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QUANTIFYING ARTISTIC SUCCESS:  
RANKING FRENCH PAINTERS - AND PAINTINGS -  
FROM IMPRESSIONISM TO CUBISM

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Quantifying Artistic Success: Ranking French Painters -  
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### **ABSTRACT**

For 35 leading painters who lived in France during the first century of modern art, this paper uses textbook illustrations as the basis for measuring the importance of both painters and individual paintings. The rankings pose an interesting puzzle: why do some of the greatest artists not produce famous paintings, and why do some relatively minor artists produce some of the most famous individual paintings? The answer may lie in an important difference in approach between experimental and conceptual painters. Experimental artists work incrementally, their innovations appear gradually, and they generally do their best work late in their careers; conceptual artists innovate more suddenly, produce individual breakthrough works, and usually do their best work early in their careers. This paper demonstrates that artistic success can usefully be quantified, and that doing so increases our understanding of the working methods of modern painters.

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If ever there was a study which, needing as it does the co-operation of so many sciences, would benefit by sharing the life of the University, it is surely that of Art-history... [W]e have such a crying need for systematic study in which scientific methods will be followed wherever possible, where at all events the scientific attitude may be fostered and the sentimental attitude discouraged.

Roger Fry<sup>1</sup>

Robert Storr, a curator at New York's Museum of Modern Art, recently declared that an artist's success "is completely unquantifiable."<sup>2</sup> By studying a key group of painters - those who invented and first developed modern art - this paper shows that quantitative measures not only can produce informative rankings of the relative importance of both painters and paintings, but furthermore can be used to highlight an important difference in approach among major modern artists that has significant implications for our understanding of their careers and their accomplishments. The analysis of this paper consequently demonstrates that artistic success can be quantified, and that doing so enriches our understanding of the evolution of modern art.

### The Artists

The goal in choosing the artists to be studied here was to select the most important painters who lived and worked in France, the birthplace of modern art, during roughly the first century of that art's history. This was done by using five leading texts on the history of modern art.<sup>3</sup> The first step was to list all artists who had at least one painting reproduced in three or more of these five books. The 27 artists included in this list who had been born in France between 1819 (the birth year of Gustave Courbet) and 1900 were placed in the sample. Another 8 artists on the list who were born elsewhere during the same period but who spent substantial portions of their careers in France were also placed in the sample.

The resulting sample of 35 painters is shown in Table 1. In addition to Courbet and

Manet, who are generally considered key figures in the transition to modern painting, the sample contains the central members of a series of important groups of French artists - the Impressionists, the Post-Impressionists, the Fauves, the Cubists, and the Surrealists. The sample members therefore include the artists who dominated modern painting in France in the nineteenth century and well into the twentieth. They also include a number of less prominent artists, and this will serve to test whether the method used here can clearly identify the leading artists.

### The Data

[Q]uality in art is not just a matter of private experience. There is a *consensus* of taste. The best taste is that of the people who, in each generation, spend the most time and trouble on art, and this best taste has always turned out to be unanimous, within certain limits.

Clement Greenberg<sup>4</sup>

Texts about art history are also the source of the evidence analyzed in this study. This evidence was drawn from all available books, published in English in the past 30 years, that provide illustrated surveys of modern painting.<sup>5</sup> A total of 33 such books were found. The data set for this study was created by listing every reproduction of every painting shown in these books by all of the 35 artists in the sample.

Texts on art history were chosen as the source of the data in order to draw on the judgments of art scholars as to the most important painters and paintings. The dozens of authors and co-authors represented include many of the most distinguished art historians, critics, and curators of the recent past and present. Although the eminence of the authors varies, the number of books consulted is sufficiently large that no important result depends on the opinions of any one author, or the emphasis of any one book.

This investigation is obviously done in the spirit of a citation study. Yet using illustrations of paintings as the unit of measurement, instead of such alternatives as the number of times a painter or painting is mentioned, has the advantage that illustrations are substantially more costly than written references. In addition to the greater space taken up by the illustration and the greater cost of printing, the author must obtain permission to reproduce each painting, and of course a suitable photograph. This cost in time and money implies that authors may be more selective in their use of illustrations, and that illustrations may consequently provide a more accurate indication than written references of what an author believes to be genuinely important.

The objection might be raised that the paintings reproduced in textbooks are not the most important, but rather the most easily accessible to the author, or those that require the lowest royalty payments. Authors would deny this - Marilyn Stokstad, for example, declares that her book covers "the world's most significant paintings" - but such claims might be suspected of disingenuousness.<sup>6</sup> Yet for major artists, whose work has had decades to make its way into museums by purchase and bequest, the constraint posed by ease of access is not likely to bind tightly. Scores of public museums own the work of the artists considered by this study, in quantities generally far greater than the requirements of the textbooks. Even if we restrict our view to a small number of the greatest museums, the numbers of works by these artists are substantial. So for example 35 different works by Picasso just from the collection of New York's Museum of Modern Art are illustrated in the 33 textbooks; 19 different illustrated Monets are drawn just from the collections of the Louvre and the Musée d'Orsay, as are 19 works of Degas, and 11 of Manet.<sup>7</sup> And these museums often hold many more works than are displayed, or reproduced: so for example, Chicago's Art Institute alone owns a total of 49 paintings by Monet,

31 by Manet, 27 by Picasso, and 18 by Matisse.<sup>8</sup> The works owned by museums also tend to be important ones, because curators - particularly at major museums - have little interest in acquiring unimportant works. Thus it seems clear that authors can readily choose among large numbers of important works in selecting the paintings to illustrate their textbooks.

### The Rankings and the Puzzles

The two most basic rankings from these data can be presented immediately: Table 2 ranks the artists by total illustrations, while Table 3 ranks individual paintings by the same measure. For those acquainted with the history of modern art, neither list appears surprising in itself. The artists at the top of Table 2 are the greatest masters of modern French painting: Picasso, Matisse, and Braque are clearly the major figures of the twentieth century, as were Cézanne, Manet, and Monet those of the nineteenth. And the paintings in Table 3 are all classic works, their images immediately familiar to students of modern art.

Yet puzzles appear when Tables 2 and 3 are compared. Two of the five highest-ranked artists in total illustrations - Cézanne and Monet - have no paintings among the 10 highest-ranked works in Table 3. Cézanne's only painting in Table 3, ranked just twelfth, appears in less than half of all the books surveyed, and Monet's only entry, ranked in a tie for nineteenth place, appears in only one-third of the books. Furthermore, two artists among the leading ten in Table 2, Braque and Degas, fail to have even a single painting among the 21 listed in Table 3.

Conversely, some artists ranked below the top group in Table 2 have paintings very prominently placed in Table 3. Seurat ranks only fourteenth in total illustrations, but his painting of a Sunday afternoon in a park near Paris ranks third in Table 3, reproduced in over 70% of the

books surveyed, more than any other painting executed in the nineteenth century. Duchamp, ranked only eleventh in Table 2, remarkably has two paintings among the first seven in Table 3 - both of them above any work by such masters as Cézanne, Matisse, and Monet. And not only do Picasso and Manet each have three paintings listed in Table 3, but so does Courbet, who ranks only twelfth overall among artists in Table 2.

Why did some of the most important artists not produce the most important individual works? Why were some of the most important individual paintings produced by painters who do not rank among the most important artists? Answering these questions obviously requires consideration of what makes modern painters, and paintings, important.

### Importance in Modern Art

For modern artists, importance is primarily a function of innovation. The central place of innovation in modern art has been generally recognized by critics and scholars. Thus in 1968 the critic Clement Greenberg remarked that “Until the middle of the last century innovation in Western art had not had to be startling or upsetting; since then ... it has had to be that.”<sup>9</sup>

Greenberg’s archrival, Harold Rosenberg, stated simply that “the only thing that counts for Modern Art is that a work shall be NEW.”<sup>10</sup> Historian Meyer Schapiro remarked in 1952 on the “unique intensity of the growth of styles in painting since the 1830s,” and observed: “Every great painter in that period (and many a lesser one) is an innovator in the structure of painting.”<sup>11</sup>

Historian Alan Bowness agreed in 1972 that the recent stress on innovation is not new: “we are always persuaded that there has never been a more revolutionary period, never an age when art was more experimental. This remark, however, has been made about contemporary art for a great

many years now - certainly since Manet exhibited at the Salon des Refusés [in 1863].”<sup>12</sup>

Sociologist Raymonde Moulin observed that “Artists since the impressionists have been in the business of challenging established values and perpetually renovating the house of art. The history of modern art has been one of new tendencies establishing themselves in opposition to the old, only to be quickly challenged by still newer ones.”<sup>13</sup> The critic Michael Fried described the history of modern art as one of “perpetual revolution,” arguing that “the best model for the evolution of modernist painting is that of the dialectic understood as an unceasing process of perpetual radical self-criticism.”<sup>14</sup> More simply, critic Arthur Danto declared that “the Paris art world of the 1880s was like the New York art world of the 1980s - competitive, aggressive, swept by the demand that artists come up with something new or perish.”<sup>15</sup> And historian Leo Steinberg remarked that “Modern art always projects itself into a twilight zone where no values are fixed.”<sup>16</sup>

Since the birth of modern painting in the mid-nineteenth century, artists have made innovations in many areas, including subject matter, composition, scale, materials, and techniques. But whatever the nature of an artist’s innovation, its importance has been determined primarily by its influence on other artists. The more widespread the adoption of an innovation by other artists, the more important its creator. The importance of individual works similarly depends on the extent of their influence. The most important individual paintings are those that announce the first appearance of innovations that become widely adopted.

Recognition of the key role of innovation in determining the importance of modern painters and paintings allows a restatement of the puzzles raised earlier, derived from the differences in rankings between Tables 2 and 3. Specifically, why did some of the most important



innovators not produce individual works that announced important innovations, and why were many of the most important individual embodiments of innovations not executed by the most important innovators?

Answering these questions requires recognition of the fact that there have been two very different types of innovation in the history of modern art. What distinguishes them is not their relative importance, for instances of both rank among the major innovations in modern art. What distinguishes them is rather the method by which they are produced. One of these methods can be called esthetically motivated experimentation, the other conceptual execution.

Modern artists who have produced experimental innovations have generally been prompted by esthetic considerations; their art has usually sought to express visual perceptions or sensations. They typically describe their goals as elusive, and difficult to describe precisely. Their usual procedure has consequently been incremental. These artists repeat themselves, painting the same subjects many times - sometimes painting over a single work many times - in an experimental process of trial and error. As a result, their innovations often appear gradually over long periods: they are not declared in any single work, but rather emerge piecemeal in a large body of work. These artists are often uncertain of their progress, and commonly believe that their experiments produce no conclusive results, so that even the greatest of these innovators often express frustration at their inability to achieve their desired goals.

In contrast, modern artists who have produced conceptual innovations have generally been motivated by criteria that are other than visual; their art has typically been intended to express emotions or ideas. The goals of their work, and the methods of its execution, can often be stated precisely, in advance of its production. Their work is consequently often systematic, with all

major decisions made before they begin to paint, and they often describe the execution of a painting as perfunctory. Conceptually-driven innovations often appear suddenly: a new idea produces a result significantly different not only from other artists' work, but also from the artist's own previous work. One consequence of the suddenness of these innovations is that they can be embodied in individual breakthrough works.

The long periods often required for experimental innovations mean that they frequently occur late in an artist's career, but conceptual innovations can occur at any age. Extreme conceptual innovations are in fact most often made by young artists, who are not yet committed to existing conventions and accustomed to traditional methods, and who might consequently perceive and appreciate more radical approaches.

### Experimental and Conceptual Innovators

Certain artists clearly illustrate each of these types. In just two letters written in September, 1906, the month before his death, the 67-year-old Paul Cézanne expresses nearly all the characteristics of the experimental innovator: the visual criteria, the view of his enterprise as research, with the need for accumulation of evidence, the incremental nature of his procedure, its slowness, the repeated study of a single motif, the total absorption in the pursuit of an elusive goal, and the artist's dissatisfaction with his perceived lack of success in achieving the desired results. Thus he wrote to his son:

I must tell you that as a painter I am becoming more clear-sighted before nature, but that with me the realization of my sensations is always painful. I cannot attain the intensity that is unfolded before my senses. I have not the magnificent richness of coloring that animates nature. Here on the bank of the river

the motifs multiply, the same subject seen from a different angle offers subject for study of the most powerful interest and so varied that I think I could occupy myself for months without changing place, by turning now more to the right, now more to the left.

Two weeks later he wrote to the painter Emile Bernard:

...now it seems to me that I see better and that I think more correctly about the direction of my studies. Will I ever attain the end for which I have striven so much and so long? I hope so, but as long as it is not attained a vague state of uneasiness persists which will not disappear until I have reached port, that is until I have realized something which develops better than in the past, and thereby can prove the theories - which in themselves are always easy; it is only giving proof of what one thinks that raises serious obstacles. So I continue to study.

But I have just re-read your letter and I see that I always answer off the mark. Be good enough to forgive me; it is, as I told you, this constant preoccupation with the aim I want to reach, which is the cause of it.

I am always studying after nature and it seems to me that I make slow progress. I should have liked you near me, for solitude always weighs me down a bit. But I am old, ill, and I have sworn to myself to die painting ...<sup>17</sup>

The irony of these expressions of frustration stems from the fact that in time not only would Cézanne come to be generally recognized as the most important painter of his generation, but that it would be the work he did late in his life that would be considered his greatest contribution.<sup>18</sup>

The only two of his paintings that appear in ten or more of the texts considered here were both completed within the final two years of his life.

The incremental nature of Cézanne's approach was eloquently discussed by his biographer, Roger Fry:

For him, as I understand his work, the ultimate synthesis of a design was never revealed in a flash; rather he approached it with infinite

precautions, stalking it, as it were, now from one point of view, now from another, and always in fear lest a premature definition might deprive it of something of its total complexity. For him the synthesis was an asymptote toward which he was for ever approaching without ever quite reaching it; it was a reality, incapable of complete realization ... But when one speaks thus of Cézanne it is necessary to explain that all this refers to Cézanne in the plenitude of his development, after many years of research, after the failure of many attempts in different directions - to Cézanne when he had discovered his own personality.<sup>19</sup>

Meyer Schapiro pointed to the same characteristic when he wrote that “Cézanne’s method was not a foreseen goal which, once reached, permitted him to create masterpieces easily. His art is a model of steadfast searching and growth.”<sup>20</sup>

Late in his life, in his letters Cézanne repeatedly stressed the visual character of his goal. In his opinion, his progress was slow because of the complexity of nature, the difficulty of training his eye to see it more clearly, and the problems involved in developing a technique that would express his perceptions; thus he wrote to a friend in 1904 that the knowledge of how to express his feeling for nature “is only to be acquired through very long experience.”<sup>21</sup> His procedures in painting were painstaking in the extreme. His dealer and friend Vollard reported that “For one who has not seen him paint, it is difficult to imagine how slow and painful his progress was on certain days.” Vollard had occasion to know, for when Cézanne agreed to paint his portrait, during Cézanne’s visits to Paris the dealer would sit in the artist’s studio each morning for three and a half hours. After 115 of these sittings over a period of three years, Cézanne left the painting to return to his home in Aix. Even then, however, he considered the portrait unfinished, insisting that Vollard leave in the studio the clothes in which he had posed, in anticipation of additional sessions at some later date. Vollard understood that Cézanne almost invariably considered his

work provisional: “When Cézanne laid a canvas aside, it was almost always with the intention of taking it up again, in the hope of bringing it to perfection.”<sup>22</sup>

Cézanne’s experimental approach may also explain the casual disregard he often showed for his completed works, an aspect of his behavior that has often been remarked on as a curious and unfortunate idiosyncrasy. Vollard recounted a number of examples: how Cézanne allowed the dealer Tanguy to cut pieces from his canvases for collectors who could not afford to buy larger paintings; Cézanne’s amusement when his young son poked holes in his father’s paintings; Cézanne’s random destruction of paintings in his studio when he wished to vent his anger; and the understanding of Cézanne’s servants that they were to destroy canvases that they found discarded in the garden of his house.<sup>23</sup> Recently, historian Richard Shiff disapprovingly described what he called “the unprofessional character of Cézanne’s enterprise - as a rule, he neither signed nor dated his paintings, left parts of them in varying states of finish, and often returned to repaint canvases with the result of placing one image over another incompatible one.”<sup>24</sup> Rather than simply demonstrating his eccentricity or his lack of respect for his craft, these accounts of apparent negligence may be evidence of Cézanne’s view of his paintings as a series of experiments: once he had learned their lessons in the process of painting them, he no longer needed them. Thus the critic Clive Bell wrote that “For him every picture was a means ... something he was ready to discard as soon as it had served his purpose. He had no use for his own pictures. To him they were experiments. He tossed them into bushes, or left them in the open fields...”<sup>25</sup> Cézanne’s own language reflects this attitude, as for example in his admonition to Bernard: “painters must devote themselves entirely to the study of nature and try to produce pictures which will be an education.”<sup>26</sup> Because it was education that mattered, individual works

were not crucial: “When a picture isn’t realized, you pitch it in the fire and start another one!”<sup>27</sup>

Among the artists in this study, the most important example of the conceptually driven innovator is Picasso. A statement of his, first published in 1923, clearly presents his view that art should communicate conceptual discoveries, and expresses his contempt for the experimental approach:

I can hardly understand the importance given to the word research in connection with modern painting. In my opinion to search means nothing in painting. To find, is the thing ...

Among several sins that I have been accused of committing, none is more false than the one that I have, as the principal objective in my work, the spirit of research. When I paint my object is to show what I have found and not what I am looking for ...

They speak of naturalism in opposition to modern painting. I would like to know if anyone has ever seen a natural work of art. Nature and art, being two different things, cannot be the same thing. Through art we express our conception of what nature is not ...

I also often hear the word evolution. Repeatedly I am asked to explain how my painting evolved. To me there is no past or future in art ... Art does not evolve by itself, the ideas of people change and with them their mode of expression ...

The several manners I have used in my art must not be considered as an evolution, or as steps toward an unknown ideal of painting ... I have never made trials or experiments. Whenever I have had something to say, I have said it in the manner in which I have felt it ought to be said.<sup>28</sup>

Picasso’s attitude toward his own completed works contrasted sharply with Cézanne’s casual disregard. He became furious if he saw that any of his paintings had been varnished or cleaned.<sup>29</sup> He always signed his works, and he often dated them not only with the customary year but also with the month and day of their execution.<sup>30</sup> Unlike Cézanne, who would often destroy

works he considered unsuccessful, Picasso wanted to leave all his works to posterity: “I paint the way some people write their autobiography. The paintings, finished or not, are the pages of my journal, and as such they are valid. The future will choose the pages it prefers. It’s not up to me to make the choice.”<sup>31</sup> Far from considering his work as merely the residue of past experiments, Picasso’s words and actions indicate that he regarded every piece as a potentially significant work that would someday be of historical interest.

John Golding, a historian of Cubism, underscored the conceptual rather than visual basis of Picasso’s great early innovation:

...the Cubism of Picasso and Braque was to be essentially conceptual. Even in the initial stages of the movement, when the painters still relied to a large extent on visual models, their paintings are not so much records of the sensory appearance of their subjects, as expressions in pictorial terms of their idea or knowledge of them. “I paint objects as I think them, not as I see them,” Picasso said....<sup>32</sup>

Picasso painted the *Demoiselles d’Avignon*, generally regarded as the forerunner of Cubism, in 1907, at the age of 26. He and Georges Braque went on to develop Cubism between that date and the outbreak of World War I. Picasso would make other important contributions later in his long career, but this was the most significant. Of the *Demoiselles* in particular, critic John Russell wrote “there is no doubt that the *Demoiselles* is the white whale of modern art: the legendary giant with which we have to come to terms sooner or later,” while historian George Heard Hamilton declared that “it has been recognized as a watershed between the old pictorial world and the new.”<sup>33</sup> Similarly, Golding characterized Cubism as “perhaps the most important and certainly the most complete and radical artistic revolution since the Renaissance,” and historian Douglas Cooper described it as “the most potent generative force in twentieth-century

art.”<sup>34</sup> The *Demoiselles* is a classic example of a single work that declares a conceptual innovation. Remarkably, agreement among historians on the importance of the painting is so great that it fails to appear in only three of the 33 books examined by this study.

### Resolving the Puzzles: A Hypothesis

This distinction between the two methods by which major modern artists have produced innovations suggests a resolution of the puzzles raised earlier. First, why do some of the most important artists not produce the most important individual works? The answer may be that experimental innovators produce bodies of work that lead incrementally to their innovations, rather than individual breakthrough works. Cézanne’s work provides an obvious example. His attempt to create depth without sacrificing the colors of the Impressionists, through the development of his distinctive composition and brushstroke, is witnessed dramatically in his late views of Mont Sainte-Victoire. Had he produced just one of these, it would likely rival the *Demoiselles d’Avignon* in importance. But instead he made dozens; 13 different paintings of the mountain done in just his last two decades are illustrated in the books surveyed here, and together they appear 30 times.<sup>35</sup>

Besides Cézanne, the most prominent experimental innovator considered in this study is probably Monet. Monet’s own descriptions of his method parallel those of Cézanne in defining the experimental approach, with the emphasis on the painstaking effort to capture visual sensations, the disbelief in the possibility of rapid progress, and the resulting frustration with his own work. While working in Brittany in 1886, he wrote that “I do know that to paint the sea really well, you need to look at it every hour of every day in the same place so that you can



understand its ways in that particular spot; and this is why I am working on the same motifs over and over again, four or six times even.”<sup>36</sup> In 1890 the 50-year-old artist described painting as a “continual torture,” and reported to a friend: “I am working at a desperately slow pace, but the further I go, the more I see that I have a lot of work in order to manage to convey what I am seeking: ‘instantaneity’, above all, the envelopment, the same light spread over everywhere; and more than ever, easy things achieved at one stroke disgust me. Finally I am more and more maddened by the need to convey what I experience ...”<sup>37</sup> Three years later he declared “I tell myself that anyone who claims he’s finished a painting is terribly arrogant. To finish something means complete, perfect and I’m forcing myself to work, but can’t make any progress; looking for something, groping my way forward, but coming up with nothing very special.”<sup>38</sup> In one respect, Monet’s use of the experimental approach is even more celebrated than Cézanne’s, for although Cézanne did repeated studies of several motifs, one of Monet’s most noted innovations is the serial approach he adopted during the 1890s. His views of grainstacks, poplars, the facade of Rouen cathedral, the cliffs of Normandy, the Seine, and the Thames were the most intensive studies of particular subjects that had been done to date, with each series considered as a set of related observations.<sup>39</sup> Monet had in fact had worked less formally in series throughout his career, and the scores of paintings of water lilies he later did at Giverny between 1899 and his death in 1926 constitute perhaps the most monumental single example of serial painting in the history of modern art.<sup>40</sup> Their collective importance is clear: 17 different paintings of the water lilies appear in the texts surveyed, illustrated a total of 22 times.<sup>41</sup>

The second puzzle raised above was why some of the most important individual paintings were produced by painters who themselves do not rank among the most important artists. In light

of the distinction made earlier, these cases should be those of conceptual innovations. In the most extreme cases, an artist might produce a conceptual innovation, clearly embodied in an individual breakthrough work; this breakthrough work would then be of much greater importance than any later works that simply repeated the innovation. Seurat provides an obvious example. A friend wrote of Seurat's approach to his work that "Not only did he never begin his paintings without knowing where he was going, but his concern went even beyond their success as individual works. They had no great meaning for him if they did not prove some rule, some truth of art, or some conquest of the unknown."<sup>42</sup> Inspired by the idea of applying scientific theories of visual perception to painting, at the age of 25 Seurat methodically set out to produce a masterpiece as a definitive illustration of the use of color theory.<sup>43</sup> After making studies at the site, he produced his view of the Grande Jatte in his studio, often standing on a ladder before the canvas that was nearly seven feet high. He "always concentrated on a single section of the canvas, having previously determined each stroke and color to be applied. Thus he was able to paint steadily without having to step back from the canvas in order to judge the effect obtained." He could also paint at night, despite the poor quality of the artificial light: "the type of lighting was unimportant, since his purpose was completely formulated before he took his brush and carefully ordered palette in hand."<sup>44</sup> When visitors to his studio praised his painting, Seurat remarked to a friend: "They see poetry in what I have done. No, I apply my method and that is all there is to it."<sup>45</sup> Completed when Seurat was just 27 years old, his painting of Parisians relaxing on a Sunday afternoon is illustrated in 24 of the 33 textbooks surveyed for this study. Although Seurat subsequently intended to develop a more systematic basis for the use of line in painting, his efforts were cut short by his early death, at the age of 31.<sup>46</sup> Thus one great painting dominates his

accomplishments.

Marcel Duchamp is perhaps the other most extreme case of a conceptual innovator among the artists considered here. Although he produced few works, several have become very famous. The fourth-ranked painting in Table 3, his *Nude Descending a Staircase* of 1912, painted when Duchamp was just 25, outraged many artists for its attack on Cubism. It became a focal point for critics of the legendary 1913 Armory Show, and Theodore Roosevelt observed that it reminded him of a Navajo rug.<sup>47</sup> In seventh place in Table 3 is Duchamp's *Bride Stripped Bare*, an even more enigmatic conceptual work. Duchamp made other radical conceptual contributions to art that are not listed here because they ceased to involve painting: these included his *Fountain* - a urinal he purchased and signed - and other examples of what he would call "readymades" - objects he purchased and signed.<sup>48</sup> Duchamp's motivation was avowedly conceptual: "I wanted to get away from the physical aspect of painting. I was much more interested in recreating ideas in painting ... I was interested in ideas - not merely in visual products. I wanted to put painting once again at the service of the mind."<sup>49</sup> Duchamp's attempts to dissolve the aesthetic boundaries between art and life became enormously influential in the 1960s and beyond, as many contemporary artists pursued the question of what constitutes art.<sup>50</sup>

### Categorizing Painters: Quantitative Evidence

The modern professional humanist is an academic person who pretends to despise measurement because of its "scientific" nature. He regards his mandate as the explanation of human expressions in the language of normal discourse. Yet to explain something and to measure it are similar operations. Both are translations.

George Kubler<sup>51</sup>

The data set constructed for this study can be used to examine the implications of the

distinction suggested above, by producing evidence of systematic differences between experimental and conceptual innovators in modern painting. Table 4 presents Gini ratios for the paintings illustrated in the textbooks surveyed, by artist.<sup>52</sup> The Gini ratio is the measure of inequality most often used by economists; it is normally used to measure the degree of inequality in a country's income distribution. It varies between zero (perfect equality) and one (maximum inequality). Here, instead of people, the units over which the ratio is measured are paintings: the ratio measures how unequally a given artist's paintings are illustrated. Thus for example Camille Pissarro's 38 total illustrations show 34 different paintings, with no single painting illustrated more than twice, and his Gini ratio is therefore very low, whereas Marcel Duchamp's 72 illustrations represent 19 different paintings, and just two of these account for more than half of the illustrations, yielding a very high Gini.

Duchamp and Seurat have the highest Gini ratios among the artists studied, as would be expected from the earlier discussions of their work: neither was prolific, and both produced famous individual breakthrough works that embodied influential conceptual innovations. Near them at the high end of the list are Manet and Courbet, each of whom similarly produced several monumental individual works that introduced specific conceptual innovations. Thus for example in the *Déjeuner sur l'herbe* and the *Olympia*, both completed in 1863, and both listed in Table 3, Manet made dramatic innovations of subject matter and technique: both the placement of modern figures in settings borrowed from portrayals of classical themes and the abandonment of shadow in modelling have led many historians to identify these as the first modern paintings.<sup>53</sup> Similarly, in the *Bar at the Folies-Bergère*, his last major work, also high in Table 3, Manet distorted the representation of space in a way that has been identified as an inspiration to later artists to use

space arbitrarily, thus initiating a process that eventually led to abstraction in painting.<sup>54</sup> While Manet's total of 130 illustrations represent 48 different paintings, 56 of the illustrations - more than two-fifths - are of just these three famous works. Unlike his friends Cézanne and Monet, whose experimental approach led them to return repeatedly to study the same subjects, Manet's conceptual approach led to variety. A friend of Manet's, the critic Théodore Duret, wrote that the painter "had no circumscribed circle. He painted indifferently all that the eye can see - men and women under every aspect and all sorts of groupings, landscape, seascape, still life, flowers, animals, in the open air, and in the studio. His method was to have a constant change of subject, and never to stale a success by repetition."<sup>55</sup>

Experimental innovators should have low Gini ratios, as their incremental method reduces the importance of individual paintings. Monet has a very low Gini, as does his contemporary Degas, another artist who shared his commitment to repetition: "one must redo ten times, one hundred times the same subject."<sup>56</sup> The dealer Vollard noted that "Because of the many tracings that Degas did of his drawings, the public accused him of repeating himself. But his passion for perfection was responsible for his continual research."<sup>57</sup> Thus although Degas ranks ninth among artists in Table 2, he has no individual work listed in Table 3. Degas was famous for his studies of ballet dancers, but as a friend observed, "He has done so many dancers and so often repeated himself that it is difficult to specify any particular one."<sup>58</sup> Although 20 different individual paintings of dancers appear in the books considered by this study, and together these account for a total of 29 illustrations, no one of them appears in more than four different books.

Another Impressionist, Pissarro, has by far the lowest Gini ratio among the artists considered here. Both his paintings and his eloquent letters attest to his conception of art as a

visual and experimental enterprise. His advice to his son Lucien, who had gone to London to advance his career as an artist, always returned to the need for practice: “It is only by drawing often, drawing everything, drawing incessantly, that one fine day you discover to your surprise that you have rendered something in its true character.”<sup>59</sup> Progress would come only with effort: “So much the better if it is painful for you to take even the first step, the more toilsome the work the stronger you will emerge from it.”<sup>60</sup> Although deeply committed to his art, Pissarro suffered from persistent doubt over the quality of his work. In 1883, past the age of 50, he confessed that “I am much disturbed by my unpolished and rough execution,” but he vowed to persevere in spite of his uncertainty: “I will calmly tread the path I have taken, and try to do my best. At bottom, I have only a vague sense of its rightness or wrongness.”<sup>61</sup> It is not only art historians who do not find individual paintings that stand out among Pissarro’s oeuvre, for later the same year the artist wrote to his son: “You tell me that if I have a show in London I should send my best works. That sounds simple enough, but when I reflect and ask myself: which are my best things? I am in all honesty greatly perplexed.”<sup>62</sup>

The Gini ratio for Miró is among the lowest in Table 4. Miró’s statements about his art consistently revealed his experimental approach. So for example he told an interviewer that “when I’ve finished something I discover it’s just a basis for what I’ve got to do next. It’s never anything more than a point of departure... I’d paint over it again, right on top of it. Far from being a finished work, to me it’s just a beginning.”<sup>63</sup> He emphasized the spontaneity of his approach to each painting: “I start a canvas without a thought of what it may eventually become ... I begin painting and as I paint the picture begins to assert itself, or suggest itself under my brush. The form becomes a sign for a woman or a bird as I work.”<sup>64</sup> In a letter written early in

his career Miró gave an extended description of the kind of artist he admired, who “sees a different problem in every tree and in every bit of sky: this is the man who suffers, the man who is always moving and can never sit still, the man who will never do what people call a ‘definitive’ work. He is the man who always stumbles and gets to his feet again ... [He] is always saying *not yet, it is still not ready*, and when he is satisfied with his last canvas and starts another one he destroys the earlier one. His work is always a new beginning...”<sup>65</sup> While still in his twenties he expressed his belief “that one’s serious work begins only in maturity,” and he retained this attitude in later years, as in his forties he denounced his “young contemporaries ... who begin their shameful decline at the age of thirty,” and declared that “The great ones develop and grow as they get older.”<sup>66</sup>

Although Cézanne’s Gini ratio is below that of Picasso, as their contrasting approaches would imply, the difference between them in Table 4 is not great. Yet in a different dimension they appear at the opposite ends of a spectrum. Table 5 presents the age of each artist in the single year of his career represented by the largest number of textbook illustrations. Here Cézanne’s age of 67 is the oldest among all the artists considered, as 31 of the total of 136 illustrations of his work - just over one-fifth - represent paintings executed in the final year of his life. Picasso’s entry in Table 5, at age 26, is above only those of Chagall and Duchamp. As discussed earlier, experimental innovators’ incremental approach often means that their greatest contributions appear late in their careers, and Cézanne is followed by Monet - whose peak year for illustrations occurs at age 54 - among the artists whose late work is most heavily represented in the texts. Degas and Pissarro, other prominent experimental artists, also both have peak years above age 40. In contrast, conceptual innovations can be made quickly, and dramatic new

approaches are perceived more readily by the young. Thus Picasso is joined by Seurat and Duchamp as important conceptual innovators whose peak age for illustrations occurred before the age of 30, and Manet's peak age occurs at just 31.

Another quantitative measure points to an additional systematic difference between experimental and conceptual innovators. Table 6 shows the shortest span of years that contains at least half of each artist's total illustrations. So for example 30 of the 60 illustrations of Seurat's paintings are of work done during 1885-86, so his entry in Table 6 is two years; the shortest span that contains half of Cézanne's total illustrations is 1894-1906, so his entry is 13 years. This measure gives an indication of the temporal concentration of an artist's contribution.

The lowest entries in Table 6 are for conceptual innovators. Thus Duchamp and Seurat are among the lowest entries, of three years or less. They are joined by van Gogh. Although van Gogh was not as young as other leading conceptual innovators when he did his greatest work, this was in part because he decided to become a painter only in his late 20s, after abandoning unsuccessful careers as an art dealer, teacher, and missionary.<sup>67</sup> Van Gogh's approach to his work was clearly conceptual, though unlike Seurat, who based his work on scientific theories, or Duchamp, who used his work to pose intellectual questions, van Gogh's goal was to use painting to express emotions. In a description of his famous painting of the *Night Café in Arles* - one of his two paintings listed in Table 3 - he declared that he had "tried to express the terrible passions of humanity by means of red and green." This was an instance of his general practice that "instead of trying to reproduce exactly what I have before my eyes, I use color more arbitrarily, in order to express myself forcibly."<sup>68</sup>

The measure used in Table 6 does not clearly separate out all the conceptual innovators,



but rather produces low entries for those who made a single major contribution. Those who made several, separated in time, have higher entries. Obvious examples include Manet and Picasso. Nonetheless, the table's two highest entries, pointing to the most prolonged periods of innovation, are those of the great experimental innovators Monet and Cézanne, and they are followed by their friend Pissarro, who shared their complete commitment to the belief that real progress could be made only slowly, and could result only from the visual study of nature.<sup>69</sup>

In histories of art, a prominent place is often given not simply to an important artist's great individual works, but to a short period in which the artist makes his principal contribution. Narratives of modern art are often organized around these episodes, for in the modern era these have often been key periods in which the work of a few individuals gave rise to a new movement, from Impressionism and Neo-Impressionism through Fauvism, Cubism, and beyond. Table 7 uses the textbook illustrations to provide an indication of which of these are considered most important, by identifying the episodes that include the largest number of illustrations of work by individual artists within any five-year period. This does not precisely correspond to the historians' analyses, for artists' creative episodes vary in length, but five years constitute a period long enough to capture many of the most important breakthrough phases in modern artists' careers.

The analysis presented above would predict that Table 7 should be dominated by conceptual innovators, because of the greater temporal concentration of their achievements. This is clearly the case. Interestingly, in spite of Picasso's preeminent position in total illustrations and the enormous importance of Cubism, the list is headed by van Gogh, as his years in France emerge as the most heavily illustrated episode in the portion of modern art studied in this paper. The

invention and development of Cubism does account for the high positions of Picasso (both second in Table 7 for 1906-10, and fourth for 1911-15) and Braque (fifth for 1908-12). The period in which Matisse moved from Neo-Impressionism to the leadership of the Fauves places him third in Table 7, and Gauguin's leading role in Symbolism, from his time in Pont-Aven to his first trip to Tahiti, places him fifth. The conceptual innovations of Manet, Seurat, and Duchamp also put them high on the list, ahead of the experimental innovators Cézanne and Monet, who rank just eleventh and thirteenth, respectively.

The difference in the relative importance of short periods in the careers of conceptual and experimental innovators is again witnessed by the fact that the proportion of the artist's total illustrations that represented work done in this primary five-year period was lower for Cézanne and Monet than for any other artist in Table 7 except Picasso. The careers of van Gogh, Gauguin, and Seurat - each known primarily for one major achievement - are heavily dominated by these episodes, with more than two-thirds of all the illustrations of their work done within the relevant five years. The careers of conceptual innovators like Picasso and Manet, who made several major contributions, are much less dominated by these episodes, as were the careers of Cézanne and Monet, whose incremental approach reduced the importance of any single period. Picasso's exceptional position in modern painting is impressively demonstrated by his appearance in Table 7 for five separate episodes, while no other artist appears more than once.

A final table provides evidence of another consequence of the predominantly conceptual origins of the most important individual works identified by this study. Table 8 presents the ages of the artists when they executed the paintings listed in Table 3. Seventeen of the total of 21 paintings were produced by artists aged below 40; ten were the work of artists under 35. Because

of multiple entries in the table by several artists (Picasso, Manet, and Courbet each have three paintings listed, and Duchamp, Matisse, and van Gogh each have two), there are 12 different artists represented in the table. Of these 12, all but one - Cézanne - have at least one entry in the table that was executed at age 40 or earlier; 8 of the 12 have at least one work done at age 35 or earlier; and 5 of the 12 have at least one work done at 30 or earlier. These great paintings were therefore commonly done by young artists, and when they were not, with only one notable exception, the works done by older artists were the products of innovators who had earlier executed other works that also appear on the list. This pattern is consistent with the view that Table 3 - the most celebrated individual works in this first century of French modern painting - is dominated by artists who arrived at their innovations through conceptual rather than experimental means.

### Art and Science

It is valuable to recognize that the analysis proposed in this study of the careers of experimental and conceptual innovators has a parallel in the findings of psychologists on the life cycles of practitioners of a variety of scientific, and artistic, disciplines. The psychologists have established that chemists, mathematicians, theoretical physicists, and poets typically make their most important contributions at younger ages than do astronomers, biologists, geologists, and novelists.<sup>70</sup> A proposed explanation for these differences argues that they are a consequence of the rates at which creative ideations can be produced and elaborated: both processes may occur more rapidly in disciplines that deal with more abstract conceptual entities than in those in which the central ideas are more complex and concrete.<sup>71</sup> The empirical methods followed by

experimental innovators in painting makes their enterprise resemble that of the more concrete disciplines considered by the psychologists, whereas the theoretical approach of the conceptual innovators makes theirs resemble that of the more abstract disciplines. Following the psychologists' analysis, this would lead to a prediction - which is confirmed by the evidence analyzed above - that conceptual painters would generally produce their major works at younger ages than the experimental painters. The correspondence of this result with the regularity of the relationship between age and achievement across the disciplines studied by the psychologists thus provides additional support for the significance of the categorization of painters suggested by this study.

### Conclusion

I was very naive... I didn't realize that only art historians were allowed to write about artists.  
Penelope Fitzgerald<sup>72</sup>

Artistic success can be quantified, in a variety of ways.<sup>73</sup> This paper has illustrated one of these, by using evidence drawn from art history textbooks. The results not only produced rankings of major painters and paintings that are clearly reasonable, but posed a puzzle - in the differences between the rankings of major painters and paintings - that led to the identification of a basic difference in approach among major modern artists that has never received systematic attention from art historians.<sup>74</sup> The characteristics of each of these approaches were not only described qualitatively, but were also documented quantitatively. Specifically, quantitative analysis of the textbook illustrations provides systematic support for a distinction between experimental and conceptual innovators. Quantitative measures show that the innovations of the

conceptual artists have been embodied in a smaller number of key works, typically made at younger ages, and concentrated in shorter periods than have those of artists who have followed an experimental approach. So conceptual innovators like Courbet, Duchamp, Manet, Picasso, and Seurat produced innovations, typically announced in individual masterpieces, early in their careers, whereas experimental innovators like Cézanne, Degas, Miró, Monet, and Pissarro followed an incremental procedure in which innovations appeared gradually, in larger bodies of work, and usually at older ages.

This quantitative study of artistic success has made a new contribution to our understanding of the history of modern art. Among the most general lessons of the study of modern art is that innovations are rarely broadly welcomed, and are indeed initially most strenuously denounced by practitioners.<sup>75</sup> Battles over new approaches consequently appear as a sign of vitality. The same might equally be true of the study of art history. It is consequently to be hoped that this demonstration of the value of quantification in a discipline in which it has been sorely neglected will not only inspire more scholars to bring quantitative methods to bear on art history, but will also prompt others to devote greater efforts to producing more considered and insightful criticisms of their results.

Footnotes

I thank Allison Gamble, Robert Jensen, and Britt Salvesen for discussions of the issues treated in this paper, and Rebecca Kalmus and Thomas Walker for research assistance.

1. Roger Fry, *Last Lectures* (Boston: Beacon Press, 1962), p. 3.
2. Quoted in Christina Duff, "In Payscales, Life Sometimes Imitates Art," *Wall Street Journal*, May 22, 1998, p. B1.
3. George Heard Hamilton, *19<sup>th</sup> and 20<sup>th</sup> Century Art* (New York: Abrams, 1970); John Russell, *The Meanings of Modern Art* (New York: Museum of Modern Art, 1981); Robert Hughes, *The Shock of the New* (New York: Knopf, 1982); H. H. Arnason, *History of Modern Art*, Third edition (New York: Abrams, 1968); Sam Hunter and John Jacobus, *History of Modern Art*, Third edition (Englewood Cliffs, NJ: Prentice-Hall, 1992).
4. Clement Greenberg, *The Collected Essays and Criticism*, Vol. 4 (Chicago, 1993), p. 118.
5. The textbooks were not restricted to surveys of modern art, but rather to books that surveyed at least all of modern art. The books surveyed are the following; they are listed chronologically. In each of two cases indicated, two books that were included in a series were treated as one book.  
 H. H. Arnason, *History of Modern Art* (New York: Abrams, 1968).  
 George Heard Hamilton, *19th and 20th Century Art* (New York: Abrams, 1970)  
 Two books treated as one:  
 Fritz Novotny, *Painting and Sculpture in Europe, 1780 to 1880*, Second ed. (Harmondsworth: Penguin, 1970).  
 George Heard Hamilton, *Painting and Sculpture in Europe, 1880-1940* (Harmondsworth: Penguin, 1972)..  
 Edward Lucie-Smith, *A Concise History of French Painting* (New York: Praeger, 1971).  
 Alan Bowness, *Modern European Art* (London: Thames and Hudson, 1972).  
 Dale G. Cleaver, *Art: An Introduction*, Second ed. (New York: Harcourt Brace Jovanovich, 1972).  
 Ariane Ruskin, *History in Art* (New York: Franklin Watts, 1974).  
 Horst de la Croix and Richard G. Tansey, *Gardner's Art Through the Ages*, Sixth ed. (New York: Harcourt Brace Jovanovich, 1975).  
 Harold Spencer, *The Image Maker: Man and His Art* (New York: Charles Scribner's Sons, 1975).  
 H. W. Janson, *History of Art*, Second ed. (Englewood Cliffs: Prentice-Hall, 1977).  
 Norbert Lynton, *The Story of Modern Art* (Ithaca: Cornell University Press, 1980).  
 John Canaday, *Mainstreams of Modern Art*, Second ed. (Ft. Worth: Harcourt Brace Jovanovich, 1981).  
 John Russell, *The Meanings of Modern Art* (New York: Museum of Modern Art, 1981).

- Robert Hughes, *The Shock of the New* (New York: Knopf, 1982).
- Hugh Honour and John Fleming, *A World History of Art* (London: Macmillan, 1982).
- Sara Cornell, *Art: A History of Changing Style* (Englewood Cliffs: Prentice-Hall, 1983).
- Ralph A. Britsch and Todd A. Britsch, *The Arts in Western Culture* (Englewood Cliffs: Prentice-Hall, 1984).
- E. H. Gombrich, *The Story of Art*, 14th ed. (Englewood Cliffs: Prentice-Hall, 1985).
- Frederick Hartt, *Art*, Vol. 2, Third ed. (Englewood Cliffs: Prentice-Hall, 1989).
- Michael Wood, Bruce Cole, and Adelheid Gealt, *Art of the Western World* (New York: Simon and Schuster, 1989).
- Daniel Wheeler, *Art Since Mid-Century* (Englewood Cliffs: Prentice-Hall, 1991).
- Sam Hunter and John Jacobus, *Modern Art*, Third ed. (Englewood Cliffs: Prentice-Hall, 1992).
- Carol Strickland and John Boswell, *The Annotated Mona Lisa* (Kansas City: Andrews and McMeel, 1992).
- Two books treated as one:
- Francis Frascina, Nigel Blake, Briony Fer, Tamar Garb, and Charles Harrison, *Modernity and Modernism* (New Haven: Yale University Press, 1993).
- Charles Harrison, Francis Frascina, and Gill Perry, *Primitivism, Cubism, Abstraction* (New Haven: Yale University Press, 1993).
- Larry Silver, *Art in History* (New York: Abbeville Press, 1993).
- Laurie Schneider Adams, *A History of Western Art* (New York: Abrams, 1995).
- Marilyn Stokstad and Marion Spears Grayson, *Art History* (New York: Abrams, 1995).
- Liz Dawtrey, Toby Jackson, Mary Masterson, Pam Meecham, and Paul Wood, eds., *Investigating Modern Art* (New Haven: Yale University Press, 1996).
- Alison Gallup, Gerhard Gruitrooy, and Elizabeth M. Weisberg, *Great Paintings of the Western World* (New York: Hugh Lauter Levin Associates, 1997).
- Charles Harrison, *Modernism* (Cambridge: Cambridge University Press, 1997).
- David Wilkins, Bernard Schultz, and Katheryn Linduff, *Art Past, Art Present* (New York: Abrams, 1997).
- Julian Freeman, *Art: A Crash Course* (New York: Watson-Guptill, 1998).
- Volker Gebhardt, *The History of Art* (New York: Barron's Educational Series, 1998).

6. Stokstad, *Art History*, p. 6
7. If we tabulate the number of different works by the top 10 painters in Table 2, illustrated in the 33 texts, that are held by just 10 major museums, the results are: Picasso 67; Matisse 33; Cézanne 33; Manet 27; Braque 18; van Gogh 17; Gauguin 14; Degas 36; and Renoir 24. The museums are: Metropolitan, and Museum of Modern Art, New York; Art Institute, Chicago; Philadelphia Museum; Baltimore Museum; National Gallery, Washington; Tate Gallery; National Gallery, London; Louvre; Musée d'Orsay.
8. I thank Britt Salvesen for this information.

9. Clement Greenberg, *The Collected Essays and Criticism*, Vol. 4 (Chicago: University of Chicago Press, 1993), p. 300.
10. Harold Rosenberg, *The Tradition of the New* (New York: Da Capo Press, 1994), p. 37.
11. Meyer Schapiro, *Modern Art: 19<sup>th</sup> and 20<sup>th</sup> Centuries* (New York: George Braziller, 1979), p. 153; also see p. 167.
12. Alan Bowness, *Modern European Art* (London: Thames and Hudson, 1972), p. 172.
13. Raymonde Moulin, *The French Art Market: A Sociological View* (New Brunswick: Rutgers University Press, 1987), p. 30.
14. Michael Fried, *Art and Objecthood* (Chicago: University of Chicago Press, 1998), pp. 17, 218.
15. Arthur C. Danto, *Embodied Meanings* (New York: Noonday Press, 1995), p. 85.
16. Leo Steinberg, *Other Criteria* (London: Oxford University Press, 1972), p. 15.
17. John Rewald, ed., *Paul Cézanne Letters* (New York: Da Capo Press, 1995), pp. 327, 329-30.
18. E.g. see Theodore Reff, "Painting and Theory in the Final Decade," in William Rubin, ed., *Cézanne: The Late Work* (New York: Museum of Modern Art, 1977), p. 13; Meyer Schapiro, *Paul Cézanne* (New York: Abrams, 1952), p. 27.
19. Roger Fry, *Cézanne* (Chicago: University of Chicago Press, 1989), p. 3.
20. Schapiro, *Cézanne*, p. 10.
21. Rewald, *Paul Cézanne Letters*, p. 299.
22. Ambroise Vollard, *Cézanne* (New York: Dover, 1984), Chap. 8.
23. *Ibid.*, pp. 48, 63, 77; Ambroise Vollard, *Recollections of a Picture Dealer* (Boston: Little, Brown, 1936), p. 182.
24. Richard Shiff, *Cézanne and the End of Impressionism* (Chicago: University of Chicago Press, 1984), p. 162.
25. Clive Bell, "The Debt to Cézanne," in Francis Francina and Charles Harrison, eds., *Modern Art and Modernism* (New York: Museum of Modern Art, 1982), p. 77.
26. Rewald, *Paul Cézanne Letters*, p. 303.



27. Vollard, *Cézanne*, p. 105.
28. Alfred H. Barr, Jr., *Picasso: Fifty Years of His Art* (New York: Museum of Modern Art, 1946), pp. 270-71.
29. Patrick O'Brian, *Pablo Ruiz Picasso* (New York: W. W. Norton, 1994), p. 179.
30. *Ibid*, p. 208, Picasso told a friend he did this because "it is not sufficient to know an artist's works - it is also necessary to know when he did them, why, how, under what circumstances." In words that would no doubt please Richard Shiff, Picasso explained that "I want to leave to posterity a documentation that will be as complete as possible. That's why I put a date on everything I do;" Brassai, *Picasso and Company* (Garden City, NJ: Doubleday, 1966), p. 100.
31. Françoise Gilot and Carlton Lake, *Life with Picasso* (New York: Doubleday, 1964), p. 123.
32. John Golding, *Cubism*, Third edition (Cambridge: Harvard University Press, 1988), p. 51.
33. Russell, *Meanings of Modern Art*, p. 97; Hamilton, *Painting and Sculpture in Europe*, p. 235.
34. Golding, *Cubism*, p. xiii; Douglas Cooper, *The Cubist Epoch* (London: Phaidon Press, 1971), p. 12.
35. The dates of these 13 views of Mont Sainte-Victoire range from 1885-1906. If the novelty of the motif were the source of these paintings' importance, it might be supposed that the earliest of these would be most often reproduced. This is not the case, as the 1885 view of Mont Sainte-Victoire from the Barnes Collection is reproduced only once. Because of Cézanne's incremental process of innovation, it is the 1906 view in the Philadelphia Museum of Art that is reproduced most often (ten times).
36. Richard Kendall, *Monet by Himself* (New York: Knickerbocker Press, 1999), p. 122.
37. Linda Nochlin, ed., *Impressionism and Post-Impressionism, 1874-1904* (Englewood Cliffs, NJ: Prentice-Hall, 1966), p. 34.
38. Kendall, *Monet by Himself*, p. 178.
39. Paul Hayes Tucker, *Monet in the '90s: The Series Paintings* (Boston: Museum of Fine Arts, 1989); Grace Seiberling, *Monet's Series* (New York: Garland Publishing, 1980); Arthur C. Danto, *Embodied Meanings* (New York: Noonday Press, 1995), pp. 82-89.
40. Joel Isaacson, *Claude Monet: Observation and Reflection* (Oxford: Phaidon Press, 1978); John House, *Monet: Nature Into Art* (New Haven: Yale University Press, 1986).

41. It might be argued that Cézanne and Monet do not have entries high in Table 3 because they have few works, or few characteristic works, in collections accessible to scholars. This argument can readily be dismissed. 28 of the total of 74 paintings by Cézanne illustrated in the texts, and 45 of the 80 by Monet, are owned by just eight museums: Chicago's Art Institute, Boston's Museum of Fine Arts, Philadelphia's Museum of Art, New York's Metropolitan Museum, Washington's National Gallery, London's National Gallery, and Paris' Louvre and Musée d'Orsay. These 28 Cézannes include five views of Mont Sainte-Victoire, and the 45 Monets include five paintings of water lilies. All these major museums make their collections readily available for scholarly study and reproduction.
- It is equally the case that restricted access does not prevent paintings from appearing prominently in Table 3. Matisse's *Joy of Life*, reproduced more often than any painting by Cézanne or Monet, is owned by the Barnes Foundation, which for many years severely limited scholarly use of its collection.
42. Norma Broude, ed., *Seurat in Perspective* (Englewood Cliffs, NJ: Prentice-Hall, 1978), p. 148.
43. *Ibid.*, p. 31; Paul Signac, "From Eugène Delacroix to Neo-Impressionism," in Floyd Ratliff, *Paul Signac and Color in Neo-Impressionism* (New York: Rockefeller University Press, 1992), p. 247.
44. John Rewald, *Georges Seurat* (New York: Wittenborn, 1943), p. 26.
45. John Rewald, *Post-Impressionism* (New York: Museum of Modern Art, 1956), p. 86. That Seurat sincerely believed his work was the product of method rather than inspiration is witnessed by his conflict with Signac in 1888. Signac was delighted at the growing number of artists who were adopting Neo-Impressionist methods, but Seurat was worried by this increase. Seurat explained to Signac that "the more numerous we are, the less originality we shall have, and the day when everybody uses this technique, it will no longer have any value." Trying to calm Signac, Pissarro dismissed Seurat's concern as "absurd": "After all, all art is not in the scientific theory ... Thus apply the science which belongs to everybody, but keep for yourself the gift you have;" *ibid.*, p. 114. But it was Seurat's belief that the value of the work lay in the scientific theory, which could readily be appropriated by others, that led him to resist showing his work in public; John Rewald, ed., *Camille Pissarro: Letters to his Son Lucien* (New York: Da Capo Press, 1995), pp. 99-100.
46. William Innes Homer, *Seurat and the Science of Painting* (Cambridge: MIT Press, 1964), p. 181.
47. Harold Rosenberg, *The De-Definition of Art* (Chicago: University of Chicago Press, 1972), p. 57.

48. Calvin Tomkins, *Duchamp* (New York: Henry Holt, 1996), p. 157.
49. Michael Sanouillet and Elmer Petersen, eds., *The Writings of Marcel Duchamp* (New York: Da Capo Press, 1989), p. 125.
50. Irving Sandler, *American Art of the 1960s* (New York: Harper and Row, 1988), pp. 50-58.
51. George Kubler, *The Shape of Time* (New Haven: Yale University Press, 1962), p. 83.
52. Table 4 and subsequent tables will be restricted to the most important artists in the sample, defined as those with more than 33 total illustrations. This selection level was chosen because these are the artists with an average of more than one illustration per book.
53. Briony Fer, "Introduction," in Francis Frascina, et. al., *Modernity and Modernism* (New Haven: Yale University Press, 1993), p. 25.
54. James D. Herbert, "Privilege and the Illusion of the Real," in Bradford R. Collins, ed., *12 Views of Manet's Bar* (Princeton: Princeton University Press, 1996), p. 215.
55. Théodore Duret, *Manet and the Impressionists* (Philadelphia: J. B. Lippincott, 1910), p. 57.
56. Marcel Guérin, ed., *Lettres de Degas* (Paris: Bernard Grasset, 1931), p. 107.
57. Ambroise Vollard, *Degas* (London: George Allen and Unwin, 1928), p. 102.
58. George Moore, *Impressions and Opinions* (New York: Brentano, 1913), p. 229.
59. Rewald, *Camille Pissarro*, p. 32.
60. *Ibid.*, p. 53.
61. *Ibid.*, p. 30.
62. *Ibid.*, p. 46.
63. Joan Miró, *Selected Writings and Interviews* (New York: Da Capo Press, 1992), p. 98.
64. *Ibid.*, pp. 209-11.
65. *Ibid.*, p. 51.
66. *Ibid.*, pp. 79, 150.

67. The case of van Gogh (as well as that of Gauguin, who became a full-time painter only after resigning his job in the stock exchange, at age 35) raises an interesting qualification to the proposition that extreme conceptual innovations are typically made by the young. Chronological age and career experience tend to be highly correlated. But individuals who begin a career late will have the stages of their career delayed accordingly; see Dean Keith Simonton, *Greatness: Who Makes History and Why* (New York: Guilford Press, 1994), pp. 187-89. What matters for conceptual innovation is apparently less youth than recency of exposure to a discipline. A more precise statement is consequently that extreme conceptual innovations are typically made early in an artist's career.
68. Vincent van Gogh, *The Complete Letters of Vincent van Gogh*, vol. 3 (London: Thames and Hudson, 1958), pp. 6, 28.
69. E.g. Rewald, ed., *Camille Pissarro*, pp. 30, 53.
70. Harvey C. Lehman, *Age and Achievement* (Princeton: Princeton University Press, 1953), pp. 324-25; Dean Keith Simonton, *Scientific Genius* (Cambridge: Cambridge University Press, 1988), p. 67; Simonton, *Greatness*, pp. 68-75.
71. Simonton, *Scientific Genius*, pp. 68-75.
72. Arthur Lubow, "An Author of a Certain Age," *New York Times Magazine*, (August 15, 1999), p. 33.
73. In a different quantitative approach, I have used auction prices to measure the value of painters' works over the course of their careers. This approach produces similar conclusions about the value of the distinction between experimental and conceptual innovators, for it shows that whereas experimental innovators usually executed their most valuable work late in their careers, conceptual innovators typically produced their most valuable work at young ages. See David W. Galenson, "The Careers of Modern Artists: Evidence from Auctions of Contemporary Paintings," *Journal of Cultural Economics*, forthcoming; Galenson, "The Lives of the Painters of Modern Life: The Careers of Artists in France from Impressionism to Cubism," NBER Working Paper 6888 (January 1999); Galenson and Bruce A. Weinberg, "Age and the Quality of Work: The Case of Modern American Painters," *Journal of Political Economy*, forthcoming.
74. Distinctions similar to the one made here have sometimes been made by art historians. For example, Alan Bowness observed of the course of modern art that "By a kind of dialectical necessity, the realists always seem to be accompanied by idealist (or symbolist) painters," then remarked: "The manifold complexities of this general tendency for art to divide may depend on certain basic temperamental differences among artists - on, for example, the degree to which the painter or sculptor can envisage the finished work of art before he starts to make it. Does creation reside in the idea or in the action?" Bowness, *Modern European Art*, p. 73. Yet Bowness does not pursue this distinction, and his

failure to understand its implications is witnessed by his later comment that “Innovations in art usually come from young men;” *ibid.*, p. 122..

75. E.g. see Steinberg, *Other Criteria*, p. 4.

Table 1: Artists Included in this Study

Artist	Country of birth	Year of birth	Year of death
Arp, Jean	France	1886	1966
Bonnard, Pierre	France	1867	1947
Braque, Georges	France	1882	1963
Cézanne, Paul	France	1839	1906
Chagall, Marc	Russia	1887	1985
Courbet, Gustave	France	1819	1877
Degas, Edgar	France	1834	1917
Delaunay, Robert	France	1885	1941
Derain, André	France	1880	1954
Duchamp, Marcel	France	1887	1968
Dufy, Raoul	France	1877	1953
Gauguin, Paul	France	1848	1903
Gogh, Vincent van	Holland	1853	1890
Gris, Juan	Spain	1887	1927
Léger, Fernand	France	1881	1955
Manet, Edouard	France	1832	1883
Masson, André	France	1896	1987
Matisse, Henri	France	1869	1954
Miró, Joan	Spain	1893	1983
Modigliani, Amedeo	Italy	1884	1920
Monet, Claude	France	1840	1926
Picabia, Francis	France	1879	1953
Picasso, Pablo	Spain	1881	1973
Pissarro, Camille	France	1830	1903
Redon, Odilon	France	1840	1916

Artist	Country of birth	Year of birth	Year of death
Renoir, Pierre-Auguste	France	1841	1919
Rouault, Georges	France	1871	1958
Rousseau, Henri	France	1844	1910
Seurat, Georges	France	1859	1891
Soutine, Chaim	Lithuania	1893	1943
Tanguy, Yves	France	1900	1955
Toulouse-Lautrec, Henri de	France	1864	1901
Vlaminck, Maurice de	France	1876	1958
Vuillard, Edouard	France	1868	1940
Whistler, James	United States	1834	1903

Source: See text.

Table 2: Ranking of Artists by Total Illustrations

Artist	Total illustrations	Artist	Total illustrations
1 Picasso	335	19 Rouault	31
2 Matisse	169	20 Bonnard	29
3 Cézanne	136	20 Delaunay	29
4 Manet	130	20 Whistler	29
5 Monet	125	23 Rousseau	29
6 Braque	116	24 Derain	27
6 Van Gogh	116	25 Arp	26
8 Gauguin	97	26 Redon	23
9 Degas	81	27 Picabia	20
10 Renoir	74	28 Gris	19
11 Duchamp	72	29 Vuillard	18
12 Courbet	68	30 Vlaminck	15
13 Miró	64	31 Soutine	14
14 Seurat	60	32 Tanguy	13
15 Léger	51	33 Masson	12
16 Toulouse Lautrec	40	34 Modigliani	10
17 Pissarro	38	35 Dufy	7
18 Chagall	35		

Source: This and subsequent tables are based on the data set constructed for this study. See text for description.



Table 3: Ranking of Paintings by Total Illustrations

Rank	Illustrations	Artist, Title	Date	Location
1	30	Picasso, <i>Les Femmes d'Alger (O. J. 'R. O.')</i>	1907	New York
2	25	Picasso, <i>Guernica</i>	1937	Madrid
3	24	Seurat, <i>Sunday Afternoon on the Grand Jatte</i>	1886	Chicago
4(t)	21	Duchamp, <i>Nude Descending a Staircase, No. 2</i>	1912	Philadelphia
4(t)	21	Manet, <i>Le Déjeuner sur l'Herbe</i>	1863	Paris
6	20	Manet, <i>Bar at the Folies-Bergère</i>	1882	London
7	16	Duchamp, <i>The Bride Stripped Bare by Her Bachelors, Even</i>	1923	Philadelphia
8(t)	15	Courbet, <i>L'Atelier</i>	1855	Paris
8(t)	15	Gauguin, <i>The Vision After the Sermon</i>	1888	Edinburgh
8(t)	15	Manet, <i>Olympia</i>	1863	Paris
8(t)	15	Matisse, <i>The Joy of Life</i>	1906	Merion, PA
12	14	Cézanne, <i>Large Bathers</i>	1906	Philadelphia
13	13	Matisse, <i>Green Stripe (Madame Matisse)</i>	1905	Copenhagen
14(t)	12	Courbet, <i>Burial at Ornans</i>	1850	Paris
14(t)	12	Courbet, <i>The Stone Breakers</i>	1849	Formerly Dresden
14(t)	12	Renoir, <i>Moulin de la Galette</i>	1876	Paris
14(t)	12	van Gogh, <i>The Night Café</i>	1888	New Haven
14(t)	12	van Gogh, <i>The Starry Night</i>	1889	New York
19(t)	11	Monet, <i>Impression: Sunrise</i>	1873	Paris
19(t)	11	Picasso, <i>Still Life with Chair Caning</i>	1912	Paris
19(t)	11	Toulouse-Lautrec, <i>At the Moulin Rouge</i>	1892	Chicago

Table 4: Gini Ratios for Paintings by Artists with More than 33 Total Illustrations

Artist	Ratio
Duchamp	.59
Seurat	.57
Manet	.54
Courbet	.53
Gauguin	.47
Matisse	.45
Léger	.43
Renoir	.43
Picasso	.42
van Gogh	.39
Toulouse-Lautrec	.39
Cézanne	.38
Braque	.35
Chagall	.34
Miró	.32
Monet	.31
Degas	.28
Pissarro	.09

Table 5: Artist's Age in Year of Most Illustrations, for Artists with More than 33 Total Illustrations

Artist	(1) Year	(2) n	(3) Age
Cézanne	1906	31	67
Monet	1894	16	54
Pissarro	1873	7	43
Degas	1876	11	42
Gauguin	1889	19	41
Léger	1919	9	38
Courbet	1855	19	36
Matisse	1905	32	36
Renoir	1876	17	35
van Gogh	1888	39	35
Miró	1925	11	32
Manet	1863	38	31
Braque	1911	21	29
Toulouse-Lautrec	1892	18	28
Seurat	1886	28	27
Picasso	1907	39	26
Duchamp	1912	30	25
Chagall	1911	10	24

Notes: Column 1 shows the year from which the largest number of each artist's illustrations date. Column 2 shows the number of illustrations of paintings done in that year. Column 3 shows the artist's age in that year.

Table 6: Shortest Periods that Include at Least Half an Artist's Total Illustrations, for Artists with More than 33 Illustrations

Artist	Dates	Number of Years
Cézanne	1894-1906	13
Monet	1866-77	12
Pissarro	1867-77	11
Miró	1924-33	10
Picasso	1904-13	10
Léger	1913-21	9
Renoir	1874-81	8
Degas	1873-79	7
Manet	1862-68	7
Courbet	1850-55	6
Matisse	1905-10	6
Braque	1908-11	4
Gauguin	1888-91	4
Chagall	1911-13	3
Duchamp	1911-13	3
van Gogh	1888-89	2
Seurat	1885-86	2
Toulouse-Lautrec	1891-92	2

Table 7: Ranking of Five-Year Periods in Artists' Careers, by total Illustrations

Artist	Dates	Illustrations	% of Artist's Total Illustrations
1. van Gogh	1886-90	101	87
2. Picasso	1906-10	92	27
3. Matisse	1905-09	78	46
4. Picasso	1911-15	74	22
5. Gauguin	1888-92	66	68
6. Braque	1908-12	65	56
7. Manet	1859-63	55	42
8. Picasso	1921-25	48	14
9. Seurat	1884-99	47	78
10. Duchamp	1910-14	40	56
11. Cézanne	1902-06	38	28
12. Picasso	1901-05	37	11
13. (t) Monet	1869-73	35	28
13. (t) Picasso	1933-37	35	10
15. Toulouse-Lautrec	1891-95	32	80

Note: The final column shows the percentage of each artist's total illustrations (from Table 2) made up by illustrations of paintings done in the periods identified here.

Table 8: Ages at which Artists Executed Paintings Listed in Table 3

Number	Artist	Age
1	Picasso	26
2	Picasso	56
3	Seurat	27
4(t)	Duchamp	25
4(t)	Manet	31
6	Manet	50
7	Duchamp	36
8(t)	Courbet	36
8(t)	Gauguin	40
8(t)	Manet	31
8(t)	Matisse	37
12	Cézanne	67
13	Matisse	36
14(t)	Courbet	31
14(t)	Courbet	30
14(t)	Renoir	35
14(t)	van Gogh	35
14(t)	van Gogh	36
19(t)	Monet	33
19(t)	Picasso	31
19(t)	Toulouse-Lautrec	28

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