

# **Fame as an Illusion of Creativity: Evidence from the Pioneers of Abstract Art**

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## **ABSTRACT**

We build a social structural model of fame, which departs from the atomistic view of prior literature where creativity is the sole driver of fame in creative markets. We test the model in a significant empirical context: 90 pioneers of the early 20th century (1910–25) abstract art movement. We find that an artist in a brokerage rather than a closure position was likely to become more famous. This effect was not, however, associated with the artist's creativity, which we measured using both objective computational methods and subjective expert evaluations, and which was not itself related to fame. Rather than creativity, brokerage networks were associated with cosmopolitan identities—broker's alters were likely to differ more *from each other's* nationalities--and this was the key social-structural driver of fame.

## INTRODUCTION

“Not everyone can be famous. But much of our daily experience tells us that we should if we possibly can, because it is the best, perhaps the only, way *to be*.” (Braudy, 1997:6).

Fame is intrinsically valuable. Fame is a key metric of success for professionals in business, academia, politics and the arts. Fame also shapes access to resources and augments returns on individual effort. For the start-up, fame means access to prominent investors and talented employees; for the scientist, fame can determine the distribution of grants, labs and tenure; for the artist, fame wins benefactors, collaborators and marquee dealers. Thus, fame is both a means to success as well as an end in itself.

Little work has explored the factors that shape a producer’s fame in creative markets. Much of what exists, notably Simonton’s (1980) research, has focused on creativity as the sole driver of an innovator’s fame. However, the extant evidence is mixed regarding the link between creativity and fame. Furthermore, past research has focused on the product rather than the producer as the unit of analysis, leaving us with little understanding of the relationship between a producer’s fame and creativity. More importantly, past work overlooks a key insight that creativity in cultural and entrepreneurial contexts is itself a function of the social structure in which an individual is embedded. Despite this, to the best of our knowledge, no scholarly work has examined the link between social structure, creativity and fame. Instead we have an atomistic view of fame as an outcome of individual creativity. Such a view is not only theoretically incomplete but also empirically limited.

Consider two examples from our empirical context. The two artists in Figure 1 made important contributions to the early 20<sup>th</sup> century abstract art movement. Both are women, both were educated at elite art schools in their respective countries. Vanessa Bell attended the Royal

Academy of Arts in England while Suzanne Duchamp attended École des Beaux-Arts in France. Both were also part of elite cultural families. Bell's father was the eminent literary critic Sir Leslie Stephen and her sister was the writer Virginia Woolf. Suzanne Duchamp was the sister of the iconoclastic Dada artist, Marcel Duchamp. Both artists married other established artists. Our survey of art experts shows both artists to be equally creative along multiple dimensions (we provide further details of our survey in *Creativity* subsection under *Data*). Yet Figure 2 reveals these creative contemporaries to differ substantially in their fame as measured by mentions in texts in the Google N-gram corpus (we provide further details on our fame measure in the *Data* section). The difference is more surprising given that Marcel Duchamp was a star of the United States (U.S.) art market after the New York armory show in 1913. Despite her strong ties to such a high-status artist, his sister received little attention in the texts published in the United States in that period. This example illustrates the limitation of creativity as well as variables such as status in explaining the observed variation among innovators' fame.

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Insert Figures 1, 2 and 3 about here  
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We argue that taking into account a producer's social structure can help us to understand how similarly creative producers might vary in fame. Figure 3 compares our approach to the extant literature and illustrates that we go beyond prior work by building a social structural theory of fame, whereby social structure shapes a producer's fame through three channels – creativity, others perception of her (her creative identity) and access to promotional opportunities. The absence of a social structural view of fame in creative markets is striking given such a view has provided rich insights for other outcomes such as innovation (Reagans and Zuckerman, 2001;

Perry-Smith, 2006), critical attention (Giuffre, 1999), economic success (Uzzi and Spiro, 2005) and awards (Cattani and Ferriani, 2008).

We define fame as being known by a large set of people beyond an individual's immediate social network. Our theoretical discussion begins by distinguishing fame from related constructs such as celebrity and status. We model an innovator's social structure by the structure and composition of her peer network, which comprises innovators who know each other through personal and professional relationships. Each innovator's immediate set of peers, her alters, constitute her local network, which is a source of ideas (Burt, 2004), social support (Coleman, 1988) and identity (Podolny and Baron, 1997). We argue that the extent to which an innovator's immediate peers span diverse or similar social realms can shape her fame through three channels: her creativity; others' perception of her (her creative identity); and access to promotional opportunities.

We operationalize the structural features of a local network firstly with measures of brokerage and closure, and secondly with measures of compositional diversity. When many of an innovator's alters are disconnected, we say she is a broker, or is in a brokerage position (Burt, 2009). The disconnected alters of a broker represent diverse social worlds (Simmel, 2010). In contrast, when an innovator has fewer disconnected alters, we say she is in a closure position. An ego in a closure position is connected to alters whose social worlds overlap. We operationalize compositional diversity of the local network with measures of diversity among alters' backgrounds. In order to empirically test the role of social structure vs. creativity in shaping fame, we include two measures of creativity: an expert measure of an artist's creativity and a computational measure of an artist's novelty.

We examine the implications of social structure for fame in the context of the emergence of the early 20th century abstract art movement. The emergence of abstract art during 1910-25 marked a radical departure from the representational art paradigm and ushered in numerous artistic innovations. We examine the relationship between the fame and the social structure of 90 artists from Europe and the U.S. who were at the forefront of the movement. Our context offers several advantages. It allows us a rare glimpse into the actual ties between producers whose innovations ushered a new paradigm in their field. Their artistic innovations were contested like many innovations in art, science and technology and yet these became the foundation for much of modern art. Examining the determinants of fame of these innovators gives us an opportunity to understand the what factors shape society's attention to individuals who radically change the art world. Unlike other creative contexts such as science, music, films etc., our context also allows us to examine how peer relationships facilitate individual level creative output, rather than team output, thus allowing us to isolate the link between social structure, individual-level creativity and fame. Moreover, the personal ties in our network not only potentially shape individual level creativity but also shape opportunities and an artist's perception in the critical discourse of the period, which we call her creative identity. Thus our data allow us to explore richer theoretical linkages between social structure and fame. Finally, our context of an art market does not stack-the-deck for particular social structural configurations, in that it allows for potential advantages of both brokerage and closure. On the one hand, being part of a diverse set of peers increases a producer's access to the breadth of ideas and opportunities (Burt, 2009; Giuffre, 1999); on the other hand, in the notoriously cliquish art world, belonging to a close-knit group gives access to high profile promotion opportunities as well as to the social support needed to bring ideas to fruition (Obstfeld, 2005).

Surprisingly given previous theory, we do not find statistical support for a positive relationship between an artist's creativity and fame. Neither the expert measure of creativity, nor the computational measure of novelty mediates the relationship between an artist's local network structure and her fame. However, we find several aspects of an artist's local network structure to be associated with her fame. We find that an artist in a brokerage rather than a closure position is likely to subsequently become more famous. Furthermore, we find that compositional diversity (diversity among an ego's alters) increases an innovator's fame. Specifically, we find that a broker's alters tend to be more nationally diverse, i.e. they are likely to differ more *from each other's* national affiliations (the country of an artist's primary residence), and this difference is positively related to an artist's subsequent fame.

Our study makes several key contributions. First, we highlight fame as an occupational outcome in markets for creative talent. Second, we propose and test a social structural theory of fame. By decomposing structural determinants of fame into three components—creative identity, creativity and promotional opportunities—we present a fine-grained structural foundation for subsequent research on fame. Third, by using both subjective and objective measures of creativity, our study is the first to demonstrate that creativity is not the link between an innovator's immediate peer network and her fame. Instead our evidence reveals identity as the link between peer network and fame. The importance in our findings of identity, rather than creativity, differentiates fame from other occupational outcomes where creativity weighs more heavily (Burt, 2005). In doing so, our study advances our limited understanding of the role of identity in creative markets.

## **FAME**

### **The Difference Between Fame and Related Constructs**

We conceptualize fame as how widely known an individual is beyond her immediate peer network (Van de Rijt et al. 2013). Our definition of fame is similar to Rindova et al.'s (2006) in that it involves "large scale public attention" (Rindova, Pollock, and Hayward, 2006:50). However, unlike their conceptualization, we do not require fame to have a positive valence. While fame is correlated with constructs such as recognition, visibility, reputation and status, it is not identical with these (Becker, 1982; Lang and Lang, 1988; Leahey, 2007; Hellmueller and Aeschbacher, 2010; Driessens 2013). In fact, status and reputation can be orthogonal to fame. An individual can have widespread attention while having low status within her field. Similarly, a reputable individual can be held in high regard within her field but remain unknown beyond her field.

The most critical difference between fame and these other constructs is that fame is associated with recognizability across domains and communities. Reputation and status are often specific to a domain; similarly, recognition and visibility occurs within specific communities; status is derived from a producer's affiliation to other actors and, hence, is defined by her network; in contrast, fame transcends domains and communities. Such widespread attention makes fame a distinct form of social capital—one that transcends domains (Driessens, 2013) and enlarges the potential pool of social and economic resources an individual can access (as well as the public scrutiny they face).

### **Importance of Fame for Innovators**

Fame is particularly valuable for innovators. The artistic innovators we study are akin to others who create new products and services such as scientists and inventors. Creating a new product, whether it is a novel scientific breakthrough or a new genre of art, is a risky undertaking with consequently uncertain access to resources. This uncertainty is compounded by the

difficulty in establishing an objective criterion for evaluating an innovation's merit, especially when it is very novel. An audience's inability to comprehend and properly evaluate an innovator's output can lead her to be ignored and neglected (Simonton, 1980). The "evaluative confusion" (Simonton, 1998:207) in assessing creative output's merit can be even more acute when an industry or field undergoes a paradigm shift. During these shifts, the criteria for evaluating the worth of innovations is in a state of flux, thereby accentuating the difficulties in assessing the value of innovations. Instead of soaring, an innovator's career can flounder and fade because of an audience's incomprehension and consequent lack of attention to her work.

Audiences invest more time and effort to learn about famous individuals: The investment of attention can allow audiences to better understand the value of an innovation, which can in turn translate into access to human and financial capital. Fame is therefore a particularly valuable resource for radical innovators who are at the forefront of a paradigm shift.

## **SOCIAL STRUCTURE AND FAME**

The factors that produce fame can be broadly grouped into two categories—fame as a result of achievement and fame as a result of one's social position (Braudy, 1997). In creative markets, achievement, in the form of creativity, depends on an individual's skills as well as her social structure, which can aid or impede her ability to acquire skills (Blau and Duncan, 1967) and recognition (Lang and Lang, 1988). Thus, irrespective of whether we see fame as an outcome of achievement or social position, fame depends on social structure.

In the following section, we develop a theoretical model that links social structure and fame through three channels: creativity, identity and promotion. Our social structural theory of fame departs from prior work on fame which argues that fame is driven by creativity. Instead, in our



model, creativity is one of three channels that shapes fame; moreover, these channels are determined by a producer's social structure. We model social structure by a producer's network of peer innovators to understand how the structure of an innovator's immediate relationships i.e. her local network of peers relates to her fame. We contrast the role of two local network structures, brokerage and closure, in shaping a producer's fame.

### **Brokerage and Fame**

Brokerage can shape an innovator's fame by influencing her creativity as well as her identity and access to promotional opportunities. A long-standing line of research suggests that brokerage positions are associated with greater creativity. A broker can access non-redundant and diverse ideas through her disconnected alters. Non-redundant ideas offer opportunities for novel recombination of ideas resulting in creative breakthroughs (Perry-Smith, 2006). A broker can translate and transfer ideas between disconnected alters, moving ideas from one context, in which they are familiar, to another context, in which they might be seen as novel and creative (Burt, 2004). Furthermore, a broker with a sparse local network faces less pressure to conform to norms prevalent among her peers (Bienenstock, Bonacich, and Oliver, 1990), allowing the broker to experiment with new ideas and hence be more creative. Insofar as creativity fosters fame, innovators in brokerage positions have an advantage in becoming famous over those in closure positions.

A brokerage position can also improve a producer's access to promotional opportunities. Local network structures that propagate an innovator's name and provide her channels to new audiences are likely to increase her fame. Access to diverse information can help an innovator learn about opportunities to showcase her work to different audiences. And, if we think of the

spreading of fame as a multi-step diffusion process, we can imagine the name of an ego diffusing from her to her alters and from her alters to people beyond her local network. The more an ego's alters are disconnected from each other, the greater is the likelihood of her name diffusing to a disparate and hence a larger group of people. In contrast, the name of an ego in a dense local network might circulate repeatedly within her connected alters and have a lower chance of diffusing beyond the local network.

The advantages of brokerage may extend beyond structural diversity to compositional diversity, that is, diversity in the types of people that make up the network (Campbell, Marsden, and Hurlbert, 1986). Following Gouldner (1958, 1957), we label a producer with ties to alters with diverse backgrounds as “cosmopolitan.” Such cosmopolitanism can stem from ties to others from diverse disciplines, media, nationality etc. Cosmopolitans have access to multiple social contexts—countries, organizations, industries, disciplines—which vary in cultural and institutional schemas, opportunities and processes. Access to diverse social realms exposes an ego to a wider range of novel ideas and practices (Campbell, et al. 1986; Constant, Sproull, and Kiesler, 1996; Reagans and Zuckerman 2001). This in turn can not only spur an ego's creativity but also help her create work that may appeal to a wider range of audiences (Godart, Maddux et al. 2015). Furthermore, disconnected and diverse alters constitute audiences from distinct sub-domains. As such they represent distinct opportunities for an ego to spread her name among a disparate and hence a broader range of audience.

Compositional diversity among an ego's alters also shapes her identity, i.e. how she is perceived by others. Social identity theory argues that others evaluate an individual based on her ties to others (Heider, 1958; Brewer and Gardner). In this respect, a tie is seen as an affiliation and can inform how an audience interprets an individual's role and allegiances. In creative

markets, such interpretations shape audiences' perception of a producer's creative ability, thereby shaping her creative identity. A recent study of an online community found that cosmopolitans, i.e. software developers with more diverse ties, were perceived as more innovative (Dahlander and Frederiksen, 2012). In a creative market, a cosmopolitan producer's diverse allegiances and role expectations can result in audiences attributing multiple interpretations to her creative work (Padgett and Ansell, 1993), which might confuse audiences who prefer a narrowly defined identity (Podolny and Barron, 1997). Alternatively, the diverse background of a producer may appeal to a range of audiences from different social backgrounds. In a creative context, the multiplicity of meanings can also result in an innovator's work being seen as richer and hence more creative. Furthermore, a cosmopolitan is seen as an "outsider" (Gouldner, 1958: 449-450; Gouldner, 1957:292) because of her ties to others outside the local community (Gouldner, 1957) or the core of a field (Dahlander and Frederiksen, 2012). As such, cosmopolitans are seen as open to new conventions and perspectives (Chua 2015). Thus, they are more likely to challenge and subvert traditional practices (Godart et al., 2015) and bring novel ideas and practices into a community (O'Mahony and Bechky 2008; Dahlander and Frederiksen 2012; Zou and Ingram 2013). In effect, the outsider identity of such producers might contribute to others' perception of them as rebels who are authentically creative. Audiences may reject or embrace such a challenging creative identity, but it is more likely to garner attention.

## **Closure and Fame**

A different set of arguments suggest the possibility that closure in the local network, rather than brokerage, may be advantageous for fame. The trust, coordination and support associated with closure positions can also help an innovator secure promotional opportunities. The shared perspective and reciprocity prevalent in a dense local network can help an innovator

access distribution platforms that require coordination and peer support (Coleman, 1988). For instance, researchers working in a common field can leverage their network to assemble a conference, which would promote their work. Distribution platforms that attract the attention of a large and interested audience can increase an innovator's fame substantially. The cooperative norms that characterize the dense local networks can help an innovator elicit the peer support and coordination vital for access to such platforms (Reagans and McEvily, 2003). In contrast an innovator with a sparse local network may not be able to achieve the cooperation and common vision required to promote her work in such distribution platforms.

A second argument in favor of closure is akin to the one underlying the process of complex contagion which governs the diffusion of phenomena like social movements, where diffusion requires the adoption of some costly behavior (Centola and Macy, 2007). A risk averse individual usually adopts such a behavior only when she learns about it from multiple peers in her local network. Adoption is more likely when the peers are themselves connected to each other. Spreading the name of a radical innovator can involve a risk to one's reputation. Learning about an innovator from multiple friends who know each other can provide the reinforcement needed to spur an alter to spread an ego's name beyond the local network.

A closure position can also shape a producer's identity in a way that helps her fame. While a producer's ties to diverse groups can result in her having a diffuse identity subject to multiple interpretations, her ties to a cohesive group can signal a well-defined identity. The ease of comprehension of such as well-defined identity increases the likelihood of her such a producer's work being consumed by a wider audience (Zuckerman et al., 2003). Moreover, if a producer's ties are to a close-knit group who forms part of the mainstream, then she is more likely to be seen as an insider. The legitimacy can help her gain attention.

Our theoretical analysis suggests that both brokerage and closure positions can help a producer's fame. In order to adjudicate between the theoretical arguments we turn to empirical analysis.

## **EMPIRICAL CONTEXT**

We examine a set of abstract artists from Europe and the U.S. who were at the forefront of the abstract art movement that began around 1900. Until then, representational art had dominated the Western fine art world. A critical criterion for evaluating a work of representational art was how accurately it depicted the real world. This began to change in the 1900s with the work of post-impressionists, Cubists, and Expressionists<sup>1</sup>. While these movements differed in their styles, they all represented a radical departure from the aesthetic of representational art. The new aesthetic paradigm, which later came to be known as abstract art, encompassed several innovations in artistic style.

The pioneers of abstraction came from several European and American cities and worked in several different styles and media. For instance, *Fountain*, an inverted urinal by French Dada artist Marcel Duchamp, destabilized the very idea of what constitutes art. Another pioneer of the abstract art movement, the Russian artist Kazimir Malevich created “a new pictorial language of geometric shapes” (Chlenova, 2012:206) with his Suprematist paintings exemplified by a black square against a white background.

Past accounts of the emergence of abstraction have often portrayed these pioneers' work as a result of individual genius and solitary epiphanies. Yet, these artists did not work in

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<sup>1</sup> While, departures from representational art can be traced back to the mid-nineteenth century, the first decade of the twentieth century marks a much a clearer break from the representational paradigm.

isolation, and the development of their paradigm was much more of a collective process than is generally acknowledged. They were connected to each other as collaborators, friends, advisors, patrons, lovers and relatives. They exchanged ideas, promoted each other's work and exhibited at salons and galleries together (Dickerman, 2012). For instance, the friendship between Marcel Duchamp, Francis Picabia and Man Ray began during this period and endured over four decades. During this period "they shared ideas and experiences, and socialized with each other and each other's partners as close friends. They played chess endlessly, and even holidayed together. They discussed what they were working on, and when apart kept in touch by letter. They exhibited together and helped each other with sales, commissions and contacts" (Mundy, 2008:11).

## **DATA**

### **Dependent Variable**

Our measure of fame is similar to past measures in that it is based on the mentions of names in a corpus. However, our measure differs from previous measures in a key respect: instead of confining the corpus to those in a specific library (Martindale, 1995) or industry journal (Giuffre, 1999), we use the Google n-gram corpus which comprises over 8 million books which represent six percent of the books ever published. Recent work has demonstrated the promise of this corpus in understanding the evolution of fame of artists (Michel et al., 2011). Using this much larger corpus allows us to measure the mentions of an innovator's name in a much larger "volume of public discourse" (van de Rijt et al., 2013:267) thereby allowing us to better measure how widely an innovator is known. Moreover, since the corpus spans multiple languages, using this measure allows us to hold constant attributes of the producers and their output while varying the features of the audience across two major, and different, art markets: France and the U.S.

In 1910-1926, France, was the center of the Western fine art world. It was the seat of art academies such as Academie des Beaux Arts, whose members were among the leading practitioners of two key representational art movements—Neoclassicism and Romanticism (Kleiner, 2013). Paris hosted numerous salon exhibitions that showcased artistic developments (Cottingham, 1998). Newspapers and art journals regularly featured these developments, which were actively debated by critics, dealers and collectors in salons and cafes (Gee, 1977).

In contrast, United States was a peripheral market; it was relatively isolated from the developments in the art world (Gee, 1977). Unlike France with its institutionalized system of salons, the United States was introduced to abstract artists ad hoc, as they happened to be discovered by individual patrons, artists and dealers, each of whom learned about abstract artists through diverse channels and experiences (Martinez, 1993).

We measure each artist's fame in this corpus by the mentions of her name which typically corresponds to a 2-gram (e.g. Fernand Leger) or a 3-gram (e.g. Morton Livingston Schamberg). The measure is standardized for the size of the corpus by dividing the count of an artist's name in the corpus by the number of 2-grams (or 3-grams) in the corpus<sup>2</sup>. We use a log-odds transformation of this fame measure, which is a proportion and follows a skewed distribution. Our results remain the same when we use the untransformed fame variable, which is a proportion, in a generalized linear model. We measure fame in 1926 (the year after our

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<sup>2</sup> Our measures of fame are based on the spellings of artists' names used by the MoMA curators. We expect these spellings to be widely used in texts discussing these artists' work but many of the artists had alternate names. In order to account for other versions of the artists' names we re-ran our analysis using the sum the of fame measures of the alternate names specified in the Library of Congress Name Authority File (LCNAF) and J. Paul Getty Trust's Union List of Artists Names (ULAN) databases. Results were consistent with those reported here.

network measures were taken) in the French and U.S. English corpus. In robustness checks of the durability of the effects we identify, we extended the measure of fame to the year 2000.

## **Independent Variables**

In collaboration with the curatorial division of the Museum of Modern Art, we identified the connections between 90 artists who were at the forefront of the abstract art movement (Figure 4).

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A connection between two artists means they knew each other either through a personal or professional relationship. Evidence for these connections comes from MoMA curators specializing in this period. The curators relied on biographies (full list available from authors) documenting the lives of these artists to construct the network. These curators, like any expert art historian, have deep expertise about the lives of artists which involves not only knowing the artists' works but also their social milieu. The curators chose a sample of artists who were the pioneers in the abstract art paradigm. The curators had selected the sample independent of and well-before knowing the goals of our study. Their goal was to highlight the pioneers of abstract art and they included artists who are now famous such as Pablo Picasso and Marcel Duchamp, as well as less known artists such as Wladyslaw Stresinski and David Bomberg. Importantly, the curators did not select artists on our dependent variable, fame.

The ties in our data were formed in the period 1910–1925. However, the data on the ties does not vary over time. Thus we construct a static network that formed over 1910–25. In



supplemental analyses, we eliminated ties to nine artists who died between 1910 and 1925. Results using that alternative representation of the network are robust to those we report below.

We operationalize our main independent variable, brokerage, by subtracting the local density of the ego network from one. Local density is the proportion of the actual number of connections between an artist's peers (alters) and the maximum possible connections between those peers (Obstfeld, 2005). A low (high) local density value means a high (low) brokerage value. We also controlled for degree centrality, which is a count of the number of network ties an artist has to other artists.

We used data on artists' national backgrounds to examine alter diversity. We measured the diversity in an artist's alters' national affiliations by the index of qualitative variation used for categorical variables (Marsden, 1987). An artist is affiliated with a country if that country was her primary place of residence. The measure is calculated as a proportion of the actual distribution of alters across the countries and maximum possible distribution of alters across the countries. If all alters belong to one country, then the index is 0 in which case ego has no diversity in her local network. If each alter belongs to a different country then the index is 1 in which case ego has maximally diverse network. We called this measure *Alter National Diversity*.

We used two measures to operationalize creativity, an expert evaluation and an original computational measure which uses image recognition algorithms. For the measure based on expert evaluation, we asked art historians to rate the average creativity of each artist's work in 1910–25 along five dimensions: *originality* (the extent to which an artist breaks from known aesthetic precedent), *uniqueness* (the extent to which an artist's work was distinct, different or

one-of-a-kind), *stylistic diversity* (the extent to which an artist worked in many different styles, media, technique etc.), *abstraction* (the extent to which an artist's work was non-figurative) and *innovativeness* (the extent to which an artist was among the first to come up with a new artistic style).<sup>3</sup> Experts were also asked to rate the overall quality of each artist's work in the 1910–25 period.

Raters were given the option to not rate an artist and briefly describe why they were not able to do so. Each creativity dimension in our survey varies along a five point scale. Two out of the four raters rated each artist on all six dimensions. We used the ratings of the two raters in our model. The inter-rater reliability score for the two raters' ratings measured by the inter-class coefficient (consistency) varied between 0.6 and 0.78. Factor analysis revealed that all six dimensions including quality load onto a single factor.

The computational measure of creativity is meant to capture the novelty of a piece of work relative to works in the representational paradigm that preceded the emergence of the abstract art movement. The measure draws on advances in computer science and machine learning. We used a machine vision algorithm<sup>4</sup>, developed by a team of computer scientists, to represent each painting as a 4096 dimensional vector of features. We applied this algorithm to each work of 75 pioneers of abstract art in our data (7113 works in all) as well as to 2000 images

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<sup>3</sup> The qualities of originality and innovativeness are frequently invoked by art historians in style analyses (Csikszentmihalyi and Getzels 1971 Simonton 1980). Abstraction was a key stylistic innovation of the art works and is therefore included here. Stylistic diversity or eclecticism is another criterion that critics and dealers use to characterize an artist's oeuvre (Gee 1977). Finally, uniqueness is regarded as an important component of creativity in cultural markets (Caves 2000). Our interview with an art historian confirmed that our dimensions were in fact applicable to the artists' creativity.

<sup>4</sup>The machine vision algorithm is based on Caffe ImageNet image recognition algorithm. The algorithm uses neural networks to learn representations of images. The algorithm was trained and refined on a set of images and then applied to the images in our data set.

of art works from the 19<sup>th</sup> century representational paradigm. We accessed these images through the art database ArtStor (the database did not have image data for 15 of the 90 artists for whom we had network data so they are excluded from analyses using the computational measure).

In order to measure the novelty of each work of abstract art, we computed the cosine distance between its feature vector and the feature vector of each of 19<sup>th</sup> century pieces of art in the data. Thereafter, we took the average of the cosine distances of a focal work of abstract art from all the 19<sup>th</sup> century works of art. The greater this distance for a focal work of abstract art, the more novel it is. For instance, the average cosine distance of the painter Vasily Kandinsky's painting, *The Birds from Xylographies*, is 0.801. In contrast, the average cosine distance of his more abstract painting, *Several Circles* is 0.869 (see Figure 5). The computational creativity score for each artist is the average of the novelty measure for all her works.

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## Control Variables

We included several artist level control variables. The data for these variables comes from the MoMA, artists' biographies, Oxford Art online and the Ngram corpus. The variables include age in 1926 (*Age1926*), gender (*Female*), initial fame in the U.S. and France (*USFrFame1910*), number of media an artist worked in (*No. of Media*), number of countries an artist worked and lived in (*No. of Countries*), number of art movements an artist belonged to between 1910-25 (*No. of Movements*), the primary media an artist worked in (*Primary Media*), the primary art movement or school an artist belonged to during 1910–25 (*Primary Movement*) and the dummy variables for artists with French (*French*) and American (*American*) nationality. Four artists in our data died while serving in the military during World War I. Dying in war could have

increased an artist's fame by making him a national hero or could have limited his fame by cutting short his artistic career. Hence we included a dummy variable for whether an artist died in the war (*Died in WWI*).

The descriptive statistics and correlation matrix for the variables is included in Table 1.

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## ANALYSIS AND RESULTS

We use ordinary least squares (OLS) regression to estimate the relationship between network variables and the log-odds transformed fame variable. Alternate models which use the untransformed fame variable and a fractional logit model, a generalized linear model using quasi-likelihood technique, yield the same results. Table 2 shows the results for the combined fame in U.S. English and French in 1926 (Models 1-6). Across all models, an artist's initial fame in 1910 is positive and significant. Model 1 is the baseline model with the control variables. Among these, age is positive and significant. Model 2 introduces the variable for degree centrality for which the coefficient is not significant. This non-result is important as it rules out a possibility that the identification of artists' network ties by MoMA curators would be biased against less famous artists. The number of network relationships the curators identified for an artist was not significantly related to the artist's subsequent fame.

Model 3 introduces the brokerage measure, which has a positive and statistically significant relationship with fame. An artist with more disconnected alters is likely to be more famous than an artist with fewer disconnected alters.

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Models 4-6 examine the mechanisms that might mediate the relationship between brokerage and fame. Model 4 includes alters' national diversity, which has a positive and significant coefficient. Using the bootstrap mediation test (Shrout and Bolger, 2002), we found that the alters' national diversity mediates the relationship between brokerage and fame. An artist in a brokerage position is likely to be connected to peers from diverse countries instead of a clique of nationally homogenous peers. The diversity mediates the relationship between brokerage position and fame. This result offers support for our argument that a broker's access to diverse alters augments her fame.

Model 5 includes the experts' estimate of the artist's creativity. Surprising to us, creativity was not significantly related to fame in any model (the sub-components of our creativity measure likewise do not have individual effects on an artists' fame). We also do not find any statistical support for creativity mediating the relationship between brokerage and fame. Importantly, our result remains the same when we re-estimated the models using the more objective computational measure of creativity on the reduced sample of artists for which that measure is calculable (Model 3a, Table 1a in Appendix).

When we enter both mechanisms—national diversity and creativity—in Model 6, national diversity remains significant. The results remain the same when we orthogonalize the brokerage variable and the variables for both mechanisms. It is worth noting that the national diversity is significant even when controlling for an artist's nationality. This indicates that the benefits associated with cosmopolitanism accrue not only to immigrants because of their ability to adapt to a foreign culture but also to native artists. We re-estimated the full model (Model 4a,

Table 1a in the appendix) using the computational measure of creativity to find that our results remain unchanged, providing further confidence in this non-result. Our conclusion is that the positive effect on fame of social structure in the form of brokerage, is mediated through compositional diversity among an artist's alters and not through the artist's creativity.

## **FURTHER ANALYSIS AND ROBUSTNESS CHECKS**

### **Sub-Market Analyses**

While the results so far presented are decisively in favor of a positive relationship between brokerage and artist's fame, our theoretical review indicated some forces that argued in favor of an advantage of closure in this context. To further investigate whether there is any evidence of a closure advantage in our data, we decomposed our fame measure into two components: U.S. fame and French fame. As we explained, France in the time we studied was a central, and highly institutionalized art market, while the U.S. was peripheral, with weakly developed institutions. The arguments for a positive relationship between social closure and fame would seem to be more relevant in the French context. For example, the cohesion associated with closed peer networks should be more valuable in the tightly managed salon system in France than in the ad hoc distribution system prevalent in the U.S. at the time of our study. Similarly, the insider status associated with closure seems more important for gaining recognition in the institutionalized system of criticism and opinion through which new art was evaluated in France.

Table 3 replicates the models in Table 2, first with U.S. fame in 1926 as the dependent variable, and then French fame (fame measures are log-odds transformed here as in Table 2).

The results from both the U.S. and France mirror each other, and are both in line with the

aggregate results from Table 2. In both instances, brokerage is associated with fame, with the effect mediated by alters' national diversity. In neither model is creativity associated with fame. These consistent results from two very different markets provide further confidence that the findings here are generalizable across art markets.

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Insert Table 3 about here  
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### **Fame Across Time**

We undertook further analysis of fame at different points in time to confirm that our results in accord with our conceptualization of fame as widespread public attention. In these analyses we found results consistent with those presented using the 1926 measure of fame: brokers were likely to be more famous and this relationship was mediated by the national diversity among an ego's alters. Table 2a in the appendix shows the results for the dependent variable of combined fame in French and U.S. English in 2000 (results for other years are available from the authors). This provides further evidence that our measure of fame is distinct from measures like visibility which is temporally limited.

### **DISCUSSION AND CONCLUSION**

What explains the fame of innovators? We found that it was not creativity *per se*, but rather the compositional diversity of their local networks, which was more likely in brokerage networks. Let's return to the historical puzzle we described in the introduction. Structural and compositional diversity can account for the disparity in the fame of the two artists, Suzanne Duchamp and Vanessa Bell. Both artists were part of influential artists' groups – Suzanne Duchamp was part of the Dada circle while Vanessa Bell was part of the Bloomsbury group. Yet

Duchamp's social circle was confined to the Dada artists; in fact, even within this circle, her closest friends were her brother Marcel, her husband Jean Crotti and the artist Francis Picabia, a family friend (Camfield, 2001: 92). In contrast, Vanessa Bell's social world encompassed the Bloomsbury group, a broad swathe of artists who were part of the London Group, collectors and patrons located outside England such as Gertrude Stein as well as theatre producers and artists associated with Sergei Diaghilev's *Les Ballet Russes* (Shone, Beechey, and Morphet, 1999). The greater diversity of Bell's social world relative to Duchamp is reflected in the measures for brokerage and compositional diversity in our data. Bell's brokerage value is 0.38 which is eighty percent higher than Duchamp's is 0.21; among the possible network ties within their respective local network, Bell has eighty percent more disconnected alter pairs than Duchamp. In terms of alter national diversity, the national diversity within Bell's alters is 0.74 of the maximum possible value of 1. This is seventeen percent higher than Duchamp's alter national diversity of 0.63. The diversity within Bell's peer network defined her cosmopolitan identity and provided access to a broader audience. In contrast, Suzanne Duchamp, while praised by critics, remained well-known to a smaller circle of peers and relatives. Thus, while the similar creativity of the artists failed to explain the difference in their fame, our structural model of fame gives us concrete insight into this difference.

Our finding that neither the expert nor computational measures of creativity mediates the link between social structure and fame highlights the powerful role of social structure in shaping fame. Our theoretical model allowed for the possibility that individual achievement, in the form of creativity, is the link between social structure and fame. Yet our results demonstrate that social structure shapes a producer's fame independent of her creativity. We see these results as related to the perception of creativity, what we have called an artist's creative identity.



Following Glaveanu and Tannggaard (2014) we looked for evidence of artists' creative identities in representations of her work in public discourse. Historical art criticism from the period reveals that cosmopolitanism and nationalism of an artist's milieu informed critics' evaluation of her creative identity. A cosmopolitan identity stemming from a diverse milieu was consonant with an artistic identity of creating art for art's sake and of estrangement from the "mainstream cultural apparatus" (Cottington, 1998:132). In contrast, a nationalist identity was more consonant with an identity of belonging to the "establishment".

The creative identity associated with an artist with diverse national alters shaped how critics, dealers, patrons and even other artists viewed the artist and her work. It was consonant with an artistic identity of being outside and opposed to the traditional representational paradigm. Such an identity helped an artist's fame in two crucial ways. First, the creative identity of the cosmopolitan artist was congruent with the aesthetic preferences of the dealers and collectors who viewed themselves as champions of an aesthetic credo which valued art for art's sake (Cottington, 1998). The dealers and collectors became particularly crucial to promoting artist's work in the early 20<sup>th</sup> century which witnessed the decline in the importance of academic salons as the key promotional venues for art work (White and White, 1993) Second, the creative identity associated with cosmopolitanism constituted a more authentic creative identity (Fine, 2003), one that signaled the independence of an artist's vision, and one that was not circumscribed by allegiance to either a traditional paradigm or a nationalistic political agenda.

Creative identity shapes a producer's access to a wide breadth of promotional opportunities. The multiplicity of meanings associated with a cosmopolitan artist's work engages the attention of a wider set of audience, each of whom can read into a producer's oeuvre a meaning that makes the work more personally resonant. Thus eliciting widespread attention

requires a rich creative identity that balances the goal of authenticity with that of appealing to wide range of audience tastes. In our study, we find that such identity and the associated fame can arise out of the compositional diversity of a producer's local network.

Our study advances recent scholarly attempts to understand the relationship between creative identity and success. We provide a concrete way to model the relationship between a producer's social context (her peer network diversity) and her creative identity in creative markets. Integrating creative identity into a model for fame can help us understand how perception translates into fame in creative markets. Recognizing that more famous producers are perceived to be creative but are not necessarily the most creative, helps us understand how creativity might be continued to be valorized in discourse but not actually rewarded.

Our study contributes to the literature on the role of networks as prisms (Podolny, 2001), by providing novel evidence for the role of networks in shaping an innovator's creative identity. Specifically, our study enriches the understanding of networks as signals not only of legitimacy (Galaskiewicz, 1985; Baum and Oliver 1991; Stuart, Hoang and Hybels, 1999) but also of a rich creative identity. The relationship between structural and compositional diversity in our study implies that prism-related effects of networks might be better understood by taking into account the compositional characteristics of the network.

Past work on information processing approach has argued that compositional diversity is beneficial because it gives access to new and diverse information and perspectives (Hoffman and Maier 1961; Gruenfeld et al., 1996; Mannix and Neale 2005). We add to this model by documenting evidence that compositional diversity is not only associated with informational advantages but also an identity—in our case, the creative identity of an artist. The lack of significance of the variables for creativity further suggests that the role of networks as prisms

might matter more than pipes for becoming famous among top members of a field: A differentiated identity arising from diverse alters is key for gaining attention not only in a crowded market but also when a producer is competing with top members of a field.

The lack of significance for both measures of creativity in our model can be understood in two ways. Our results are consistent with past sociological and social psychological work which argue that even though creativity is a cherished value, it does not necessarily translate into greater rewards (Mueller, Melwani, and Goncalo, 2012). In our case, we find that greater creativity does not translate into fame, a determinant of other forms of rewards. Research in social psychology suggests that we are likely to underestimate highly original ideas because of the cognitive difficulties in accessing attributes relevant to evaluate such ideas (Csikszentmihalyi, 1999; Licuan, Daily and Mumford, 2007). Scholars in sociology of science argue that original theories and results that depart from the existing paradigm are regarded as “anomalous discoveries” which “are usually ignored and seldom welcomed by a scientific community, which is conceived as resistant to paradigmatic shifts.” (Guetzkow, Lamont and Mallard, 2004:191). Such original theories threaten the position of the stakeholders who have invested themselves in the prevailing paradigm. These stakeholders’ resistance to paradigm shifting ideas might be reflected in their conscious or unconscious neglect of such ideas.

The lack of significance for our creativity measure also points to a more nuanced relationship between creativity and fame. Being widely known can be seen as a two stage process (Zuckerman et al., 2003): in the first stage an innovator becomes recognized as a legitimate member of the field, and then in the second stage the innovator gains widespread attention. As the leading innovators of the abstract art paradigm, the artists in our study can be regarded as top members of their field, and thus the second rather than the first stage of the

model is more applicable. Our results imply that, within this set of pioneers of a field, creativity is not a differentiator. Future studies, which include less pioneering producers can examine the first stage of the process, where we expect creativity to affect the likelihood of a producer receiving the attention necessary become legitimate member of a field. This implication suggests that a scope condition of our study is that it pertains to the leading innovators of a new paradigm. Viewing fame as a two-stage process allow us see that our results do not contradict the well-established position that network brokerage is associated with creativity in other contexts. At the same time, paradigm shifts seem particularly fertile for the cultivation of fame, so the fact that brokerage was not associated with more creative output in our context is highly relevant to our goal of contributing to a structural theory of fame.

Our results have implications for the relationship between structural and compositional diversity for producers in an external market, outside formal organizations. Evidence for the relationship between compositional and structural diversity remains mixed (Campbell, Marsden, and Hurlbert, 1986; Balkundi et al., 2007). A possible condition for a positive relationship between structural and compositional diversity might be that ties in a network are formed outside formal organizations (Zou and Ingram, 2013). When a network is formed within an organization, we might not observe a positive relationship between structural diversity and compositional diversity based on race, gender etc. because (i) organizations may attract individuals who are relatively similar along these characteristics; and/or (ii) within an organization, characteristics such as tenure, department, or functional roles, might be more salient than characteristics such as race, gender etc., and as a result the former characteristics might be more likely to influence interactions and thus shape an individual's peer network. In contrast, in a network where individuals' affiliations with formal organizations plays little or no

role in tie formation, we expect compositional diversity based on characteristics such as nationality, ethnicity or gender to be more salient and hence more important in shaping an innovator's local network.

A scope condition for the positive effect of compositional diversity on fame is our context of a creative market where innovation is a key aspect. In this context, we find that national affiliation as a salient driver of a producer's identity. This is consistent with prior work which suggests geographic origins of innovators and their innovations might be a salient lens through which audiences understand and value these innovations (Phillips, 2011). Moreover, other forms of cosmopolitanism, such as ties to peers outside one's field of specialization, also shape an individual's creative identity. In contexts where innovation is a key aspect, we can expect the cosmopolitan identity associated with compositional diversity to be interpreted positively. In non-innovation contexts, we remain agnostic about the benefits of a cosmopolitan identity. At the same time, we expect compositional diversity to be associated with access to information to disseminate one's name, and this benefit may be less dependent on an innovation context. Thus the relationship between compositional diversity and fame will depend on the context and how benefits (and costs) of compositional diversity balance out.

The mechanisms in our study suggest that as a construct, fame might crucially hinge on an individual's access to diverse dissemination opportunities and an identity which differentiates her. Thus, our arguments and propositions can be meaningfully applied to other non-innovation contexts such as the social structure and fame of CEOs, social activists, organizations and brand labels. For instance, future studies can examine whether a social activist who protests with peers from social movements with diverse platforms or protest tactics is more likely to attract broader

media attention. Similarly, future studies can examine if founders of start-ups with ties to peers from diverse industries and countries is likely garner more widespread media attention.

CEOs, activists, scientists and innovators all benefit from fame. Meanwhile, the struggle for fame is becoming ever more intense and complex in a digital economy. This is particularly true of industries where actors experience high variance and mobility in their careers. Such variance and mobility characterize an increasing number of industries. As such, it is imperative to understand what factors shape fame. Our study sheds light on a pivotal factor, social structure, and the associated implications for a producer's identity, creativity and access to promotional opportunities.

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**Table 1: Descriptive Statistics and Correlations**

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. CombinedFame1926	-33.17	2.06	1.00																				
2. CombinedFame1910	-45.43	2.01	0.54	1.00																			
3. USFame1926	-34.08	2.04	0.98	0.55	1.00																		
4. USFame1910	-47.00	1.93	0.50	0.93	0.51	1.00																	
5. FrenchFame1926	-41.45	2.14	0.69	0.49	0.65	0.42	1.00																
6. FrenchFame1910	-51.52	1.71	0.41	0.70	0.41	0.57	0.49	1.00															
7. Combined Fame 2000	-20.16	1.04	0.34	0.27	0.33	0.25	0.35	0.22	1.00														
8. Age1926	42.47	0.91	0.34	0.33	0.36	0.32	0.26	0.22	0.32	1.00													
9. Female	0.14	0.04	-0.17	-0.19	-0.16	-0.16	-0.19	-0.21	-0.34	-0.23	1.00												
10. Died in WWI	0.04	0.02	0.17	0.17	0.16	0.18	0.14	0.16	0.08	-0.02	-0.09	1.00											
11. No. of Media	1.60	0.07	-0.20	-0.21	-0.21	-0.19	-0.09	-0.19	0.07	-0.15	0.06	-0.12	1.00										
12. No. of Countries	1.64	0.06	0.11	-0.01	0.14	-0.06	0.09	-0.02	0.20	-0.02	-0.13	-0.05	0.01	1.00									
13. Media	1.78	0.20	0.03	-0.03	0.04	0.02	0.03	0.10	0.04	0.00	0.02	-0.12	0.18	-0.03	1.00								
14. Primary Movement	5.18	0.34	0.00	-0.03	0.03	0.01	-0.20	-0.23	-0.20	0.03	0.15	-0.14	-0.15	0.06	0.06	1.00							
15. No. of Movements	1.42	0.11	0.11	-0.05	0.11	0.00	0.13	0.00	0.22	-0.01	0.02	0.07	0.22	0.16	-0.31	-0.37	1.00						
16. American	0.13	0.04	0.16	0.04	0.17	0.08	-0.10	-0.12	-0.06	0.05	-0.07	-0.08	-0.16	-0.04	-0.11	0.39	-0.07	1.00					
17. French	0.10	0.03	0.27	0.22	0.26	0.23	0.31	0.29	0.13	0.04	-0.03	0.11	-0.14	0.01	0.02	0.00	0.08	-0.13	1.00				
18. Creativity	-0.02	0.10	0.28	0.20	0.29	0.20	0.31	0.23	0.22	0.18	-0.16	-0.02	0.09	0.15	-0.19	-0.21	0.46	-0.08	0.09	1.00			
19. Degree Centrality	0.15	0.01	0.16	0.08	0.14	0.02	0.30	0.21	0.23	0.08	-0.06	0.02	0.20	0.15	-0.23	-0.36	0.55	-0.20	0.21	0.46	1.00		
20. Brokerage	0.38	0.02	0.44	0.25	0.43	0.23	0.44	0.31	0.38	0.10	-0.14	0.09	0.14	0.28	-0.11	-0.06	0.40	0.06	0.29	0.38	0.63	1.00	
21. Alter National																							
Diversity	0.63	0.03	0.48	0.26	0.47	0.23	0.48	0.16	0.41	0.06	-0.06	0.13	0.06	0.21	-0.02	0.03	0.16	-0.02	0.16	0.24	0.30	0.58	1.00

**Table 2**  
**Regression Models of Artist Fame in 1926**

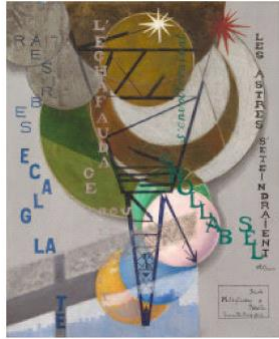
	<u>Fame in 1926</u>					
	(1)	(2)	(3)	(4)	(5)	(6)
Age1926	0.396*	0.380*	0.387*	0.405**	0.363*	0.384*
	(0.213)	(0.215)	(0.206)	(0.196)	(0.206)	(0.197)
Female	-0.411	-0.358	0.760	0.315	1.510	0.967
	(5.155)	(5.167)	(4.971)	(4.741)	(4.990)	(4.770)
Combined Fame1910	0.424***	0.417***	0.352***	0.311***	0.331***	0.294***
	(0.099)	(0.099)	(0.098)	(0.095)	(0.099)	(0.096)
Died in WWI	8.962	9.485	6.854	4.925	7.926	5.888
	(8.512)	(8.554)	(8.257)	(7.899)	(8.273)	(7.935)
No. of Media	-2.706	-3.086	-4.216	-4.316	-4.268	-4.358
	(2.898)	(2.941)	(2.850)	(2.717)	(2.840)	(2.713)
No. of Countries	3.760	3.487	1.521	0.947	1.391	0.850
	(3.007)	(3.031)	(2.992)	(2.859)	(2.983)	(2.856)
Primary Media	1.452	1.579	1.317	1.249	1.386	1.310
	(0.999)	(1.013)	(0.976)	(0.931)	(0.974)	(0.931)
Primary Movement	-0.161	-0.072	-0.383	-0.519	-0.392	-0.523
	(0.638)	(0.649)	(0.632)	(0.604)	(0.630)	(0.603)
No. of Movements	3.010	2.331	1.544	1.704	0.775	1.043
	(2.020)	(2.187)	(2.116)	(2.018)	(2.198)	(2.102)
American	10.555*	11.007*	7.536	9.204*	8.008	9.565*
	(5.646)	(5.685)	(5.593)	(5.362)	(5.586)	(5.364)
French	10.027*	9.001	5.785	6.634	6.089	6.873
	(5.925)	(6.068)	(5.933)	(5.664)	(5.917)	(5.659)
Degree Centrality		22.848	-27.423	-22.718	-33.391	-27.932
		(27.870)	(32.272)	(30.806)	(32.513)	(31.116)
Brokerage			32.415***	15.720	31.530***	15.383
			(11.663)	(12.486)	(11.643)	(12.471)
Alter National Diversity				22.459***		21.897***
				(7.645)		(7.650)
Creativity					2.564	2.190
					(2.062)	(1.974)
Constant	-41.351***	-42.961***	-42.313***	-51.826***	-39.885***	-49.515***
	(13.868)	(14.035)	(13.461)	(13.235)	(13.555)	(13.378)
Observations	90	90	90	90	90	90
R <sup>2</sup>	0.422	0.427	0.480	0.533	0.490	0.541
Adjusted R <sup>2</sup>	0.340	0.337	0.390	0.446	0.395	0.448
<i>Note:</i>				*p<0.1; **p<0.05; ***p<0.01		

**Table 3**  
**Separate Analyses of U.S. and French Fame in 1926**

	<u><b>U.S. Fame1926</b></u>				<u><b>French Fame 1926</b></u>			
	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Age1926	0.456** (0.204)	0.466** (0.196)	0.428** (0.204)	0.441** (0.196)	0.394* (0.230)	0.350* (0.209)	0.328 (0.224)	0.324 (0.211)
Female	1.069 (4.961)	0.664 (4.751)	1.932 (4.963)	1.427 (4.765)	-2.088 (5.683)	-1.386 (5.178)	-0.003 (5.523)	-0.788 (5.207)
USFame1910	0.320*** (0.101)	0.291*** (0.097)	0.293*** (0.102)	0.268*** (0.098)				
FrenchFame1910					0.443*** (0.133)	0.332** (0.128)	0.286** (0.138)	0.308** (0.130)
Died in WWI	7.862 (8.254)	5.987 (7.928)	9.185 (8.247)	7.198 (7.946)	5.577 (9.400)	0.782 (8.637)	5.181 (9.146)	1.707 (8.679)
No. of Media	-5.247* (2.780)	-5.371** (2.662)	-5.349* (2.762)	-5.455** (2.650)	-0.217 (3.226)	-2.093 (3.007)	-2.280 (3.194)	-2.219 (3.008)
No. of Countries	2.539 (2.990)	1.917 (2.871)	2.318 (2.973)	1.746 (2.860)	3.240 (3.322)	0.200 (3.110)	0.758 (3.296)	0.062 (3.112)
Primary Media	1.379 (0.972)	1.348 (0.931)	1.484 (0.968)	1.440 (0.929)	0.413 (1.121)	0.455 (1.032)	0.706 (1.098)	0.547 (1.035)
Primary Movement	-0.208 (0.625)	-0.315 (0.600)	-0.208 (0.621)	-0.311 (0.597)	-0.583 (0.665)	-1.028 (0.645)	-1.006 (0.685)	-1.041 (0.645)
American	6.649 (5.478)	8.126 (5.269)	7.146 (5.450)	8.509 (5.253)				
French					12.124* (6.625)	8.497 (6.161)	8.689 (6.543)	8.748 (6.162)
No. of Movements	1.206 (2.098)	1.473 (2.010)	0.384 (2.160)	0.750 (2.076)	1.598 (2.226)	-0.101 (2.217)	-1.461 (2.447)	-0.791 (2.314)
Degree Centrality	-19.386 (32.428)	-15.127 (31.078)	-26.924 (32.621)	-21.817 (31.356)		-2.398 (33.096)	-13.787 (35.481)	-7.673 (33.468)
Brokerage	33.462*** (11.455)	17.464 (12.332)	32.696*** (11.388)	17.326 (12.276)		10.281 (13.609)	31.357** (12.749)	10.461 (13.603)
Alter National Diversity		21.606*** (7.622)		20.894*** (7.606)		28.097*** (8.285)		27.210*** (8.325)
Creativity			2.973 (2.057)	2.583 (1.979)			2.993 (2.302)	2.261 (2.180)
Constant	-48.636*** (13.526)	-57.137*** (13.291)	-46.009*** (13.554)	-54.574*** (13.374)	-41.481*** (15.407)	-53.515*** (14.390)	-43.247*** (15.245)	-51.161*** (14.561)
Observations	90	90	90	90	90	90	90	90
R <sup>2</sup>	0.463	0.514	0.477	0.525	0.327	0.469	0.402	0.477
Adjusted R <sup>2</sup>	0.379	0.431	0.388	0.436	0.241	0.378	0.300	0.379
<i>Note:</i>					*p<0.1; **p<0.05; ***p<0.01			



**Figure 1: Two Early 20<sup>th</sup>-Century Abstract Artists Suzanne Duchamp and Vanessa Bell, their art work and biographical details**



**Broken and Restored  
Multiplication  
(1919)**



**Marcel Duchamp's  
Unhappy Readymade  
(1920)**



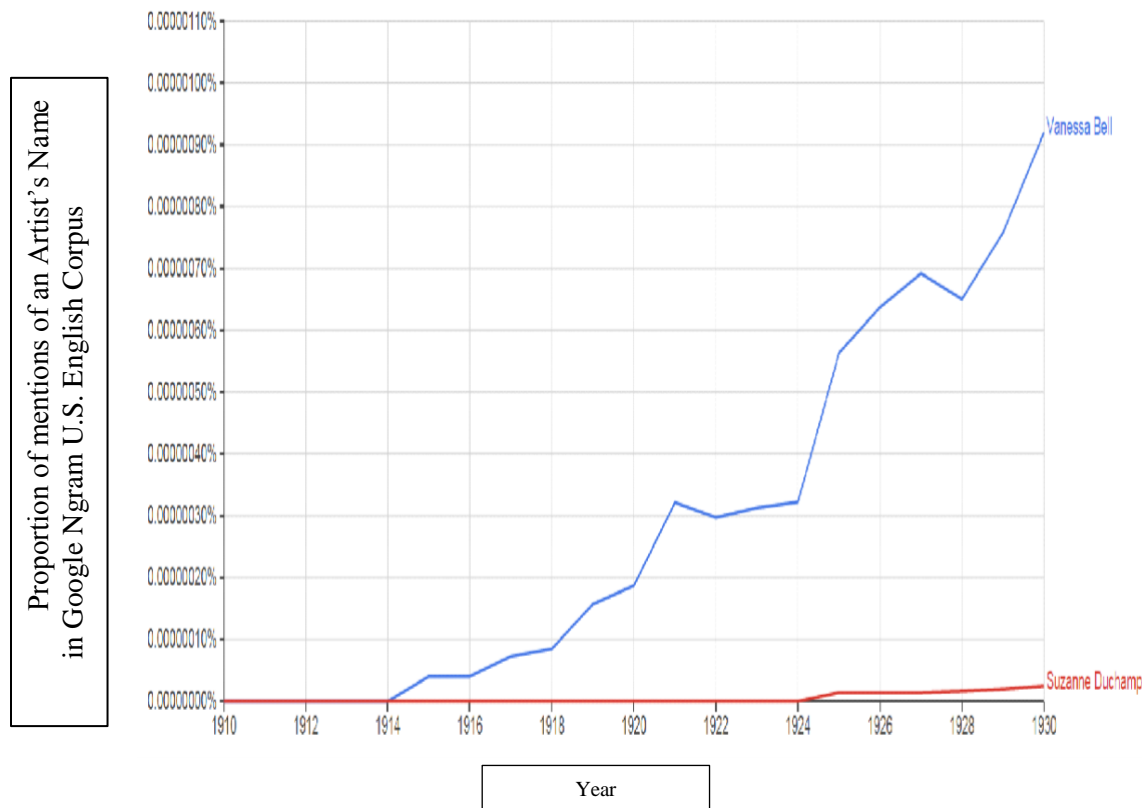
**Abstract Painting  
(1914)**



**Still Life on  
Corner of a Mantelpiece  
(1914)**

	<b>Suzanne Duchamp</b>	<b>Vanessa Bell</b>
<b>Born</b>	1889	1879
<b>Nationality</b>	French	British
<b>Primary Media</b>	Painting	Painting
<b>Formal Training</b>	École des Beaux-Arts	Royal Academy of Art

**Figure 2: Fame of two artists Suzanne Duchamp and Vanessa Bell as measured in the Google N-Gram U.S. English corpus**



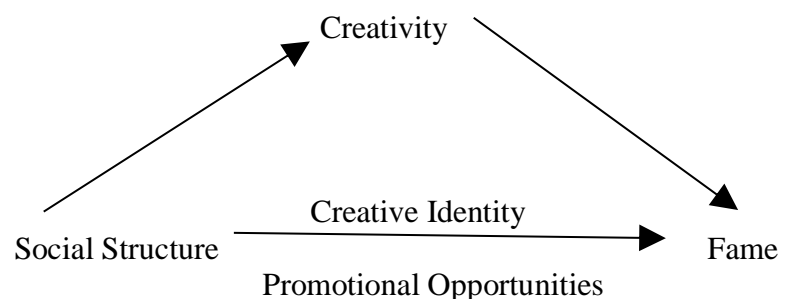
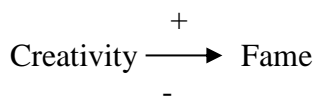
**Figure 3: How our social structural theory of fame departs from past work on fame and creativity**

**Past work on fame in creative market.**

- (i) It has taken an atomistic view and focused on individual creativity as a driver of fame.
- (ii) The evidence for this relationship has been mixed.

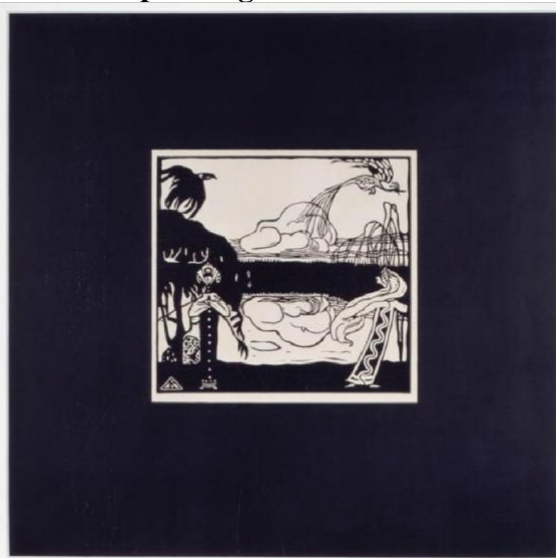
**Our social structural model of fame.**

- (i) Creativity is one of the three channels through which social structure shapes fame.
- (ii) The other two channels are creative identity and promotional opportunities





**Figure 5: Novelty scores (measured by cosine distance) of two paintings using an image recognition algorithm to represent the paintings.**



The Birds from Xylographies (1909) by Vasily Kandinsky  
Cosine distance from 19<sup>th</sup> Century Art = 0.801



Several Circles (1926) by Vasily Kandinsky  
cosine distance from 19<sup>th</sup> century art works = 0.869

# APPENDIX

**Table 1a: Models of Combined Fame Re-estimated for sub-sample of Visual Artists With Computational Model of Creativity Based on the Artists' Paintings**

	<b>Fame 1926</b>			
	(1a)	(2a)	(3a)	(4a)
Age1926	0.375 (0.231)	0.345 (0.224)	0.384* (0.230)	0.354 (0.224)
Female	-8.245 (6.117)	-8.504 (5.934)	-7.243 (6.141)	-7.744 (5.995)
Fame1910	0.282** (0.114)	0.258** (0.111)	0.271** (0.114)	0.252** (0.112)
Died in WWI	5.842 (9.837)	5.223 (9.544)	6.126 (9.793)	5.478 (9.558)
No. of Media	-1.912 (3.079)	-2.248 (2.990)	-2.387 (3.088)	-2.576 (3.013)
No. of Countries	-1.854 (3.566)	-1.898 (3.459)	-1.123 (3.597)	-1.353 (3.511)
Primary Media	1.104 (1.208)	1.240 (1.173)	1.473 (1.238)	1.503 (1.207)
Primary Movement	-1.219 (0.736)	-1.281* (0.714)	-1.274* (0.733)	-1.317* (0.716)
No. of Movements	2.294 (2.317)	2.501 (2.249)	1.911 (2.326)	2.202 (2.274)
American	11.540* (5.956)	13.173** (5.824)	11.537* (5.928)	13.055** (5.832)
French	9.522 (6.981)	8.472 (6.787)	9.587 (6.948)	8.595 (6.796)
Degree Centrality	-61.329 (40.493)	-47.953 (39.745)	-58.243 (40.379)	-46.625 (39.812)
Brokerage	45.965*** (13.283)	29.709* (14.872)	43.848*** (13.329)	29.304* (14.894)
Alter National Diversity		19.299** (8.820)		17.920** (8.951)
Computational Measure of Creativity			14.621 (11.682)	10.816 (11.552)
Constant	-41.439*** (15.542)	-48.732*** (15.437)	-53.664*** (18.294)	-57.254*** (17.935)
Observations	74	74	74	74
R <sup>2</sup>	0.513	0.550	0.526	0.557
Adjusted R <sup>2</sup>	0.408	0.443	0.413	0.442
Note: * p<0.1; ** p<0.05; *** p<0.01				

**Table 2a: Models showing our social structural variable of brokerage and compositional diversity continue to be positively associated with fame in the year 2000**

	<b>Fame 2000</b>			
	(5a)	(6a)	(7a)	(8a)
Age1926	0.261** (0.117)	0.270** (0.113)	0.265** (0.118)	0.275** (0.115)
Female	-5.709** (2.827)	-5.924** (2.739)	-5.829** (2.865)	-6.102** (2.773)
Combined Fame1910	0.058 (0.056)	0.039 (0.055)	0.062 (0.057)	0.043 (0.056)
Died in WWI	0.645 (4.696)	-0.290 (4.563)	0.473 (4.750)	-0.553 (4.613)
No. of Media	0.953 (1.621)	0.904 (1.569)	0.961 (1.630)	0.916 (1.577)
No. of Countries	1.762 (1.702)	1.484 (1.651)	1.782 (1.713)	1.510 (1.660)
Primary Media	0.453 (0.555)	0.420 (0.538)	0.442 (0.559)	0.403 (0.541)
Primary Movement	-0.411 (0.360)	-0.477 (0.349)	-0.410 (0.362)	-0.476 (0.351)
No. of Movements	1.199 (1.204)	1.277 (1.166)	1.323 (1.262)	1.458 (1.222)
American	-1.174 (3.181)	-0.366 (3.097)	-1.249 (3.207)	-0.465 (3.118)
French	0.641 (3.375)	1.052 (3.272)	0.592 (3.397)	0.987 (3.290)
Degree Centrality	-16.007 (18.355)	-13.727 (17.796)	-15.052 (18.667)	-12.301 (18.090)
Brokerage	13.542** (6.633)	5.454 (7.213)	13.683** (6.684)	5.546 (7.250)
Alter National Diversity		10.881** (4.416)		11.034** (4.448)
Creativity			-0.410 (1.184)	-0.599 (1.148)
Constant	-35.349*** (7.656)	-39.958*** (7.645)	-35.737*** (7.782)	-40.590*** (7.778)
Observations	90	90	90	90
R <sup>2</sup>	0.341	0.391	0.342	0.393
Adjusted R <sup>2</sup>	0.229	0.277	0.220	0.270
Note:	*p<0.1; **p<0.05; ***p<0.01			