***	24
43	9.791	0.604	-2.06***	9
44	9.785	0.329	-2.07***	15
45	10.27	0.377	-1.58***	14
46	8.948	0.741	-2.90***	12
47	7.584	0.339	-4.27***	7
48	8.42	0.583	-3.43***	10
49	10.07	0.333	-1.78***	14
50	10.48	0.325	-1.37***	9
51	9.716	0.675	-2.14***	6
52	9.733	0.447	-2.12***	7
53-54	9.637	0.56	-2.21***	14
55-56	9.346	0.783	-2.51***	8
57	9.766	0.308	-2.08***	12
58-59	8.792	0.481	-3.06***	10
60	8.507	0.615	-3.35***	8
61	9.044	0.439	-2.81***	6
62-63	9.157	0.345	-2.7***	20
64-65	8.714	0.308	-3.14***	5
66-67	10.04	0.478	-1.81***	13
68	9.566	0.567	-2.29***	7
69	9.99	0.433	-1.86***	5
71	9.418	1.104	-2.43**	5
72	11.14	0.404	-.712*	11
73	9.144	1.008	-2.71***	5
74	10.34	0.44	-1.50***	10
Paper	-1.39	0.298		
Other	-2.1	0.215		
Support Size	0.643	0.062		
Sale Year	Yes			
Adj. R^2	0.7			
Observations	363			

Notes: See Table 2.

Table 6: Non-Parametric Regression Analysis for Robert Rauschenberg

Age	D[Age=j]	Robust SE	D[Age=j] - D[Age=28-30]	N[Age=j]
20-27	8.779	0.997	-2.22**	12
28-30	11	0.912	-	5
31-32	9.06	0.871	-1.94**	7
33	9.294	0.896	-1.70*	7
34-35	9.165	0.935	-1.83**	7
36	9.039	0.924	-1.96**	8
37	8.3	0.888	-2.70***	7
38	8.475	0.975	-2.52***	9
39-40	8.265	0.919	-2.73***	7
41	8.449	0.875	-2.55***	8
42-43	7.679	0.875	-3.32***	14
44-45	6.946	1.009	-4.05***	12
46-47	4.385	0.924	-6.61***	11
48	6.466	0.933	-4.53***	5
49	5.089	0.895	-5.91***	25
50	6.066	0.908	-4.93***	19
52-53	5.949	0.984	-5.05***	11
54	5.892	0.933	-5.11***	21
55	6.316	0.882	-4.68***	15
56-57	4.89	0.89	-6.11***	30
58-59	5.385	0.97	-5.61***	10
60-61	6.466	0.883	-4.53***	7
62	6.542	0.866	-4.46***	10
63	5.425	0.915	-5.57***	25
64	6.443	0.885	-4.56***	13
65	6.028	0.895	-4.97***	13
66	6.349	0.912	-4.65***	15
67-69	5.604	0.947	-5.39***	10
70	6.138	0.892	-4.86***	6
71	6.485	0.907	-4.51***	9
72	7.255	0.914	-3.74***	9
73-82	6.819	0.898	-4.18***	9
Paper	-1.04	0.238		
Other	-0.863	0.206		
Support Size	0.818	0.063		
Sale Year	Yes			
Adj. R^2	0.662			
Observations	374			

Notes: See Table 2.

Table 7: Non-Parametric Regression Analysis for Jasper Johns

Age	D[Age=j]	Robust SE	D[Age=j] - D[Age=30]	N[Age=j]
26-27	11.63	0.551	-0.509	9
28	11.66	0.56	-0.479	7
29	12.14	0.541	-0.004	14
30	12.14	0.783	-	6
31	11.24	0.547	-.896*	8
32	10.84	0.552	-1.29**	8
33-35	10.42	0.892	-1.71*	5
36-37	9.868	0.799	-2.27***	5
38-39	9.484	0.657	-2.66***	5
40-41	9.112	1.341	-3.03**	8
42-43	11.16	0.536	-.976*	5
44-47	10.16	0.998	-1.98**	6
48-50	10.34	0.536	-1.79***	5
51-53	10.78	0.879	-1.36*	5
54-57	9.274	0.733	-2.87***	7
58-60	9.496	0.535	-2.64***	6
61-65	9.406	0.693	-2.73***	5
68-82	9.797	0.537	-2.34***	7
Paper	-1.59	0.393		
Other	-0.646	0.321		
Support Size	0.806	0.093		
Sale Year	Yes			
Adj. R^2	0.507			
Observations	121			

Notes: See Table 2.

Table 8: Non-Parametric Regression Analysis for Frank Stella

Age	D[Age=j]	Robust SE	D[Age=j] - D[Age=25]	N[Age=j]
20-22	7.658	0.345	-2.47***	12
23	10.03	0.489	-0.098	7
24	10.06	0.369	-0.063	14
25	10.13	0.352	-	14
26	9.65	0.3	-.481*	10
27	9.527	0.32	-.604*	7
28	9.413	0.449	-.719*	10
29-30	8.41	0.329	-1.72***	27
31	7.687	0.401	-2.44***	11
32	7.924	0.327	-2.20***	21
33	7.126	0.474	-3.00***	11
34	7.414	0.371	-2.71***	10
35	7.07	0.407	-3.06***	10
36	7.281	0.404	-2.85***	14
37	7.601	0.427	-2.53***	22
38	8.676	0.413	-1.45***	10
39	6.397	0.438	-3.73***	10
40-41	8.237	0.386	-1.89***	13
42	8.445	0.335	-1.68***	12
43-44	7.671	0.421	-2.46***	25
45	7.851	0.79	-2.28***	5
46	8.743	0.469	-1.38***	6
47	8.678	0.506	-1.45***	6
48-53	6.412	0.673	-3.71***	8
54-59	7.28	0.608	-2.85***	9
60-65	6.26	0.575	-3.87***	6
Paper	-1.35	0.228		
Other	-1.15	0.253		
Support Size	0.643	0.061		
Sale Year	Yes			
Adj. R^2	0.767			
Observations	310			

Notes: See Table 2.

Table 9: Parametric Regression Analysis for Barnett Newman

Age	1.0559***
	(0.3339)
Age²	-0.0101***
	(0.0033)
Canvas	0.2084
	(0.6197)
Size	0.8819***
	(0.1848)
Constant	-17.3850*
	(8.5344)
Sale Year	Yes
Adj. R^2	0.782
Observations	39

Notes: Age variables are continuous. For other variables, see Table 2.

Table 10: Peak Ages, by Artist

Artist	Age at peak value	Age of most illustrations
Mark Rothko	47-49, 52, 59	46
Arshile Gorky	39	40
Willem de Kooning	48-49	48
Barnett Newman	48	46
Jackson Pollock	36-38	38
Roy Lichtenstein	38-39, 41	40
Robert Rauschenberg	28-30	34
Andy Warhol	34-35	34
Jasper Johns	26-30	25
Frank Stella	23-25	23

Sources: Ages at peak value are derived from Tables 2-9, above, except for Pollock and Warhol, whose ages are derived from Galenson and Lenzu, "Pricing Genius," Tables 2-3, pp. 224-25. Age of most illustrations is based on the 50 textbooks surveyed for this study. See the Appendix for the listing of these.

Table 11: Peak Dates, by Artist

Artist	Date at peak value	Date of most illustrations
Mark Rothko	1950-52, 1955, 1962	1949
Arshile Gorky	1943	1944
Willem de Kooning	1952-53	1952
Barnett Newman	1953	1951
Jackson Pollock	1948-50	1950
Roy Lichtenstein	1961-62, 1964	1963
Robert Rauschenberg	1953-55	1959
Andy Warhol	1962-63	1962
Jasper Johns	1956-60	1955
Frank Stella	1959-61	1959

Source: Tables 1 and 10, above.

Table 12: Distributions of Illustrations Over Artists' Careers

	Percentage of artist's total illustrations that represent work done:		
Artist	**Prior to peak year**	**In peak year**	**After peak year**
Mark Rothko	14	12	74
Arshile Gorky	33	38	29
Willem de Kooning	30	28	42
Barnett Newman	35	33	32
Jackson Pollock	38	47	15
Roy Lichtenstein	18	40	42
Robert Rauschenberg	42	26	32
Andy Warhol	4	52	44
Jasper Johns	0	30	70
Frank Stella	4	22	74

Sources: see Appendix.

Appendix

The 50 books surveyed for this study are listed here, ordered by date of publication.

1. Collings, Matthew, *This is Modern Art* (New York: Watson-Guptill Publications, 2000).
2. Hopkins, David, *After Modern Art* (Oxford: Oxford University Press, 2000).
3. Kemp, Martin, ed., *The Oxford History of Western Art* (Oxford: Oxford University Press, 2000).
4. Bell, Cory, *Modern Art* (New York: Watson-Guptill Publications, 2001).
5. Blistène, Bernard, *A History of 20th-Century Art* (Paris: Flammarion, 2001).
6. Janson, H.W., and Anthony Janson, *History of Art*, sixth ed. (London: Thames and Hudson, 2001).
7. Lucie-Smith, Edward, *Movements in Art Since 1945* (London: Thames and Hudson, 2001).
8. Richter, Klaus, *Art* (Munich: Prestel Verlag, 2001).
9. Doss, Erika, *Twentieth-Century American Art* (Oxford: Oxford University Press, 2002).
10. Honour, Hugh, and John Fleming, *The Visual Arts*, sixth ed. (New York: Harry N. Abrams, 2002).
11. Johnson, Paul, *Art* (New York: Harper Collins, 2003).
12. Joselit, David, *American Art Since 1945* (New York: Thames and Hudson, 2003).
13. Arnason, H.H., *History of Modern Art*, fifth ed. (Upper Saddle River, NJ: Prentice Hall, 2004).
14. Arnold, Dana, *Art History* (Oxford: Oxford University Press, 2004).
15. Foster, Hal, et al., *Art Since 1900* (New York: Thames and Hudson, 2004).
16. Hunter, Sam; John Jacobus, and Daniel Wheeler, *Modern Art*, third ed. (New York: Prentice Hall, 2004).
17. Bjelajac, David, *American Art*, second ed. (Upper Saddle River, NJ: Prentice Hall, 2005).
18. Cottington, David, *Modern Art* (Oxford: Oxford University Press, 2005).
19. Cumming, Robert, *Art* (New York: DK Publishing, 2005).
20. Eschenburg, Barbara, et al., *Masterpieces of Western Art*, Vol. 2 (Cologne: Taschen, 2005).
21. Ruhrberg, Karl, *Art of the 20th Century*, Vol. 1 (Cologne: Taschen, 2005).
22. Stokstad, Marilyn, *Art History*, revised second ed. (Upper Saddle River, NJ: Pearson Education, 2005).

23. Zuffi, Stefano, *Dictionary of Painters* (New York: Barnes and Noble, 2005).
24. Adams, Laurie, *Art Across Time*, third ed. (Boston: McGraw Hill, 2006).
25. Lewis, Michael, *American Art and Architecture* (New York: Thames and Hudson, 2006).
26. Thompson, Jon, *How To Read a Modern Painting* (New York: Abrams, 2006).
27. Bell, Julian, *Mirror of the World* (New York: Thames and Hudson, 2007).
28. Buchholz, Elke, et al., *Art* (New York: Abrams, 2007).
29. Davies, Penelope, et al. *Janson's History of Art*, seventh ed. (Upper Saddle River, NJ: Pearson Prentice Hall, 2007).
30. Strickland, Carol, *The Annotated Mona Lisa*, second ed. (Kansas City: Andrews McMeel, 2007).
31. Gualdoni, Flamino, Art (Milan: Skira, 2008).
32. Harrison, Charles, *An Introduction to Art* (New Haven: Yale University Press, 2009).
33. Lucie-Smith, Edward, *Lives of the Great Modern Artists*, revised ed. (London: Thames and Hudson, 2009).
34. Dempsey, Amy, *Styles, Schools, and Movements*, second ed. (London: Thames and Hudson, 2010).
35. Fineberg, Jonathan, *Art Since 1940*, third ed. (Upper Saddle River, NJ: Prentice Hall, 2011).
36. Gompertz, Will, *What Are You Looking At?* (New York: Dutton, 2012).
37. Heine, Florian, *Art* (Munich: Prestel, 2012).
38. Paglia, Camille, *Glittering Images* (New York: Pantheon Books, 2012).
39. Parmesani, Loredana, *Art of the Twentieth Century and Beyond* (Milan, Skira, 2012).
40. Pohl, Frances, *Framing America*, third ed. (New York: Thames and Hudson, 2012).
41. Chilvers, Ian, et al., *Art That Changed the World* (New York: DK Publishing, 2013).
42. Eimert, Dorothea, *Art and Architecture of the Twentieth Century* (New York: Parkstone Press, 2013).
43. Hodge, Susie, *Art* (New York: Quercus, 2014).
44. Kemp, Martin, *Art in History* (London: Profile, 2014).
45. Kleiner, Fred, *Gardner's Art Through the Ages*, fourteenth ed. (Boston: Wadsworth, 2014).
46. Arnold, Dana, *A Short Book About Art* (London: Tate Publishing, 2014).
47. Ball, Larry, et al., *30,000 Years of Art* (London: Phaidon Press, 2015).

48. DeWitte, Debra, et al., *The Thames & Hudson Introduction to Art* (London: Thames and Hudson, 2012).
49. Hodge, A.N., *The Story of Art* (London: Arcturus, 2015).
50. Holzwarth, Hans, ed., *Modern Art* (Cologne: Taschen, 2016).